



# Section 3

## **Clinical uses of massage**

This page intentionally left blank

# Relaxation massage

## CHAPTER CONTENTS

<b>Stress</b> . . . . .	<b>201</b>
<b>Anxiety and depression</b> . . . . .	<b>202</b>
<b>Group therapy</b> . . . . .	<b>205</b>
<b>Other uses of relaxation massage</b> . . . . .	<b>205</b>
<b>The research</b> . . . . .	<b>205</b>
<b>Forms of sedative massage</b> . . . . .	<b>207</b>

## Stress

The autonomic nervous system (ANS) was discussed in Chapter 3 in connection with the reflex effects of massage. That discussion is extended here, applied specifically to stress and autonomic arousal. The relevant function of the ANS to relaxation massage is that when an individual experiences severe fear or pain, or has a strong emotional reaction, the hypothalamus is stimulated to transmit impulses to the spinal cord which cause a sympathetic discharge, resulting in the alarm response, or general adaptation syndrome (Seyle 1982) (Fig. 10.1). This is the protective mechanism which prepares an animal or human for 'flight or fight', to ensure that, whichever of these actions is chosen, the animal is physiologically prepared for vigorous activity. The changes include an increase in blood levels of glucose, cortisol, adrenaline (epinephrine) and noradrenaline (norepinephrine), and an increase in blood pressure, blood flow to skeletal muscles, muscle tone and heart rate—the sympathetic stress response (Figs. 10.2 and 10.3).

In Chapter 3 the concept of a stressor was briefly examined in relation to various types of touch and other stimulation via the sense organs. A stressor acts

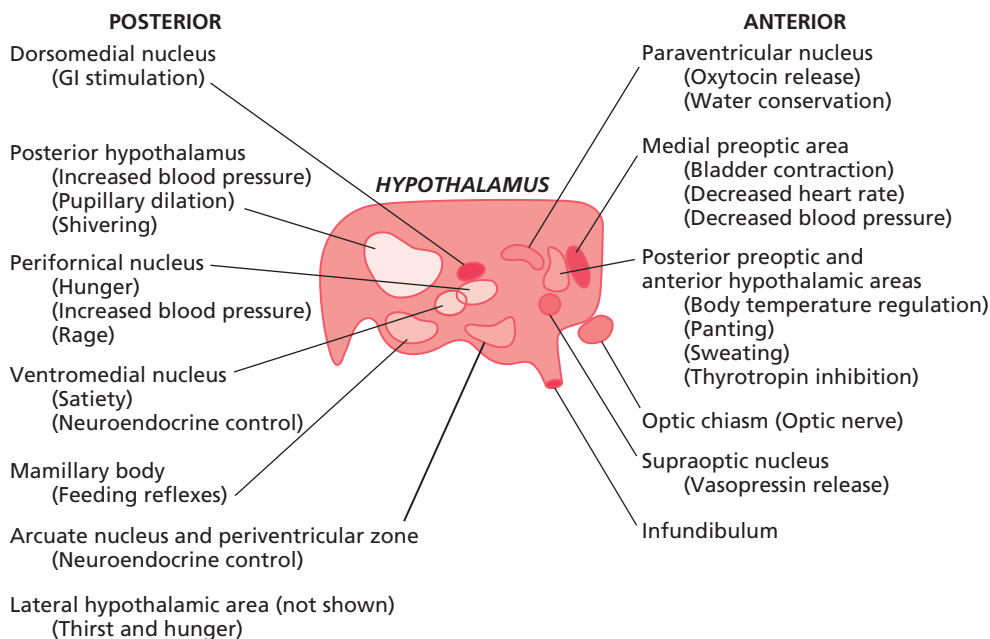
to arouse the sympathetic branch of the ANS; massage is frequently used to achieve the opposite effect, the aim being to provoke a decrease of activity in the sympathetic branch and an increase of activity in the parasympathetic branch of the ANS, thus returning the body to a normal balance.

Arousal is the result of an individual's personal response to any stimulus perceived as a threat. *Clinical stress* may occur if the arousal persists and the individual develops feelings of being unable to cope; thus, stress can be viewed as a form of chronic arousal. Prolonged stress may result in raised levels of cortisol, which can have further harmful effects, such as decreased immunity and hypertension. Unrelenting stress is undesirable for the human organism. To maintain health there must be a reversal of the arousal and a return to a normal baseline state of homeostasis (Table 10.1).

Some people with clinical stress initially require pharmacological intervention, but longer term therapies focus principally on developing coping strategies which may be in the form of:

- Cognitive approaches;
- Behavioural methods; and
- Body awareness techniques.

Therapists who work in mental health care find that massage is a useful component when teaching body awareness techniques; this is often the first stage of physical treatment which attempts to reverse the musculoskeletal aspects of stress, such as muscle tension. Massage is not used in isolation but as an integral part of the rehabilitation programme; it may enhance relaxation and also promote integration of the physical senses.



**Figure 10.1 • Control centres of the hypothalamus.** Reprinted from *Textbook of Medical Physiology 8e*, Guyton (1991) with permission from Elsevier.

Outside the orthodox health care setting, people often seek massage for ‘stress’, which has become a common term used to describe feelings of fatigue, tension and general weariness brought on by, for example, overwork, lack of sleep and worry. This condition is clearly to be differentiated from clinical stress, but massage is an appropriate prophylaxis if used in conjunction with exercise and other activities which promote physical and mental well being.

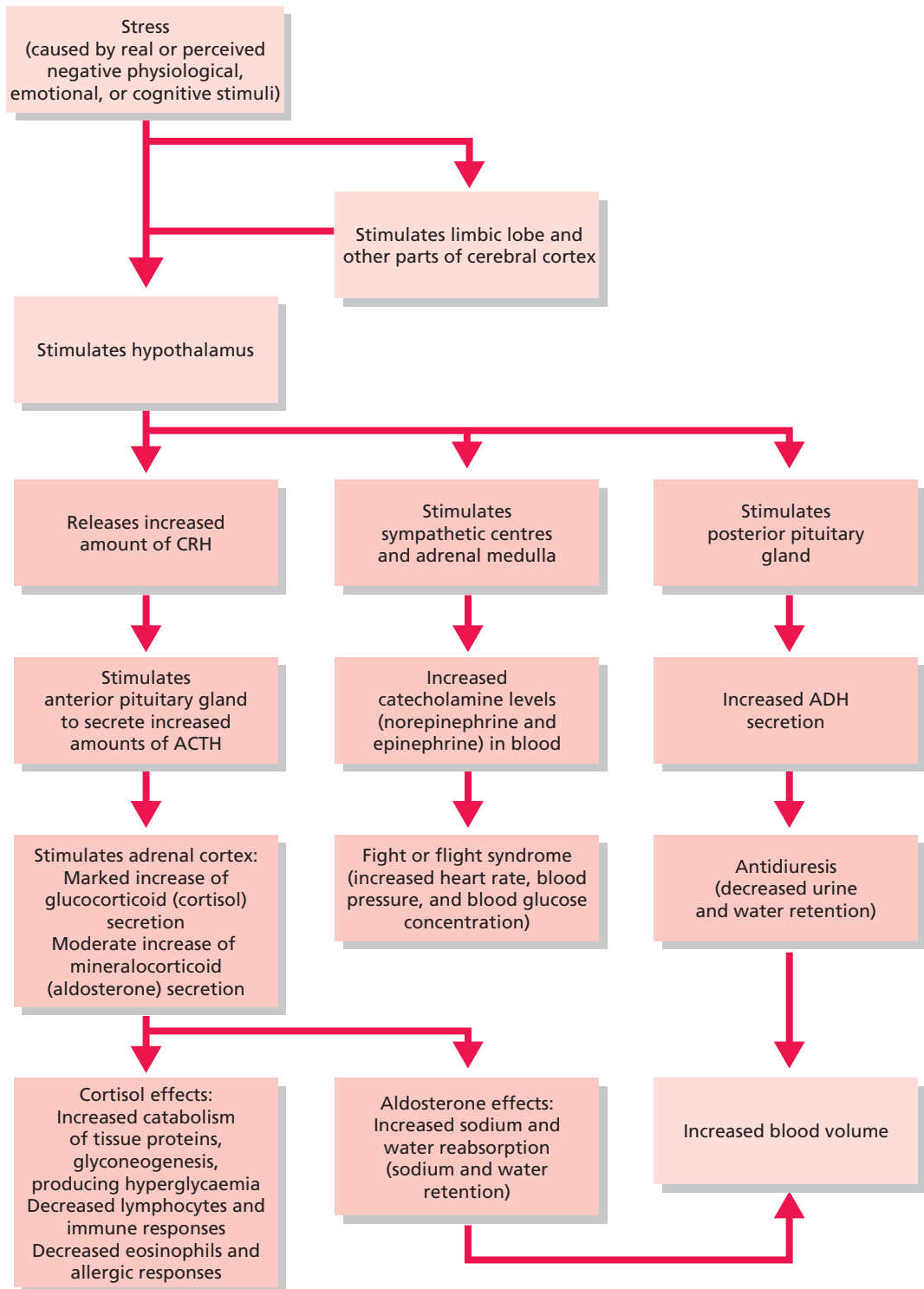
## Anxiety and depression

Feeling anxious or depressed is a normal response to harrowing life events such as bereavement, loss of a job or financial difficulties. In healthy people these feelings reduce as the person adapts to the situation, uses coping strategies and returns to a state of mental well being. Anxiety and depression become mental disorders when the feelings are prolonged and constant.

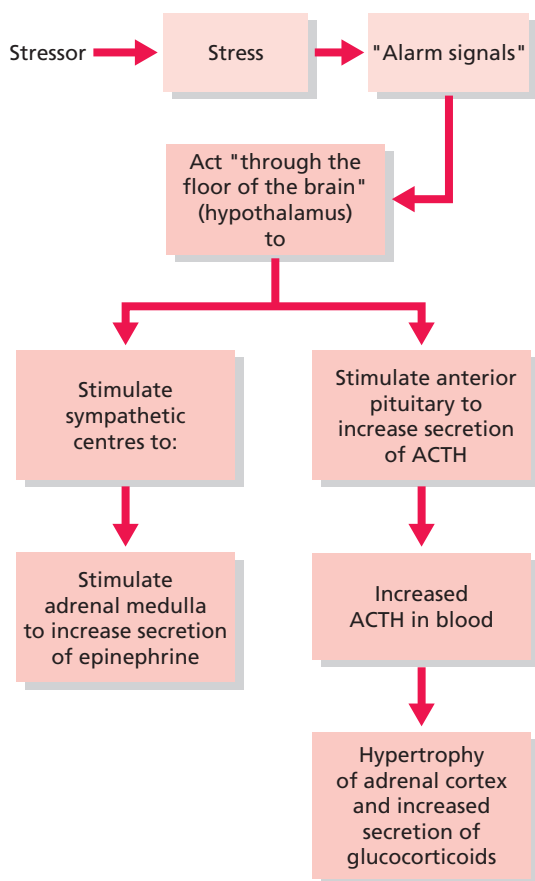
In *anxiety* states people may experience irrational fears concerning everyday activities or the carrying out of normal routine tasks. They may exhibit physical symptoms consistent with increased sympathetic nervous system activity, such as muscle tension, palpitations, sweating and insomnia. Training in relaxation should be a component of anxiety management

for these patients, and for many individuals massage will be a valuable prelude to this. Most patients with anxiety states have forgotten how it feels to be physically relaxed and massage is valuable in preparing these people for subsequent self-relaxation techniques.

A *depressed* patient will express profound sadness and social withdrawal; other symptoms may include impaired concentration, loss of interest in life, emotional lability, eating disorders, fatigue, irritability, insomnia, early morning waking and suicidal thoughts. Treatment is often long term and complex. Antidepressant medication is commonly prescribed together with occupational, physical and psychotherapy. Initially a patient with depression may be more comfortable with a passive type of treatment. Some depressed patients will also have symptoms of anxiety and for these people a sedative massage is appropriate but, to reduce the risk of therapy dependence developing, the therapist may encourage the individual to learn self-massage or self-acupressure as a component of a relaxation strategy. Dependence is less likely to result if it is explained that any passive treatment administered by the therapist is a preliminary to the patient being taught how to massage him- or herself or to start active exercises. This explanation will also help to prevent any feelings of rejection when the massage treatment comes to an end.



**Figure 10.2 • Current concepts of the stress syndrome.** Reprinted from *Anatomy and Physiology 6e*, Thibodeau & Patton (2007) with permission from Elsevier.



**Figure 10.3 • Seyle's hypothesis about activation of the stress mechanism.** Reprinted from *Anatomy and Physiology 6e*, Thibodeau & Patton (2007) with permission from Elsevier.

Many patients with chronic stress, anxiety or depression will also exhibit dysfunctional posture and movement patterns. This reflects the effect of the psyche on physical function and exemplifies non-verbal communication of the emotions of an individual. These dysfunctions signal the need for body awareness training, the object of which is to create the conditions necessary for a patient to begin to integrate sensory information, thus becoming more aware of posture and movement. For these patients massage may be the chosen treatment to help reduce muscle tone and to facilitate physical activities. It may also be of benefit by prompting the patient to connect with pleasant physical sensations, thereby promoting a positive body image and, ultimately, helping to restore self-esteem.

Massage may be the only regular experience of caring touch for a large proportion of the population. Sedative massage is used frequently as a treatment by

**Table 10.1 Stress-related diseases and conditions**

Target organ or system	Disease or condition
Cardiovascular system	Coronary artery disease Hypertension Stroke Disturbances of heart rhythm
Muscles	Tension headaches Muscle contraction backache
Connective tissues	Rheumatoid arthritis (autoimmune disease) Related inflammatory diseases of connective tissue
Pulmonary system	Asthma (hypersensitivity reaction) Hay fever (hypersensitivity reaction)
Immune system	Immunosuppression or immune deficiency Autoimmune diseases
Gastrointestinal system	Ulcer Irritable bowel syndrome Diarrhoea Nausea and vomiting Ulcerative colitis
Genitourinary system	Diuresis Impotence (erectile dysfunction) Frigidity
Skin	Eczema Neurodermatitis Acne
Endocrine system	Diabetes mellitus Amenorrhoea
Central nervous system	Fatigue and lethargy Type A behaviour Overeating Depression Insomnia

*From Anatomy and Physiology 6e, Thibodeau & Patton (2007), Elsevier.*

therapists, particularly nurses, for those who are tactually deprived. This client group is largely found among elderly people being cared for within institutions, the terminally ill and the chronically sick. The importance of massage to these groups is that, in its absence, they may experience not only tactual deprivation but also sensory deprivation, as the opportunities for normal sensory input are not currently a

feature of many hospitals and other residential care environments. The massage session also provides an opportunity to establish an effective therapeutic relationship by enhancing the rapport between patient and therapist.

## Group therapy

This approach to treatment works well with groups of clients who are survivors of abuse, provided an experienced therapist supervises and counselling is available should the need arise. Mutual support groups for carers may also benefit from learning how to give relaxation massage to each other; carers are often tense and so benefit from relaxation techniques and caring touch.

Massage can be used as a means of promoting trust and cohesion within the group. Hand or foot massage should be demonstrated by the therapist and, under her supervision, massage can be given and received by group members. Even individuals who initially are tactually defensive may be drawn into this activity when they recognise the benefit that other members derive from the massage. Members of such a group tend to become enthusiastic learners. Inevitably the activity leads to questions from individuals about the benefit of massage, which presents an opportunity for the therapist to discuss topics of health education.

## Other uses of relaxation massage

A further area for the use of sedative massage is as a prophylaxis against musculoskeletal dysfunction secondary to occupational stresses. Many workers sit, stand or move in ways that engender pathologically increased tone in some muscle groups. A classic example is the computer operator who frequently has increased tone in the upper back and neck muscles, as a result of prolonged static contraction of these muscle groups. The condition may go undetected until the therapist begins to massage the involved muscles, which are often painful. Once an employee is alerted to the potential problems he/she should be advised on how to work with ergonomic efficiency, to take regular breaks and to maintain good posture. Intervention at an early stage may help to avoid chronic muscle tension, muscle imbalance, adverse neural tension and postural dysfunction.

Although we have discussed in this section specific groups of people who are likely to benefit from

massage as a relaxation therapy, there is no intention to suggest that the therapy should be confined to those with specific medical disorders. A large section of society chooses to have massage for the pleasurable experience and the positive psychological feelings of health it can give. Many people are now taking responsibility in promoting their own health and engaging in illness prevention. They are turning to various complementary therapies which they believe give them some control over their own health care. A growing fitness and leisure industry promotes activities that encourage an increasing number of people to become actively involved in maintaining a healthy lifestyle. Receiving regular massage is often a part of that endeavour.

## The research

Several studies have explored the link between massage, autonomic effects and/or perceived levels of anxiety (Table 10.2). While some of the studies have shown significant changes of indices of autonomic activity, self-reported anxiety, or both, others present conflicting results, making interpretation of the studies as a whole difficult. Many of the studies have methodological and statistical limitations, and demonstrate potential internal bias. There are differences in sample sizes, populations, types of massage employed, time scales and number of massages. Some are pilot studies carried out to ascertain the relevance of massage to a particular profession working with a certain client group, and as such the results cannot be generalised. Despite these deficiencies it is possible to draw some inferences from the studies viewed as a whole. It is clear, for example, that studies which used a population who were residing in potentially stressful circumstances or with disease states (as opposed to a normal population) show results that appear to be more consistent, even when a widely different methodology was employed.

Two of the studies, those of [Fakouri and Jones \(1987\)](#) and [Meek \(1993\)](#), show consistent results, suggesting a decrease in autonomic arousal. However, the one measurement that shows consistent results across the studies in which it was employed is that of the State-Trait Anxiety Inventory, suggesting that this is a more predictable indicator of anxiety than the more traditionally used physiological measurements of autonomic arousal. The importance of the studies, taken as a whole, is that there appears to be no clear link between autonomic arousal and

**Table 10.2 Table of studies which have examined the link between massage and ANS sympathetic activity and anxiety**

Reference	Subjects and controls	Intervention, length and no.	Results for massage groups
Barr & Taslitz (1970)	<i>n</i> = 10; F; healthy; 19–21 yrs; own control	'Conventional' back massage, 'frictions' on sacrum; 20 min × 3	SBP & DBP; ↓; delayed effects: SBP↑; DBP↓; HR↑; GSR↓; BT↑; PD↑; RR↓
Longworth (1982)	<i>n</i> = 32; F; healthy; 19–52 yrs; own control	SSBM; 9 min × 1	STAI↓; HR↑; EMG↓; delayed effects: SBP↑; GSR↑
Bauer & Dracup (1987)	<i>n</i> = 25; 18 M, 7 F; 37–76 yrs; acute myocardial infarction; no control	SSBM; 6 min × 1	No changes in physiological indicators; subjective reports of relaxation
Fakouri & Jones (1987)	<i>n</i> = 18; 4 M, 14 F; 56–96 yrs; in nursing care; no control	SSBM; 3 min × 3	SBP↓; DBP↓; delayed effects: HR↓; ST↓; subjective reports of relaxation
Field et al (1993)	<i>n</i> = 72; 40 M, 32 F; 7–18 yrs; adjustment disorder and depression; massage group + control group	SSBM; 30 min × 5	Depressed subjects: STAI↓; urine cortisol; urine noradrenaline (norepinephrine)↓ Both subjects: POMS; observed behavioural arousal↓
Meek (1993)	<i>n</i> = 30; 16 M, 14 F; 50–90 yrs; terminally ill; no control	SSBM; 3 min × 2	HR↓; SBP↓; DBP↓; ST↑
Fraser & Ross Kerr (1993)	<i>n</i> = 21; 4 M, 17 F; 601 yrs; in residential care; massage group + 2 controls	SSBM; 5 min × 4	SBP↓; STAI↓; delayed effects: EMG↓; HR↑; DBP no change Subjective reports of relaxation
Ferrell-Tory & Glick (1993)	<i>n</i> = 9; M; 23–77 yrs; patients with cancer pain; no control	Effleurage and petrissage to back and feet, myofascial trigger point therapy for 30 min, then SSBM 3 min × 2	Pain (VAS)↓; relaxation (VAS)↓; STAI↓; HR↓; RR↓; SBP↓; DBP↑
Groer et al (1994)	<i>n</i> = 32; 10 M, 22 F; 44–77 yrs; healthy; massage group + control group	Nursing back rub, 10 min × 1	STAI↓; s-IgA↓
Field et al (1998)	<i>n</i> = 28; debridement of burns patients; control	Stroking to six body regions, 20 min × 7	STAI↓; BOS improved; saliva cortisol↓; HR↓; POMS↓
Hernandez-Reif et al (2000)	<i>n</i> = 30; hypertensive adults; control	Massage therapy, 30 min × 10	DBP↓; urinary cortisol↓; salivary cortisol↓; reports of anxiety, depression, hostility↓
Kim et al (2001)	<i>n</i> = 59; cataract surgery patients; control	Hand massage	Anxiety (VAS)↓; SBP↓; DBP↓; HR↓; adrenaline (epinephrine)↓; noradrenaline (norepinephrine)↓

Trends as well as results with statistical significance have been included.

**Key:** M, male; F, female; SSBM, slow-stroke back massage; SBP, systolic blood pressure; DBP, diastolic blood pressure; HR, heart rate; RR, respiratory rate; ST, skin temperature; GSR, galvanic skin resistance; EMG, electromyograph; STAI, State-Trait Anxiety Inventory; POMS, profile of mood states; VAS, visual analogue scale; s-IgA, salivary secretory immunoglobulin A; BOS, behaviour observation scale; PD, pupil diameter; BT, body temperature.



self-reported anxiety. The assumption that there is a correlation between autonomic arousal and perceived anxiety needs to be reappraised since, in the light of these studies, the link appears to be tenuous.

The results suggest that the hypotheses of future studies of this genre would be better tested by the employment of psychological measurements. A paradigm shift may be necessary to ensure that what is being tested is *clinical effectiveness*, which is defined as ‘the scientifically proven usefulness of a treatment in alleviating symptoms or combating disease’ (Ernst & Fialka 1994). Research in this area has traditionally focused on physiological effects, rather than clinical effectiveness. As it is widely accepted, in the present context, that massage is used as a coping mechanism and not a cure, physiological measures will not translate as showing clinical effectiveness. Weze et al (2007) demonstrated statistically significant improvement in self-reported stress, anxiety and depression following four 1-hour sessions of static touch. It is evident that further randomised longitudinal field studies capable of measuring self-reported anxiety and any consequent changes in behaviour and function are needed.

## Forms of sedative massage

A *full body massage* will usually take from 45 to 90 minutes, depending on the time available, the variety of strokes used and regions of the body that may require extra attention. When increased muscular tone is found, the therapist may spend more time working in this region until a decrease in tone is achieved. Alternatively, it can occasionally be advantageous to continue with the full body massage and then return to troublesome areas, which may then be found to have reduced in tone. It is unlikely that very ill patients would tolerate a full body massage. With the very ill it is advisable to concentrate on one area, such as the back, the neck and shoulders, or the face. In addition, many therapists working in a health care environment are so constrained by time that a full body massage is not possible. It is suggested that a *3-minute slow-stroke back massage* may prove effective in these circumstances (Fakouri & Jones 1987, Labyak & Metzger 1997, Meek 1993). If possible, the patient should lie prone. The therapist, using both hands, should use reciprocal strokes bilaterally over the posterior rami from the occiput to the sacrum in slow and rhythmical movements.

The starting point for the full body massage can be variable and is best decided upon by the preferences of the client and therapist. At the first massage the client may prefer to start in the prone position with the therapist beginning work on the back; for anyone who is anxious or ill at ease, this is the least threatening position.

When giving a relaxation massage the strokes should be light but firm, care being taken not to be so light as to stimulate rather than sedate. The therapist must be calm and avoid giving the impression that she is in a hurry—if the therapist is not feeling relaxed, then neither will the patient. Appropriate music may be played if the patient finds it soothing.

The lubricant may be applied by superficial stroking of the body region to be massaged; for a sedative massage it is acceptable to use slightly more than the normal quantity of oil as traction of the skin is unnecessary and undesirable. Essential oils may be used for their therapeutic properties and to enhance the pleasurable qualities of the massage (see Chapter 7).

Box 10.1 presents a suggested sequence for a full body sedative massage in the absence of complicating factors. The depth of pressure should be light to moderate and the strokes should be made slowly and rhythmically.

### Box 10.1

#### Full body sedative massage

##### Positioning of the patient

- Lying prone on a treatment couch, pillows underneath the abdomen and ankles.

##### Sequence of massage and manipulations

Begin all the regions by stroking:

- The back: effleurage, light palmar and finger kneading, effleurage, transverse stroking, effleurage.
- The back of the legs: effleurage, light kneading, effleurage.

The patient turns to supine, pillows under the head and knees:

- The front of the legs: effleurage, light kneading, effleurage.
- The arms: effleurage, light kneading, effleurage.
- The abdomen: effleurage, transverse stroking, effleurage.
- The chest, shoulders and neck: effleurage, light finger kneading, effleurage.
- The face: effleurage, light finger kneading, plucking, effleurage.

## References

- Barr, J.S., Taslitz, N., 1970. The influence of back massage on autonomic functions. *Phys. Ther.* 50 (12), 1679–1691.
- Bauer, W.C., Dracup, K.A., 1987. Physiological effects of back massage in patients with acute myocardial infarction. *Focus Crit. Care* 14 (6), 42–46.
- Ernst, E., Fialka, V., 1994. The clinical effectiveness of massage therapy: a critical review. *Forsch. Komplementarmed.* 1 (5), 226–232.
- Fakouri, C., Jones, P., 1987. Relaxation treatment: slow stroke back rub. *J. Gerontol. Nurs.* 13 (2), 32–35.
- Ferrell-Tory, A.T., Glick, O.J., 1993. The use of therapeutic massage as a nursing intervention to modify anxiety and the perception of cancer pain. *Cancer Nurs.* 16 (2), 93–101.
- Field, T., Morrow, C., Valdeon, C., et al., 1993. Massage reduces anxiety in child and adolescent psychiatric patients. *International Journal of Alternative and Complementary Medicine* (July), 125–131.
- Field, T., Peck, M., Krugman, S., et al., 1998. Burn injuries benefit from massage therapy. *J. Burn Care Rehabil.* 19 (3), 241–244.
- Fraser, J., Kerr, J.R., 1993. Psychophysiological effects of back massage on elderly institutionalized patients. *J. Adv. Nurs.* 18, 238–245.
- Groer, M., Mozingo, J., Droppleman, P., 1994. Measures of salivary secretory immunoglobulin A and state anxiety after a nursing back rub. *Appl. Nurs. Res.* 7 (1), 2–6.
- Guyton, A.C., Hall, J.E., 2006. *Textbook of medical physiology*, eleventh ed. Elsevier Saunders, Philadelphia.
- Hernandez-Reif, M., Field, T., Krasnegor, J., et al., 2000. High blood pressure and associated symptoms were reduced by massage therapy. *J. Bodyw. Mov. Ther.* 4 (1), 31–38.
- Kim, M.S., Cho, K.S., Woo, H., Kim, J. H., 2001. Effects of hand massage on anxiety in cataract surgery using local anesthesia. *J. Cataract Refract. Surg.* 27 (6), 884–890.
- Labyak, S.E., Metzger, B.L., 1997. The effects of effleurage backrub on the physiological components of relaxation: a meta-analysis. *Nurs. Res.* 46 (1), 59–62.
- Longworth, J.C.D., 1982. Psychophysiological effects of slow stroke back massage in normo-tensive females. *ANS Adv. Nurs. Sci.* 6, 44–61.
- Meek, S.S., 1993. Effects of slow stroke back massage on relaxation in hospice clients. *J. Nurs. Scholarsh.* 25 (1), 17–21.
- Seyle, H., 1982. History and present status of the stress concept. In: Goldberger, L., Breznitz, S. (Eds.), *Handbook of stress: theoretical and clinical aspects*. Macmillan, New York.
- Thibodeau, G.A., Patton, K.T., 2007. *Anatomy and physiology*, sixth ed. Mosby Elsevier, St Louis.
- Weze, C., Leathard, H.L., Grange, J., et al., 2007. Healing by gentle touch ameliorates stress and other symptoms in people suffering with mental health disorders or psychological stress. *Evidence Based Complementary and Alternative Medicine* 4 (1), 115–123.

# Massage for people with long-term and terminal illness

## CHAPTER CONTENTS

<b>Massage for people with cancer</b> . . . . .	<b>209</b>
<b>Massage for lymphostatic oedema</b> . . . . .	<b>213</b>
<b>Technique: manual lymphatic drainage</b> . . .	<b>216</b>
<b>Massage in HIV/AIDS</b> . . . . .	<b>219</b>

Long-term conditions present specific problems and therefore require that health care workers take an appropriate approach. Patterns of progression may differ and these conditions may be chronic but stable, or may deteriorate, as, for example, in motor neurone disease. Alternatively they may exacerbate and remit, as with multiple sclerosis, for example. In terminal illnesses, progress may be either slow or rapid from the time of diagnosis.

Common to all these conditions is distress, fear, stress, unavoidable symptoms and a severe disruption of lifestyle. In all cases, health care workers should emphasise the maintenance of quality of life (QoL) for these patients, reducing stress and supporting the patients by equipping them with coping strategies. If cure is not an option, then acceptance and learning how to cope and maintain independence are the challenges facing patients and their carers. Carers are an integral part of the process and helping the patient to maintain close supportive relationships is important.

Although the difficulties and emotional trauma must not be minimised in any way (these diagnoses are clearly devastating and the trauma not fully appreciated by anyone without personal experience), care should be directed towards assisting patients and those close to them through this time in shared experience, rather than feeling they are under an

impossible burden. Thus, goals are not focused on cure or passive receipt of care but on patient-led strategies and therapies which respect and involve their personally identified unit of significant others.

Massage can be used to:

- Reduce pain;
- Reduce oedema;
- Reduce musculoskeletal symptoms;
- Reduce muscle tone;
- Desensitise hypersensitive skin;
- Reduce stress;
- Reduce anxiety;
- Alleviate constipation;
- Help prevent pressure sores;
- Improve body image;
- Enhance coping strategies;
- Promote relaxation and well being; and
- Facilitate communication and intimacy.

Massage may therefore be an obvious choice as a useful and often powerful tool when working with this client group, as it can help in the ways listed above. It should be stressed, however, that the problems faced by this client group are complex—massage by itself cannot achieve these effects but it can make an important contribution to all of them.

## Massage for people with cancer

Patients with cancer often endure a long period of anxiety and uncertainty as they wait for diagnosis, medical test results, unpleasant drug treatments, sometimes disfiguring surgery and new prognoses.

Their physical fight against the disease may be accompanied by emotions such as denial, fear, anxiety, sorrow and loss. They may have to let go of work, leisure pursuits and loved ones at the same time as they endure pain and sometimes disablement. A stress management programme incorporating health education, muscle relaxation and massage has been found to be helpful in reducing stress in people with cancer (Lin et al 1998). A systematic review conducted by Fellowes et al (2004) concluded that short-term benefits may be conferred by massage and aromatherapy on psychological well being, and possibly anxiety, but evidence is mixed. A later review by Wilkinson et al (2008) concluded that further well-designed and large trials were necessary to draw firm conclusions in relation to massage in cancer management. Billhult et al (2008) found that, in a sample of 22 women with breast cancer who were undergoing radiotherapy, effleurage massage had no effect on circulating lymphocytes, or the degree of anxiety, depression or QoL. The radiation department as the study environment may have influenced these results.

Modern medicine can sometimes cure cancer and can offer considerable relief from symptoms. This section relates more specifically to the terminally ill patient who may be at home, in hospital or in a hospice. Massage has been found to be beneficial in reducing perceptions of distress, fatigue, nausea and state anxiety in cancer patients undergoing autologous bone marrow transplant (Ahles et al 1999). A randomised controlled clinical trial, which was conducted within a hospice, examined the effects of massage on cancer pain intensity, prescribed intramuscular morphine equivalent doses (IMMEQ), hospital admissions and QoL. Pain intensity was significantly reduced after the massage and current QoL scores were significantly higher in the massage group. IMMEQ doses were comparable in the massage and control group, as were hospital admissions (Wilkie et al 2000). These two studies underscore the benefit of massage in both hospital and hospice environments with patients at different stages of disease.

Relationships with carers are crucial at this stage, as they offer love, support and intimacy to the patient. It is important, then, that therapeutic intervention helps to strengthen relationships rather than disrupt them. Touch can be a strong need of the cancer sufferer, who may have lowered self-esteem, particularly if disfiguring surgery has been necessary. Touch may also be important for carers, as something

they can give to the patient, 'something to offer' that is positive and therapeutic, enabling them to take an active role rather than one of passive observation which can lead to feelings of helplessness and uselessness. It has positive benefits as a supportive care intervention (Hughes et al 2008) and can be applied safely (Corbin 2005). If a carer wishes to learn massage a good starting point would be for the therapist to instruct him/her in how to give a foot massage. There is evidence that a 10-minute foot massage (5 minutes each foot) can have a significant effect on perceptions of pain, nausea and relaxation (Stephenson et al 2000). A further study has examined the effects of foot reflexology on anxiety and pain in patients with breast or lung cancer who were on a medical/ oncology ward. All the patients treated with massage experienced a significant decrease in anxiety and patients with breast cancer showed a significant decrease in pain (Stephenson et al 2000).

Touch can also help to restore intimacy, which may be lost due to fear of hurting the patient, or because of separation through periods of medical treatment. Touch itself, as well as massage, may have immediate beneficial effects on pain and mood (Kutner et al 2008), so the deprivation of touch may be very significant. The therapist must work with those close to the patient, and must sometimes relinquish her role and pass it on to the carer. Carers may also be stressed and in need of massage themselves, in which case 'time out' should be encouraged. Another option is reciprocal massage, between patient and carer, which may facilitate communication and intimacy. It can be a non-strenuous but fulfilling form of sensuality. It may restore the early experiences in a relationship—exploration, physical awareness and gentle, sensitive responses to each other's needs. Scented oils and music may enhance the experience. The advice and support of the therapist may facilitate this activity. The relaxation effects of massage can also aid in reducing sleep disturbance (Richards 1998).

McCaffery and Wolf (1992) suggest that massage is especially helpful when the patient is confined to bed (either because of specific treatment or the terminal stage) and lies supine much of the time, as it improves circulation to the skin and reduces skin breakdown. This can enhance nursing strategies to reduce pressure sores such as turning and positioning regimens. Care should be taken if the skin has become reddened, as this can indicate that there is tissue breakdown underneath the skin, and manipulation of skin may worsen the situation.

Modifications usually make a treatment possible and it is always worth pursuing, as a study with female cancer patients showed that massage gave them ‘meaningful relief from suffering’ (Billhult & Dahlberg 2001).

Patients should be respected as individuals and encouraged to direct the best time for the massage and how long it should last, and to decide whether the massage should be conducted in silence or whether it offers a welcome opportunity for talking, either general discussion or expression of feelings. The areas to be massaged may be modified by the presence of any open lesions. The hands and feet may be good options if accessibility to other parts of the body is limited by surgical wounds, drips or drains. These areas are often acceptable to the individual who does not welcome further personal intimacy. The addition of an essential oil to the lubricant may enhance the effects of massage. Wilkinson et al (1999) found that the addition of Roman chamomile essential oil to a carrier oil enhanced the therapeutic effects of reduced anxiety and improved overall QoL. A follow-up RCT study of 288 cancer sufferers found no long-term benefit on anxiety or depression, but a clinically important benefit up to 2 weeks after the intervention (Wilkinson et al 2007).

### Is massage a safe intervention for people with cancer?

Early writers on massage placed little emphasis on cancer as a contraindication to massage. It was not listed by Goodall-Copestake (1926) or Tidy (1932), although this omission could indicate the scant attention the disease received generally in physiotherapy texts. Hollis (1987) gives tumour as a contraindication and Tappan (1988) lists melanoma, as this type of cancer metastasises easily through lymphatic and blood vessels. In its traditional use, within orthodox medical care, massage has previously been regarded as being contraindicated for patients with active malignant disease.

Physiotherapists, by taking a detailed medical history and having access to patients’ medical records, have avoided techniques that might increase local metabolic rate or blood flow in the vicinity of active disease. This statement needs some clarification, as massage has been used to reduce local symptoms, or to aid relaxation in the terminally ill patient, when emphasis is on comfort rather than cure. Massage has also proved useful, for example, in spinal cancer

which has produced uncomfortable sensory changes such as hyperaesthesia. This can be sufficiently severe to make touch uncomfortable to the point where washing becomes distressing. Gentle rhythmic stroking can prove useful for desensitising the skin, and the use of warm water for massaging the skin gently (via gentle movements in a hydrotherapy pool, for example) may be helpful. Heavier stroking can be used as a counterirritant, acting through the pain gate to reduce pain. Also, after radical mastectomy for example, patients can be given or taught oedema massage for the arm following removal of the lymph glands. Effleurage was formerly the main treatment of choice; it has now largely been superseded by the more superficially applied manual lymphatic drainage. Traditionally, however, massage has been taboo in the earlier active stages of the disease, but acceptable at the later and terminal stages.

Of course, patients with cancer have the right to treatment of other injuries and physical problems unrelated to the cancer. They also have the right to support for symptoms of stress, and help with coping mechanisms. Thus, as long as the tissues are not actively manipulated over any active disease site, an increase in lymphatic and venous flow is avoided in patients with melanoma or Hodgkin’s disease and the lymph nodes are not directly stimulated mechanically, then massage can be a useful adjunct to other therapies. Stationary and light pressure techniques are probably the safest (holding, therapeutic touch, acupressure, for example); the more superficial techniques—as used in gentle stroking, whole body sedative massage or through an oily medium—would be the next treatment of choice from a safety viewpoint. It is unlikely that these techniques would be physiologically more stimulating than everyday activities such as walking or housework. Hadfield (2001) used aromatherapy massage in patients with a primary malignant brain tumour who were attending their first follow-up appointment after radiotherapy. There was a statistically significant reduction in four physical parameters of the autonomic nervous system (ANS) which suggested a relaxation response.

In relation to drug therapy, it has been suggested that massage may increase the rate at which chemotherapeutic agents flow around the body when administered into the bloodstream, that it increases the rate at which drugs enter the bloodstream when administered by other means and that the dosage should be reduced accordingly (McNamara 1994). However, this has not yet been substantiated experimentally. Also, it has been suggested that massage

increases the rate at which chemotherapy and its toxins will be lost from the body, although it should be recognised that we have insufficient experimental evidence to support these suppositions. Of course, as in all conditions, techniques and approaches should be modified to match the stage of disease.

Another pertinent study was undertaken by McNamara (1994). She sent out questionnaires to 24 volunteer massage practitioners and asked for their views and knowledge on the use of massage for people with cancer. The main findings in relation to dangers and contraindications were that practitioners had often been taught or had read that massage was contraindicated in the earlier stages of the disease but not in the terminal stages. There was obviously some concern about the lack of research evidence to support or refute this suggestion, but massage was generally being offered to people with cancer.

An *absolute contraindication* for massage is undiagnosed cancer. It is important that the massage therapist is alert to the possibility and that any patient experiencing symptoms which may relate to a serious condition should be urged to seek advice from a doctor immediately. Look for:

- Intractable pain—no relief on rest, significantly disturbed sleep (this may indicate inflammatory or malignant disease);
- Feeling of being generally unwell;
- Change in temperature;
- Inflammation and heat in the absence of trauma;
- Unexplained weight change; and
- Any lump bigger than 5 cm, especially if it is a recurrence of a previous lump or is deeper than fascia or is increasing in size (Grimer & Dalloway 1995).

Within the physiotherapy profession there has been a long tradition of concern about the safety of massage for patients with cancer. Its unwritten nature leaves an apparent controversy in this area, which has prompted research in the subject (McNamara 1994). The consensus is that massage is *not* acceptable if:

- The cancer is metastasising;
- The cancer is active;
- The massage is in the region of a contained tumour;
- Cancer is undiagnosed; and
- The therapist is not sensitive to any fragile areas of bone.

Generally, massage is considered quite appropriate for use in the terminal stages of the disease.

If a therapist is unsure of any of these factors and is unable to receive specific guidance from the patient's doctor, then she should err on the side of caution.

If in doubt, *stationary holding* or *therapeutic touch techniques* can be used as there is no evidence to suggest that these are unsafe in any circumstances.

Gentle stroking, a back rub, foot massage or whole body massage are techniques of choice for relaxation.

Heavier *stroking* or *classical Swedish massage techniques* can be used to influence the pain gate or to have a counterirritant effect to relieve pain.

The reflex techniques of *acupressure* may be preferred, to promote relaxation or for their balancing effect to strengthen immunity and improve general health.

Massage should be modified to match the medical condition and desires of the individual patient, and the type of massage and structure of the sessions negotiated beforehand. Essential oils may be found to be pleasant, or they may worsen nausea. If tolerated, specific oils, such as rosemary, can be applied as a shampoo to the head or as a massage oil, to stimulate hair growth following chemotherapy. If applied in excess, however, it may cause convulsions and fitting, so the therapist should be cautious. Massage may be preferred for a whole hour or may be tolerated only for short periods of time.

Tyler and colleagues (1990) demonstrated that the 1-minute back rub (a traditional nursing procedure) showed no statistically significant worsening of mixed venous oxygen saturation and heart rate levels when applied to 173 patients in receipt of critical care. This suggests that massage is safe even in critically ill patients, though the considerable variability shown reinforces the principle of close monitoring of physiological responses in this client group. Dunn et al (1995) also found that massage and aromatherapy with lavender oil did not adversely affect vital signs in patients being nursed on an intensive care unit. Stress or coping measures were not altered to statistically significant levels post-massage, or aromatherapy, or rest; but aromatherapy significantly improved mood and decreased anxiety levels.

## Oedema in oncology

A specific use of massage is in the treatment of oedema. Hydrostatic oedema may result from the pressure of a malignant growth, whereas lymphoedema may be caused by the removal of lymph glands during cancer surgery or their obliteration

by radiotherapy or tumour mass, and may occur in Kaposi's sarcoma, associated with human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS). This oedema is protein rich and must therefore be removed by the lymphatic system.

To summarise, the principles of treating *hydrostatic oedema* are to clear proximal areas first; thence to direct strokes from distal to proximal; increase pressure in the tissue spaces; and supplement massage by elevation of the limb, compression and circulatory exercises. The principles of *lymphoedema* treatment are that massage is light in order that lymph vessels, which are placed superficially in the tissues, are stimulated; healthy glands are stimulated first, before clearing trunkal areas; swelling is then drained into these cleared areas before being moved towards healthy glands; and massage is accompanied by compression bandages, exercises and benzopyrone therapy for maximum effect. Manual lymphatic drainage (MLD) is the technique of choice for lymphoedema. The selection of strokes includes stationary circles, light effleurage, pump technique, scoop technique and rotary technique, which can be applied with a little oil. The effectiveness of this regimen in the treatment of lymphoedema has been demonstrated by Bunce et al (1994), who studied 25 women referred for post-mastectomy lymphoedema treatment. Massage (Foldi MLD), pneumatic compression, compression bandaging and exercises were undertaken for 3 hours daily, 5 days per week for 4 weeks. The length of time since mastectomy was found not to affect the results. After the intensive phase of treatment, there was a mean reduction in excess volume of the affected limb of 40%. At 12 months, the affected limbs were no more than 5% larger than the unaffected limbs. The results in this well-designed study were statistically significant.

## Massage for lymphostatic oedema

Lymphoedema is swelling due to an abnormality in the lymphatic system, often occurring in one limb. It is classified according to cause.

### Primary lymphoedema

#### *Dysplasia*

Aplastic: no vessels

Hypoplastic: few vessels

Hyperplastic: incompetent valves (Kinmonth 1982).

*Congenital dysplasia*: occurs at birth (Turner's syndrome, Nonne-Milroy-Meige disease).

*Lymphoedema praecox*: develops in late puberty.

*Lymphoedema tarda*: apparent later in life.

## Secondary lymphoedema

*Parasitic lymphoedema* is caused by filarial parasites, transmitted through mosquito bites. The parasites block the lymphatics causing massive oedema and large skin vesicles, when it is often called elephantiasis.

*Iatrogenic lymphoedema* results from surgical removal or radiotherapeutic destruction of the glands in the treatment of cancer.

Additionally, *obliterative lymphangitis* can occur secondary to deep vein thrombosis, *trauma* can damage vessels or glands, and *kinetic insufficiency* can occur in paralysis.

Lymphoedema is also classified according to severity (Casley-Smith & Casley-Smith 1992, Foldi 1994):

*Grade 1*: Pitting oedema which reduces on elevation.

*Grade 2*: No pitting or reduction on elevation; fibrosclerosis, which may feel hard; skin changes.

*Grade 3*: Elephantiasis.

Traditional techniques for the removal of excess tissue fluid, such as deep massage, electrical stimulation under pressure, compression devices and muscle pump exercises, have been used with variable results in this condition. The current treatment of choice is a regimen termed complex physical therapy (CPT) or complex decongestive physical therapy (CDP), which is time-consuming and therefore costly, but which achieves excellent results. An integral part of the regimen is the specialised massage technique of MLD, which was originally developed by Vodder (1936) and has since been modified by Leduc (Leduc et al 1981) and Foldi (1994) (see also Chapter 9).

MLD is thought to be preferable to other forms of massage in the treatment of lymphoedema as it is based on the anatomy and physiology of the lymphatic system and deeper forms of massage are thought to damage the lymphatics. Rapid massage at a pressure of 70–100 mmHg has been found to create artificial cracks in lymphatic vessel walls, loosen subcutaneous tissue, form large tissue channels and

release lipid droplets (Eliska & Eliskova 1995). The massage in this study, however, was particularly vigorous.

## Manual lymphatic drainage

### Aims

To stimulate lymphatic drainage (Fig. 11.1) and to clear proximal lymphotomes (adjacent areas of the trunk).

To promote movement of lymph across lymphatic watersheds.

To open up superficial collateral lymphatic vessels.

To facilitate lymph removal by opening up the flaps in the vessel walls.

To stretch and assist in the reabsorption of fibrous tissue.

### Principles

Lymphatic oedema cannot be removed via the bloodstream as it is protein-filled. The plasma proteins are

too large to be reabsorbed through blood vessels, so must be removed via lymph channels. If the lymphatic system is poor, the proteins will increase the colloid osmotic pressure in the tissue spaces, drawing fluid out of the bloodstream. This results in massive oedema. Fibrin is formed which traps the swelling, and the cells are separated from their source of nutrition. The skin becomes hard and altered in quality. Compressive techniques do not open the flaps in the walls of lymphatic vessels, to allow fluid in. Massage should therefore gently move the skin, opening the flaps in the superficial vessels and have a pumping effect on the deeper vessels. It should also bypass the damaged vessels and facilitate removal across the lymphatic watersheds. Massage should be given for 1 hour daily. It should not be undertaken in the presence of untreated acute infection (cellulitis) and reddening of the skin must be avoided, as histamine is thought to increase oedema (Kurz 1989, 1990).

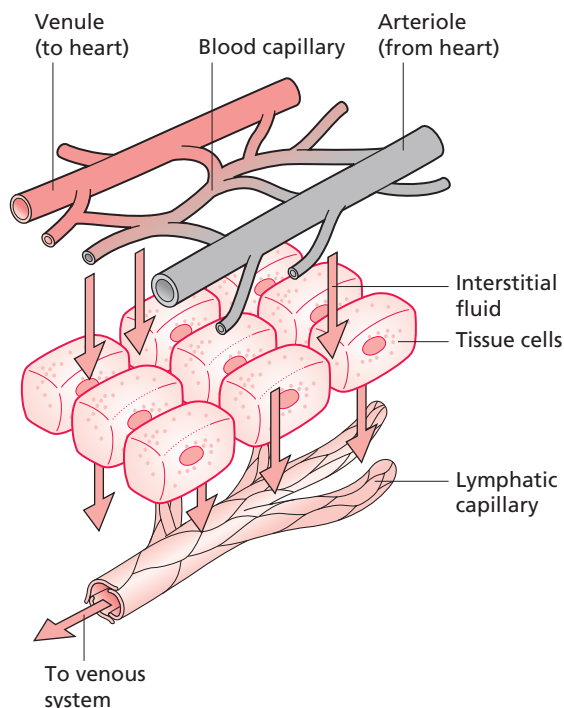
### Media

A small amount of oil should be used, but not enough to cause a gliding over the skin.

### Strokes

- Stationary circles;
- Light effleurage;
- Pump technique;
- Scoop technique; and
- Rotary technique.

Treatment should start in the left supraclavicular space, to drain the ductus thoracicus followed by clearance of the adjacent lymph gland area (axilla or groin) (Kurz 1989, 1990). If the lymph glands are removed or damaged, the strokes should sweep across to the glands on the opposite aspect of the body. For example, if the oedema is in the arm and the axillary glands have been removed during mastectomy, the massage should continue to the opposite axilla. In severe cases it may be necessary to clear the opposite side of the trunk and adjacent quadrants on the opposite side of the trunk before moving towards the affected limb. Once the starting point has been decided, the areas of treatment must progress by clearing proximal areas before distal. The massage cannot continue across a scar: it should progress on the opposite aspect of the body.



**Figure 11.1 • The lymphatics in fluid balance.**

Reprinted from *Anatomy and Physiology 6e*, Thibodeau & Patton (2007) with permission from Elsevier.



## Self-care

The patient should be advised that MLD is only one component of a complex programme of treatment. Treatment is much more effective if the patient conscientiously follows the regimen of prescribed benzopyrones (a form of vitamin P which causes resorption of the tissue proteins), pressure garments, measured to a precise fit and worn 24 hours a day, and skin care. Mechanical pumps may occasionally be used in secondary lymphoedema under supervision, but should be used judiciously. If used in primary oedema, they merely shunt the swelling to a proximal area, for example the genital region. They can also result in the formation of a fibrous band around the top of the limb, which reduces the effectiveness of other treatments.

When severe, the fluid can sometimes be felt to ripple in the tissues under the therapist's hand. Aching within the trunk, for example over the thoracic spine area, often reduces as the swelling reduces.

Progress can be monitored by measuring the girth along a limb, every 10 cm, with a tape measure. The volume of the limb is then calculated by dividing the limb into four, then adding the volumes of each segment using the formula for a cylinder ( $\text{volume} = \pi (\text{circumference}/2\pi) 2h$ , where circumference is the mean of adjacent circumferences and  $h$  is 100 mm).

## Effectiveness of massage in oedema

Some time-consuming techniques have been described here. Just how effective is massage in oedema? Ladd et al (1952) examined the effects of massage on lymph flow. They cannulated the lymph channel in the neck of 17 dogs and collected lymph in a test tube during an experimental procedure. The nearest limb of each dog was put through a routine of massage, passive movement and electrical stimulation interspersed with 10 minutes' rest, the whole cycle being repeated between two and four times and rotated in order between dogs. The massage was a modified Hoffa-type routine of stroking, effleurage, petrissage and Hoffa frictions, and it was found to raise lymph flow to significant levels above those found in the other techniques. Passive movements worked better than electrical stimulation. Of further interest was the finding that, in one dog which shivered, lymph flow was as good as when massaged. This mirrors the findings of Wakim and co-workers (1949) that blood flow is increased more by active movement than passive movement or massage, suggesting that in normal healthy individuals

massage is not required to improve certain physiological parameters. This does not, of course, negate its use for psychological or musculoskeletal benefits.

In 1990, a study was conducted in which Mortimer et al measured skin lymph flow by an isotope clearance technique in anaesthetised pigs. It was found that the flow rate varied naturally between pigs and between parts of the body, and that subdermal flow was faster than deep flow. Local massage, described as 'Gentle, local massage using a hand-held massager' increased flow rates to highly significant levels statistically. These results are interesting, because they suggest that local mechanical manipulation of the tissues will increase the lymphatic flow. It can be postulated that this is due to a mechanical movement of the tissues opening the flaps in the lymphatic vessel walls, to allow passage of the proteinous fluid. Further evidence was provided by Ikomi & Schmid-Schonbein in 1996. They measured the effects of passive leg movement and massage on lymph flow rates in a dog and found that both movement and massage increased the rate of lymph flow. The rate was dependent on the frequency of tissue movement and the amplitude of skin displacement. These results were independent of heart function, indicating that expansion and compression of the lymphatics provide a mechanism for the pumping of lymph.

There is much interest in the specific effectiveness of MLD. One such study was undertaken by Kurz (1989, 1990) who gave MLD (Vodder method) to 29 patients suffering from lymphoedema due to varying causes. The results were compared with those of 10 healthy controls. It was found that three to four times the quantity of urine was excreted after the massage. The subjects underwent controlled food and drink intake before the study and full urine analysis was conducted after the massage phase. The significant findings were that urine levels of 17-OH-cortisone and serotonin decreased, whereas those of adrenaline (epinephrine) increased by 50% and histamine by 129%. The authors found the results elucidating in that cortisone is sodium retaining and oedema producing, so its elimination will have obvious effects on oedema. The reduction in serotonin levels demonstrates destruction of this oedema-producing hormone. The researchers thought that the increases in adrenaline (epinephrine) and noradrenaline (norepinephrine) were due to the fact that they were stimulated to increase the circulation, and that the presence of large quantities of histamine indicates that this might contribute to the oedema formation as it creates and sustains tissue fluid. They consider that this

research substantiates Kuhnke's (1975) claims that MLD causes reabsorption of oedema, contraction of vascular muscle (as shown in the catecholamine levels) and decompression of nociceptors (as evidenced by the reduction in the concentration of serotonin and other metabolites). This research, however, did not have an experimental and control group equal in size and the explanation for the meaning behind the urine analysis is speculative.

Zanolla et al (1984) studied 60 patients, aged between 37 and 80 years, and divided them into three groups. No difference was found between the groups in terms of sex, age and disease status. MLD was compared with uniform pneumatic pressure and differentiated pneumatic pressure and the circumference of the arm was measured in seven places before and after treatment. MLD produced the best results, and uniform pneumatic pressure also showed a significant improvement over differentiated pressure. The results for the differentiated pressure and control device were not significant. Unfortunately, the groups were not large enough for between-group comparison of effectiveness. What was interesting, however, was that the massage was very effective, although it was applied for only 1 hour three times weekly for 1 month, whereas the mechanical treatments were applied for 6 hours daily over 1 week. Not only has intermittent mechanical pressure been found clinically to worsen the problem in some cases, it was not shown to be particularly effective in this research. These findings suggest that MLD is the treatment of choice for lymphoedema but the use of pressure garments (which mimic the uniform pressure applied in this study) can considerably enhance the treatment. A complex approach of MLD, pressure garments, exercises and skin care is advocated as the treatment approach of choice by lymphoedema specialists (Casley-Smith & Casley-Smith 1994, Foldi 1994) and is recommended in the UK Department of Health guidelines for managing the treatment of post breast cancer lymphoedema (Kirshbaum 1996).

The effectiveness of using a combined approach has been documented by Casley-Smith & Casley-Smith (1992), who described their results of treating 78 patients with oedema following mastectomy with CPT (including the Foldi method of MLD). In the first 4 weeks of treatment, the mean reduction of swelling in grade I lymphoedema was 103% of its initial volume and the mean volume reduction in grade II lymphoedema was 60%, both sets of results being highly significant. A smaller but significant drop in

volume was maintained over the following year. When each leg was examined separately, mean losses of fluid were 1.1 L for grade I, 1.3 L for grade II and 3.7 L in elephantiasis. Ko et al (1998) found similarly good results with a reduction in per cent volume and reduced infection rate following CPT in this large study. These positive results have been substantiated by Wozniowski et al (2001) who found that the milder the lymphoedema, the better the results of CPT.

MLD may be more effective than a simplified version often taught to patients for self-massage (simple lymphatic drainage, SLD), as suggested by the results of a small pilot study conducted by Sitzia et al (2001). In addition, aromatherapy with lavender oil can be included in a CPT programme to enhance the comfort, relaxation and self-esteem of women who have had breast cancer (Kirshbaum 1996).

## Conclusion

---

Oedema is present in many of the patients who consult or are referred for physical therapy. It must be controlled immediately it occurs, because chronic oedema can cause fibrosis, adhesions, resultant loss of joint movement and pain. The excess fluid itself causes pain as pressure is exerted on nociceptors; it further prevents cells from being bathed in fresh, newly nourished tissue fluid, thereby reducing normal cellular metabolism. Metabolic circulation may be reduced, together with metabolites, and protein remains in the tissues. Prevention, containment and removal of swelling is the essential hierarchy of care for the tissues, regardless of cause, and massage can be a cornerstone of effective treatment, with skilful application of MLD being essential in the treatment of lymphoedema.

## Technique: manual lymphatic drainage

---

This is the treatment of choice for lymphoedema.

### Features

- The strokes are extremely light and superficial.
- The strokes are directed towards lymph glands along lymphatic channels.
- Proximal areas must be cleared before distal areas.
- Treatment may need to work across lymphatic watersheds from one area to another.
- The trunk often needs clearing before the affected limb.

Progress should be made towards healthy lymph glands.

'The softer the tissue, the lighter the pressure' (Wittlinger & Wittlinger 1982).

All techniques should be done as stationary ones or continuous spirals; there is no glide over the skin.

### Purpose

- To stimulate lymphatic drainage.
- To increase lymphatic flow.
- To stimulate the lymph glands.
- To reduce lymphoedema.

## Manipulation: pump technique

### Procedure

The therapist's hand should be placed flat on the skin, palm down.

The wrist is lifted to pull the hand slightly backwards.

The wrist is then lowered to move the hands forwards, applying a slight forwards pressure (Figs. 11.2A, B).

Hand movements should be controlled so that they follow a slight oval circular pathway.

**Figure 11.2 • Manual lymphatic drainage.** • (A, B) pump technique in the axilla; (C, D) stationary circles.

*Continued*

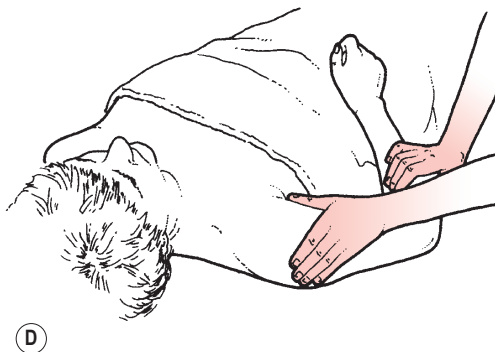
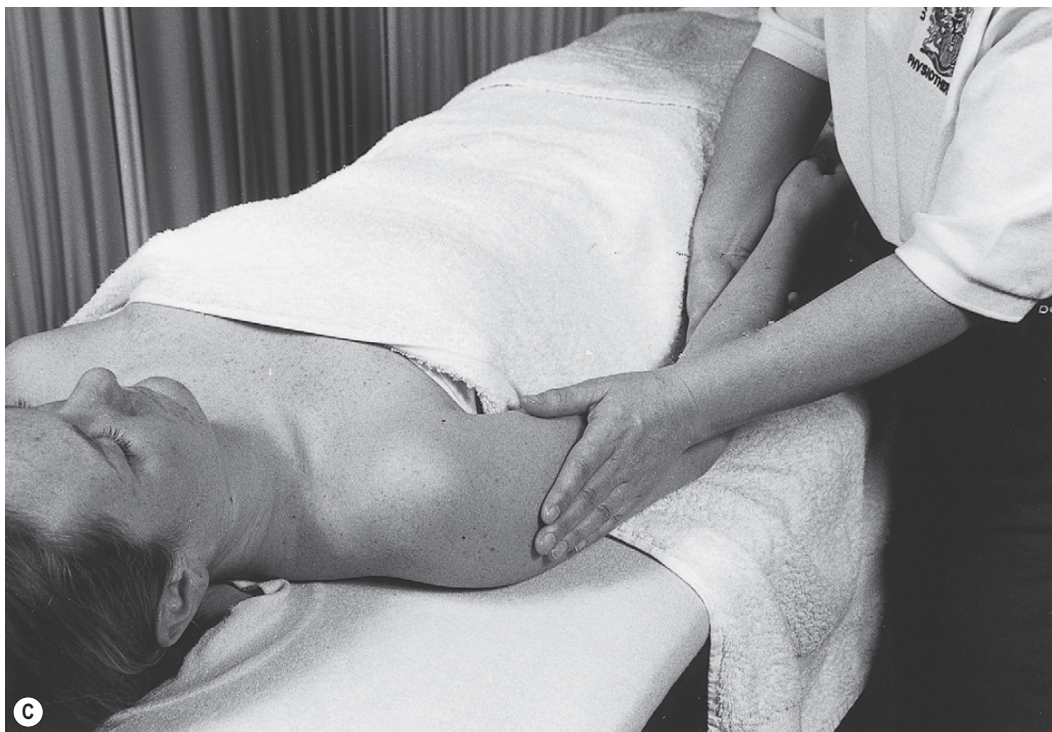


Figure 11.2—cont'd

The skin must move with the hand, which does not glide over the skin.

### Manipulation: stationary circles

#### Procedure

The therapist's fingers should be placed flat on the patient's skin.

The hands should be placed side by side or one on top of the other for reinforcement.

The hands should exert a light pressure in a circling motion (Figs. 11.2C, D).

The skin should move with the hands, which do not glide at all on the skin.

The pressure should go on into the circle and come off out of the circle.

The circles should be applied in the direction of lymph drainage.

Stationary circles should be applied over the lymph nodes and face.

## Manipulation: scoop technique

### Procedure

The dorsum of the therapist's hand should lie on the patient's skin.

The arm should be rotated so that the carpometacarpal joint of the index finger bears the weight of the hand.

The wrist is then rotated from side to side by slight pronation and supination of the forearm.

The therapist's body position should be appropriate for minimising end-of-range wrist movements.

The skin should move with the therapist's hand.

## Manipulation: rotary technique

### Procedure

The therapist's hand should lie palm down on the patient's skin.

The fingers and thumb are separated to increase the web space between the thumb and index finger.

The wrist is raised.

As the wrist is lowered, pressure is applied downwards through the heel of the hand.

Pressure is then transferred from the base of the thumb across the heel of the hand to the little finger.

The skin is moved with each rotatory movement.

Each new stroke should begin slightly further along to overlap with the previous one.

## Massage in HIV/AIDS

The issues already discussed may apply to individuals who have HIV or AIDS, who may also experience particular problems which warrant further discussion. As with all seriously ill patients, patients with HIV or AIDS may have skin highly sensitive to touch, and the type of massage used must be chosen with care. Slow stroking may appear to be less desirable but may work to desensitise the skin, if the patient is able to tolerate this approach and to persevere with a technique that may initially have been uncomfortable. Some patients have Kaposi's sarcoma, which appears as brown, reddish or purple lesions which can be several inches across. Of course, any open

lesions should be avoided and closed lesions massaged lightly.

Hygiene is very important: many people with AIDS suffer from skin rashes and these should be diagnosed accurately before massage. Fungal infections, for example *Candida albicans*, may be highly contagious. Direct contact with herpes must also be avoided. Hand or foot massage may be appropriate if skin problems are widespread, or sensitive acupressure massage can be given through clothing or bedcovers. Depending on the general medical condition of the patient with AIDS, there may be coughing, vomiting or diarrhoea. No one should be excluded from treatment should they desire it, but massage may have to be interrupted to assist with other needs. When helping with bodily fluids or to change soiled clothing or bedding, gloves should be worn and hands washed thoroughly before recommending treatment. The therapist should be fully aware of the unit's infection control policy and an appropriate standard of hygiene must be maintained at all times.

The therapist may treat individuals with this diagnosis at an early stage when they may want to boost their immune systems and acquire relaxation and coping skills. Alternatively, she may treat people at the opposite extreme, in the later stages of terminal illness. In the latter situation, the therapist must be prepared to deal with the presenting symptoms, which may be neurological or respiratory, or involve the eyesight. Lang (1993) found, in a retrospective study of community physiotherapy with 10 people with AIDS, that pain was often musculoskeletal in origin.

There is some evidence that massage can decrease stress and increase natural immunity. Ironson et al (1996) studied 29 gay men, of whom 20 were HIV positive, and their responses to daily massage over 1 month. The subjects had a significant increase in natural killer cell number and cytotoxicity, and soluble CD8; a significant decrease was found in anxiety and urinary cortisol levels. The massage was designed specifically to be relaxing; it included elements of Swedish, Trager, polarity, acupressure and craniosacral therapy. Interpretation of the term 'massage' was, therefore, very loose and it would be difficult to replicate, either clinically or in a subsequent study. However, the results are supported by later research with adolescents who were HIV positive (Diego et al 2001). Massage twice a week for 12 weeks was compared with a group who received progressive muscle relaxation. It was reported that the immune changes

in the massage group included increased natural killer cell number (CD56); in addition, the HIV disease progression markers CD4/CD ratio and CD4 number showed improvement. This study contrasted with that of Birk et al (2000), who found massage did not enhance immune measures. The study by Birk et al was a randomised prospective controlled trial of adults with HIV infection; massage alone was compared with massage in combination with either exercise or stress management-biofeedback treatment and a control group receiving a standard treatment intervention. No significant changes were found in any enumerative immune measure and the conclusion was that massage administered once a week to HIV-infected people does not enhance immune measures. However, all these studies add support to the supposition that massage reduces feelings of stress, anxiety and depression and this can affect natural immunity. There are clear implications, therefore, for the treatment of people with immune-related conditions.

Essential oils may be beneficial for any of these clients, but allergies should be considered as immunity is compromised. As with all clients, but more so with this group, the therapist should ask what the patient's body needs are at each treatment session; a preordained programme may be inappropriate with a fluctuating medical condition and a patient who may feel very ill or be in acute pain. Treatment may be further restricted by drips and drains.

Working with this client group can be demanding both professionally and emotionally. It is important to encourage and allow expression of feelings and emotions. It is better for the therapist to attempt to advise and to give clients what they desire in support of their personal strategy, rather than trying to achieve great things. If you work with the client on equal terms, leaving self aside, then you can remain strong, conserving emotional energy for personal, non-professional life, and so work with this client group can be long term rather than transient.

## Key points

- Goals of care should not focus on cure or passive receipt of care, but should support and reinforce patient-led strategies.
- Massage may be preferred for short periods of time.
- Be flexible if the condition is fluctuating.
- Abdominal massage may alleviate constipation.
- Massage can reduce oedema, and manual lymphatic drainage is effective in lymphoedema.
- Be prepared to hand over your role to a carer.
- Ensure your intervention enriches, rather than disrupts, relationships.
- Massage can reduce pain and muscle tone, and promote relaxation and well being.

## References

- Ahles, T.A., Tope, D.M., Pinkson, B., et al., 1999. Massage therapy for patients undergoing autologous bone marrow transplantation. *J. Pain Symptom Manage.* 18 (3), 157–163.
- Billhult, A., Lindholm, C., Gunnarson, R., et al., 2008. The effect of massage on cellular Immunity, endocrine and psychological factors In woment with breast cancer—a randmosied controlled clinical trial. *Auton. Neurosci.* 140 (1–2), 88–95.
- Billhult, A., Dahlberg, K., 2001. A meaningful relief from suffering: experiences of massage in cancer care. *Cancer Nurs.* 24 (3), 180–184.
- Birk, T.J., McGrady, A., MacArthur, R.D., et al., 2000. The effects of massage therapy alone and in combination with other complementary therapies on immune system measures and quality of life in human immunodeficiency virus. *J. Altern. Complement. Med.* 6 (5), 405–414.
- Bunce, I.H., Mirolo, B.R., Hennessy, J.M., et al., 1994. Post-mastectomy lymphoedema treatment and measurement. *Med. J. Aust.* 161, 125–128.
- Casley-Smith, J.R., Casley-Smith, J.R., 1992. Modern treatment of lymphoedema. I. Complex physical therapy: the first 200 Australian limbs. *Aust. J. Dermatol.* 33, 61–68.
- Casley-Smith, J.R., Casley-Smith, J.R., 1994. Information about lymphoedema for patients. Lymphoedema Association of Australia, Adelaide.
- Corbin, L., 2005. Safety and efficacy of massage therapy for patients with cancer. *Cancer Control* 12 (3), 158–164.
- Diego, M.A., Field, T., Hernandez-Reif, M., et al., 2001. HIV adolescents show improved immune function following massage therapy. *Int. J. Neurosci.* 106 (1–2), 35–45.
- Dunn, C., Sleep, J., Collet, D., 1995. Sensing and improvement: an experimental study to evaluate use of aromatherapy massage and periods of rest in an intensive care unit. *J. Adv. Nurs.* 21 (1), 34–40.
- Eliska, O., Eliskova, M., 1995. Are peripheral lymphatics damaged by high pressure manual massage? *Lymphology* 28 (1), 21–30.
- Fellowes, D., Barnes, K., Wilkinson, S., 2004. Armoatherapy and massage for

- symptom relief in patients with cancer. *Cochrane Database Syst. Rev.* (2), CD002287.
- Foldi, M., 1994. Treatment of lymphedema [editorial]. *Lymphology* 27, 1–5.
- Goodall-Copestake, B.M., 1926. *The theory and practice of massage.* Lewis, London.
- Grimer, R.J., Dalloway, J., 1995. Tumour recognition - signs and symptoms [letter]. *Physiotherapy* 81 (7), 413.
- Hadfield, N., 2001. The role of aromatherapy massage in reducing anxiety in patients with malignant brain tumours. *Int. J. Palliat. Nurs.* 7 (6), 279–285.
- Hollis, M., 1987. *Massage for therapists.* Blackwell, Oxford.
- Hughes, D., Lada, E., Rooney, D., et al., 2008. Massage therapy as a supportive care intervention for children with cancer. *Oncol. Nurs. Forum* 35 (3), 431–442.
- Ikomi, F., Schmid-Schonbein, G.W., 1996. Lymph pump mechanics in the rabbit hind leg. *Am. J. Physiol.* 271 (1–2), H173–H183.
- Ironson, G., Field, T., Scafidi, F., et al., 1996. Massage therapy is associated with enhancement of the immune system's cytotoxic capacity. *Int. J. Neurosci.* 84 (1–4), 205–217.
- Kinmonth, J.B., 1982. *The lymphatics: surgery, lymphography and diseases of the chyle and lymph systems.* Edward Arnold, London.
- Kirshbaum, M., 1996. Using massage in the relief of lymphoedema. *Prof. Nurse* 11 (4), 230–232.
- Ko, D.S., Lerner, R., Klose, G., et al., 1998. Effective treatment of lymphedema of the extremities. *Arch. Surg.* 133 (4), 452–458.
- Kuhnke, E., 1975. Die physiologischen Grundlagen der manuellen Lymphdrainage. *Physiotherapie* 66, 12.
- Kurz, I., 1989. *Textbook of Dr Vodder's manual lymphatic drainage, vol. 2. Therapy.* Haug, Heidelberg.
- Kurz, I., 1990. *Textbook of Dr Vodder's manual lymphatic drainage, vol. 3. Treatment.* Haug, Heidelberg.
- Kutner, J.S., Smith, M.C., Corbin, L., et al., 2008. Massage therapy versus simple touch to improve pain and mood in patients with advanced cancer: a randomised trial. *Ann. Intern. Med.* 149 (6), 369–379.
- Ladd, M.P., Kottke, F.J., Blanchard, R.S., 1952. Studies of the effect of massage on the flow of lymph from the foreleg of the dog. *Arch. Phys. Med.* 33 (10), 604–612.
- Lang, C., 1993. Community physiotherapy for people with HIV/AIDS. *Physiotherapy* 79 (3), 163–167.
- Leduc, A., Caplan, I., Lievens, P., 1981. *Traitement physique de l'oedeme du bras.* Paris.
- Lin, M.L., Tsang, Y.M., Hwang, S.L., 1998. Efficacy of a stress management program for patients with hepatocellular carcinoma receiving transcatheter arterial embolization. *J. Formos. Med. Assoc.* 97 (2), 113–117.
- McCaffery, M., Wolf, M., 1992. Pain relief using cutaneous modalities positioning and movement. *Hosp. J.* 8 (1–2), 121–153.
- McNamara, P., 1994. *Massage for people with cancer.* Wandsworth Cancer Support Centre, London.
- Mortimer, P.S., Simmonds, R., Rezvani, M., et al., 1990. The measurement of skin lymph flow by isotope clearance—reliability, reproducibility, injection dynamics and the effect of massage. *J. Invest. Dermatol.* 95 (6), 677–682.
- Richards, K.C., 1998. Effect of a back massage and relaxation intervention on sleep in critically ill patients. *Am. J. Crit. Care* 7 (4), 288–299.
- Sitzia, J., Sobrido, L., Harlow, W., 2001. Manual lymphatic drainage compared with simple lymphatic drainage in the treatment of post-mastectomy lymphoedema. *Physiotherapy* 88 (2), 99–107.
- Stephenson, N.L., Weinrich, S.P., Tavakoli, A.S., 2000. The effects of foot reflexology on anxiety and pain in patients with breast and lung cancer. *Oncol. Nurs. Forum* 27 (1), 67–72.
- Tappan, F.M., 1988. *Healing massage techniques.* Appleton and Lange, Norwalk, CT.
- Thibodeau, G.A., Patton, K.T., 2007. *Anatomy and physiology, sixth ed.* Mosby Elsevier, St Louis.
- Tidy, N.M., 1932. *Massage and remedial exercises.* John Wright, London.
- Tyler, D.O., Winslow, E.H., Clark, A.P., et al., 1990. Effects of a one minute back rub on mixed venous saturation and heart rate in critically ill patients. *Heart Lung* 19 (5), 562–565.
- Vodder, E., 1982. *Le drainage lymphatique: une nouvelle methode therapeutique santé pour tous.* In: Wittlinger, H., Wittlinger, G. (Eds.), *Textbook of Dr Vodder's manual lymphatic drainage, vol. 1. Haut,* Heidelberg.
- Wakim, K.G., Martin, G.M., Terrier, J.C., et al., 1949. Effects of massage on the circulation in normal and paralyzed extremities. *Arch. Phys. Med.* 30, 135–144.
- Wilkie, D.J., Kampbell, J., Cutshall, S., et al., 2000. Effects of massage on pain intensity analgesics and quality of life in patients with cancer pain: a pilot study of a randomized clinical trial conducted within a hospice care delivery. *Hosp. J.* 15 (3), 31–53.
- Wilkinson, S., Aldridge, J., Salmon, I., et al., 1999. An evaluation of aromatherapy massage in palliative care. *Palliat. Med.* 13 (5), 409–417.
- Wilkinson, S.M., Love, S.B., Westcombe, A.M., et al., 2007. Effectiveness of aromatherapy massage in the management of anxiety and depression in patients with cancer: a multicenter randomized controlled trial. *J. Clin. Oncol.* 25 (5), 532–539.
- Wilkinson, S., Barnes, K., Storey, L., 2008. Massage for symptom relief in patients with cancer: systematic review. *J. Adv. Nurs.* 63 (5), 430–439.
- Wittlinger, H., Wittlinger, G., 1982. *Textbook of Dr Vodder's manual lymphatic drainage, vol. 1. Basic course,* third ed. Haut Verlag, Heidelberg.
- Wozniowski, M., Jasinski, R., Pilch, U., et al., 2001. Complex physical therapy for lymphoedema of the limbs. *Physiotherapy* 87 (5), 252–256.
- Zanolla, R., Monzeglio, C., Balzarini, A., et al., 1984. Evaluation of the results of three different methods of postmastectomy lymphedema treatment. *J. Surg. Oncol.* 26, 210–213.

This page intentionally left blank



# Neuromusculoskeletal disorders

## CHAPTER CONTENTS

The musculoskeletal system . . . . .	223
Mechanical and postural factors . . . . .	224
Disease factors . . . . .	228
Trauma and surgery . . . . .	229
Headaches and neck pain . . . . .	229
Back pain . . . . .	230
Upper limb problems . . . . .	231
The lower limb . . . . .	232

Massage has a particular role in the traditional treatment of musculoskeletal disorders. Its popularity as a core therapeutic intervention within this clinical area of orthodox medicine has varied over time, from being a primary intervention to becoming almost totally disregarded as a useful technique. As physical therapy evolved, Swedish massage was an essential element in the treatment of back and neck pain until techniques with a perceived higher status such as electrotherapy and manipulative therapy became predominant. Consequently the use of massage waned in state-run health care in some countries but it remained an important feature of sports medicine and osteopathy.

One of the problems was that massage was generally assumed to be a symptomatic treatment. Therapists generally believe that, where possible, the cause of symptoms should be identified and eliminated, as treatment that is purely symptomatic is less satisfactory and not cost-effective. Certainly, many patients' problems stem from mechanical, degenerative and inflammatory problems of the joints themselves and massage cannot be said to effect a cure of such problems. However, it is believed that massage *can*

influence the soft tissue problems that occur either in isolation or in association with joint dysfunction.

As structures in the body are neuronally interconnected, a joint cannot undergo changes that alter its normal movement pattern without the surrounding muscles and their connective tissues responding in some way. These secondary changes often become symptomatic. The reflex effect of joint manipulation will prevent development of, and may ease, some of these alterations but is unlikely to reverse long-standing or complex changes.

It is through an *integrated* approach that acute dysfunction of the musculoskeletal system is best treated, ensuring that causative factors are identified and where possible eliminated, and that reflex soft tissue adaptation is corrected, providing total relief of symptoms and preventing recurrence. It should also be recognised that this scenario may occur in reverse, whereby soft tissue problems arising from excess muscle tension can produce postural change and muscle imbalance, thus precipitating joint problems (Marks 1993).

In this chapter, we explore the different soft tissue injuries and responses to bone and joint dysfunction. We also discuss how massage can be an essential component of effective musculoskeletal therapy, by examining the total musculoskeletal system in the context of the whole person.

## The musculoskeletal system

The (neuro)musculoskeletal system comprises the bones of the skeleton, the joints at which movement occurs, the muscles that move them and the nerves

that stimulate the muscles. The central nervous system (CNS) must also be included as it is the coordinator of all activity, for example that which occurs in the autonomic nerves to control the blood vessels essential for tissue nutrition, and that in the brain and spinal cord which controls the protective and coordinated movement patterns occurring in response to sensations arising from the periphery.

The skeletal and muscular systems are interconnected through joints and connective tissue. Dysfunction in one part will ultimately affect adjacent parts and may also have a broader effect through postural or gait adaptations. There are many factors that contribute to the original causative factor of musculoskeletal problems and, in some cases, one can lead to another. Those considered here are:

- Mechanical;
- Postural;
- Occupational;
- Traumatic;
- Surgical; and
- Disease.

They are dealt with as mechanical and postural (including occupational factors, discussed in more detail in Chapter 14); disease; and trauma and surgical factors.

## Mechanical and postural factors

The majority of patients with musculoskeletal problems who seek medical help have back or neck problems. Spinal problems and rheumatological conditions are thought to be much more common in the West than in countries where individuals lead a more active lifestyle. It is widely believed, therefore, that inactivity and resulting postural stresses, or sedentary or repetitive occupational stresses, are responsible for many of the symptoms. Generally, the human body must adjust in accordance with the person's lifestyle. Individuals with physical limitations experience this in reverse: aspects of their lifestyle and behaviour may be dictated by their bodies to a greater extent. Lifestyle requires a particular excursion of joints and stretch of soft tissues unique to the individual, and specific activities will put physical structures through a wider range of movement more frequently. In an inactive person or someone whose job involves sitting, repetitive movements or

inappropriate physical loading, plastic adaptation of a mechanical or postural nature must occur to accommodate this particular lifestyle.

The postural changes may be as a result of habit, for instance many hours over several years spent slumped in easy chairs, or sitting with rounded shoulders and a poking chin at a keyboard until, gradually, less muscular effort is made to maintain an upright posture against gravity (Figs. 12.1, 12.2).



Figure 12.1 • Poor sitting posture.

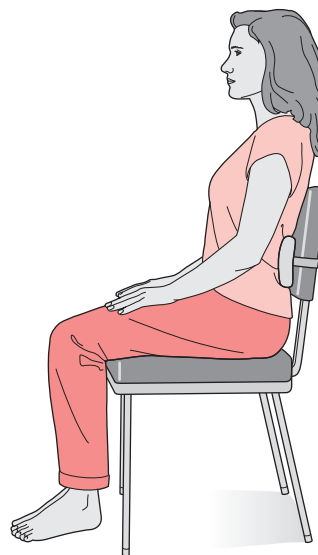


Figure 12.2 • Use of a lumbar roll to correct poor posture.

The postural (antigravity) muscles have a tendency to shorten (Janda 1983) and become structurally tight, and their antagonists tend to become reflexly inhibited and weakened. This produces postural changes and instability. A typical pattern is one of weakened, lengthened abdominal muscles and weak glutei. The hip flexors and the back extensors become short and tight. This was identified by Janda as the 'crossed pattern'; it is accompanied by tight hamstring muscles, thought to be an attempt to stabilise the pelvis. The situation becomes more complicated where there are many short muscles together. The erector spinae, for example, although seen as one muscle mass running along either side of the spinal column, consists of three groups of muscles (iliocostalis, longissimus and spinalis), each of which has a subgroup in each area of the spine. The fibres of erector spinae run in several different directions over different distances. It is important that these muscles act in coordination, but imbalance can occur within the group. According to Janda, antagonist muscles tend to react in a way that is opposite to their agonist, either weakening or shortening, resulting in a muscular imbalance around a joint and eventually throughout the body.

The muscles adapt to their shortening, probably losing sarcomeres (Williams & Goldspink 1978), and their connective tissue loses length and flexibility. As the reflex weakening of the antagonist occurs, these postural changes become self-perpetuating. They can be exacerbated, or indeed caused, by body language, whereby tall people may develop rounded shoulders, shy people a protective flexed posture in which the pectoral muscles become tight and the thoracic spine flexed and stiff, the chronically depressed a poking chin in which the extensor muscles of the neck become short (for further discussion see Kurtz & Prestera 1984). The normal mechanical stresses which the tissues experience through everyday functional activities are correspondingly altered and may be magnified as some (spinal) joints may now be held at an extreme of their range. The increased stress on the connective tissue causes remodelling and the fibres become laid down along the new lines of stress, so they actually change structure to accommodate the postures. Usual patterns of movement may start to strain this altered tissue. For example, sporting activities, or sudden explosive movements, such as running for a bus which places dynamic stretch on tissue, may strain or partially tear connective tissue. Adhesions or excess fibrous tissue may be laid down in response and attempts to correct the posture to a 'normal' one, or attempts

at exercising to strengthen weakened antagonists, will produce pain. This is because 'normal' stress which protects joints has now become 'abnormal' as far as the collagenous tissues are concerned. Applying normal stress will in fact weaken the tissues as the fibres now lie in the direction of the abnormal stress and are therefore ill-equipped to resist normal stress. The obvious result of these attempts to correct the situation will be pain. This scenario was recognised by McKenzie (1981) in his postural syndrome (see Box 12.1). He recommends fully stretching ligaments and surrounding tissue following injury.

Muscle imbalance leads to altered biomechanical stresses in joints which may precipitate cartilaginous degeneration and stiff or hypermobile joints (Marks 1993). Often, in the spine, one segment becomes damaged or degenerative as the stress it experiences is altered from that which the joint was designed to withstand. The accompanying inflammation causes fibrosis and stiffening so an adjacent joint becomes hypermobile and painful in an attempt to maintain normal functional movement. A common example of this is where stiffness of thoracic vertebral joints 1–4 causes pain at cervical 5–6, as is typical in cervical spondylosis, recognised by the forming of a 'ledge' between C6 and C7 and a so-called 'dowager's' or 'buffalo' hump. Adaptation takes place in ligaments and muscles to guard the painful area, and symptoms can be produced from these soft tissues. The loading on muscles may produce spasm, fibrosis and the development of myofascial trigger spots (Travell & Simons 1992), and further postural adaptation may result.

It eventually becomes difficult to understand which changes occurred first—habitual posture, joint dysfunction or occupational stress—and a complete treatment regimen must address all aspects: correcting poor posture and poor ergonomic habits, freeing joints and their surrounding tissues, and settling soft

### Box 12.1

#### Postural syndrome

Characterised by pain that:

- Is alleviated by rest or lying down or by altering position;
- Is fairly localised (low back pain not referring lower than the knee, or neck pain no lower than the elbow);
- Improves on movement; and
- Is accompanied by no history of trauma.

tissue symptoms. Treatment that addresses only some facets of the problem will have only limited success. Weintraube (1986) states that treating only secondary soft tissue changes will remove compensatory mechanisms and may worsen symptoms. He suggests that, under chronic conditions, the joints should be treated first to balance the joint and soft tissue changes.

Some persistent spinal problems fall into the category of a complex chronic back pain model. As the symptoms follow a pattern of quiescence and flare-up, the patient gradually adapts her/his lifestyle. Attempts to increase activity, whether by beginning exercise programmes to increase fitness or changing work or leisure patterns, will create pain as a result of the adaptations already described. This increased irritability of symptoms may cause irritability of mood, which affects relationships with partners, family and friends. Depression or anxiety—whether transient or long term—can become a feature. The increased muscle tone experienced in either of these conditions can exacerbate musculoskeletal symptoms. An altered sleep pattern will perpetuate the problem as sleeplessness due to pain will worsen depression, while ‘tossing and turning’ due to psychological factors will worsen physical pain and stiffness. Drugs to relieve insomnia, pain or psychological symptoms may cause side effects such as constipation, which, accompanied by a reduction in physical activity, contributes to the general loss of well being. Chronic pain can become more complex in that behavioural patterns of the sufferer generally within relationships can become inextricably bound up with the whole syndrome and the disability can be a focus for dependence or caring within a relationship. This scenario can be further complicated when the patient tends to respond emotionally to pain. Further discussion of this is outside the scope of this book, but a full understanding is essential for anyone working in this field. Touch and massage can contribute to a multifactorial, holistic treatment programme for these patients but should be used as *enabling* techniques, to support patients in sharing in the responsibility for their own recovery, rather than to perpetuate passivity. This is particularly important for patients in whom the psychological factors outweigh the physical factors in chronic pain ‘syndrome’. These patients are best helped by a multidisciplinary team, taking a cognitive behavioural approach.

A recent and rigorously controlled study which compared massage, acupuncture and self-care education for chronic low back pain had surprising results.

Patients in each of the treatment groups received therapy appropriate to their condition, thus following normal clinical practice. Treatments lasted 10 weeks, the patients being assessed at week 4 and week 10. The massage group scored significantly better than the other groups throughout the trial. A follow-up one year later showed massage and self-care scored almost equally. Acupuncture did not even achieve a significant placebo effect (Cherkin et al 2001).

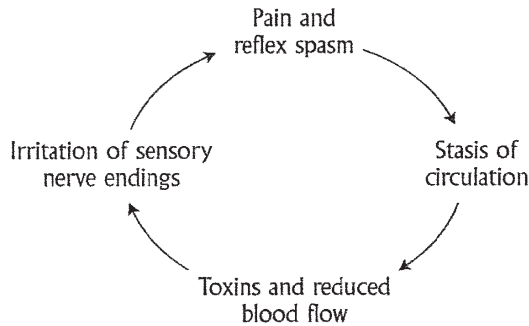
Where *muscle damage* has occurred as a result of long-term postural stresses or trauma, inflammation will occur at the site of the lesion, which may be at a muscle–connective tissue interface, and fibrous scarring will result. If this is ignored, it will become shortened and adherent, with symptoms persisting even when the active inflammatory processes have resolved. In acute problems, muscle *contraction* causes pain, although a minor lesion in a strong patient may require hard muscle work to reproduce symptoms. Widthways expansion may be allowed during contraction, so contracting the muscle may not cause pain. However, *stretching* the muscle longitudinally may be painful. Thus, exercises to strengthen opposite muscle groups may be ineffective if reciprocal lengthening is not possible, and stretching (both active and through massage) should be an integral part of the rehabilitation of injured muscles. The damage may result in inhibition within a different part of the muscle group, or in altered patterns of recruitment, where the precise coordinated sequential fibre contraction is disturbed. For example, the multifidus is a segmental muscle (Macintosh & Bogduk 1986) and altered preferential recruitment may occur (Norris 1995). A similar situation occurs at the knee where the vastus lateralis may be recruited before the vastus medialis oblique if the latter is inhibited, for example following knee trauma (Gerrard 1989).

The aims of massage in muscle damage should be to contain inflammation and promote repair; increase nutrition to the area; reduce swelling and inflammatory byproducts; gradually increase mechanical stresses on the immature collagen; ensure strength and mobility at tissue interfaces; facilitate full excursion of the tissue in all directions; and prevent soft tissue contracture. These will reduce pain and promote normal function.

Massage can help alleviate secondary muscle *spasm*. This tends to be due to an acute problem. It is generally thought that muscle tone increases in response to pain as a splinting, protective

mechanism. A spasm cycle becomes established in which the spasm is self-perpetuating. Eventually, the circulatory compromise caused by the excess tone may lead to muscle wasting. Shortening of connective tissue occurs and the muscle decreases in length. This mirrors the history of muscle ‘tension’ which is often found in shoulder girdle and neck muscles as a physical response to stress.

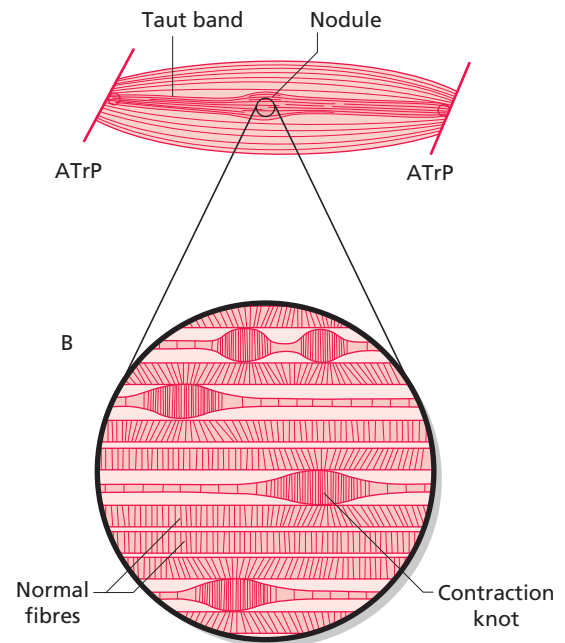
Massage can interrupt the cycle of:



These events can be replaced by a therapeutic cycle, created by massage, whereby an interruption of this pathophysiological cycle will break the chain of ongoing events. However, this theory has more recently come under scrutiny as pain and tenderness in muscles has not been found to correlate to increased muscle tone. In fact, pain tends to inhibit rather than facilitate muscle contraction (Mense et al 2001). Other theories vary from hyperactive muscle spindle activity (Hubbard 1996) to spontaneous electrical activity at the motor end-plate (Bohr 1995). These theories are supported by some contradictory physiological evidence but tend to focus on specific aspects of the clinical picture such as the presence of myofascial trigger points (see below) and not the whole clinical picture, and ignore the effects felt in the *total* muscle following massage.

## Myofascial trigger points

Myofascial trigger points (MTPs) were identified by Travell and Simons (1992). They can occur due to any factor (postural, mechanical, metabolic, nutritional, etc.) which alters the local circulation to a few muscle fibres. MTPs are narrow bands of fibres within a muscle which have been held in excess tone or spasm for some time. Eventually, the fibres become ischaemic and fibrous (Fig. 12.3). They



**Figure 12.3 • Trigger point complex.** • ATrP = Active Trigger Point.

are identified by palpation and by a particular pattern of symptoms (see Travell & Simons (1992) for charts of referred pain patterns, and Fig. 12.4).

## Symptoms of myofascial trigger points

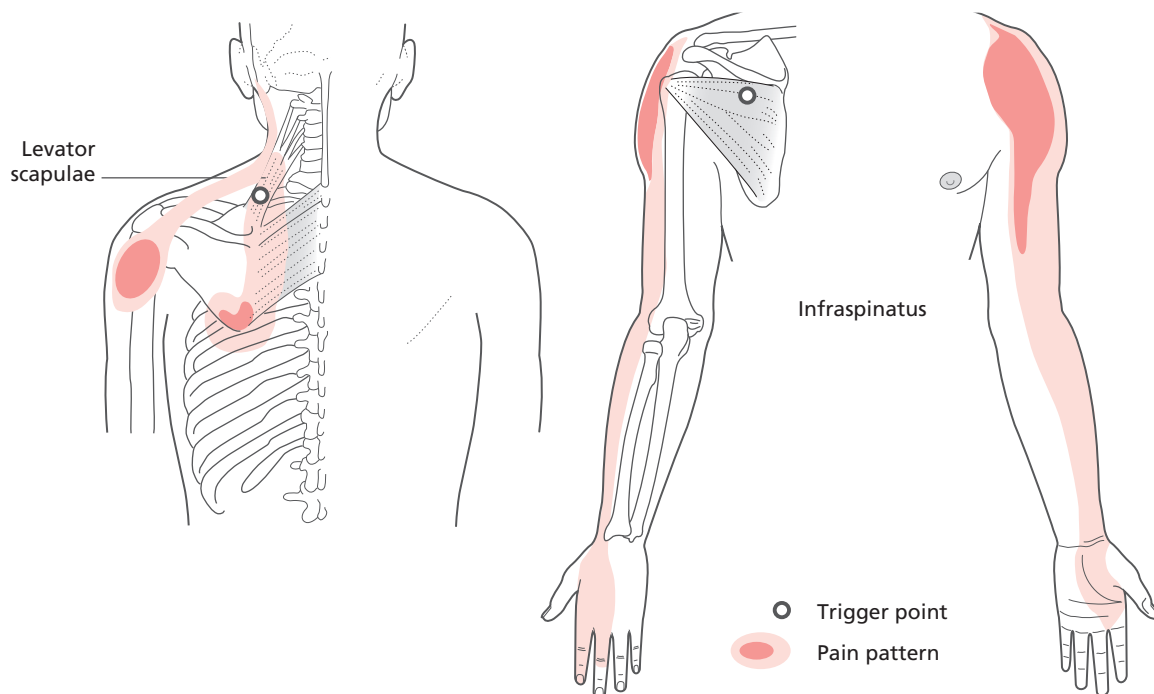
- Pressure reproduces the pain, including the exact recognisable pattern of referral.
- A distinct tight band can be felt.
- When the finger slides over the band, a distinctive clear twitch response occurs.
- An active MTP might be described as ‘exquisitely tender’.

## Treatment

Successful treatment of MTPs has two distinct stages:

1. The first is deactivation—pain relief and reducing the tonicity of the fibres involved.
2. The second is stretching.

Deactivation may be by injection, dry needling, Cyriax frictions, ultrasound, direct pressure or a ‘milking’ massage technique. The most effective manual therapy methods of MTP deactivation are direct pressure or massage. The pressure must be accurately applied directly on the MTP (which



**Figure 12.4 • Myofascial trigger points and usual areas of referred pain.**

may be perhaps 2 mm in length) at 90° to the fibres, and held for approximately 20 seconds (Travell & Simons 1992). A thumb, elbow, tennis ball or mushroom-shaped wooden implement (Prudden 1984) can be used for either treatment by a therapist or self-treatment. The ‘milking’ massage technique is a deep stroking performed by the fingertips along the length of the affected fibres. It usually elicits a vivid local erythema.

These techniques all produce relief but must be followed by full-range passive stretching to restore full resting length to the muscles. The initial deactivation will offer only short-term relief. Travell and Simons (1992) recommend the use of vasocoolant spraying prior to stretch but many therapists now use muscle energy techniques whereby the muscle is contracted against static resistance (approximate guidelines are 5 seconds at 20% of maximum strength if acute, 10 seconds at 30% of strength if chronic, to vary according to patient need and response) before stretching. This utilises postisometric relaxation of the muscle to allow passive stretch, so there must be a slight pause after contraction and before stretching. Even where the MTPs are chronic, three to five repetitions are often sufficient to produce a full range of stretch and this restored

length and function with its accompanying reduction in pain can be maintained by active stretching exercises. Once full range has been achieved, the MTP becomes silent, but predisposing factors must be addressed to prevent recurrence.

## Disease factors

*Arthritis*, both inflammatory and degenerative, is often met by the physical therapist and can be a primary cause of many of the secondary soft tissue problems outlined earlier. The inflammatory type is commonly rheumatoid arthritis or ankylosing spondylitis but many less common syndromes exist, such as infective arthritis and Sjögren’s syndrome. Inflammatory arthritis has a systemic component which produces symptoms of fatigue and listlessness when the condition is active. The joints undergo severe inflammatory changes which result in ligament erosion and joint deformity with instability. Degenerative arthritis (osteoarthritis or spondylosis) is a response to biomechanical, genetic and metabolic factors, and leads to joint deformity with stiffness. Soft tissue inflammation can be a painful feature.

Massage in inflammatory arthritis must be undertaken with great care. The skin is often fragile and must not be overstretched. Bruising may occur easily and joints must be fully supported in a comfortable position. Local massage is contraindicated in an active stage of the disease and general massage is contraindicated where the disease is active systemically. At other times, gentle massage, with plenty of lubricant, to help avoid overstretching the skin can be therapeutic. Massage in degenerative arthritis is often of considerable value in relieving the secondary soft tissue problems; for example, neck massage in an exacerbation of cervical spondylosis can be beneficial. Care must be taken to ensure the underlying joints are resting in a neutral well-supported position during the massage.

## Trauma and surgery

---

Muscle strains and ligament sprains can be minor, involving just a few fibres, or can be severe where the structure undergoes complete rupture. Details of the healing process have been given in previous chapters but, to summarise, the main problems created by soft tissue trauma are oedema and fibrous scarring within the structure. Oedema leads to fibrosis and adhesions, and should be controlled. Pain is caused by the pressure exerted by the tissue fluid and is worsened when movement stretches the damaged tissue.

These problems also occur after surgery (to repair a ruptured muscle or ligament or to fixate a fracture internally, for example). Post-surgical oedema and scarring literally stick tissue layers together, both underneath the scar and in the area of repair. This can seriously compromise joint movement.

Fractures in bones that are not weight-bearing, or which can be fairly readily immobilised externally, may still be treated by the plaster cast method. This splintage will be left *in situ* until union has occurred, which can take as long as 6 weeks for a Colles' fracture. This immobilisation may leave weakening and contracture of the connective tissues. Adhesions may render the joint almost immobile initially. Therapy is required to promote movement, and graded muscle strengthening and massage can play an important part in the early stages, replenishing tissue fluid, restoring pliability to the tissues, stretching adhesions and possibly promoting resorption and remodelling of the fibrous tissue. It is especially valuable, over any type of scar, to stretch and mobilise the new skin and restore mobility at tissue interfaces.

Appropriate stress applied correctly during healing can increase the final length of a scar (Hardy 1989). Scars often turn pale when exercise first puts them on a stretch but eventually they become a healthy colour, reflecting the colour of the surrounding skin. Swelling, which is often trapped in pockets near the scar, eventually dissipates with massage and the scar lifts from the underlying tissue, becoming pliable.

Active exercises will produce these effects to a certain extent, but individual patients often require help in the form of massage. It can be particularly valuable following joint replacements, especially if the patient has been inactive for some time and post-surgical rehabilitation progresses slowly. Massage will promote functional recovery following internal fixation of fractures which have necessitated extensive scarring, for example where the iliotibial tract is involved.

## Scar massage

---

- Effleurage to increase circulation;
- Static pressure to reduce pockets of swelling;
- Finger and thumb kneading to mobilise the scar and surrounding tissue;
- Skin rolling to restore mobility to tissue interfaces;
- Wringing the scar to stretch and promote collagenous remodelling; and
- Cyriax frictions to loosen adhesions.

We will now examine various sections of the body and discuss the specific application of these concepts and principles to each section.

## Headaches and neck pain

---

Many clients suffer from headaches. The types of headache that have relevance to the massage therapist are tension headaches and those of cervical origin. One of the somatic responses to stress is increased tone in shoulder girdle muscles. Subtle changes in body language and posture may occur, the shoulders being held high and the upper back held stiff and straight. This can lead to muscle fatigue, when the muscles ache and feel tired because of metabolic insufficiency and toxin build-up. On palpation, there is increased tone, 'stringy' areas where several muscle fibres are held in increased tension, sometimes surrounded by shortened connective

tissue. This is often felt like a rope in the paravertebral muscles. The affected muscles may be extremely tender or may have tender spots in them, or active MTPs. Muscles particularly at risk are those in the cervicothoracic region. Trapezius, supraspinatus, levator scapulae, rhomboids and the scalenes are commonly involved. A painful spot midway between the acromial process (acromion) and T1 is commonly present in the trapezius muscle, and a point in supraspinatus, just above the mid-point of the spine of scapula, can often be found. Most sufferers of tension headaches and neck pain also have tenderness and thickening at the insertion of trapezius on the nuchal line of the occiput, and tenderness and fibrosis at the insertion of levator scapulae (at the superior angle of the scapula), with the borders of this muscle sometimes clearly palpable along its length. The scalenes are often extremely uncomfortable on palpation, the palpation eliciting a toothache-like pain and feeling 'stringy' and tight to the therapist.

Massage often enables the patient to adopt a better neck posture; retraction of a poking chin, for example, may become possible after massage. Range of movement is often increased to a surprising degree following massage, and functional activities such as driving and sleeping become easier. Even migraines can reduce in frequency following a combination of massage, muscle energy technique and postural correction. Massage has been found, when used in combination with relaxation therapy, to be more effective than acupuncture in terms of pain frequency and severity, duration of migraines and severity and number of migraine days (Wylie et al 1997). This approach can be particularly useful where the underlying joints are irritable and do not readily tolerate mobilising and manipulative techniques, or where manipulation is contraindicated. Hernandez-Reif et al (1998) found that 30 minutes of massage, performed twice-weekly, over 5 weeks, reduced pain, anxiety, frequency of headaches, and also increased serotonin levels and improved sleep patterns in the massage group compared with the control group. Nine out of the 26 patients had migraine headaches. This was a scientifically designed study but it does not differentiate between the effects of massage itself and the effects of touch. A similar study comparing massage with a touch-based placebo would give more information about specific therapeutic effects of massage. Wylie et al (1997) found that both acupuncture and massage and relaxation significantly improved pain ratings in patients

suffering from chronic headache, but that massage had a greater effect than acupuncture. More detailed examination of the cervical spine is often possible following massage as tenderness is reduced and movement increased. Underlying joint problems can be treated more satisfactorily due to reduced tenderness and guarding spasm.

Grimsby and Grimsby (1993) compared joint manipulation with massage and passive stretching in the cervical spine of 14 patients with C3 dysfunction. Both groups showed increased angle of movement following treatment, but muscle tone, as measured by electromyography, reduced following manipulation and increased in the massage and stretching group in five of seven subjects. Unfortunately the effects of massage were not studied separately, a small sample was used and each patient had the left scalenes stretched, regardless of the symptoms. Stretching did not involve postisometric techniques, which have been shown to be the most effective method of stretching (Entyre & Abraham 1986). While this study is thought provoking, its results are inconclusive because of the small sample size and provide insufficient justification for the choice of stretching technique.

Nilsson et al (1997) found that deep friction massage and laser therapy, given to the lower cervical and thoracic region including all MTPs, was less effective for the treatment of cervicogenic headache than therapeutic exercise or manipulation. This is not surprising as clinical reasoning would suggest that treatment targeting spinal joints would be more effective than a treatment which targeted the soft tissues where headaches are derived from the cervical spine. The researchers had used frictions as a control treatment as it was so unlikely to be effective. In a review of massage as a stand-alone treatment for mechanical neck disorders, Haraldsson et al (2006) found that the evidence for the effectiveness of massage is uncertain and more, larger trials need to be conducted.

## Back pain

---

Back pain is an increasingly serious problem in the UK, accounting for 14–15 million consultations annually with general practitioners (Clinical Standards Advisory Group 1994). Back problems range from those of traumatic origin, where a single incident results in identifiable damage, to the spontaneous



episodes of self-resolving back pain, which can be thought of as 'normal occurrences'.

In the acute stage, back pain is accompanied by spasm and soft tissue pain. Muscle imbalance is commonly seen; for example a shortened quadratus lumborum can produce a 'shortened leg' or a scoliosis. The paraspinal muscles can be very tender in acute spasm. Under more chronic conditions, the lumbar fascia can become tight, especially where periods of immobility have occurred. Tenderness and thickening may be present around the margins of the lumbar fascia, at the points of attachment along the lower costal margin, at the junction with the abdominal fascia, along the iliac crest and sacrum and supraspinal ligaments. MTPs may be present, particularly in the buttock muscles. A 'piriformis syndrome' can exist where an MTP in this muscle involves branches of the sciatic nerve (which may pass directly below or through this muscle), referring pain down the leg. Nodules are often palpated around and below the iliac crests. Grieve (1990) suggests that these are fat herniations through the fascial layer. They appear to become painful when they are adhered to the surrounding tissue, or inflamed. Massage increases circulation and mobilises them, often rendering them painless.

Massage in *acute* back pain should aim to:

- Promote local and general relaxation;
- Increase circulation;
- Reduce oedema; and
- Reduce muscle spasm.

Massage in *chronic* back pain should aim to:

- Reduce muscle spasm;
- Stretch shortened tissues;
- Mobilise adhesions and tissue interfaces; and
- Relieve symptoms of stress.

The strokes and massage routine will therefore be varied accordingly.

The number of treatments required by these patients can often be reduced if manual therapy is augmented by massage. Manual therapy must, however, be followed by an active rehabilitation programme. Research has shown that active functional rehabilitation is effective in the treatment of back pain (Frost & Klaber Moffet 1992); thus manual techniques are to be used as enabling techniques, to facilitate dynamic self-rehabilitation. Furlan et al (2008) suggests that massage might be of benefit for patients with subacute and chronic non-specific

low back pain and this is enhanced when combined with exercises and education. Lewis and Johnson (2006) had earlier noted conflicting results and unconvincing findings. It should be noted that their methodology has been criticised by Brown et al (2007).

## Upper limb problems (Box 12.2)

In many upper limb problems, the whole arm and posture must be examined and included in the treatment. Many work-related upper limb disorders involve adverse neural tension which occurs in the neck region due to poor postural habits. In conditions such as tennis elbow and carpal tunnel syndrome the neck must be assessed and, if massage is incorporated into the treatment, areas such as the scapula region, where 'grating' may be felt by the patient, and nodules underneath or along the vertebral border of scapula should be included.

Li Zumo (1984) reported on 235 patients with frozen shoulder who were treated by manipulation and massage, for at least four sessions each: 146 of the 205 patients in the group having massage and exercises had complete recovery, whereas only 3 patients improved in the group having manipulation, exercises and hand massage. The samples were uneven in size and subjective measures were used. However, all 205 patients in the massage group showed 'satisfactory' results and a significant difference was demonstrated between the two groups.

Scapula release is often important in the treatment of patients with shoulder problems; Cyriax

### Box 12.2

#### Common upper limb disorders

Shoulder: Supraspinatus tendinitis  
 Rotator cuff lesions  
 Bicipital tendinitis  
 Subacromial bursitis  
 Elbow: Tennis elbow  
 Golfer's elbow  
 Ligament sprain  
 Wrist and hand: Tendinitis/tenosynovitis  
 De Quervain's syndrome  
 Ligament sprain  
 Carpal tunnel syndrome

friction techniques are useful in the treatment of rotator cuff tendinitis, tennis or golfer's elbow, and de Quervain's syndrome. Massage of the upper limb, especially the flexors of the forearm, can offer relief to chronic carpal tunnel syndrome sufferers, particularly following release surgery; however, where neural tension or poor posture (increasing pressure in the anterior triangle of neck) precipitates the symptoms, then massage is merely palliative and the cause should preferentially be addressed. Care must be taken where the condition exists in pregnancy. It is thought to be due to increased fluid retention and thus any increase in pressure in the wrist induced by massage will be detrimental.

Massage is particularly valuable following hand injuries. Swelling is often trapped in the fascial spaces of the hand and massage will aid its reabsorption. A combination of massage and string wrapping has been found to be effective for swollen fingers (Flowers 1988). Scarring in the hand, which inevitably follows trauma or surgery, can have serious consequences. A small loss of excursion of soft tissue, following scarring or immobilisation, can have significant functional implications in a hand, which depends on full movement of many small joints for essential functions such as power grip and pinch grip. Scar massage with lanolin-type creams is therefore usually an important part of a hand rehabilitation programme, particularly in conditions such as Dupuytren's contracture, in which scarring tends to be thick and dense. Massage is also important following splintage, to mobilise the tissues and facilitate active exercises.

### The lower limb (Box 12.3)

Particular issues in the lower limb include swelling around the ankle, which occurs following local injuries such as sprains or is caused by gravitational movement of more proximal oedema. Firm strokes with the thumb or fingertips can be applied in the tissue spaces on either side of the malleoli and Achilles tendon. These are known as Bisgaard strokes. Friction techniques are useful in chronic sprains of the ankle, coronary ligaments of the knee and muscle tears. Deep techniques along the iliotibial tract can promote stretch in cases of trochanteric bursitis or where post-surgical scarring is present. In addition, circulatory massage is often beneficial in a wide range of individuals, and leg massage is helpful to the sports person.

## Box 12.3

### Common lower limb disorders

Hip and thigh: Iliotibial band syndrome  
Trochanteric bursitis  
Piriformis syndrome  
Muscle tears  
Knee and lower leg: Ligament sprain  
Compartment syndrome  
Tendinitis  
Bursitis  
Meniscal tears  
Patellofemoral dysfunction  
Foot and ankle: Tendinitis/tenosynovitis  
Ligament sprain  
Stress fractures

## Key points

- The best approach to the treatment of acute musculoskeletal problems involves treating the cause and correcting reflex soft tissue adaptation.
- Soft tissue changes, either primary or secondary, can be symptomatic and may be helped by massage.
- Touch and massage can contribute to the management of patients with chronic pain but must enable the patient to change aspects of lifestyle.
- Massage should not inadvertently perpetuate passivity in a patient with a chronic condition: it should facilitate dynamic self-rehabilitation.
- Massage should be used in muscle trauma to promote reduced pain and improved local nutrition; reduce swelling and inflammatory byproducts; promote remodelling; prevent scar contraction.
- The cycle of muscle spasm can be interrupted by a therapeutic cycle initiated by massage.
- Scar massage can reduce local swelling, mobilise, stretch and promote remodelling of the scar.
- In acute back pain, massage can reduce pain, spasm, oedema, increase circulation and promote relaxation.
- In chronic back pain, massage can reduce spasm, stretch and mobilise shortened tissues and reduce stress.

## References

- Bohr, T.W., 1995. Fibromyalgia syndrome and myofascial pain syndrome: Do they exist? *Neurol. Clin.* 13 (2), 365–384.
- Brown, M., Hay-Smith, J., Dean, S., et al., 2007. Comments on article by Lewis and Johnson . . . Letter to the Editor. *Physiotherapy* 93, 78–79.
- Cherkin, D.C., Eisenberg, D., Sherman, D., et al., 2001. Randomized trial comparing traditional Chinese medical acupuncture, therapeutic massage, and self-care education for chronic low back pain. *Arch. Intern. Med.* 161 (8), 1081–1088.
- Clinical Standards Advisory Group, 1994. Report of a CSAG committee on back pain. HMSO, London.
- Entyre, B.R., Abraham, L.D., 1986. Gains in range of ankle dorsiflexion using three popular stretching techniques. *Am. J. Phys. Med.* 65, 189.
- Flowers, K.R., 1988. String wrapping versus massage for reducing digital volume. *Phys. Ther.* 68 (1), 57–59.
- Frost, H., Klaber Moffet, J., 1992. Physiotherapy management of chronic low back pain. *Physiotherapy* 78 (10), 751–755.
- Furlan, A.D., Imamura, M., Dryden, T., et al., 2008. Massage for low back pain. *Cochrane Database Syst. Rev.* (4), CD001929.
- Gerrard, B., 1989. The patello-femoral pain syndrome: a clinical trial of the McConnell programme. *Aust. J. Physiother.* 35, 74–80.
- Grieve, G.P., 1990. Episacroiliac lipoma. *Physiotherapy* 76 (6), 308–310.
- Grimsby, D., Grimsby, K., 1993. Electromyographic and range of motion evaluation to compare the results of two treatment approaches: soft tissue massage versus a segmental manipulation of the cervical spine. *Nederlands Tijdschrift Voor Manuele Therapie* 12 (1), 2–7.
- Haraldsson, B.G., Gross, A.R., Myers, C. D., et al., 2006. Massage for mechanical neck disorders. *Cochrane Database Syst. Rev.* (3), CD004871.
- Hardy, M.A., 1989. The biology of scar formation. *Phys. Ther.* 69 (12), 22–32.
- Hernandez-Reif, M., Field, T., Dieter, J., et al., 1998. Migraine headaches are reduced by massage therapy. *Int. J. Neurosci.* 96, 1–11.
- Hubbard, D.R., 1996. Chronic and recurrent muscle pain: pathophysiology and treatment and review of pharmacological studies. *Journal of Musculoskeletal Pain* 4 (1/2), 124–142.
- Janda, V., 1983. On the concept of postural muscles and posture in man. *Aust. J. Physiother.* 29 (3), 83–84.
- Kurtz, R., Prester, H., 1984. The body reveals. Harper and Row, New York.
- Lewis, M., Johnson, M.I., 2006. The clinical effectiveness of therapeutic massage for musculoskeletal pain: a systematic review. *Physiotherapy* 92, 146–158.
- Li, Zumo, 1984. Two hundred and thirty-five cases of frozen shoulder treated by manipulation and massage. *J. Tradit. Chin. Med.* 4 (3), 213–215.
- Macintosh, J.E., Bogduk, N., 1986. The biomechanics of the lumbar multifidus. *Clin. Biomech.* 1, 205–213.
- McKenzie, R.A., 1981. The lumbar: spine mechanical diagnosis and therapy. Spinal Publications, Waikanae, New Zealand.
- Marks, R., 1993. Muscles as a pathogenic factor in osteoarthritis. *Physiother. Can.* 45 (4), 251–259.
- Mense, S., Simons, D.G., Russell, I.J., 2001. Muscle pain: understanding its nature, diagnosis and treatment. Lippincott/Williams and Wilkins, Philadelphia, PA.
- Nilsson, N., Christansen, H.W., Hertvigsen, J., 1997. The effect of spinal manipulation in the treatment of cervicogenic headache. *J. Manipulative Physiol. Ther.* 20 (5), 326–330.
- Norris, C.M., 1995. Spinal stabilisation: 3. Stabilisation mechanisms of the lumbar spine. *Physiotherapy* 81 (2), 72–79.
- Prudden, B., 1984. Myotherapy: Bonnie Prudden's complete guide to pain-free living. Doubleday, New York.
- Travell, J.G., Simons, D.G., 1992. Myofascial pain and dysfunction: the trigger point manual, vol. 2. Williams and Wilkins, Baltimore, MD.
- Weintraube, A., 1986. Lumbar soft tissue mobilisation. In: Grieve, G. (Ed.), *Modern manual therapy of the vertebral column*. Churchill Livingstone, London.
- Williams, P.E., Goldspink, G., 1978. Changes in sarcomere length and physiological properties in immobilised muscle. *J. Anat.* 127, 459–468.
- Wylie, K.R., Jackson, C., Crawford, P. M., 1997. Does psychological testing help to predict the response to acupuncture or massage/relaxation therapy in patients presenting to a general neurology clinic with headache? *J. Tradit. Chin. Med.* 17 (2), 130–139.

This page intentionally left blank

# Massage in sport

## CHAPTER CONTENTS

<b>Introduction</b> . . . . .	<b>235</b>
<b>What is sports massage?</b> . . . . .	<b>235</b>
<b>Soft tissue response to training and recovery</b> . . . . .	<b>236</b>
<b>Sports skill demand</b> . . . . .	<b>238</b>
<b>Sports massage application</b> . . . . .	<b>238</b>
<b>Acute soft tissue injury management</b> . . . . .	<b>242</b>
<b>Sports massage in the management of athletes with disabilities</b> . . . . .	<b>246</b>
<b>Summary</b> . . . . .	<b>248</b>

## Introduction

Massage and soft tissue mobilisation have become accepted modalities in the overall musculoskeletal management of recreational and high performance athletes alike, as both athletes and their coaches explore all avenues to achieve optimal performance and sporting success.

Previous chapters have already discussed the effects of therapeutic massage. This chapter will present some of the current issues in massage and soft tissue mobilisation in relation to the athlete and athletic performance.

The term athlete in this chapter refers to any regular participant in sport and fitness training. It encompasses a range of levels and involvement (Fig. 13.1).

The casual athlete category includes those individuals who have adopted a fitness lifestyle balancing all aspects of physical and mental and spiritual life to achieve for themselves the highest quality of life, wellness and adaptive capacity. Exercise and activity

play a major part in the life of these individuals. Massage for this group would focus on enhancing the feelings of well being. They would be unlikely to seek out a specialist sports massage.

A second group of casual athlete is the recreational athlete. These are participants who engage in sport as a social rather than competitive activity. Participation is often irregular and training between games is minimal or absent. This group is likely only to seek out sports massage when injury prevents participation.

Athletes in the performance group differ from the casual social athlete in that for the performance athlete the outcome of competition is seen as a measure of success and failure and where training for specific performance achievement is essential. For the performance athlete, massage and soft tissue mobilisation are part of their regular maintenance routine. Sports massage for this group of athletes should focus on achieving and maintaining peak performance. This is achieved through the application of techniques to facilitate optimal neuromuscular movement patterns, limiting the negative impact of compensatory patterns and aiding physiological and psychological recovery from training and competition stress.

## What is sports massage?

Sports massage, rather than being a single technique, can be more appropriately considered as a combination of soft tissue mobilising techniques integrated and applied to the athlete to enhance the positive benefits of physical performance and to minimise the negative effect of the physical stress of training and competition.

Casual athlete		Performance athletes		
Fitness	Recreational	Local	Regional	National
International				
Lifestyle	Social / athlete			
Competitive				

**Figure 13.1 • Types of athletic participation.**

Techniques commonly used in sports massage practice are:

- Traditional Swedish massage—effleurage, petrissage, and tapotment;
- Massage with movement—lengthening and broadening;
- Soft tissue release—utilising passive, active or weight-bearing movement;
- Muscle energy techniques:
  - Post isometric relaxation
  - Reciprocal inhibition;
- Positional release approaches;
- Trigger point release; and
- Direct application—local approximation—local distraction.

The range of techniques available and the integrated mode of application in sports massage practice has made research in to the efficacy of sports massage challenging. This challenge is as yet unresolved. Currently only the components of Swedish massage have been evaluated in relation to the efficacy of sports massage with equivocal results (Weerapong et al 2005). Evidence based on well-designed clinical research is more authoritative than that based on consensus and experience and views of recognised experts. In the field of sports massage there has been only limited well-designed clinical research, leaving consensus and the views of recognised experts as the best evidence available (Best et al 2008).

The empirical success of sports massage application lies in the selection of appropriate technique(s), positioning of the target tissue and accuracy of application to meet the specific needs of the individual athlete. Sports massage practice like all other manual therapies must be based on thorough assessment and sound clinical reasoning.

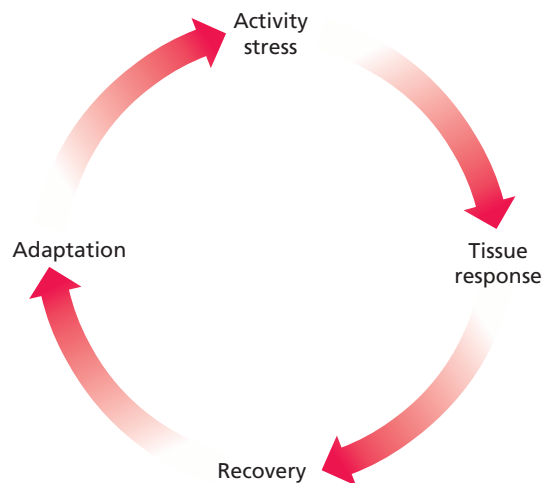
To be successful the sports massage practitioner must not only be skilled in the application of massage techniques but must have an understanding of the

theory underpinning practice. This should include a sound knowledge of functional anatomy coupled with an appreciation of the biomechanics of specific sports skill. It is important that there is an understanding of how the soft tissue responds and adapts to the imposed stress of training and competition including the response to trauma, inflammation and repair.

## Soft tissue response to training and recovery

Athletic performance is dependent on the synergistic interaction of the whole body musculoskeletal system. To be successful the performance athlete needs to develop sports-specific skill and ability of the highest quality and efficiency. This is dependent on training specificity, skill repetition and motor learning ability and genetic predisposition to achieve the physiological changes, neuromuscular movement patterns and compensatory soft tissue adaptations necessary for optimal performance.

Training for improved performance is based on the established specific adaptation to imposed demand (SAID) principle (Baechle & Earle 2008) (Fig. 13.2). To affect a change in the body system or tissue the demand must be sufficient to provoke an adaptation response. The demand must be specific to the skill pattern(s) required if it is to carry over into performance. It is important to remember that to provoke adaptation the body system needs to be



**Figure 13.2 • Cycle of SAID training response. •**

Reprinted from *Anatomy and Physiology 6e*, Thibodeau & Patton (2007) with permission from Elsevier.

stressed, often inducing a microtrauma response in the tissue. Adaptation is a time-dependent process; therefore sufficient time between loading events needs to be given to allow the adaptation process to occur. A period of recovery between loading events is therefore an essential component of optimal training design (Baechle & Earle 2008).

The SAID approach to training while facilitating the development and maintenance of the optimal capacity of the major body systems exposes the athlete to the risk of injury when the tissue load exceeds the adaptive and reparative capacity of the tissues. It should be remembered that not all tissues respond in the same way and the response is stepwise rather than linear.

Regular sports participants demonstrate tissue changes in response to sport-specific movement patterns and training demand. Increases in the strength of the ligaments and tendons have been identified in response to repeated loading; however, in early training there is some structural weakening before the strength gain (Archambault et al 1995). This may be the reason athletes new to sport or suddenly increasing their training are prone to overuse injury affecting the tendons.

Fascia is an interconnecting fibrous connective tissue found throughout the body. It forms the sheaths around the muscles, forming separation between individual muscles, and allows the smooth gliding between the adjacent muscles. The interconnecting fascial planes also provide pathways for neural and vascular structures. Trauma or overload of fascial tissue can result in loss of elasticity and tissue congestion.

The stress response of the supporting fascia to real or perceived threat is tissue thickening. Repeated stress on the fascia produces fibrotic thickening which can spread over time across the fascial sheath, resulting in reduced mobility and further dysfunction. The functional integration of fascial sheaths connecting the lower and upper limbs via 'slings' crossing the trunk can lead to body-wide compensatory shifts (Myers 2009, Vleeming et al 2007). The integration of the fascial sheaths requires the massage practitioner to consider the whole body movement pattern compensations in response to local tissue stress when designing massage applications. Massage application should be aimed at influencing the mobility of the fascia.

Fritz (2005) reports application of slow gliding movements with a degree of tissue 'drag' producing a slow sustained pressure or tension can be effective

in influencing the pliability of the tissue and increasing blood flow. Application of massage strokes should include mobilising the fibres longitudinally, diagonally and cross fibre to mirror the multiplanar and multidirectional demand of sport. Soft tissue release with passive or active movement can be incorporated to focus on more localised areas of thickening or tissue resistance (Sanderson 1999).

Training has been shown to enhance the physiological responses to physical demand with changes seen in the vascular network and local muscle physiology to meet increased metabolic demand (Baechle & Earle 2008). Aubert et al (2003) identified that high intensity exercise and training produced an autonomic imbalance characterised by an increase in resting heart rate often considered to be an indicator of overtraining in an athlete (Holzer 2007). Arroyo-Morales et al (2008) report that whole body myofascial release in conjunction with active recovery aided in the restoration of autonomic nervous system balance; however, the method of application of the myofascial release was unclear.

Regular training and sports skill performance will also lead to a refining of neural patterning through responsive change in cortical plasticity (Tyc et al 2005) and the integration of feedback and feed forward mechanisms in response to task specificity, resulting in enhanced movement efficiency (van Vliet & Henegan 2006).

Changes in the cortical response have been shown to occur relatively quickly (Tyc et al 2005). The development of these preferential pathways will result in high repeatability of motor skill which will increase performance skill. The inter-relationship of the feedback and feed forward mechanisms are essential for ensuring that the body employs the most efficient movement pattern optimising muscle balance and joint position.

The altered movement patterns seen in the athlete in response to injury and subclinical tissue changes provoke a rapid adaptive response in the central nervous system. Left unchecked these adaptations may lead to muscle imbalance and subsequent alteration in joint motion, giving rise to repeated suboptimal loading of the supporting tissues, leaving them vulnerable to overuse injury.

The anticipatory feed forward mechanisms essential for functional stability have been shown to be compromised by pain (Gowan 2004, Hodges et al 2003) and isometric muscle fatigue (Allison & Henry 2002). Sports massage application aimed at reducing pain and minimising the effect of fatigue may be

influential in maintaining feedback feed forward balance and thus reducing the risk of injury.

Many sports skills require the athlete to develop a performance-specific functional asymmetry. Functional asymmetry is seen as an excessive range of motion at a joint or joints in order to achieve a specific performance demand. Consider the excessive external shoulder rotation seen at the shoulder during the tennis serve or the javelin throw at the end of the take back. It is important that the sports massage practitioner appreciates the role of functional asymmetry and facilitates its controlled development rather than trying to prevent it. Focus should rather be on preventing unwanted compensatory changes in other structures.

## Sports skill demand

Many sports skills are multiplanar and multidirectional, requiring force transmission across several joints, often combining extreme ranges of motion and muscle strength. They are often unpredictable in nature and performed in a changing environment. The athlete needs the capacity to respond appropriately at all times. To ensure that these demands can be met the athlete needs to have access to full range of motion along and across the body chain. This will require optimal muscle length, mobility of and between the supporting fascial sheaths and integrity of the neural control systems. When planning sports massage intervention, it is important to consider the demand of the sports' skills and specific movement patterns on the individual athlete. Some of the considerations are presented in Table 13.1.

Individual sports skills and performance are based on a combination of factors: see Figure 13.3. The interplay between mobility and stability mechanisms needs to be understood by the sports massage practitioner so that work on one element does not compromise another. The influence of the psychological status of the athlete cannot be discounted as this is often central to performance (Hemmings 2000a, b).

## Sports massage application

### Massage in competition

Galloway and Watt (2004) identified that sports physiotherapists at major games devoted approximately 45% of their time to massage. Athletes at major competitions present for massage for a variety

**Table 13.1 Consideration of specific movement pattern on the individual athlete**

Specific movement pattern	Sport	Consider
Running	Athletics; football; rugby	Changes in speed: acceleration and deceleration Changes in direction: forwards backwards; cutting; pivoting
Propelling	Balls; implements	Kicking Throwing Hitting Through water e.g. swimming; rowing
Take off and landing	Netball; basketball; gymnastics	Take off from one foot or two Landing and stopping Landing and rebounding Changes of direction Aerial skill between take off and landing



**Figure 13.3 • Components of optimal sports skill and performance.**

of reasons: as part of their routine maintenance, as part of their warm-up routine, to help alleviate pre-competition anxiety, to aid recovery between bouts of activity and to minimise the effects of fatigue and or muscle soreness over several days of



competition. Techniques and applications will therefore need to be adapted to the demand of the circumstance, timing of events and the practitioner's evaluation of the soft tissue status of the individual.

Recovery between bouts of strenuous activity is a major requirement for the performance athlete especially during periods of competition at a major event. Research activity in relation to sports massage for recovery has focused on delayed onset muscle soreness and fatigue (Barnett 2006, Best et al 2008, Cheung et al 2003, Hemmings et al 2000, Hilbert et al 2003, Howatson & Van Someren 2008, Mancinelli et al 2006, Weerapong 2005, Zainuddin et al 2005)

Muscle fatigue has to date been poorly explored in published studies. Fatigue has been defined as any exercise-induced reduction in the ability to exert muscle force or power (Powers & Howley 2009) with both peripheral and central mechanisms reported to contribute to muscle fatigue. The specific mechanisms of muscle fatigue have not yet been established although chemical, neural, vascular and mechanical factors are all implicated. Fatigue has also been found to have a detrimental effect on motor pattern, resulting in an increased potential for suboptimal performance and injury. Kernozek et al (2008) identified altered landing mechanics following neuromuscular fatigue while Givoni et al (2007) demonstrated altered proprioception in response to fatigue of the quadriceps. Fatigue has also been identified as a contributor to reduction in shock attenuation resulting in increasing loading on the skeleton (Nordin & Frankel 2001), which may contribute to the development of stress fractures.

In many sports such as gymnastics, throwing and jumping in track and field and weightlifting, rest and recovery time between fatiguing bouts of activity are short. Rapid recovery is therefore an important factor in maintaining optimal performance throughout the duration of the competition. The focus of massage in this context is to enhance the clearance of metabolites, and to gain reduction in post exercise muscle tension. Early studies focused on the increase of circulation and the clearance of post activity lactate acid (Bale & James 1991, Monedero & Donne 2000); however, these studies did not address the short duration applications necessary in the context of sport competition.

Application of coarse vibrations and shaking to the whole limb can produce alteration in muscle tone via overload of neural input into the central nervous system from the mechanoreceptors. Vibration and

shaking in combination with effleurage may have a more positive influence on the circulation helping to clear post activity metabolites. Effleurage in this context should be varied in depth and rhythm to avoid a sedating effect and to maintain the athletes concentration and focus. There are as yet no published studies that evaluate the depth and rhythm of effleurage nor are there any that consider the effect of coarse vibration and shaking on recovery of muscle performance. A study by Hemmings (2000a) found that although massage had no effect on recovery of muscle power, it did have a positive influence on the athletes' perception of recovery.

## Post activity massage

Massage after activity is often linked to the prevention of muscle soreness and the associated loss of function. It is in the area of delayed onset muscle soreness that most of the research relating to sport has taken place.

Delayed onset muscle soreness (DOMS) is a complex phenomenon. Cheung et al (2003) present six proposed causal mechanisms for DOMS: lactic acid; muscle spasm; connective tissue damage; muscle damage; inflammation and calcium release. It is, however, unlikely that any one of these is responsible in isolation.

DOMS is associated with sudden change in activity or increased training load predominantly in association with eccentric muscle work (Jonhagen et al 2004). Eccentric loading has been associated with structural damage to both muscle and connective tissue leading to oedema and localised inflammatory response. Nosaka et al (2002) found that the level of indicators of muscle damage did not correspond to the intensity or course of DOMS, thereby suggesting that DOMS may be present with minimal muscle damage and that muscle damage may occur with minimal DOMS. Zainuddin et al (2005) therefore suggest that some interventions may be effective for enhancing recovery of muscle function without affecting DOMS or vice versa.

Increased muscle soreness and swelling are common features of DOMS and are well recognised by athletes but the accompanying temporary decrease in muscle function is less well recognised (Jonhagen et al 2004). Previous research has reported changes in joint kinematics, muscle function and gait in the presence of DOMS (Harris et al 1990, Weber et al 1994) and muscle damage (Paschalis et al 2007); however,

Saxton et al (1995) report that athletes' perception of the subsequent physical impairment is often disturbed, which may in turn lead to an increased risk of injury. Moraska (2005) reports that while concentric and isometric muscle function recovers within 4 days, eccentric force production may take up to 10 days.

Studies relating to DOMS have focused predominantly on the removal of lactate following exercise and on increasing circulation. The role of lactate levels in DOMS has now been largely discounted. Early research reviewed by Ernst (1998), carried out on active population but not specifically on performance athletes indicated that massage may have a positive effect on DOMS. This is in contrast to the review by Tiidus (1997) who found no evidence to support the use of massage in the management of DOMS. In one of the few randomised control trials Frey Law et al (2008) found that deep massage had a positive effect on reducing pain associated with DOMS, whereas superficial touch had little or no effect. Much of this conflict in the evidence is due to the methodological variations in design, subjects, massage technique and skill of the therapist, making comparison between studies almost impossible.

It is important to remind ourselves that DOMS is associated with a change in intensity or nature of activity. Performance athletes are for the most part highly trained and therefore their susceptibility and response to DOMS is significantly lessened compared to the recreational athlete.

## Out of competition maintenance massage

The application of massage and soft tissue mobilisation for maintenance of health, well being and optimal performance forms the major part of the work of the sports massage practitioner. To be effective in this phase of athlete management the emphasis must be on normalisation of the body tissues and movement patterns.

Massage for maintenance focuses on addressing and managing some of the 'silent' subclinical contributors to musculoskeletal dysfunction. Progression of excessive tissue loading to dysfunction occurs over time (Fig. 13.4).

Judicious application of sport massage techniques can minimise or reverse this process. The specific direction, duration, depth and emphasis will depend on the palpation findings and the tissue response throughout the treatment.

### Sub clinical response to functional stress

Altered length relationship producing a change in muscle tone

Development of local changes in the connective tissue

Additional muscle recruitment producing a reduction in movement economy resulting in early fatigue

### Functional adaptation - Fatigue and discomfort

More obvious alteration in muscle balance

Subtle alteration in movement pattern and background posture observed

Altered neural firing patterns become established

### Functional compromise - Tissue change

Sub-optimal movement patterns established (hyper / hypo mobility)

Compensatory cycle of increased dysfunction and response becomes establishes

Performance compromise

Figure 13.4 • Progression of tissue dysfunction.

Many athletes in regular training will seek out prophylactic sports massage as part of their training and recovery plan rather than wait for injury to strike. The specific benefit of this prehabilitative massage interventions is hard to quantify and therefore difficult to research.

The practitioner needs to evaluate both the primary performance pattern (specific skill pattern) of the individual and the associated secondary pattern looking at the background movement control of posture and balance. The interplay of the background adjustment and the primary movement intent are essential for optimal movement performance. An imbalance of this interplay may lead to the development of a less than optimal compensatory pattern which if left unchecked can lead to a compensatory movements resulting in tissue dysfunction.

It is important to consider that the more elite high-performance athlete is likely to have skill levels that are highly repeatable which can produce for consistent loading on specific tissues. The less skilled performer tends to have a more variable skill pattern which produces a more variable loading pattern. The high-performance athlete is therefore vulnerable to repetition overload especially if there are alterations in tissue as a consequence of fatigue or prior injury. The variable loading pattern of the less skilled athlete may spread the tissue load but there will also be a reduction in the adaptive strengthening of the ligaments and tendons. This may give rise to an increased injury potential especially on sudden unguarded movements.

### Specific sports massage application

Athletes have unique physiognomy and as a result respond to training and performance in a highly individual way. Sports massage must be responsive to the specific needs of the individual.

Although evidence is limited the proposed benefits of sports massage can be considered under four headings when planning intervention (see Table 13.2).

Swedish massage theory and application has already been presented elsewhere in this text so only specific adaptations in relation to sport application are presented here. Other adjunct techniques are briefly outlined. For further detail on application the reader is directed to Chaitow & Walker Delany (2001, 2002).

#### Effleurage

One of the key roles of introductory effleurage and/or palpation examination is to identify area of tissue change, local tenderness and sites of pain. When an area is found to be tender on palpation it

can be considered to be responding to or associated with disturbance of normal muscle balance, altered reflex activity or soft tissue dysfunction.

Effleurage with active movement is an effective method of increasing muscle length. This can be specifically targeted to areas of local thickening and tissue bind found longitudinally along the line of muscle fibre orientation. It is a useful approach in warming up an area of post muscle strain injury repair prior to stretching or activity.

Effleurage can also be coupled with movement to achieve a broadening or spreading of fibres. This is a useful method of loosening adhesions across the fibres of the target muscle. It is beneficial in restoring muscle extensibility following resolution of intramuscular haematoma.

#### Positional release techniques

Chaitow (1996) defines 'positional release' as the positioning of the body or part of the body in such a way as to facilitate a resolution of musculoskeletal dysfunction. The literature has identified several approaches to positional release (Jones 1981: strain counterstrain; Bowles 1981: functional technique) but there is a degree of commonality as all require that the client be positioned in such a way that the implicated tissues are placed away from any resistance and towards a position of comfort.

This approach has value in sport where sport skill demand places excessive repetition and loading on the tissues, resulting in their inability to fully relax back into the neutral state after the functional stress is removed. Failure to return to this state after activity results in local spasm with or without local tenderness. If this suboptimal position is maintained over time the normal flow of proprioceptive information is disturbed, resulting in an alteration in resting muscle length with one component becoming

**Table 13.2 Proposed benefits of sports massage application**

Biomechanical effect	Physiological effect	Neurological effect	Psychological effect
↓ Tissue adhesion	↑ Muscle blood flow	Alteration in neuromuscular excitability	↓ Anxiety
↑ Muscle compliance	↑ Skin circulation	Pain modulation	Relaxation induced
↑ Range of motion	↑ Parasympathetic activity	Reduced muscle tension or spasm	Reduced perception of fatigue
↓ Passive stiffness	↓ Stress hormones		
Improved alignment			

hypershortened. Any sudden stretching of this shortened structure causes a further reflex shortening of the already shortened muscle. Unless this reflex response is addressed, the response continues, producing an increased pain response.

The massage practitioner can assist in the management of this response as a preliminary to other massage applications. The body or the local body part is positioned by the practitioner away from any resistance towards a position of ease. This can be identified by monitoring the tone in the stressed tissue. As the position of ease is achieved and maintained there is a palpable reduction in tone. As the tone reduces, the body or body part can be moved into a more neutral; position and other techniques applied as indicated.

### Muscle energy techniques

The reciprocal innervation of the neuromusculoskeletal system forms the basis of the muscle energy approach to management of the athlete. It is dependent on the interaction between muscle spindle and Golgi tendon organ to influence change in the length and tension of the target muscles. Post isometric relaxation (PIR) and reciprocal inhibition (RI) are the two methods of applications of muscle energy techniques.

PIR is an effective tool in increasing range of motion in a shortened muscle. The athlete is carefully positioned to ensure that the target muscle can be taken to the point of restriction. At this point the practitioner resists isometric contraction of the muscle. Following the release of the contraction there is a refractory period before the muscle is able to contract again. This period is used to move the limb further into range until a new point of restriction is encountered. The process is then repeated until range is restored.

In situations where pain is inhibiting the target muscle RI may be the best approach for improving range. The athlete is positioned so that the antagonist of the target muscle can be isometrically contracted; this will provoke relaxation in the target muscle through the mechanism of reciprocal innervation. Following this inhibition there is an immediate demonstrable reduction in tone, allowing an increased movement potential in the target muscle (Chaitow & Walker Delany 2001).

Clinical increase in range of the target tissue is well accepted among practitioners; however, there are as yet no randomised control trials to evaluate the efficacy of muscle energy approaches in an athlete population.

## Acute soft tissue injury management

---

Following trauma to the soft tissues fibrin-rich inflammatory exudates often pool in the anatomical spaces. If left unchecked, fibrous adhesions can begin to form, leading to adhesions between normally friction-free gliding surfaces. The sports massage practitioner must address this problem respecting the healing status of the directly traumatised tissue and associated tissue to help facilitate the early restoration of normal function and to assist in creating an optimal environment for further repair.

Working in conjunction with the normal PRICE (protect, rest, ice, compression and elevation) protocol (CSP 1999), an example of this would be management of the acutely sprained ankle. Effleurage massage, sweeping through the anatomical space around the posterior margins of the malleoli and up to the popliteal fossa performed with the limb in elevation, can significantly reduce swelling following ankle sprain. Gentle 'box massage' can also be incorporated to assist in fluid movement. Begin with general effleurage strokes to the proximal area of the limb, directing the stroke into the femoral triangle to assist in the lymphatic drainage, and minimise any congestion in the proximal structures. This approach can be begun 24 hours after injury and repeated at regular intervals. It is important at this stage to avoid over-vigorous application directly over the traumatised structure(s) so as not to disturb the initial clot formation. A supporting brace should be maintained between massage interventions.

## Managing muscular haematomas

---

Muscular haematomas are a problem in contact and implement sports. They can be divided into two categories—intermuscular and intramuscular haematoma—depending on their presentation and underlying tissue damage.

### Intermuscular haematoma

Intermuscular haematoma forms when a direct blow to the muscle causes disruption of the fascia surrounding the traumatised muscle fibres, allowing bleeding to occur freely between and around neighbouring tissues. This results in an often spectacular display of superficial discolouration along with local tenderness at the site of trauma and some loss of range of motion at the joints over which the affected muscle acts.

While these injuries are spectacular to look at they are relatively easy to manage. In the first 48 to 72 hours following injury any massage intervention would be gentle; clearance stroking in the area proximal to the trauma site is all that is initially required from the sports massage practitioner at this stage. As recovery and resolution of the haematoma progresses, massage focus is shifted to ensuring that no compensatory movement patterns are left to develop. For the lower limb this will involve addressing the trunk and pelvis as well as the contralateral limb and the distal area of the ipsilateral limb. Once resolution has been achieved effleurage with lengthening can be employed to ensure that the local extensibility is restored at the site of the repaired tissue. RI can be employed after the initial clot has stabilised to encourage relaxation in the fibres surrounding the injury site and to encourage range of motion. PIR can be employed as healing continues to restore extensibility and range in the muscle. This may need to continue during the rehabilitation phase to ensure normal function is restored.

### Intramuscular haematoma

By contrast an intramuscular haematoma has little to show in the initial stages. In the type of injury the direct blow to the muscle is sufficient to cause a significant crush injury to the muscle fibres but the fascial sheath surrounding the muscle remains intact. The consequence of this is that bleeding from the crush injury builds up within the muscle being unable to escape from the enclosing fascia. The pressure from the bleeding causes pain as it stretches against pain-sensitive structures. This increase in pressure will also compromise the vascular supply to the surrounding area and especially to the focal point of the trauma. Chemical pain will add to the pain presentation from the local ischaemia and subsequent hypoxia and buildup of metabolites. At the initial presentation this is often seen as a 'target area': white in the centre due to compromised blood supply and red around the outside where blood is pooling from the intact supply.

A palpable very firm tender mass is detected at the site of the primary blow. The athlete is likely to have a significant loss of function of the implicated muscle as a consequence of both the local swelling and secondary protective muscle spasm provoked by the pain. Resolution of this type of injury can be slow as blood supply essential for the inflammatory and healing process is severely compromised. Overzealous treatment can result in the development of calcification within the haematoma.

The sports massage practitioner must make every effort to avoid increasing tension in the already tense area by avoiding any contact directly over the affected area. Gentle finger massage around the periphery of the area may assist in reducing local pressure and normalising blood supply.

Proximal clearance utilising slow gently effleurage strokes may be beneficial and can be introduced as soon as the clot has stabilized. As resolution continues gentle effleurage can be re-introduced to the injured muscle, avoiding direct pressure over the injury site. Management of secondary compensations through fascia mobilisation and muscle balancing through the use of RI and PIR techniques can begin as soon as the patient can tolerate it.

Once the area of healing is stable (usually after 14–21 days), work can be focused on restoring local tissue extensibility within the injured muscle. Local soft tissue release and effleurage with lengthening and broadening are particularly valuable here. Techniques focusing on normalisation of muscle tone and encouraging extensibility should be continued as the athlete returns to training and competition.

## Muscle strain

### Hamstring complex

Two joint muscles are vulnerable to muscle tear with the hamstring complex being the most commonly injured in sprint athletes (Drezner 2003, Hoskins & Pollard 2005). Orchard (2001) identified that previous injury is the major contributor to future recurrence. Prevention of injury must therefore be a major component in the management of the sprint athlete. The challenge for the practitioner is to recognise the individual athletes predisposing risk factors that contribute to hamstring injury.

The biarticular nature of the hamstring complex across the knee and hip require the practitioner to consider the stresses arising from above and below. This is especially the case during sprinting when the hamstring must adapt rapidly from concentric to eccentric action during the swing phase and initial foot contact of gait to maintain efficient forward momentum.

The distal expansions of the hamstrings provide lateral (biceps femoris) and medial support (semi membranosis and semitendinosus) for the knee joint. The distal attachment of the biceps femoris also has a fascial connection to the peroneus longus

(Stranding et al 2005). Alteration of the biomechanics of the foot and lower leg may place additional stress on the hamstrings, especially the biceps femoris. Running biomechanics must therefore be considered in the assessment and management of the sprint athlete.

Proximally the hamstring complex attaches to the ischial tuberosity. Biceps femoris via a fascial expansion is connected to the sacrotuberous ligament of the sacroiliac joint which in turn has a facial connection with the thoracolumbar fascia (Vleeming et al 2007). The extensive nature of muscular attachments to the thoracolumbar fascia provide a functional connection between the hamstrings and the pelvis, the trunk, upper torso and the shoulder girdle. This integration of function requires the practitioner to evaluate the overall posture and alignment of the athlete.

Management of hamstring injury will follow a pattern similar to that proposed for the intermuscular haematoma. Consideration must also be given to the complex functional role of the thoracolumbar fascia. Soft tissue release to the thoracolumbar fascia should be included to ensure optimal mobility is maintained. It is also important to reduce any muscle imbalance across the hip and pelvis to ensure normal pelvic tilt can be maintained to reduce the stress on the proximal attachment of the hamstrings.

### *Overuse injury in running sports*

The evolution of mass participation in charity running events over the past two decades has brought with it a large number of recreational athletes who take on the challenge of training and running distances up to a marathon. This increased participation has also produced an increase in injury. In the early 1990s there were reports that between 25 and 50% of runners experienced an injury that was severe enough to cause a break in training or an alteration in performance.

Training and running up to and beyond marathon distances brings with it high repetition loading with a relatively constant pace resulting in a high level of cyclic loading, leaving tissue vulnerable to overuse and overload failure, especially in the poorly vascularised tendons. Cavanagh and La Fortune (1980) identified that each kilometre run required 600 foot strikes. Many team sports involve running, often requiring rapid changes of pace and direction while running at speed with sudden stops and starts which produce additional stress on the muscles and the supporting and stabilising connective tissue. As a result

of running-related activity, exercise-related lower limb leg pain (ERLLP) has become an increasingly common overuse problem presenting to the sports massage practitioner.

ERLLP encompasses some of the more enigmatic sports injuries including anterior knee pain syndrome, iliotibial band syndrome, 'shin splints', medial tibial stress syndrome, compartment syndrome and stress fracture. In order to effectively manage these often challenging and long-lasting conditions it is necessary for the sports massage practitioner to have an appreciation of the contributing factors.

In a review of risk factors for lower limb injuries Murphy et al (2003) found that there was limited agreement and understanding of causative factors. Several studies have put forward a range of potential causation. These can be roughly divided into intrinsic and extrinsic factors and are presented in Table 13.3.

These factors need to be considered by the practitioner in the clinical reasoning and decision-making prior to assessment and treatment of the athlete.

Prospective studies investigating the cause and effect relationship of intrinsic biomechanical risk factors were lacking prior to the study of Willems et al (2006). In a study of 400 PE students Willems et al found that those subjects who developed ERLLP had a running pattern that differed from those who remained injury free. The common findings in the ERLLP subjects were a more central heel strike at

**Table 13.3 Intrinsic and extrinsic factors in musculoskeletal injury**

Intrinsic	Extrinsic
Individual structural anatomy	Changes in training load
Foot posture	Activity, intensity load, frequency
Pronated foot (low medial arch)	Surface and footwear
Supinated foot	Terrain
Knee alignment	Regular irregular
Valgus	Incline/decline camber
Varus	
Hip position	
Anteverted (toe in)	
Retroverted (toe out)	
Tissue load history	
Previous injury	
Preferred posture habit	
Poor physical condition	
Age	

initial contact, a more everted foot with increased loading under the medial aspect of the forefoot in mid-stance and an increase in extension range of motion at the first metacarpophalangeal joint, the most clinically significant finding of the three being increased eversion of the foot in mid-stance. The functional linkage between the foot and knee would tend to produce an increase in internal rotation of the tibia in response to the more everted foot, along with an increase in the passive and dynamic stabilising demand of the soft tissues at the hip and knee to limiting internal rotation. The failure of the tissues to meet this increased stabilising demand has been suggested as a cause of mal-tracking of the patella, provoking patellofemoral pain syndrome and increased load on the iliotibial band, resulting in the development of iliotibial band syndrome.

Transition from walking to running occurs as the double stance phase in the walking gait cycle is replaced by a float phase between each foot contact in running. With this comes an increased demand on the limb at foot contact. There is an increased stability demand at the hip, knee and foot and ankle along with increased impact force from 0.7 (walking)  $\times$  body weight to 2–3 (running)  $\times$  body weight.

As running speed increases, initial foot strike moves from the hind foot to the forefoot. This shift reduces the contact area that accompanies mid-stance. This resulting reduction in base of support will require increased stability throughout the support limb. Increased running speed will also reduce contact time with the ground, reducing the time for force dissipation. The time between each foot contact reduces as speed increases, reducing recovery time between each loading event. Any muscle weakness or imbalance at the hip, knee or ankle must therefore be minimised or eliminated to ensure optimal loading (Novacheck 1998).

### *Patellofemoral pain syndrome*

Patellofemoral pain syndrome is a catch-all term for anterior knee pain located around the patella margins. It has been related to hyperpronation of the foot during gait with associated increased medial rotation of the tibia and a tendency towards an increased valgus stress of the knee with increased stress on the lateral aspect of the patella and the soft tissue support of the lateral aspect of the knee, namely the iliotibial band and the distal biceps femoris. Shortening of any of these can restrict patella glide, increasing the stress on the lateral margin of the patella. These altered kinematics have been attributed to poor foot

mechanics and also to weakness of the ipsilateral gluteus medius (Powers 1998).

Massage can play a significant part in both the prevention and management of this condition utilising a combination of applications including general effleurage to the quadriceps and hamstrings, muscle energy release of tensor fascia lata and gluteus maximus to optimise the mobility of the iliotibial band and petrissage, wringing and bending of biceps femoris to increase extensibility. The practitioner should also consider the tissues of the lower leg and foot as well as those of the pelvis and low back.

### **The shoulder complex**

Cools et al (2003) reports that chronic shoulder pain is probably the most common upper extremity problem in athletes involved in overhead sports.

It is commonly recognised that symptoms of glenohumeral impingement in the overhead athlete are often related to instability in the shoulder complex (Borsa et al 2008, Meister 2000). Instability of the shoulder complex is often insidious and difficult to demonstrate on clinical testing.

The quality of shoulder movement depends on the interaction between the scapular and glenohumeral kinematics. The posture of the head, neck and upper torso also play a part as they form the attachment points for the major scapular muscles, namely trapezius (upper middle and lower fibres), levator scapulae rhomboids and serratus anterior. For optimal function of the glenohumeral joint, the head of the humerus needs to be centred into the glenoid fossa of the scapula. In overhead sports skills the scapular needs to rotate on the thorax to position the glenoid to form a platform for the humerus. Muscle balance and timing of the muscles acting on the scapula is essential to ensure that this can be achieved.

Sports-specific throwing skills often require the acquisition of a functional asymmetry in range of motion. In the javelin thrower for example there is a requirement for an excessive range of external rotation with horizontal extension in the throwing shoulder. To achieve this, the athlete needs to have optimal extensibility of the anterior glenohumeral capsule and the supporting anterior structures, and balance of control between the infraspinatus and subscapularis to control the position of the head of the humerus in the glenoid. An increased length in the ipsilateral pectoralis major and pectoral fascia along with the contralateral abdominal fascia is also required to allow the shoulder girdle and trunk to

rotate effectively against the pelvis to gain an efficient pre-load position. In order to achieve this position there must be sufficient rotation at the pelvis, side flexion of the trunk and hip extension on the leading leg. All of these factors need to be addressed in the massage planning.

The deep-seated tendon of supraspinatus, the commonest site of impingement, is not accessible for massage under the acromion and therefore treatment should be aimed at normalising the function of the shoulder girdle. Sports massage can play a major part in optimising the position of the scapula, and the function of the glenohumeral joint through management of posture and muscle balance across the head, neck and shoulder girdle. Soft tissue releases of the major facial sheaths should also be included to ensure optimal length across the trunk. Local application to optimise the function of individual muscles should be included.

## Sports massage in the management of athletes with disabilities

---

Over the past 60 years there have been major advances in sport participation by athletes with disabilities. The televising of the Paralympic Games has been a major driving force for encouraging more people with disabilities into sport. The participation level and commitment to sport is the same as is seen in [Figure 13.1](#) but unlike their able-bodied counterparts, athletes with disability often have an underlying medical condition that may have a negative impact on sporting performance.

At the elite end of performance for athletes with disability the Paralympic Games now boast over 4000 participants across a range of sports categorised into three major categories of disability:

- Visual impairment;
- Intellectual impairment; and
- Physical disability.

Each category brings its own challenge for the massage practitioner working with athletes with disabilities. Associated problems with cognitive ability and social skills are often present and may require a more flexible approach to communication and handling to ensure optimal compliance with treatment.

Categorisation is made for convenience but athletes do not fall neatly into each. The sports massage

practitioner working with athletes with disability will need to understand the complexity and impact of any coexisting medical conditions in order to design appropriate interventions.

## Athletes with visual impairment

---

Athletes with visual impairment often present with altered or increased postural stress as a result of their response to performing with a guide, as in such sports as track athletics and tandem cycling. Many may also develop altered movement patterns as they utilise enhanced senses of hearing and touch to optimise their performance. Running athletes often have an altered gait pattern that if not effectively managed can result in overuse injury. Prophylactic massage application can play a major part in the overall management of the visually impaired performance athlete. The massage practitioner must consider any compensatory mechanisms alongside the individual's physical profile and the specific sports skill demand when designing massage intervention for this group of athletes. The application of techniques should not require adaptation but it is important that the practitioner takes care to minimise the risk of skin irritation as the athlete may not be able to monitor this for themselves.

## Athletes with intellectual impairment

---

Intellectual impairment may accompany some of the physical disability categories within the Paralympic sports. This should not be confused with those athletes with frank learning disabilities that currently compete in the Special Olympics. Working with athletes with intellectual impairment and those with learning difficulties demands care in communication and chaperoning to ensure that the athlete understands and consents to the massage intervention and feels comfortable with the modes of application. Formal consent may need to be obtained from a parent or guardian. The massage practitioner should also be aware of any accompanying physical problems, for example associated hypermobility, poor muscle tone and altered proprioception often found in Down's Syndrome. Athletes with intellectual impairment may also have associated medical conditions; for example, athletes whose intellectual disability resulting from head trauma may have accompanying



epilepsy. In the management of these athletes the massage practitioner should ensure that they have a full medical history in order to identify any specific cautions and or contraindications.

## Athletes with physical disabilities

In order to allow athletes with physical disability to compete in a fair and equitable manner they are further arranged into four subcategories:

- Spinal cord injury which may be either congenital or acquired;
- Limb deficiency or amputation;
- Cerebral palsy; and
- Les Autres.

Each category brings with its own specific challenges for the massage practitioner.

### Spinal cord injury

Spinal cord lesions may be either acquired through trauma or disease or as a consequence of a congenital condition such as spina bifida. The level of the spinal lesion determines the classification for these athletes but also gives the massage practitioner guidance on accompanying problems that need to be considered in the treatment design. Thermoregulation is a challenge for athletes with spinal cord injury. Dissipation of any heat generated by the massage application may be compromised especially if the massage is being applied in a hot environment. Conversely athletes may also experience difficulties in maintaining body temperature in a cold environment. The massage practitioner needs to consider this relation to skin exposure and draping when working in a low ambient temperature.

The loss of skin sensation below the level of the lesion makes the spinal-injured athlete vulnerable to skin abrasions and pressure sores. Care must be taken when positioning the athlete for massage. The pattern of application should be considered in advance to ensure optimal positioning and regular change of posture to avoid unnecessary pressure buildup. Care of any insensitive area during handling is essential for minimising the risk of abrasion.

Altered sensation below the level of the lesion prevents the normal pain response in athletes with spinal injury. The lack of pain response may be the trigger for the potentially life-threatening response of

autonomic dysreflexia. In the spinal-injured patient any nociceptive input below the level of the lesion can result in an inappropriate level of noradrenaline (norepinephrine) secretion, producing hypertension, sweating and skin blotching above the level of the lesion. The individual will also complain of a pounding headache. The massage practitioner must be aware of the potential for this condition and take care in handling and positioning of the insensitive region below the level of the lesion. If the practitioner suspects the onset of this condition it is essential to act promptly as the elevated blood pressure, if not managed, can result in cerebral haemorrhage or even death.

Spinal cord-injured athletes, as a consequence of the paralysis-related immobility and loss of weight-bearing activity, also suffer from progressive loss of bone mineral density, leaving them vulnerable to osteoporotic fracture in the lower limbs and the spine. Fracture in this population may result from minimal trauma. The massage practitioner should maintain a high level of suspicion for fracture when assessing the athlete if the athlete is involved in contact sport or reports a fall from their wheelchair. Once again handling and positioning must respect the risk of fracture.

Wheelchair-based athletes are exposed to significant risk of overuse injury to their shoulder and the functioning levels of the trunk. As in the management of other athletes successful massage application must be based on a sound individual physical profile and an appreciation of the sport-specific skill performance. Optimising posture and managing muscle imbalance are the main focus of intervention in this group of athletes.

### Athletes with limb deficiency

Limb deficiency may be acquired or congenital. Limb-deficient athletes are classified for performance according to functional capacity rather than on specific limb deficiency. The potential for muscle power and strength and proprioception of the intact limbs and trunk are normal. Limb deficiency does, however, cause an alteration in the positioning of the centre of gravity and line of gravity, creating a challenge to balance and coordination that the athlete needs to accommodate. These challenges will have an impact on the movement patterns and physical adaptations of the individual athlete. The massage practitioner needs to evaluate these adaptations

when designing their intervention. The massage application for this group of athletes needs no specific adaptation.

### Athletes with cerebral palsy

The nature of cerebral palsy provides a significant challenge for the sports massage practitioner. Athletes in this category of disability have all movement deficiency classified by the limbs affected and the nature of the movement disorder. Alteration in normal tone is the common physical feature but the severity and nature of the tone change will vary from individual to individual. Alteration in tone will also have a marked impact on posture. Care must be taken in the application of massage to this group. The spasticity (increased tone) may play an important role in the joint stability in these athletes; therefore massage application that reduces tone prior to training or competition may have a negative impact on the athlete, increasing the risk of injury.

### 'Les Autres'

This is a complex group of athletes with physical disabilities arising from a range of syndromes that do not fit into any other classification. To work effectively with this group the massage practitioner must be sure that they have a clear understanding of the complexity of the specific syndrome.

Management of athletes with disabilities is a highly specialised area of sports massage. The massage techniques are in common to those of other athletes but the selection and design of the application requires careful planning.

## Summary

---

The variety of context and application techniques routinely employed in sports massage have made the construction of objective research difficult, leaving the efficacy of massage in sport unsubstantiated.

Many of the available studies have been highly dependent on subjective criteria for the diagnosis, treatment application and outcome measure. The effect of touch is unique between practitioner and client, making control and standardisation almost impossible. Design and progression of sports massage application is often guided by the athlete's report of 'tightness' or 'niggles' and by the practitioner's

interpretation of soft tissue 'feel', adding to the challenge of standardisation.

Overall evidence for massage in sport has been limited with the major emphasis on post exercise recovery and prevention of delayed onset muscle soreness. The studies have usually had only a small cohort and have been undertaken on non-elite athletes, limiting the validity of any outcome.

Best et al (2008) attempted a meta-analysis to investigate the effectiveness of sport massage for recovery of skeletal muscle following strenuous exercise but it proved impossible due to the large variation in the research method and in the application of the massage intervention. Subjects are predominantly normal healthy subjects or recreational athletes. Studies on performance athletes are minimal. Research is often limited to only a single massage application and to only one limb or part of a limb. The continued value that both athletes and coaches place on benefit of sports massage suggests that future clinical research is needed within the performance sport environment to establish the mechanisms of efficacy.

## Key points

---

- Sports massage is not a single technique. It is the integration of several soft tissue mobilising techniques.
- Successful sports massage is dependent of appropriate technique(s), positioning and accuracy of application to meet the specific needs of the individual athlete.
- Understanding soft tissue response to the stress of training and competition is essential for successful sports massage practice.
- Functional integration of the fascial sheaths requires the practitioner to consider whole body movement patterns and compensations in response to local tissue stress when designing massage applications.
- Mobility and stability mechanisms need to be understood to ensure that treatment of one element does not compromise another.
- Working with athletes with disability requires the practitioner to understand the complexity and impact of any coexisting medical conditions in order to design appropriate interventions.

## References

- Allison, G.T., Henry, S.M., 2002. The influence of fatigue on trunk muscle responses to sudden arm movements: a pilot study. *Clin. Biomech. (Bristol, Avon)* 17 (5), 414–417.
- Archambault, J.M., Wiley, J.P., Bray, R. C., 1995. Exercise loading of tendons and the development of overuse injuries: a review of current literature. *Sports Med.* 20 (2), 77–89.
- Arroyo-Morales, M., Olea, N., Martinez, M., et al., 2008. Effects of myofascial release after high intensity exercise: a randomised control trial. *J. Manipulative. Physiol. Ther.* 31 (3), 217–223.
- Aubert, A.E., Seps, B., Beckers, F., 2003. Heart rate variability in athletes. *Sports Med.* 33 (12), 889–919.
- Baechle, T.R., Earle, R.W. (Eds.), 2008. *Essentials of strength training and conditioning*, third ed. Human Kinetics, Champaign, IL.
- Bale, P., James, H., 1991. Massage warmdown and rest as recuperative measures after short-term intense exercise. *Physiotherapy in Sport* 13 (2), 4–7.
- Barnett, A., 2006. Using recovery modalities between retraining sessions in elite athletes: does it help? *Sports Med.* 36 (9), 781–796.
- Best, T.M., Hunter, R.D.C., Wilcox, A., et al., 2008. The effectiveness of sports massage for recovery of skeletal muscle from strenuous exercise. *Clin. J. Sport. Med.* 18 (5), 446–460.
- Bowles, C., 1981. Functional technique - a modern perspective. *J. Am. Osteopath. Assoc.* 80 (3), 326–331. Cited in: Chaitow, L., 1996. *Positional release techniques*. Churchill Livingstone, Edinburgh.
- Borsa, P.A., Laudner, K.G., Sauers, E.L., 2008. Mobility and stability adaptations in the shoulder of the overhead athlete: a theoretical and evidence-based perspective. *Sports Med.* 38 (1), 17–36.
- Cavanagh, P.R., La Fortune, M.A., 1980. Ground reaction forces in distance running. *J. Biomech.* 13, 397–406.
- Chaitow, L., 1996. *Positional release techniques*. Churchill Livingstone, Edinburgh.
- Chaitow, L., Walker Delany, J., 2001. *Clinical application of neuromuscular techniques*, volume 1 The upper body. Churchill Livingstone, Edinburgh.
- Chaitow, L., Walker Delany, J., 2002. *Clinical application of neuromuscular techniques*, vol. 2. The lower body. Churchill Livingstone, Edinburgh.
- Cheung, K., Hume, P.A., Maxwell, L., 2003. Delayed onset muscle soreness. Treatment strategies and performance factors. *Sports Med.* 33 (2), 145–164.
- Cools, A.M., Witvrouw, E.E., Declercq, G.A., et al., 2003. Scapular muscle recruitment patterns: trapezius latency with and without impingement symptoms. *Am. J. Sports Med.* 31 (4), 542–549.
- Cowan, S.M., Schache, A.G., Brukner, P., et al., 2004. Delayed onset of transversus abdominus in long-standing groin pain. *Med. Sci. Sports Exerc.* 36 (12), 2040–2045.
- CSP, 1999. Guidelines for the management of soft tissue (musculoskeletal) injury with protection, rest, ice, compression and elevation (PRICE) during the first 72 hours. Chartered Society of Physiotherapy .
- Drezner, J.A., 2003. Practical management: hamstring muscle injuries. *Clin. J. Sport. Med.* 13, 48–52.
- Ernst, E., 1998. Does post-exercise massage treatment reduce delayed onset muscle soreness? A systematic review. *J. Sports Med.* 32 (3), 212–214.
- Frey Law, L.A., Evans, S., Knudtson, J., et al., 2008. Massage reduced pain perception and hyperalgesia in experimental muscle pain: a randomised control trial. *J. Pain* 9 (8), 714–721.
- Fritz, S., 2005. *Sports and exercise massage: comprehensive care in athletics, fitness and rehabilitation*. Elsevier Mosby, St Louis.
- Galloway, S.D., Watt, J.M., 2004. Massage provision by physiotherapists at major athletic events between 1987 and 1998. *Br. J. Sports Med.* 38 (2), 235–236.
- Givoni, N.J., Pham, T., Allen, T.J., et al., 2007. The effect of quadriceps muscle fatigue on position mating at the knee. *J. Physiol.* 584 (1), 111–119.
- Harris, C., Wilcox, A., Smith, G., et al., 1990. The effect of delayed onset muscle soreness (DOMS) on running kinematics. *Med. Sci. Sports Exerc.* 22 (2), S200.
- Hemmings, B., 2000a. Sports massage and psychological regeneration. *Br. J. Sports Med.* 7, 184–188.
- Hemmings, B., 2000b. Psychological and immunological effects of massage after sport. *Br. J. Sports Med.* 7 (12), 516–519.
- Hemmings, B., Smith, M., Graydon, J., et al., 2000. Effects of massage on physiological restoration, perceived recovery and repeated sports performance. *Br. J. Sports Med.* 34 (2), 109–114.
- Hilbert, J.E., Sforzo, G.A., Swensen, T., 2003. The effects of massage on delayed onset muscle soreness. *Br. J. Sports Med.* 37 (1), 72–75.
- Hodges, P.W., Moseley, G.L., Gabrielson, A., et al., 2003. Experimental muscle pain changes feedforward postural responses of the trunk muscles. *Exp. Brain Res.* 151 (2), 262–271.
- Holzer, K., 2007. The tired athlete. In: Brukner, P., Khan, K. (Eds.), *Clinical sports medicine*, third ed. McGraw-Hill, North Ryde, NSW.
- Hoskins, W., Pollard, H., 2005. The management of hamstring injury—Part 1: Issues in diagnosis. *Man. Ther.* 10, 96–107.
- Howatson, G., van Someren, K.A., 2008. The prevention and treatment of exercise induced muscle damage. *Sports. Med.* 38 (6), 483–503.
- Jones, L., 1996. *Strain and counterstrain*. Academy of Applied Osteopathy, Colorado Springs. Cited in: Chaitow, L., 1996. *Positional release techniques*. Churchill Livingstone, Edinburgh.
- Jonhagen, S., Ackernann, P., Eriksson, T., et al., 2004. Sports massage after eccentric exercise. *Am. J. Sports Med.* 32 (6), 1499–1503.
- Kernozek, T.W., Torry, M.R., Iwasaki, M., 2008. Gender differences in lower extremity landing mechanics caused by neuromuscular fatigue. *Am. J. Sports Med.* 36 (3), 554–565.
- Mancinelli, C.A., Davis, D.S., Aboulhosn, L., et al., 2006.

- The effects of massage on delayed onset muscle soreness and physical performance in female college athletes. *Phys. Ther. Sport* 7, 5–13.
- Meister, K., 2000. Injuries to the shoulder in the throwing athlete. *Am. J. Sports Med.* 28, 265–275.
- Monedero, J., Donne, B., 2000. Effect of recovery interventions on lactate removal and subsequent performance. *Int. J. Sports Med.* 21 (8), 593–597.
- Moraska, A., 2005. Sports massage: a comprehensive review. *J. Sports Med. Phys. Fitness* 45 (3), 370–381.
- Murphy, D.F., Connolly, D.A.J., Benyonn, B.D., 2003. Risk factors for lower extremity injury: A review of the literature. *Br. J. Sports Med.* 37, 13–29.
- Myers, T.M., 2009. *Anatomy trains: myofascial meridians for manual movement therapists*, second ed. Churchill Livingstone, Edinburgh.
- Nordin, M., Frankel, V.H., 2001. *Basic biomechanics of the musculoskeletal system*, third ed. Lippincott Williams and Wilkins, Philadelphia.
- Nosaka, K., Newton, M., Sacco, P., 2002. Delayed-onset muscle soreness does not reflect the magnitude of eccentric exercise-induced muscle damage. *Scand. J. Med. Sci. Sports* 12 (6), 337–346.
- Novacheck, T.F., 1998. The biomechanics of running. *Gait Posture* 7 (1), 77–95.
- Orchard, J.W., 2001. Intrinsic and extrinsic risk factors for muscle strains in Australian football. *Am. J. Sports Med.* 29 (3), 300–303.
- Paschalis, V., Giakas, G., Baltzopoulos, V., et al., 2007. The effects of muscle damage following eccentric exercise on gait biomechanics. *Gait Posture* 25 (2), 236–242.
- Powers, C., 1998. Rehabilitation of patellofemoral joint disorders: a critical review. *J. Orthop. Sports Phys. Ther.* 28 (5), 345–354.
- Powers, S.K., Howley, E.T., 2009. *Exercise physiology: theory and application to fitness and performance*, seventh ed. McGraw-Hill, Boston.
- Sanderson, M., 1999. *Soft tissue release: a practical handbook for physical therapists*. Corpus Publishing.
- Saxton, J.M., Clarkson, P.M., James, R., 1995. Neuromuscular dysfunction following eccentric exercise. *Med. Sci. Sports Exerc.* 27 (8), 1185–1193.
- Stranding, S., Ellis, H., Healy, J.C., et al., 2005. *Gray's anatomy: the anatomical basis of clinical practice*, thirtyninth ed. Elsevier Churchill Livingstone, Edinburgh, pp. 1825–1861.
- Tiidus, P.M., 1997. Manual massage and recovery of muscle function following exercise: a literature review. *J. Orthop. Sports Phys. Ther.* 25 (2), 107–112.
- Tyc, F., Boyadjian, A., Devanne, H., 2005. Motor cortex plasticity induced by extensive training revealed by transcranial magnetic stimulation in humans. *Eur. J. Neurosci.* 21 (1), 259–266.
- Van Vliet, P.M., Heneghen, N.R., 2006. Motor control and the management of musculoskeletal dysfunction. *Man. Ther.* 11, 208–213.
- Vleeming, A., Mooney, V., Stoeckart, R., 2007. *Movement stability and lumbopelvic pain*, second ed. Churchill Livingstone, Edinburgh.
- Weber, M.D., Servedis, F.J., Woodall, W.R., 1994. The effects of three modalities on delayed onset muscle soreness. *J. Orthop. Sports Phys. Ther.* 20, 236–242.
- Weerapong, P., Hume, P.A., Kolt, G.S., 2005. The mechanisms of massage effects on performance, muscle recovery and injury prevention. *Sports Med.* 35 (3), 235–256.
- Willems, T.M., DeClecq, D., Delbaere, K., 2006. A prospective study of gait related risk factors for exercise related lower leg pain. *Gait Posture* 23 (1), 91–98.
- Zainuddin, Z., Newton, M., Sacco, P., et al., 2005. Effects of massage on delayed-onset muscle soreness, and recovery of muscle function. *J. Athl. Train.* 40 (3), 174–180.

## Client groups

### CHAPTER CONTENTS

<b>Massage for people with neurological disorders</b> . . . . .	<b>251</b>
<b>Massage in respiratory disorders</b> . . . . .	<b>252</b>
<b>Pain</b> . . . . .	<b>252</b>
<b>Plastic surgery</b> . . . . .	<b>253</b>
<b>Massage with older people</b> . . . . .	<b>253</b>
<b>Massage in occupational health</b> . . . . .	<b>256</b>
<b>Massage in mental health</b> . . . . .	<b>258</b>
<b>Massage for people with learning disabilities</b> . . . . .	<b>261</b>
<b>Abdominal massage</b> . . . . .	<b>263</b>
<b>Baby massage</b> . . . . .	<b>263</b>
<b>Massage in older children</b> . . . . .	<b>266</b>
<b>Massage in labour and pregnancy</b> . . . . .	<b>266</b>
<b>Breast massage</b> . . . . .	<b>266</b>
<b>Massage in gynaecology</b> . . . . .	<b>267</b>
<b>Summary</b> . . . . .	<b>267</b>

The possibilities for the clinical use of massage are extremely broad. In this chapter, we highlight its use with the client groups for which massage is most commonly used. It is hoped that this will encourage therapists creatively to widen the clinical application of massage.

### Massage for people with neurological disorders

Patients with neurological conditions, just like any other individuals, may request massage to achieve a feeling of well being. In mainstream health care,

the use of massage with this client group is an adjunct to active exercise therapy through which abnormal reflexes are managed and normal reflex activity is facilitated as muscle function and balance are improved. Restoration and maintenance of normal movement is the priority for use of patient–therapist contact time, to maximise natural neuroplastic changes and increase function. Massage should therefore be used selectively, to enhance the effects of other forms of physiotherapy. Where massage is used, for example in an attempt to reduce excess muscle tone, the type of spasticity must be understood because spastic reflexes are easily triggered by inappropriate handling. Examples of this are in flexor spasticity, when stroking the palm of the hand can stimulate the grasp reflex, or in extensor spasticity in the lower limb, when stroking the ball of the foot can trigger an extensor thrust response. As spasticity is due to loss of inhibitory control from the higher centres, reduction through peripheral stroking techniques is not of permanent value but can be used to evoke a temporary response, which enhances the effectiveness of subsequent movement techniques.

Slow stroking over the posterior primary rami region, based on the Rood approach, has been advocated by O’Sullivan (1988). Her suggested mechanism for the resulting reduction in muscle tone is activation of the inhibitory reticular system, which temporarily replaces the lost descending inhibition. In a study by Brouwer and Sousa de Andrade (1995), 10 patients with multiple sclerosis had measures taken of H-reflex amplitude, H-reflex amplitude during vibration and Achilles tendon jerk, in the triceps surae muscle. The measurements were taken before, immediately after and 30 minutes

after stroking. The technique consisted of 3 minutes of continuous stroking from the occiput to the coccyx (with the patients lying prone), by the therapist's index and middle fingers on either side of the spinous processes. A significant reduction in H-reflex amplitude was found in the group with multiple sclerosis, particularly 30 minutes after the stroking ended. The study was well controlled except for use of baclofen (an antispastic drug), although analysis showed that subjects taking the drug demonstrated the same trend in results, albeit to a lesser degree. In addition, the subjects reported subjective feelings of relaxation. Farber (1982) suggests that 3–5 minutes should be the maximum length of time this type of massage is given to neurological patients, to avoid rebound effects of the autonomic nervous system (ANS) or skin irritation.

Sirotkina (1964) used massage on flaccid muscles in the hemiparetic arms of stroke patients, in an attempt to increase muscle tone. Electrical activity was shown to increase following massage. Massage has been shown to have a positive psychological effect on multiple sclerosis sufferers. Hernandez-Reif et al (1998) compared 'medical treatment' with massage and found that the massage group improved anxiety and depression scores after ten 45-minute massages over 5 weeks.

Massage can be used to mobilise and stretch shortened muscle groups, in conjunction with active exercise therapy techniques. This can be useful in the flexor muscles of the forearm. Soft tissue mobilisations (STMs) are commonly used, to stretch muscle and its surrounding tissues and to restore muscles in excess torsion back to their more usual position. The muscle belly is grasped within the therapist's palm and the muscle is lifted and rotated towards its normal position, repeated numerous times. This is done in conjunction with active exercise therapy, to help normalise muscle tone and increase the effectiveness of muscle activity.

## Massage in respiratory disorders

Massage is not in widespread use with this client group. Asthma and other conditions which cause breathlessness, however, can lead to feelings of panic and anxiety so it may be that massage has a use in assisting patients to manage these conditions. Connective tissue manipulation has been used to reduce bronchospasm. Beeken et al (1998) studied the

effects of neuromuscular release massage therapy in five individuals. Four of the subjects had an increase in thoracic gas volume, peak flow and forced vital capacity. The authors report significant improvements in heart rate, oxygen saturation and systolic blood pressure following 24 weekly treatments. These findings are of interest and may be worth repeating with a larger sample to explore whether the findings can be generalised to other individuals, and whether massage was the only causative factor in the improved physiological measures. Massage was found to be superior to relaxation therapy in children with asthma (Field et al 1998a). The children were more relaxed after massage and over time experienced improvement in lung function. It is unclear whether the effects were psychological or physical, as again this research group did not control with another touch therapy. It also had poor reporting characteristics (Hondras et al 2001).

## Pain

Pain is an important symptom. Pain caused by cancer is experienced as 'negative' pain, possibly perceived to indicate a severity or worsening of the condition, therefore provoking fear and anxiety. This contrasts with 'positive' pain which can be endured more readily as it leads to reward, such as the pain of childbirth or athletic achievement. Massage can help an individual to cope with pain. Several approaches can be taken: whole body massage can be given to induce relaxation; local Swedish massage can be applied to close the pain 'gate' or to have a counterirritant effect. Reflex techniques such as acupressure can be used to promote relaxation and a feeling of general well being or to improve specific organic functions.

A study conducted on volunteer healthy subjects found that massage produced hypoalgesic effects on experimental pain (Kessler et al 2006). Weinrich and Weinrich (1990) studied 28 patients with cancer, assigning them to two groups of 14 in matched pairs. The treatment group received 10 minutes of massage (performed by senior nursing students who had received less than 1 hour of massage training), while the control group was visited for 10 minutes. The back massage significantly reduced pain in men but not in women. This was short-term relief, as no significant differences remained after 1 hour. The levels of pain before the massage were, in fact, quite low, so significant falls would have been difficult to demonstrate in a sample of this size.

In a larger study, [Marin et al \(1991\)](#) studied the effect of massage on 116 patients who had had a thoracotomy. A visual analogue scale was used, as in the [Weinrich](#) study, and it was found that massage and physiotherapy reduced pain significantly. This is a French paper and unfortunately the English abstract does not give further details. Massage therapy was found to have superior effects to transcutaneous electrical nerve stimulation (TENS), a common treatment for chronic pain, and placebo TENS in fibromyalgia patients. The massage therapy group enjoyed improved sleep patterns and decreased pain, fatigue, anxiety, depression and cortisol levels following ten 30-minute massages over 5 weeks. The TENS group also improved across several parameters by the last treatment. The massage therapy was compared to modalities which were less intensive in terms of touch and direct individual contact, so the psychological effects of massage cannot be differentiated from any physiological effects in this study ([Sunshine et al 1996](#)). In a more recent study of the same client group, massage was found to have a positive effect on pain intensity, number of tender points in the neck and upper back region and functional status in fibromyalgia patients. Massage was added to a treatment regimen of heat and exercise and compared with heat, exercise and mobilisations. Neither approach was found to be superior but the sample sizes were small ( $n = 7$ ) in this study which contained multiple variables ([Aslan et al 2001](#)). A randomised controlled trial undertaken by [Hulme et al \(1999\)](#) explored the effects of foot massage on patients' perceptions of daycare following laparoscopic sterilisation. The mean pain scores following surgery differed between the two groups (foot massage and analgesia compared with analgesia only), with the foot massage group reporting less pain over time, although this was not statistically significant. [Field et al \(2000\)](#) studied the effects of burn scar massage and found that twice-weekly massage reduced the incidence of itching, pain and anxiety and improved mood. Unfortunately, the mechanical effects on the scar itself were not measured. Massage appears to be a promising intervention for pain relief but studies differentiating between the psychological and physiological effects would inform work with this client group.

## Plastic surgery

Patients with cancer may be offered reconstructive ('plastic') surgery following disfiguring surgery. Massage following mastectomy is advocated by [Field and](#)

[Miller \(1992\)](#) for reducing the thickening of the scar, facilitating revascularisation and promoting mobility and elasticity of the skin. These authors also describe massage of silicone breast implants to prevent capsular contracture, a common cause of disfigurement. These massage 'exercises' are recommended from 24 to 48 hours after operation and should then become a permanent routine for the patient. The implant under the skin is displaced superior and medially to counteract the effects of gravity. Laterally and inferiorly directed movements can be included, but are optional.

[Bodian \(1969\)](#) reported the efficacy of massage following ophthalmic plastic surgery to reduce thickening of scars and keloid formation and to prevent deformity caused by scar contracture. A technique whereby the skin of the eyelid is stretched to full excursion in a direction opposite to the tightening was described. This method, using approximately 20 excursions three times a day, was taught to the patient or parent 2 weeks or more after surgery. Reported results were softening and thinning of the eyelid, smoothing of the scar as underlying adhesions were released and reduction of keloid formation.

## Massage with older people

Within the client group termed the young old (65–74 years) and the old (over 75 years) ([Rosenberg & Moore 1995](#)), widely varying degrees of physical and mental health can be found. This is not a homogeneous group and, as far as health is concerned, there is no reason to assume they all have health or functional problems. It is noteworthy that about 80% of older people in the UK perceive their health and activity levels to be satisfactory ([Partridge et al 1991](#)). Since then, Western society has seen a move towards increased activity, employment and active leisure pursuits in this age group. However, some of the changes associated with ageing can cause physical discomfort, loss of function and psychological change. Collectively these may lead to a loss of coping skills, which means that these elderly people will require varying levels of support to remain independent in their own home, or will require admission to long-term residential care. In both cases, the prime goals of care are to improve or maintain functional abilities for as long as possible and to enhance the quality of life (QoL). These aims are unlikely to prove successful in the long term if adequate

attention is not given also to intellectual and emotional function. Thus, it is especially important to view a programme of care holistically and it may then be found that improvement in one function will often be followed quickly by improvement in others.

Some elderly and very old people are admitted to residential care because their support system has failed, for example when a carer has fallen ill. If the client does not deteriorate functionally then a return to semi-independent living is possible once the support is reinstated. However, the majority of people in residential care are there because, even with a high level of support, they cannot function satisfactorily and safely in their own home. Many of these clients have multiple pathologies and other problems associated with old age. Physical discomfort, impaired function, social isolation, bereavement, decreased financial status and loss of home are also likely to have had a significant effect on people in this environment. While some clients display remarkable resilience in coping psychologically with these events, others suffer a consequent impairment in mental health.

Although depression is commonplace in the elderly (Gurland & Toner 1982), the therapist should guard against mistaking the symptoms of depression for dementia, which is an organic brain syndrome. A depressed person may appear confused and lack motivation but the condition may be helped by appropriate interventions. Highly developed interpersonal skills are required of the therapist to maximise the possibility of successful treatment. Empathy and an unconditional positive regard are prerequisites to developing a therapeutic relationship which may partially compensate for the social isolation and anxiety caused by a change in the client's environment.

Personal autonomy—the freedom to make one's own choices—is largely denied to elderly people in residential care. This frequently engenders a loss of self-esteem and sense of self, which is damaging to QoL and can also affect motivation. It is important, therefore, that clients should be empowered in such a way that they feel that they have some choices. This is pertinent to the therapist when considering massage with this group of clients. It should not be assumed that every elderly person will welcome touch or that it is necessarily appropriate. However, there is a body of opinion which supports the view that some institutionalised elderly and chronically sick people may be tactually deprived (Barnett 1972, Fakouri & Jones 1987). It has been reported that a group of elderly clients with anxiety

and depression responded well to hand massage, experiencing feelings of relaxation and an improved sense of well being (Cole 1992). Back massage with conversation has been shown to reduce anxiety in the elderly. Fraser and Kerr (1993) compared back massage with conversation to a conversation-only and a no-intervention group, in a population of institutionalised elderly clients. The results showed a significant difference in the mean anxiety score between the back massage and the no-intervention group; the results approached statistical significance between the back massage and the conversation-only group. Although the sample size was small ( $n = 21$ ), which makes the validity of the statistics questionable, this study does lend some support to the use of massage as an intervention with anxious elderly clients in residential care.

The therapist should ensure that privacy is maintained throughout the massage and require the client to remove only the items of clothing essential for facilitating the treatment. Many elderly people are embarrassed to remove clothing in the presence of another and the therapist will be rewarded if she first takes time to establish a good rapport and remains sensitive to this issue. Care and attention need to be paid to the type of massage administered, particularly in relation to the soft tissues, which are not so resilient as those found in a younger age group. Extra lubricant should be used on dry skin to avoid stretching and uncomfortable friction; light techniques should be used in the presence of fragile blood vessels. The client may not be able to lie in the usual positions for massage: climbing on to a non-adjustable treatment couch may be impossible or unsafe, and for some elderly people the prone position will be uncomfortable. If a treatment couch is used the supine and side-lying positions may be more comfortable, but many clients will require the therapist to use ingenuity in achieving a position that both is effective for the massage and remains comfortable and ergonomically sound for client and therapist (Fig. 14.1). Massage to the upper and lower limbs can be administered with the client seated in a comfortable chair; back massage is facilitated when the client is seated on a stool of suitable height and supported anteriorly by pillows placed on the couch or a table. If positioning is problematic, or if the client does not wish to remove clothing, then a hand massage may be acceptable. This is a useful alternative when privacy cannot be assured and can also be utilised as a component of a group programme for promoting social interaction and shared enjoyment.





**Figure 14.1 • Enabling massage in a seated position by use of a portable head rest.**

## Dementia

This term denotes a global intellectual impairment associated with most areas of mental function and may be accompanied by decreased motor abilities. It is commonly the result of Alzheimer's disease, multiple cerebral infarcts, metabolic disorders or some degenerative diseases. Most dementias are chronic, with an unremitting deterioration in the condition. Occasionally a form of acute dementia is diagnosed which can be treated, for example in the case of vitamin B<sub>12</sub> deficiency. The challenge facing health professionals, when caring for clients with dementia, is to provide an environment that offers opportunities for optimum QoL for each individual.

The therapist must be prepared to take much time in building a relationship of trust with the client and in acquiring the skills needed to communicate in the presence of intellectual and sensory deficits. Several studies support the view that the use of two sensory stimuli during communication are more effective than one, so that the addition of caring touch to a verbal approach may facilitate verbal or non-verbal responses (Kleinke 1977, Langland & Panicucci 1982). The

utilisation of touch may not have a universal application: in some patients with high agitation and severe cognitive impairment touch was found to be linked with an increase in aggressive behaviour (Cohen-Mansfield et al 1989). This work supports that of De Wever (1977), who found that nursing home clients often perceived discomfort when an arm was placed around their shoulder by a nurse. Thus, great care should be taken by the therapist to ensure that physical contact is not misinterpreted by the client: ensure that the client is able to observe your approach; attempt to maintain eye contact during communication; always explain what you require from the client; avoid making sudden movements which may startle the client; and, where possible, ensure that the client is in a familiar environment with minimal extraneous sensory distractions. Ballard et al (2002) demonstrated a clinically significant reduction in agitation in patients with severe dementia but these positive effects are attributed to the essential oil melissa. This is regarded as a good study (Thorgrimsen et al 2003).

Massage of the hands may help to accustom the client to being touched, assist in building trust and promote relaxation. Poon (1991) found a 40%

increase in self-reported relaxation scores after elderly clients with dementia were treated with hand massage. When the massage was combined with music, the scores increased to 60%. Hand massage may be taught to the family, carers and significant others of dementia sufferers; these are people who often feel helpless in the face of the unremitting nature of the disease and the difficulties in communicating with their loved one. Giving a massage may enable them to enjoy a form of caring touch once again.

## Key points

- Many elderly people are healthy and do not have functional problems.
- Therapists who work with this client group need good interpersonal skills.
- Not all elderly people respond well to touch.
- Massage may help to reduce anxiety in some institutionalised elderly people.
- Client positioning for massage may need modifications.

## Massage in occupational health

There is currently a global trend for market economies to emphasise increased production at reduced cost. This inevitably leads to fewer workers working harder—at a faster rate and for longer hours. While work can have a positive effect on the individual—aiding the development of physical strength and flexibility, social skills, personal growth and providing financial security—it can also have a detrimental effect on well being. Massage can be used to prevent and reduce psychosocial and musculoskeletal stress, but emphasis is currently placed on prevention of the latter. In Europe, attention has been focused on the prevention of musculoskeletal stress by the European Community Directive (1990), which resulted, in the UK, in the Manual Handling and Health and Safety Regulations of 1992. Broad health and safety issues are outside the scope of this book and require specialist knowledge from the fields of management, occupational psychology, ergonomics, engineering, and health and safety. To address the issues satisfactorily a workplace requires a detailed health and safety policy for which all the members of the workforce at all levels share responsibility. A comprehensive policy

should ideally include health promotion in addition to addressing ill-health treatment and prevention. Massage has a particular role to play in the promotion of well being and can also participate in treatment of musculoskeletal conditions.

It should be recognised that most of the issues that contribute to loss of well being in the workplace are interrelated. This is apparent when examining the many factors that contribute to work-related musculoskeletal disorders:

- Stress: work pressure, financial;
- Anxiety: job insecurity, workload;
- Relationships: inside and outside work;
- Environment: abnormal or fluctuating temperature, noise, dust, poor light, cluttered floor can all act as dangers or stressors;
- Unergonomic design of the workplace or task;
- Static loading on the musculoskeletal system;
- Repetitive tasks;
- Moving and handling of excess or awkward loads; and
- Injury.

The most common musculoskeletal problems for which a physiotherapist is consulted are spinal pain and work-related upper limb disorders (WRULDs), otherwise known as cumulative trauma disorders. The latter includes the controversial repetitive strain injury (RSI). The mechanisms that produce the symptoms of RSI are poorly understood (Pheasant 1992) and therefore its recognition by the medical profession remains inconsistent. It is of interest that the symptomology can exist when repetitive strain is not a feature of the job.

Various terms are used throughout the world. WRULD is the most satisfactory as it covers upper limb symptoms that occur as a result of work, despite their cause. Risk factors appear to be actions that are repetitive, that load muscles statically or that load joints excessively or cumulatively, particularly when they are in a poor biomechanical position. Poor positioning is often seen in the small joints of the hands, wrists and trunk, and typically occurs in the lower back when lifting in a constrained space (for example, flexion with rotation).

Symptoms occur primarily in the soft tissues and may be diagnosed as carpal tunnel syndrome, tenosynovitis or tennis elbow, which are thought to be due to overuse (as in tennis elbow), repetitive friction between the tendon and its sheath (tenosynovitis) and fluid pressure build-up with resultant nerve

pressure in a confined space (as in carpal tunnel syndrome). The latter is more likely in pregnancy when fluid retention can be a causative factor. However, in many work-related problems, while the symptoms may be local, the problem is often more complex. Symptoms and signs are often more diffuse, with discomfort felt at several sites. Thorough examination of the musculoskeletal system often reveals signs proximal to the site of discomfort. It is thought that this is often due to adverse neural tension (ANT) induced by postural factors, muscular tension or previous trauma, either instantaneous or cumulative. Therefore screening for ANT is essential in the treatment of WRULDs (Pheasant 1994). Massage can be used to reduce and prevent some of the contributing factors, and to reduce soft tissue symptoms.

### Massage for causative factors

Static loading of muscle is known to contribute to WRULDs. This tends to occur in the shoulder girdle during tasks such as typing. Widespread use of word processors appears to have contributed to the increase of arm problems as modern machines require a fairly static action whereas traditional typewriters necessitated dynamic, varied movements of the whole arm—sliding the carriage, for example. As more office tasks such as filing are becoming electronic, an increasing amount of time is being spent at the visual display unit (VDU) and relatively static postures may be held for hours. Static muscle work leads to reduced circulation and anoxia in muscle with resultant pain, tenderness and thickening. Postural adjustment and muscle tension can lead to ‘tension’ headaches.

Massage can be beneficial in reducing the effects of static muscle work by increasing circulation to the muscles, reducing toxic accumulation and its resulting tenderness and mobilising connective tissue. This facilitates elongation of the neck muscles and trapezius, allowing postural correction such as head retraction, lowering of the shoulder girdle and restoration of normal spinal alignment. The muscles that require particular attention are trapezius (palpate for a thickened occipital attachment on the nuchal line), erector spinae in the neck and thoracic areas, levator scapulae (a thickened attachment at its insertion at the superior angle of scapula is common), the rhomboids, supraspinatus, infraspinatus and the scalenes.

### Useful strokes for reducing effects of static muscle work

Strokes which are useful are *effleurage* to promote drainage and increase circulation, *petrissage* including *wringing* and *skin or muscle rolling* of the neck (and shoulder girdle if the patient is unclothed) and *finger kneading* especially at tendinous and aponeurotic insertions on to the scapula.

Massage can also be used to reduce some of the physiological effects of stress and, by promoting a feeling of well being, may help to reduce stress itself. Relaxation massage can contribute to the promotion of good health, a point being addressed in some larger companies to assist workers in maintaining fitness and the flexibility necessary to carry out their work safely and efficiently, thus reducing sick leave costs. Aromatherapy may be the treatment of choice here due to the multisensory effects of massage with essential oils. The therapeutic properties of oils such as geranium and lavender can be utilised to promote relaxation. Field et al (1997a) found that a variety of relaxation therapies, including massage, were equally effective in decreasing anxiety, depression, fatigue and confusion scores in 100 hospital employees. The same research group found massage therapy reduced anxiety, but also enhanced electroencephalogram patterns of alertness and speed and accuracy of mathematical computations (Field et al 1996a). This is interesting as it suggests that relaxation need not induce a drowsy state, but may instead produce alertness. Further work is needed to assess whether different types of massage or different body areas may influence the state of alertness. This study also demonstrates that improved psychological parameters improve work performance, as well as lead to improved well being; therefore initiatives to improve the health of workers are likely to be cost-effective.

### Massage in the treatment of work-related problems

In the treatment of musculoskeletal problems, it is important to consider the structures that may be implicated in the symptomology, even though they may seem to be symptomatically silent. Thus, in WRULDs, the neck, shoulder girdle and arm may require attention as well as the more distal areas of discomfort.

## Strokes for treatment of work-related problems

Locally, the strokes that may be useful are *effleurage* to promote drainage; *petrissage*, *wringing*, and *skin and muscle rolling* to stretch and mobilise the tissues; *finger kneading* for stretching of deeper structures; and *Cyriax frictions* for chronic tendinitis.

Care must be taken of areas showing signs of acute inflammation, recognised by redness and heat. Local massage should be avoided if this is present, and massage confined to proximal areas.

Any interruption of typical muscle work patterns is beneficial and health promotion or rehabilitation initiatives are most likely to succeed if they have a good cost–benefit ratio for the client, whether an individual employee or company. This has led to the development of on-site services, pioneered in the USA, where workers are given massage through their clothing without leaving their workstation. Where possible, however, workers are best encouraged physically to leave their workstation as the change of position and the walk, however brief, will be therapeutic and biomechanically beneficial. [Levoska and Keinanen-Kiukaanniemi \(1993\)](#) found that muscle training was more effective than heat, massage and stretching in reducing symptoms of cervicobrachial disorders in 47 female office employees, although the incidence of headache was significantly less at 12 months' follow-up in the group receiving passive physiotherapy. This illustrates the need for a combined approach. However, seated massage through clothing can be helpful where privacy is not available (see [Fig. 14.1](#)). The portable chairs which have been specially designed for massage have facilitated massage that is performed with the client in a sitting position. For many years, physiotherapists have performed neck massage with the patient leaning forwards on to a pile of pillows; though effective, this can be cumbersome and is difficult to achieve in non-clinical situations. Massage chairs are often well designed and comfortable, and facilitate massage services in public areas.

*Clothed massage*, like any other, should be tailored to the needs of the individual client, but particularly useful are pressure techniques and modified classical massage-type techniques. Care should be taken to ensure that massage over certain materials (for example lycra) does not irritate the skin. [Katz et al \(1999\)](#) conducted a small pilot study in which hospital nurses were given eight 15-minute workplace-based

massage treatments. Pain intensity, tension, relaxation and the profile of mood states scores significantly improved after massage. This study suggests that workplace-based massage may be effective in reducing the effects of stress at work and is worth investigating further.

In summary, massage can be used to treat specific musculoskeletal problems such as WRULDs and low back pain in coordination with the other occupational health staff. Relaxation massage, preferably with essential oils, in a conducive environment can be used to reduce stress. The hands or neck and shoulders should be treated as a minimum, but whole body massage is preferable. Massage plays a small part in occupational health, which should include ergonomic design, education, postural correction and body awareness to reduce musculoskeletal strain. It is not satisfactory to put energy into reducing the negative effects of work without applying an equal amount of effort towards prevention. Massage should not be used to perpetuate bad working practices by reducing symptoms and appeasing the workers. It should contribute to the empowerment of employees, which will enable them to participate in improving their working practices and environment.

## Key points

- Massage can help treat back pain and work-related upper limb disorders.
- Thorough assessment is necessary and postural factors should always be considered in this client group.
- Treatment, education and prevention should be undertaken together.
- Massage can be used to treat local problems such as neck pain or overuse injuries.
- Aromatherapy can induce relaxation, reduce stress and promote well being.
- Seated, on-site massage can be a cost-effective way of promoting health among employees.

## Massage in mental health

This is an interesting and complex area of work for the therapist. People with mental disorders have a wide variation in symptoms and the approach to treatment is specific to the patient. Clients will

typically display both cognitive and somatic signs and symptoms; cognitively there will be evidence of abnormal patterns of thought, and somatically various abnormal physical sensations may be reported. The therapist will be guided in her approach more by the symptoms experienced by the individual than by the diagnostic label that has been attached to that client.

Perhaps of primary importance when working with this group of clients is to ensure that informed consent to treatment has been obtained. People with mental illness may be particularly vulnerable to the power imbalance inherent in a therapist–client relationship and some will not possess the assertive powers needed to vocalise their feelings about treatment procedures. Others may have disordered thought processes which render them temporarily incapable of rational decision-making, including consent to treatment. In these cases the therapist may find it useful to discuss the proposed treatment methods with colleagues. For example, a client with mental illness and who has been sexually abused may experience flashbacks (a state of acute awareness of the traumatic event including the return of emotions felt at that time), which may be triggered by being touched. Consideration of the potential outcome of attempting massage with this client (information that may be offered by the clinical psychologist) may enable the therapist to adapt the treatment to avoid an unwanted effect.

The therapist should have a clear idea of the aims of massage so that there is unlikely to be any conflict with the objectives of the treatment plan as formulated by the multidisciplinary team. Massage should augment the therapeutic procedures that have been agreed by members of the multidisciplinary team. Occasionally massage may detract from the overall aims or may be thought to be an inappropriate intervention for a specific client. This is rare, however, and massage is usually a most versatile therapeutic tool in mental health care. It can, for example, be employed to sedate, to stimulate, to help develop a trusting therapeutic relationship and to decrease awareness of somatic symptoms.

It is likely that clients with a mental illness have the same incidence of musculoskeletal problems as the general population. If a client complains of symptoms, the therapist should assess in the usual manner and not assume that they are a somatised symptom of the mental illness. Occasionally certain prescribed medications may cause severe muscle spasm; the therapist may be the only person on the team to

identify this and must therefore be aware of unusual signs of this nature. Therapists in private practice will occasionally be consulted by clients who ostensibly have purely physical symptoms but who may have an underlying mental health problem. Chronic physical illness is often accompanied by depression and anxiety. At some time during their life 25% of the population will experience a psychiatric illness (Rose 1995), and individuals often do not seek professional help for mental health problems. They may report only the physical symptoms of mental illness and so the underlying cause may be undetected. This clearly has implications for the degree of improvement that can be expected in the symptoms and for the outcome of treatment.

Many of the individuals in this client group will benefit from extra attention being paid to the environment in which the massage takes place. Privacy, quietness and freedom from interruption will ensure that conditions such as anxiety and paranoia are not likely to be exacerbated by procedures. The therapist should take the time to explain what she intends to do and ensure that the patient understands what the desired outcomes are. In this way it is possible to minimise any potential stress response, such as physiological arousal. It is important to formalise the massage treatment sessions to the extent that the patient knows when massage is going to be available and how many sessions are being offered, if these are to be limited. This will underscore the fact that massage is one element of the treatment plan and also decrease the likelihood of the client experiencing a sense of rejection when massage is discontinued. In this regard, care should also be taken not to promote therapist dependency. This can be avoided if the massage treatment is viewed by the client as part of a progressive rehabilitation programme. With patients who have chronic or recurring mental disorder, massage is more likely to be used as one of a number of strategies to promote coping abilities. In these cases it is better for the patient if timed appointments for treatment are made, rather than the sessions being viewed by the patient as being on demand or when the therapist can fit a massage into a busy schedule. Misunderstandings can easily arise which may detract from a valuable therapeutic relationship.

Many clients with mental illness enjoy hand massage. Even those with an aversion to touch (provided they consent), survivors of physical and sexual abuse, and others for whom general massage may be perceived as threatening or undesirable, usually respond

well to hand massage. This form of massage is particularly useful in groups, where willing members can be taught to massage each other's hands, thus promoting interaction between members of the group (Valentine 1984). Although conversation is usually discouraged when massage is used for relaxation purposes, group massage sessions can create a helpful environment for encouraging some light-hearted discussion, or give time for the therapist to teach health education and to dispel some unhelpful health beliefs. Most clients are interested in the process and become receptive to hearing explanations about the benefits of massage and other relevant health topics.

Teaching self-massage to clients provides them with a valuable tool of self-help and the therapist will occasionally be rewarded by the great enthusiasm with which some patients embrace this opportunity. By teaching a patient these techniques the therapist empowers the individual in a unique way. Clients with anxiety or depression and those who experience panic attacks are among those who will benefit from self-massage. One way to approach this is for the client to experience a therapist-administered head or hand massage and then be taught a modified form for self-treatment, which can be used as part of a relaxation programme. In addition, patients may be taught how to stimulate appropriate acupoints as an aid to composure or as part of their coping strategy against panic attacks.

A common assessment finding in many patients with mental disorder is that they have a lost or distorted body image. Massage is valuable as a component of body awareness training, by stimulating sensory awareness of neglected areas. This presents a further opportunity for education, when body image can be related to the effect on emotions and attitude. It may aid clients who harm themselves by challenging feelings of self-loathing and helping to promote an enhanced self-image.

The therapist should always bear in mind that massage may provoke catharsis (the release of pent-up emotions); also, a trusting relationship between therapist and client may encourage emotive disclosure and the therapist must be competent to deal effectively with these situations when they occur. The release of emotions is often a prerequisite to the patient progressing towards wellness. If the therapist recognises this she can provide a secure environment in which it may occur and an empathetic 'listening ear', which is often all that is required (Dennis 1995).

## The evidence

---

Coelho et al (2008), in their systematic review of massage for depression, concluded that, as far as massage is concerned, the evidence was promising but not compelling due to the fact that there were few studies which satisfied rigorous scientific standards. Nevertheless, there are some relatively small-scale randomised controlled trials which have shown massage to be beneficial for people with depression and post-traumatic stress disorder (PTSD).

Field et al (1996b) studied 60 children randomly selected from a pool of children who displayed classroom behaviour problems following Hurricane Andrew (these were symptoms previously reported for children considered to be suffering PTSD including numbness of responsiveness, increased arousal and conduct problems). The children were allocated to either a massage therapy group who received a 30-minute back massage 2 days per week for 4 weeks or a video attention control group who spent the same amount of time watching children's relaxing video tapes with a research assistant who provided physical contact. On the last day of the study the massage group showed significant decreases in anxiety and depression compared to pre-treatment scores; there were also significant differences between the two groups.

In a different study Field et al (1996c) randomly assigned 32 depressed adolescent mothers to either a massage therapy or relaxation therapy group. The massage group received 30 minutes' massage on 2 days per week for 5 weeks; the relaxation therapy group spent the same amount of time doing yoga and progressive muscle relaxation. The profile of mood states scores significantly decreased from pre-treatment values in the massage therapy group over the trial and there was also a significant difference between groups. In addition, the massage therapy group showed a significant decrease in stress hormone levels (cortisol) over the period. Price (2007) found that, in 24 women who received eight 1-hour body therapy (bodywork) sessions during sexual abuse recovery, the greatest change was in reduction of dissociation. This is a predictor of positive outcomes.

## Key points

---

- The therapist should consult with other members of the multidisciplinary team.
- Massage should promote the objectives of the treatment plan.

- Physical symptoms need proper assessment.
- The client requires a full explanation of the treatment.
- Teaching self-massage is a way of empowering the client.
- The therapist should be prepared for emotive disclosure.

## Massage for people with learning disabilities

Clients with learning disabilities have the same physiological and emotional needs as the rest of the population, but they often require support to learn 'living skills'. Massage can be used to fulfil some emotional needs such as the need for touch and intimacy and it can be used as a vehicle through which certain skills can be learned. Its incorporation into the lives of those with learning disabilities can be both valuable and pleasurable for the recipient and rewarding for the therapist, and it can be employed as an integral part of the therapeutic programme.

The learning of social skills is one of the keys by which an individual achieves 'normalisation' or 'social role valorisation' (Wolfsenberger 1983). However, this cannot be achieved without implications for all members of the learner's community. O'Brien (1987) has identified the widely accepted so-called Five Accomplishments, which should be addressed by those providing services for people with learning disabilities in order that they might achieve a good QoL. The accomplishments are community presence

and participation, choice, competence and respect. Communication is an implicit skill required for the personal achievement of most of these goals and individuals may need help in developing their potential in this area, whether that potential involves speech, sign language or eye contact. Important stages in communication are trust, sharing and interaction, and these must be reinforced by reciprocity with others. Touch is a powerful route through which these can be developed and massage is advocated as an appropriate form.

Massage can also be used to assist the development of sensory awareness, augmenting the sophisticated multisensory workshops which include movement- or touch-generated light and sound systems, water beds, hammocks and tactile surfaces. They can be used to encourage interaction with the environment. Multisensory massage (Sanderson et al 1991), with objects of differing sensory quality such as brushes and cotton wool or with mechanical massagers, can desensitise psychological or physical touch intolerance and promote sensory differentiation. This physical interaction with another human being also requires trust and tolerance of sharing personal space. Sanderson and co-workers suggest that massage can be used with the eight steps identified by McInnes and Treffry (1982), through which a person with dual sensory impairment must progress before being comfortable with physical contact (Table 14.1). These are resistance, toleration, passive cooperation, enjoyment, active cooperation, leading, imitation and initiation. They suggest that *passive massage* becomes *interactive massage* when the stage of active cooperation is reached. These stages are a

**Table 14.1** The interactive sequence

	Stage	Interpretation and intervention
Passive massage	1. Resists	Person may hide hands—switch to a form of touch which is more acceptable to the individual, e.g. stroking hair.
	2. Tolerates	May be fleeting—aim to increase the time engaged on the activity.
	3. Cooperates passively	Subtle change in response which might allow different strokes to be introduced.
	4. Enjoys	Enjoyment shown by relaxation/smiling.
Interactive massage	5. Responds cooperatively	Participates in some way, e.g. moving limbs to facilitate the massage. Less need for encouragement at this stage.
	6. Leads	May offer a limb for massage once the previous one is finished. Follow the lead.
	7. Imitates	Imitates the massage on the back of her own hand, with encouragement. Give verbal support and encouragement.
	8. Imitates independently	Imitation occurs without verbal prompting, e.g. offering the oil for massage. Reciprocal massage between the learner and support worker may become possible.

useful guide to progression and goal attainment, but the support worker should be aware that, while they are a useful base for massage and other interventions, they can be regarded as oversimplistic as they are not necessarily linear and distinct (Chia 1995). More than one stage may be achieved at any one time and moves from interactive to passive stages do not necessarily imply regression, but may be dependent on factors such as mood and physical health (see Table 14.1). A study by Lindsay et al (1997) showed that hand massage/aromatherapy and active therapy (a bouncy castle) had a less positive effect on concentration than snoezelen and relaxation in eight subjects with profound learning disabilities. Rather than demonstrating that massage is not effective, it may indicate that massage must be skilfully applied and individualised according to McInnes and Treffry's interactive sequence if it is to be effective. Field et al (1997b) demonstrated that touch therapy can improve attentiveness and responsivity in autistic children.

Individuals who do not understand their environment or the intentions of others, or who are unable to identify or communicate their needs and feelings, may show their distress by violent or erratic ('challenging') behaviour. This behaviour can be externally applied towards others or internally applied when it is termed self-injurious behaviour. Dosseter et al (1991) reported on the use of massage in the care of a 14-year-old girl with Cornelia de Lange syndrome and a 10-year history of self-injurious behaviour. The results were dramatic. She enjoyed twice-daily massage which soon developed into a form of reciprocal play over which the girl and care worker shared equal control. After 6 months of massage this girl no longer required medication, despite the fact that, before massage, she had had 100 bouts of self-injurious behaviour each day. This illustrates the creative ways in which massage can be shared with this client group. A similar positive finding occurred in a man with autism and severe challenging behaviour and anxiety following a programme of 'deep touch therapy' induced by a tight tucking in of sheets (Blairs et al 2007).

Many people with severe developmental disabilities may be severely restricted physically, as well as intellectually, and may have disorders of muscle tone. Constipation can be a permanent problem in their nursing care and enemas are widely used to maintain bowel evacuation. Emly (1993) describes the use of abdominal massage in a 21-year-old man with profound disabilities. Massage (modified from

the method first described by Prosser in 1938 (Prosser 1941)) three times weekly reduced the enema requirement from twice-weekly for 10 years to none for a whole month. The benefits of massage can be multifactorial in this group of patients and goals should be set accordingly.

## Uses and effects of massage in people with learning disabilities

Massage can be used with this client group to:

- Promote relaxation;
- Reduce anxiety;
- Stimulate;
- Calm challenging behaviour;
- Improve sleep patterns;
- Improve communication and interaction;
- Promote therapeutic rather than destructive sensory stimulus;
- Improve bowel function;
- Assist in the expression of emotional response; and
- Promote pleasure and feelings of well being.

The use of essential oils can be particularly beneficial in this client group (Harrison & Ruddle 1995). They provide useful sensory input and added enjoyment and their therapeutic effects can be chosen according to individual need. Clients may progress to choosing and communicating their preferred odours, which can also be applied in baths or burners. As with all client groups, it is essential that a full assessment is carried out before proceeding with massage. In particular, essential oils should be chosen with care with due regard to side effects, especially in the presence of medical conditions such as epilepsy (when hyssop and rosemary should be avoided) and skin conditions. Weak blends and short treatment times should be used when treating young children.

## Key points

- Ensure the client understands what you are doing.
- Take the steps very slowly; expect and acknowledge small amounts of progress.
- Remember the steps are not always linear: fluctuation between stages of achievement does not necessarily indicate regression.
- Respect individual moods and desires.



- When rejection of the massage occurs, switch immediately to another activity the individual enjoys.
- Take care in planning the environment—does this individual like music or privacy, or require the presence of a trusted person or advocate?
- Choice of the massage position should be client-led and should aspire towards facilitating absolute physical and emotional comfort.
- The massage should be learner-led.
- Welcome and permit the interaction and leadership of the client.
- Persevere.
- Keep massage sessions short.
- Be exquisitely sensitive to responses.
- Keep input simple.
- Ensure that there is a clear start and finish to the activity.

## Abdominal massage

Individuals with altered muscle tone or reduced mobility, or who are taking long-term medication, may suffer from constipation, which is uncomfortable and increases feelings of being unwell. Although massage has long been advocated as being beneficial to those with constipation (Chin 1959), the results of studies have appeared contradictory. Klauser et al (1992) reported that colonic massage did not change parameters of colonic function in either healthy volunteers or constipated patients. They measured bowel function by transit time of swallowed radio-opaque markers and stool consistency, the latter being a subjective score which was averaged. They compared two 2-week control periods (before and after massage), separated by a 3-week massage period in the healthy volunteers, and compared a pre-massage period with a massage period in the constipated patients. It has been suggested that massage can have a delayed effect on constipated patients (Holey & Lawler 1995), so, in omitting a post-massage measurement period in the treatment group, the Klauser study missed what is possibly the most important time period.

In contrast, Resende et al (1993) found that massage and exercise improved bowel evacuation frequency and reduced the use of enemas and bouts of incontinence significantly. Unfortunately, the study was not well controlled as there was no control group, medication was stopped and exercise was

added. The results could be due to any one or a combination of these three interventions. Interestingly, bowel transit times were not increased, but frequency of bowel emptying *was* increased, demonstrating the dubious nature of the link between these two factors.

Emly (1993) advocates the use of abdominal massage in neurological patients, following success in her learning disability unit. She suggests that massage reduces spasticity in the abdominal wall, thereby promoting peristalsis. Evidence to support the widespread anecdotal evidence of massage-induced bowel emptying is clearly inconclusive but it may be a comfortable alternative to laxatives and enemas in individuals who are less mobile, on restricted diets or on medication. Indeed, a pilot study conducted with subjects who were profoundly disabled and institutionalised found that massage was not more effective than laxative use. Colonic transit times, stool frequency, size and consistency, the requirement for enemas and client well being were monitored (Emly et al 1998). It appears, then, that massage may be an alternative to laxative/enema use and a promising treatment for chronic constipation (Ernst 1999) but is not a superior intervention in terms of bowel function.

## Baby massage

Massaging babies is a tradition in many countries and is becoming popular in the West. Babies spend their embryonic developing months in the cushioned enclosure of the womb, being massaged by the amniotic fluid, with additional sensory input from the mother's heartbeat. Tactile sense is developed at 7.5 months of gestation (Gottlieb 1983). Once born, babies are comforted by cuddles, back patting, carresses and stroking, all of which are natural acts performed instinctively by most parents. A baby quickly comes to recognise the feel and smell of its primary carers and to enjoy the closeness involved in feeding and cuddling. This and the intimacy of personal hygiene maintenance (bathing and nappy changing) promotes a strong psychological bond between parents and child.

Babies, who are unable to reason, can learn some important things through sensation, for example danger (e.g. touching something hot) or self-esteem. Abusive touch can lead to confusion about touch, whereas positive and appropriate touch can lead to emotional security. If parents are stressed or

depressed, or if they themselves have never learned the value of caring touch, their babies may become deprived of touch. Massage is one way in which bonding and caring touch can be facilitated and supported. There are various ways in which massage is being used with babies: in premature baby units, in baby massage classes which also function as postnatal health promotion sessions and in private massage classes. Massage can also be used to increase mother–baby interaction where women have postnatal depression. Onozawa et al (2001) found that scores on the Edinburgh postnatal depression scale (EPDS) dropped in both the massage and support groups but only participation in the massage group improved mother–baby interaction. This study had a high drop-out rate but is worth repeating with a higher sample, to explore the validity of the results. In the treatment of infantile colic, however, Arikan et al (2008) demonstrated, by studying 175 Infants in a randomised controlled trial, that massage reduced mean duration of total crying, but less so than hydrolysed formula, sucrose solution or herbal tea. Diego et al (2007) has shown that increases in vagal activity and gastric motility is associated with massage therapy on preterm infants and may be linked to weight gain following massage.

Much of the practice of baby massage is supported by research findings. Hartelius et al (1992) discuss their previous research in which they studied how premature babies responded to touch. The babies relaxed during *containment* (holding by their parents) but became restless and irritable when stroked. They preferred firm stroking on the back and arm to soft stroking on the back and arm. In a further study by the same workers, 11 preterm babies, born at 26–36 weeks' gestation, were videoed at weekly intervals while being touched in different ways (Hartelius et al 1992). Containment induced relaxation, and an initially reduced blood oxygen level, before restoring it to a higher level than before touch. The babies became alert and awake with fine controlled movements. Stroking appeared to trigger reflex activity, for example whole limb extension, clenched fists, legs fully flexed to the body, grimaces and crying, whimpering and grunting noises. They stared expressionlessly. When left alone, their movements and expressions changed. The touch also had a negative effect on breathing, resulting in reduced blood oxygen levels and occasionally apnoea. The conclusion drawn was that premature infants do not tolerate massage and this appeared to reinforce the widespread policy of minimal touch in special care baby units. This study was based on a small

sample with no analysis of results to identify which age, condition or type of touching produced specific effects. Also, no oil was used, which could have influenced the babies' reaction. Field et al (1996d) found that massage with oil enhances the positive effects of massage on newborns.

Other studies have shown that massage does benefit preterm infants. Field et al (1986) monitored 20 premature babies, with a mean gestational age of 31 weeks, who were in transitional care. Following baby massage with oil and passive movements for three 15-minute periods daily for 10 days, the babies showed increased weight, activity, alertness and maturity, and required a hospital stay of 6 days less than the control group. Statistical significance was reached in this well-controlled study.

Adamson-Macedo (1990) discussed studies that have substantiated Macedo's (1984) TAC-TIC method of patterned tactile stimulation, finding that it produces better weight gain and better sucking and hand grasp reflexes. Acolet et al (1993) studied 11 stable premature babies with a median age of 29 weeks. Twenty minutes of massage with arachis (peanut) oil was applied to the back and limbs. No behavioural responses were monitored but eight infants had consistently reduced plasma cortisol levels. There were no consistent significant changes in adrenaline (epinephrine), noradrenaline (norepinephrine) or oxygen concentration, but skin temperature dropped.

Thus, it was shown that massage reduces the stress of intensive care but the need to maintain body temperature was demonstrated, although it must be acknowledged that the sample size was extremely small. In the same year, Wheeden et al (1993) conducted a randomised controlled study of 30 preterm neonates who had been exposed to cocaine. They were medically stable with a mean age of 30 weeks. Massage was given for 15 minutes, three times over 10 days, and the babies increased their weight, reduced stress behaviour and postnatal complications, and showed increased motor maturity above the control group. Similar positive effects were found in a subsequent study (Scafidi et al 1996) in cocaine-exposed newborns, who showed a 28% greater daily weight gain than controls, improved behavioural development and fewer complications. These results are transferable to babies born to HIV-positive mothers (Scafidi & Field 1997). Maternal massage, performed four times each day on the face and limbs of very-low-birth-weight infants, decreased the length of hospital stay and the

incidence of late-onset neonatal sepsis (Mendes & Prociony 2008). This was a randomised study of 104 babies; however, the massage was augmented by passive limb movements, so the actual effect of massage was not measured in isolation.

A variety of studies have been conducted on this subject which, on the whole, show positive beneficial effects of massage for normal preterm infants. The contradictory findings of the Hartelius studies perhaps show that the specific strokes are important and that oil should be used. The age, medical stability and reflex activity of the babies should be taken into account. Babies under 29 weeks' gestation may prefer holding and containment, and all babies should be stroked firmly, preferably through an oily medium which should not be peanut-based as it is thought that the increase in serious peanut allergies may be due to early exposure to peanuts in childhood. However, Vickers et al (2001), in one of the rigorous Cochrane Reviews, points out that the selective reporting of outcomes in a number of these studies weakens the assertion that massage is beneficial to preterm or low-birth-weight infants. The Cochrane review conducted by Underdown et al (2006) concluded that the evidence of a significant impact of massage on growth in infants under the age of 6 months was from studies with a high risk of bias. However, some evidence of benefits on mother–infant interaction, sleeping, crying and stress hormones was found.

With older babies, massage can promote bonding. This is particularly important where there are social difficulties causing stress, postnatal depression, poor parenting skills, illness or disability, or following a difficult birth. Massage can also help the mother who is apprehensive about handling her baby because, for example, it is a fragile baby. Mothers often want to do something extra for their baby beyond routine caring tasks and massage can provide an additional interest. Thus, massage has been utilised as a vehicle for health promotion, as it is attractive to a busy mother who would not necessarily find the time to seek health promotion advice for herself. Massage can be taught in a supportive class environment and the mother can be encouraged to continue massage at home. The principles therefore apply to both situations.

Baby massage classes can:

- Promote bonding;
- Give the mother a chance to take 'time out' for relaxation;

- Create an opportunity to meet other parents and professionals and discuss feelings and problems;
- Provide an opportunity for health promotion: back care, postnatal exercises, prevention of incontinence; and
- Offer support and monitoring of problems.

## Principles of baby massage classes

First, it is essential that the room is adequately warm, as babies lose heat quickly. Isherwood (1994) recommends the use of music and has found that slow rock music soothes restless babies while new age music is preferred by the mothers. The parent and class leader must be flexible and prepared to adapt to the reactions of individual babies and the needs of the mother. There should be an unhurried relaxed atmosphere and mothers should be encouraged to watch, listen to and cuddle their babies. The relaxation and rest offered to the mother is equally valid and there may be occasions where massage does not seem appropriate because the baby is asleep or upset or the mother is anxious. On these occasions, she can participate in other ways. Oil should always be used and it should be warmed in the hands first. Essential oils can be selected, but allergic reactions should be watched for and oil should not be used on broken or sore skin. Nut oils should be avoided. Mothers may develop an interest in massage for themselves and may then be advised to seek a preferred type such as aromatherapy. For safety, the women in the group should be advised to keep fingernails short and to remove any jewellery that could scratch the baby. The maximum length of massage for a baby under 4 months old should be 10 minutes and this time can be increased gradually to suit individual babies. The baby should be allowed expression and comfort, so its wriggling or repositioning should be accommodated. A baby massage routine is shown in Box 14.1.

## Specific conditions

Massage is particularly useful in certain conditions. If a baby has a congenitally dislocated hip and must spend periods of time in immobilisation, for example in a Paulik harness or plaster of Paris, then massage can facilitate bonding, self-esteem and comfort, especially between plaster changes. The so-called 'floppy' baby can be hyposensitive to stimulation and massage can be used as an extrasensory stimulus.

## Box 14.1

**Baby massage routine**

The baby should be on the lap, looking at the mother. Eye contact is encouraged. Various routines can be taught, but the following is typical:

- Circle the crown of the head gently with the palm of the hand.
- Stroke both hands from the crown of the head down the sides of the face.
- Apply firm but gentle strokes across the shoulders.
- Stroke down the arms.
- Stroke down the chest, then the abdomen.
- Stroke down the legs and feet.
- If desired, these strokes can be followed by gentle 'squeezing' movements with the palm of the hand; this affects the tissues like a kneading technique.
- Finish the front of the body by light strokes from the neck to the toes.

Turn the baby prone:

- Stroke down the back of the head and neck.
- Continue long strokes down the back and buttocks.
- Stroke down the legs and feet.
- Follow with gentle 'squeezing' movements with the palms.

The depth should be variable, depending on the tolerance of the individual baby, and should be appropriate to the age of the baby and its associated reflex activity.

If the baby has difficulty weaning, massage can be followed by a bottle feed, stroking across the cheek to the mouth to stimulate the rooting reflex. When teething or constipated, massage can be soothing and is often applied naturally, although a particular routine may give the parent confidence in its application. A premature baby may be best massaged in side-lying and flexion, and a near foetal position can be encouraged if an upset baby begins arching its back.

**Massage in older children**

Children sometimes suffer from many of the same conditions which affect adults. It would be logical to assume, then, that massage could benefit children in terms of their mental and physical health. It can be carried out in much the same way, depending on the age of the child (short periods of massage and interactive massage, perhaps accompanied by some relaxing singing, may suit younger children). Research in

this area is patchy but it has been conducted in the areas of attention deficit disorder, juvenile rheumatoid arthritis, burned children, diabetes mellitus and atopic eczema (Anderson et al 2000). Massage has been found to reduce aggression behaviour in 4–5 year olds (von Knorring et al 2008). Massage proved to be superior to relaxation in self-ratings of happiness and observed hyperactivity in a small group of hyperactive attention-deficit adolescents (Field et al 1998b). Anxiety, stress and pain reduced in children with mild to moderate juvenile rheumatoid arthritis, compared with a relaxation therapy group (Field et al 1997c). Massage was found to reduce distress during a painful change of dressings in children with burns (Hernandez-Reif et al 2001). The same research team used massage to lower blood glucose levels in children with diabetes mellitus (Field et al 1997d). Children attending a chronic pain clinic reported significant improvements in distress, pain, tension, discomfort and upset immediately after massage therapy (Suresh et al 2008). Beider and Moyer (2006), in their review of RCTS, found statistically significant results for trait anxiety, muscle tone and arthritic pain.

**Massage in labour and pregnancy**

Light superficial massage is safe to do in pregnancy. Gentle stroking and circular kneading can be done with oil over the abdomen to facilitate stretching of the skin. Massage with a partner can be done for support and closeness in pregnancy and labour. Circular stroking over the low back, or wherever the contractions are felt, can be soothing, and sensitive stroking over the lower abdomen can be helpful in early labour. Massage has been reported to be helpful in labour, but preferred non-pharmacological pain-relieving methods vary from individual to individual (Brown et al 2001). It has also been found to improve psychological factors (such as anxiety and depressed mood) in labour (Field et al 1997e). According to Dennis and Allen (2008), there is insufficient evidence to recommend massage to treat antenatal depression.

**Breast massage**

This is often recommended for problems associated with breastfeeding: for example, hypoga lactia (insufficient milk, thought to be a mechanical problem)

or stagnation mastitis. Breast massage is often done automatically by women who are suffering problems of tender breasts, reduced lactation and milk ejection. It can be taught and advised by midwives and physiotherapists postnatally. Yokoyama et al (1994) compared six women who suckled their babies with six women who had Japanese breast massage, which involved stroking down and round the breast by both hands and squeezing the nipples. Blood samples taken every 2 and 10 minutes from 10 minutes before the start to the end of the experiment showed that oxytocin release was pulsatile during the suckling and steady, but higher, during the massage. Prolactin release was increased by suckling but not by massage. Unsurprisingly, suckling was found to be the best method to increase lactation. Prolactin is released by nipple stimulation and oxytocin stimulates milk ejection, so it would seem that massage is good for stagnation mastitis and as a precursor to breastfeeding, although the sample population in this study was extremely small. A further study on methods of expressing breast milk showed that simultaneous breast pumping is more effective than sequential pumping and that massage increased milk production even further in both pumping groups (Jones et al 2001).

## Massage in gynaecology

Massage has been used to try and reduce pain and anxiety in women undergoing genetic amniocentesis. Light effleurage of the leg was not found to be effective (Fischer et al 2000). Evidence suggests that massage may, however, produce short-term beneficial effects on mood, anxiety, pain and water retention over relaxation therapy in a small group of women with premenstrual dysphoric disorder (Hernandez-Reif et al 2000). Kuznetsov et al (1998) used intensive massage in 30 patients experiencing chronic salpingo-oophoritis. The results were remarkable—78% of subjects are reported to have had a strong

anaesthetic and anti-inflammatory effect with 33% recovering 'reproductive function'.

## Summary

Massage can be used throughout the childbearing years to assist the well being of the mother and can also provide benefit for the baby as an individual and within the family unit. It can be used as a means for educating women about their own and their babies' health; creative ways can be found to use massage to raise body awareness in children, enhance relationships between partners, children and parents, and between siblings, and assist psychological and physical growth and healthy family relationships.

## Key points

- A baby's tactile sense is developed at 7.5 months of gestation.
- Touch is an important learning tool for a baby.
- A child's self-image and esteem are partly shaped through all forms of communication, including touch.
- Massage can be used to facilitate and support bonding and caring touch.
- Babies under 29 weeks of gestation may prefer holding and containment to massage.
- Ensure you understand the developmental sequence and reflex activity to inform your positioning and touching of babies.
- Oils, but not nut oils, should be used for baby massage.
- Breast massage can aid stagnation mastitis.
- Women may find massage supportive during labour.
- Massage can be used for creative health promotion sessions.
- Family relationships can be aided through massage.

## References

- Acolet, D., Modi, N., Giannakouloupoulos, X., et al., 1993. Changes in plasma cortisol and catecholamine concentrations in response to massage in preterm infants. *Arch. Dis. Child.* 68, 29–31.
- Adamson-Macedo, E.N., 1990. The effects of touch on preterm and fullterm neonates and young children. *J. Reprod. Infant Psychol.* 8, 267–273.
- Anderson, C., Lis-Balchin, M., Kirk-Smith, M., 2000. Evaluation of massage with essential oils on childhood ectopic eczema. *Phytother. Res.* 14 (6), 452–456.
- Ariken, D., Alp, H., Gozum, S., et al., 2008. Effectiveness of massage, sucrose solution, herbal tea or

- hydrolysed formula. *J. Clin. Nurs.* 17 (13), 1754–1761.
- Aslan, U.B., Yüksel, I., Yazici, M., 2001. A comparison of classical massage and mobilization techniques in the treatment in primary fibromyalgia. *Fizyoterapi Rehabilitasyon* 12 (2), 50–54.
- Ballard, C.G., Spector, A., Wiles, A., et al., 2002. Aromatherapy as a safe and effective treatment for the management of agitation in severe dementia: the results of a double-blind, placebo-controlled trial with melissa. *J. Clin. Psychiatry* 63, 553–558.
- Barnett, K., 1972. A theoretical construct of the concepts of touch as they relate to nursing. *Nurs. Res.* 21 (2), 102–110.
- Beeken, J.E., Parks, D., Cory, J., et al., 1998. The effectiveness of neuromuscular release in five individuals with chronic obstructive lung disease. *Clin. Nurs. Res.* 7 (3), 309–325.
- Beider, S., Moyer, C.A., 2006. Randomized controlled trials of pediatric massage: A review. *Evidence Based Complementary and Alternative Medicine* 4 (1), 23–34.
- Blairs, S., Slater, S., Hare, J., 2007. The clinical application of deep touch pressure with a man with autism presenting with severe anxiety and challenging behaviour. *British Journal of Learning Disabilities* 35, 214–220.
- Bodian, M., 1969. Use of massage following lid surgery. *Eye Ear Nose Throat Mon.* 48, 542–545.
- Brouwer, B., Sousa de Andrade, V., 1995. The effects of slow stroking on spasticity in patients with multiple sclerosis: a pilot study. *Physiother. Theory Pract.* 11, 13–21.
- Brown, S.T., Douglas, C., Flood, L.P., 2001. Women's evaluation of intrapartum nonpharmacological pain relief methods used during labor. *J. Perinat. Educ.* 10 (3), 1–8.
- Chia, S.H., 1995. Evaluating groups in learning disabilities. *Nurs. Stand.* 10 (9), 25–27.
- Chin, P.C., 1959. Experiences in 16 cases of intestinal obstruction cured by abdominal massage. *Shandong Yi Kan* 18, 15.
- Coelho, H.F., Boddy, K., Ernst, E., 2008. Massage therapy for the treatment of depression: a systematic review. *Int. J. Clin. Pract.* 62 (2), 325–333.
- Cohen-Mansfield, J., Marx, M.S., Werner, P., 1989. Agitation and touch in the nursing home. *Psychol. Rep.* 64, 1019–1026.
- Cole, E.L., 1992. Hands on hands: the effects of hand massage on mentally ill people on an acute admissions ward. Association of Chartered Physiotherapists in Mental Health student project housed at Queen Margaret College, University of Edinburgh, Edinburgh.
- De Wever, M.K., 1977. Nursing home patients' perception of affective touching. *J. Psychol.* 96, 163–171.
- Dennis, M., 1995. Pain stress and misdiagnosis. In: Everett, T., Dennis, M., Ricketts, E. (Eds.), *Physiotherapy in mental health*. Butterworth-Heinemann, London, pp. 127–142.
- Dennis, C.L., Allen, K., 2008. Interventions (other than pharmacological, psychosocial or psychological) for treating antenatal depression. *Cochrane Database Syst. Rev.* (4) CD006795.
- Diego, M.A., Field, T., Hernandez-Reif, M., et al., 2007. Preterm infant massage elicits consistent increases in vagal activity and gastric motility that are associated with greater weight gain. *Acta Paediatr.* 96 (11), 1588–1591.
- Dosseter, D.R., Couryer, S., Nicol, A.R., 1991. Massage for severe self-injurious behaviour in a girl with Cornelia de Lange syndrome. *Dev. Med. Child Neurol.* 33, 636–644.
- Emly, M., 1993. Abdominal massage. *Nurs. Times* 89 (3), 34–36.
- Emly, M., Cooper, S., Vail, A., 1998. Colonic motility in profoundly disabled people: a comparison of massage and laxative therapy in the management of constipation. *Physiotherapy* 84 (4), 178–183.
- Ernst, E., 1999. Abdominal massage therapy for chronic constipation: a systematic review of controlled clinical trials. *Forsch. Komplementarmed.* 6 (3), 149–151.
- Fakouri, C., Jones, P., 1987. Relaxation treatment: slow stroke back rub. *J. Gerontol. Nurs.* 13 (2), 32–35.
- Farber, S.D., 1982. A multisensory approach in neurorehabilitation. In: Farber, S.D. (Ed.), *Neurorehabilitation - a multisensory approach*. W B Saunders, Philadelphia, PA.
- Field, D.A., Miller, S., 1992. Cosmetic breast surgery. *Am. Fam. Physician* 45 (2), 711–719.
- Field, T.M., Schanberg, S.M., Scafidi, F., et al., 1986. Tactile/kinesthetic stimulation effects on preterm neonates. *Pediatrics* 77 (5), 654–658.
- Field, T., Ironson, G., Scafidi, F., et al., 1996a. Massage therapy reduces anxiety and enhances EEG patterns of alertness and math computations. *Int. J. Neurosci.* 86, 197–205.
- Field, T., Seligman, S., Scafidi, F., et al., 1996b. Alleviating post-traumatic stress in children following Hurricane Andrew. *J. Appl. Dev. Psychol.* 17, 37–50.
- Field, T., Grizzle, N., Scafidi, F., et al., 1996c. Massage relaxation therapies: effects on depressed adolescent mothers. *Adolescence* 31 (124), 903–911.
- Field, T., Schanbergs, S., Davales, M., et al., 1996d. Massage with oil has more positive effects on newborn infants. *Pre- Peri-Nat. Psychol. J.* 11, 73–138.
- Field, T., Quintino, O., Henteleff, T., et al., 1997a. Job stress reduction therapies. *Altern. Ther. Health Med.* 3 (4), 54–56.
- Field, T., Lasko, D., Mundy, P., et al., 1997b. Brief report: autistic children's attentiveness and responsivity improve after touch therapy. *J. Autism Dev. Disord.* 27 (3), 333–338.
- Field, T., Hernandez-Reif, M., Seligman, S., et al., 1997c. Juvenile rheumatoid arthritis: benefits from massage therapy. *J. Pediatr. Psychol.* 22 (5), 607–617.
- Field, T., Hernandez-Reif, M., Lagreca, A., et al., 1997d. Massage therapy lowers blood glucose levels in children with diabetes mellitus. *Diabetes Spectrum* 10, 237–239.
- Field, T., Hernandez-Reif, M., Taylor, S., et al., 1997e. Labor pain is reduced by massage therapy. *J. Obstet. Gynaecol.* 18 (4), 286–291.
- Field, T., Henteleff, T., Hernandez-Reif, M., et al., 1998a. Children with asthma have improved pulmonary functions after massage therapy. *J. Pediatr.* 132 (5), 854–858.
- Field, T., Quintino, O., Hernandez-Reif, M., Koslovsky, G., 1998b. Adolescents with attention deficit hyperactivity disorder benefit from

- massage therapy. *Adolescence* 33 (129), 103–108.
- Field, T., Peck, M., Hernandez-Reif, M., et al., 2000. Postburn itching pain and psychological symptoms are reduced with massage therapy. *J. Burn Care Rehabil.* 21 (3), 189–193.
- Fischer, R.L., Bianculli, K.W., Sehdev, H., et al., 2000. Does light pressure effleurage reduce pain and anxiety associated with genetic amniocentesis? A randomized controlled trial. *J. Matern. Fetal Med.* 9 (5), 294–297.
- Fraser, J., Kerr, J.R., 1993. Psychophysiological effects of back massage on elderly institutionalized patients. *J. Adv. Nurs.* 18, 238–245.
- Gottlieb, G., 1983. The psychobiological approach to developmental issues. In: Mussen, P.H. (Ed.), *Handbook of child psychology*, vol. 2. *Infancy*. Wiley, New York.
- Gurland, B.J., Toner, J.A., 1982. Depression in the elderly: a review of recently published studies. In: Eisdorfer, C. (Ed.), *Annual review of geriatrics and gerontology*. Springer, New York.
- Harrison, J., Ruddle, J., 1995. An introduction to aromatherapy for people with learning disabilities. *British Journal of Learning Disabilities* 23, 37–40.
- Hartelius, I., Ramussen, L., Sygehus, O., 1992. How little you are? *Neonatal Netw.* 11 (8), 33–37.
- Hernandez-Reif, M., Field, T., Field, T., et al., 1998. Multiple sclerosis patients benefit from massage therapy. *J. Bodyw. Mov. Ther.* 2 (3), 168–174.
- Hernandez-Reif, M., Martinez, A., Field, T., et al., 2000. Premenstrual symptoms are relieved by massage therapy. *J. Obstet. Gynaecol.* 21 (1), 9–15.
- Hernandez-Reif, M., Field, T., Lergie, S., et al., 2001. Children's distress during burn treatment is reduced by massage therapy. *J. Burn Care Rehabil.* 22 (2), 191–195.
- Holey, E.A., Lawler, H., 1995. The effects of classical massage and connective tissue manipulation on bowel function. *British Journal of Therapy and Rehabilitation* 2 (11), 627–631.
- Hondras, M.A., Linde, K., Jones, A.P., 2001. Manual therapy for asthma. *Cochrane Database Syst. Rev.* (Issue 4) Oxford.
- Hulme, J., Waterman, H., Hillier, V.F., 1999. The effect of foot massage on patients' perception of care following laparoscopic sterilization as day case patients. *J. Adv. Nurs.* 30 (2), 460–468.
- Isherwood, D., 1994. Baby massage groups. *Modern Midwife* (February), 21–23.
- Jones, E., Dimmock, P.W., Spencer, S.A., 2001. A randomised controlled trial to compare methods of milk expression after preterm delivery. *Arch. Dis. Child Fetal Neonatal Ed.* 85 (2), F91–F95.
- Katz, J., Wowk, A., Culp, D., et al., 1999. Pain and tension are reduced among hospital nurses after on-site massage treatments: a pilot study. *J. Perianesth. Nurs.* 14 (3), 128–133.
- Kessler, J., Marchant, P., Johnson, M.I., 2006. A study to compare the effects of massage and static touch on experimentally induced pain in healthy volunteers. *Physiotherapy* 92, 225–232.
- Klauser, A.G., Flaschenträger, J., Gehrke, A., et al., 1992. Abdominal wall massage: effect on colonic function in healthy volunteers and in patients with chronic constipation. *Z. Gastroenterol.* 30, 247–251.
- Kleinke, C.L., 1977. Compliance to requests made by gazing and touching experimenters in field settings. *Journal of Experimental and Social Biology* 13, 218–223.
- Kuznetskov, O.F., Makarova, M.R., Markina, L.P., 1998. The comparative effect of classic massage of different intensities on patients with chronic salpingo-oophoritis. *Vopr. Kurortol. Fizioter. Lech. Fiz. Kult.* 2, 20–23.
- Langland, R.M., Panicucci, C.L., 1982. Effects of touch on communication with elderly confused clients. *J. Gerontol. Nurs.* 8 (3), 152–155.
- Levoska, S., Keinanen-Kiukaanniemi, S., 1993. Active or passive physiotherapy for occupational cervico-brachial disorders? A comparison of 2 treatment methods with a 1 year follow-up. *Arch. Phys. Med.* 74 (4), 425–430.
- Lindsay, W.R., Picaithly, D., Geelen, N., et al., 1997. A comparison of the effects of four therapy procedures on concentration and responsiveness in people with profound learning disabilities. *J. Intellect. Disabil. Res.* 41 (3), 201–207.
- Macedo, E.N., 1984. Effects of very early tactile stimulation on very low birth weight infants: a 2-year follow-up study. Doctoral thesis, University of London, London.
- McInnes, J., Treffry, J., 1982. Deaf-blind infants and children - a developmental guide. Open University Press, Milton Keynes.
- Marin, I., Lepresle, C., Mechet, M.A., et al., 1991. Postoperative pain after thoracotomy: a study of 116 patients. *Rev. Mal. Respir.* 8 (2), 213–218.
- Mendes, E.W., Procianny, R.S., 2008. Massage therapy reduces hospital stay and occurrence of late-onset sepsis in very preterm neonates. *J. Perinatol.* 28, 815–820.
- O'Brien, J., 1987. A guide to lifestyle planning. In: Wilcox, B., Bellamy, G.T. (Eds.), *A comprehensive guide to the activities catalogue: an alternative curriculum for youth and adults with severe disabilities*. Paul H Brookes, Baltimore, MD.
- Onozawa, K., Glover, V., Adams, D., et al., 2001. Infant massage improves mother-infant interaction for mothers with postnatal depression. *J. Affect. Disord.* 63 (1–3), 201–207.
- O'Sullivan, S.B., 1988. Strategies to improve motor control. In: O'Sullivan, S.B., Schmitz, T.J. (Eds.), *Physical rehabilitation: assessment and treatment*. F A Davis, Philadelphia, PA.
- Partridge, C.J., Johnstone, M., Morris, L., 1993. Disability and health services: perceptions beliefs and experiences of elderly people. Centre for Physiotherapy Research, King's College, London. Cited in: Smyth, L., 1993. Positive ageing. *Physiotherapy* 79 (12), 823–824.
- Pheasant, S.T., 1992. Does RSI exist? *Occup. Med.* 42, 167–168.
- Pheasant, S.T., 1994. Musculoskeletal injury at work: natural history and risk factors. In: Richardson, B., Eastlake, A. (Eds.), *Complement. Ther. Clin. Pract.* Butterworth-Heinemann, Oxford, pp. 146–170.
- Poon, K., 1991. Hand massage and music: the effectiveness of each as forms of relaxation therapy with dementia sufferers. Association of Chartered Physiotherapists in Mental Health course project housed at

- Queen Margaret College, University of Edinburgh, Edinburgh.
- Price, C., 2007. Dissociation reduction in body therapy during sexual abuse recovery. *Complemen. Ther. Clin. Pract.* 13 (2), 116–128.
- Prosser, E.M., 1941. *A manual of massage and movements*, second ed. Faber and Faber, London.
- Resende, T.L., Brocklehurst, J.C., O'Neill, P.A., 1993. A pilot study on the effect of exercise and abdominal massage on bowel habit in continuing care patients. *Clin. Rehabil.* 7, 204–209.
- Rose, N., 1995. Psychiatric illnesses. In: Everett, T., Dennis, M., Ricketts, E. (Eds.), *Physiotherapy in mental health*. Butterworth-Heinemann, London, pp. 3–17.
- Rosenberg, M.W., Moore, E.G., 1995. Demography of aging and disability. In: Pickles, B., Compton, A., Cott, C. et al., *Physiotherapy with older people*. W B Saunders, London, pp. 19–28.
- Sanderson, H., Harrison, J., Price, S., 1991. Aromatherapy and massage for people with learning difficulties. *Hands on Publishing*, Birmingham.
- Scafidi, F., Field, T., 1997. Massage therapy improves behaviour in neonates born to HIV positive mothers. *J. Pediatr. Psychol.* 21, 889–897.
- Scafidi, F., Field, T., Wheeden, A., et al., 1996. Cocaine-exposed preterm neonates show behavioural and hormonal differences. *Pediatrics* 97, 851–855.
- Sirotkina, A.V., 1995. Materials for the study of massage influence on paresis and paralysis of different etiology. PhD thesis, USSR. Cited in: Wine, Z. K. (Ed.), *Massage Magazine*, vol. 55. Noah Publishing Company, Davis, California, pp. 101–102.
- Sunshine, W., Field, T., Schanbergs, S., et al., 1996. Massage therapy as compared to TENS improved sleep patterns and decreased pain fatigue anxiety depression and cortisol levels. *J. Clin. Rheumatol.* 2, 18–22.
- Suresh, S., Wang, S., Porfyrus, S., et al., 2008. Massage therapy in outpatient pediatric chronic pain patients: do they facilitate significant reductions in levels of distress, pain, tension, discomfort, and mood alterations? *Paediatr. Anaesth.* 18 (9), 884–887.
- Thorgrimsen, L., O'Brien, J.T., Reichett, K., et al., 2003. Aromatherapy for dementia. *Cochrane Database Syst. Rev.* (3), CD003150.
- Underdown, A., Barlow, J., Chung, V., et al., 2006. Massage intervention for promoting mental and physical health In Infants aged under six months. *Cochrane Database of Systematic Reviews* (4) CD005038.
- Valentine, K.E., 1984. Massage in psychological medicine - modern use of an ancient art. *New Zealand Journal of Physiotherapy* (December), 15–16.
- Vickers, A., Ohlsson, A., Lacy, J.B., et al., 2001. Massage for promoting growth and development of preterm and/or low birth-weight infants. *Cochrane Library* (4).
- Von Knorring, A.L., Soderberg, A., Austin, L., et al., 2008. Massage decreases aggression In preschool children: a long-term study. *Acta Paediatr.* 97 (9), 1265–1269.
- Weinrich, S.P., Weinrich, M.C., 1990. The effect of massage on pain in cancer patients. *Appl. Nurs. Res.* 3 (4), 140–145.
- Wheeden, A., Scafidi, F.A., Field, T., et al., 1993. Massage effects on cocaine-exposed neonates. *J. Dev. Behav. Pediatr.* 14 (5), 318–322.
- Wolfsenberger, W., 1983. Social role valorisation: a proposed new term for the principle of normalisation. *Ment. Retard.* 21 (6), 234–239.
- Yokoyama, Y., Ueda, T., Irahara, M., et al., 1994. Releases of oxytocin and prolactin during breast massage and suckling in puerperal women. *Eur. J. Obstet. Gynecol. Reprod. Biol.* 53, 17–20.



# Index

Note: Page numbers followed by *b* indicate boxes, *f* indicate figures and *t* indicate tables.  
*vs.* Indicates a comparison.

## A

- Abdomen, 142–160
  - intestine positions, 160*f*
  - lymph nodes, 19*f*
- Abdominal massage, 263
  - patient positioning, 142–159
  - stroking, 160, 161*f*
- A-beta fibres, spinal cord, 57–60
- Achilles tendon, 130*f*
  - wringing, 104*f*
- ACTH (adrenocorticotrophic hormone), stress, 22
- Activation centres, autonomic nervous system, 23
- Acupressure, 185–194
  - back, 188*f*
  - cancer therapy, 212
  - cautions, 62, 186
  - contraindications, 186
  - manipulations, 187, 188*f*
  - meridians, 185–186
  - neck, 188*f*
  - reflex points, 186, 187–194, 191*f*
    - see also specific acupoints*
- Acupuncture, 186
- Acute back pain, 231
- Acute inflammation, 47*b*
- Acute zones, connective tissue manipulation, 171
- A-delta fibres, spinal cord, 57–59
- Adherence, wound healing, 56
- Adipose tissue
  - fluid system dynamics, 17
  - massage effects, 21
- Adrenocorticotrophic hormone (ACTH), stress, 22
- Adverse neural dynamics, 56
- Adverse neural tension (ANT), 256–257
- Aged *see* Older people
- Allergies
  - arachis oil, 86
  - as contraindication, 61
  - lubricants, 86
    - see also specific lubricants*
  - peanut oils, 86
- American Massage Therapy Association, foundation, 6
- Amputation, sports massage, 247–248
- Analgesics, massage *vs.*, 34
- Angularis oris muscle, 166*f*
- Animal lubricants, 86
- Ankylosing spondylitis, 228
- ANS *see* Autonomic nervous system (ANS)
- ANT (adverse neural tension), 256–257
- Anterior cervical lymph nodes, 166*f*
- Anterolateral spinal tracts, 59*f*
- Antidepressant drugs, 202
- Antimicrobial effects, tea-tree oil, 88
- Anxiety, 202–205
  - definition, 202
  - essential oils, 88
  - neuromusculoskeletal disorders, 226
- Arachis oil, allergies, 86
- Arms, 129
  - clapping, 129
  - effleurage, 129, 131*f*
  - finger kneading, 129
  - forearm, effleurage, 99*f*
  - hacking, 129, 136*f*
  - kneading, 101*f*, 129
  - manipulations, 129
    - see also specific manipulations*
  - muscle shaking, 129, 135*f*
  - patient positioning, 129
  - picking up, 129, 133*f*
  - prolonged elevation, 92
  - wringing, 129, 134*f*
- Aromatherapy
  - contraindications, 89
  - definition, 87
  - full body massage, 89
  - precautions, 89
  - static muscle work, 257
    - see also Essential oils; specific oils*
- Arteriovenous plexus, skin, 11*f*
- Arthritis, 228
- Ascending–descending inhibitory loop, 59*f*
- Ascites, 53
- Asthma, 252
  - bronchial, reflextherapy, 196
- Autonomic nervous system (ANS), 35–38
  - activation centres, 23
  - connective tissue manipulation, 171
  - definition, 35–36
  - skin, 38
  - stress, 201
  - suprasegmental reflexes, 37
- Autonomic reflexes, 35
- Axillary lymph nodes, 19*f*

**B**

Baby massage, 263–266  
 body temperature, 264–265  
 congenital dislocated hips, 265  
 containment, 264  
 'floppy' babies, 265  
 maternal bonding, 263–264, 265  
 postnatal depression, 263–264  
 principles, 265  
 routines, 266*b*  
 TAC-TIC patterned tactile stimulation, 264  
 weaning, 266

Back, 137  
 acupressure, 188*f*  
 effleurage, 99*f*, 137  
 finger kneading, 137, 149*f*  
 kneading, 101*f*, 137, 149*f*, 150*f*  
 lymph nodes, 137  
 manipulations, 137  
 patient positioning, 137  
 picking up, 137  
 reinforced kneading, 137, 151*f*  
 segmentmassage, 181*f*  
 skin rolling, 137  
 stroking, 137  
 tapotement, 137  
 wringing, 104*f*, 137, 151*f*, 153*f*

Back pain, 230–231  
 acute, 231  
 chronic, 226  
 MTPs, 231  
 paraspinal muscles, 231  
 prevalence, 230–231

Baroreceptor reflex sensitivity (BRS), 196

Beard, Gertrude, 6

Bed confinement, cancer therapy, 210

Behavioural problems, learning disabilities, 262

Bergamot oil, 90*t*

Biceps muscle, 130*f*  
 hacking, 136*f*

Bioenergy therapies, 184–185  
 biomagnetic fields, 185

Biology (of massage), 9–20

Biomagnetic fields, bioenergy therapies, 185

Bisgaard strokes, 232

Bl 11 acupoint, 192, 192*f*  
 Bl 15 acupoint, 192, 192*f*  
 Bl 20 acupoint, 192, 192*f*  
 Bl 22 acupoint, 192, 192*f*

Bl 23 acupoint, 192, 192*f*  
 Bl 25 acupoint, 192, 192*f*  
 Bl 27 acupoint, 192, 192*f*  
 Bl 40 acupoint, 192, 192*f*  
 Bl 57 acupoint, 192, 192*f*  
 Bl 60 acupoint, 192–193, 192*f*

Blood constituents, massage effects, 28

Blood flow rate, skin circulation, 9–10

Bloom's taxonomy, clinical reasoning, 75–76

Body awareness training, 204

Body image problems, mental health, 260

Body temperature  
 baby massage, 264–265  
 regulation, 9–10

Bone fractures, 229

Bone growth, as contraindication, 61

Box kneading, 103

Brachioradialis muscle, muscle shaking, 135*f*

Bradykinins, inflammation, 45

Breast massage, 266–267

Bridgewebsmassage *see* Connective tissue manipulation (CTM)

Bronchial asthma, reflextherapy, 196

BRS (baroreceptor reflex sensitivity), 196

Buccal lymph nodes, 166*f*

'Buffalo' ('dowager's') hump, 225

**C**

Calf, vibration, 119*f*

Cancer, 209–213  
 acupressure, 212  
 bed confinement, 210  
 carers, relationships with, 210  
 chemotherapeutics, 211–212  
 as contraindication, 62, 63–64  
 effleurage, 211  
 essential oils, 210, 212  
 hydrostatic oedema, 212–213  
 intimacy issues, 210  
 oedema, 212–213  
 pain intensity, 210  
 quality of life, 210  
 randomised clinical trials, 210  
 right to massage, 63–64, 211  
 safety, 211–212  
 stationary holding, 212  
 stress management, 209–210  
 stroking, 212

Swedish massage, 212  
 therapeutic touch techniques, 212  
 undiagnosed *see* Undiagnosed cancer

Capillary–interstitial fluid flow, 17, 17*f*

Cardinal signs, chronic inflammation, 47, 48*b*

Cardiovascular system, stress, 204*t*

Carers, relationships with, cancer therapy, 210

Carpal tunnel syndrome, 231

Casual athletes, 235

Causative factor massage, occupational health, 257

Cautions/contraindications (for massage), 53, 60–64  
 cancer, 63–64  
 endocrine gland proximity, 62–63  
 stationary pressure techniques, 62

CD4 T-cells, HIV/AIDS, 219–220

CDP (complex decongestive physical therapy), 213

Cedarwood oil, 90*t*

Cell connections, wound healing, 48

Cellulite, palpation, 74

Central nervous system (CNS), 59*f*  
 soft tissues, training response, 237  
 stress, 204*t*

Cerebral palsy, sports massage, 248

Cervical lymph nodes, 19*f*

C-fibres  
 pain, 57  
 spinal cord, 57–59

Chamomile oil, 90*t*

Chapman's reflexes, 40

Chartered Physiotherapists Interested in Massage and Soft Tissue Therapies (CPMaSTT), 6

Chemotherapeutics, cancer therapy, 211–212

Children, massage, 266

Chronic back pain, 226

Chronic inflammation, 47  
 cardinal signs, 47, 48*b*  
 pain, 47  
 redness, 47  
 swelling, 47

Chronic zones, connective tissue manipulation, 171

Circulation, massage effects, 25–28  
 blood constituents, 28  
 fluid interchange, 25  
 flushing effects, 25  
 mean blood velocity, 26–27  
 plethysmography studies, 25–26

- pressure gradients, 25  
 skin temperature, 27  
 spirometry studies, 25–26  
 string wrapping *vs.*, 27  
 substance P, 27  
 vasodilatory effects, 27  
<sup>13</sup>Xe clearance technique, 26  
 Circulation, wound healing, 50  
 Cisterna chyli, 19f  
 CK *see* Creatine kinase (CK)  
 Clapping, 114, 115f  
   arms, 129  
   feet, 131  
 Client groups, 251–270  
   *see also specific diseases/disorders*  
 Client–therapist relationship, mental health, 260  
 Clinical reasoning, 75–76  
   Bloom’s taxonomy, 75–76  
   cognitive skills, 75–76  
   conditional reasoning, 76  
   cue acquisition, 76  
   cue interpretation, 76  
   hypothesis evaluation, 76  
   hypothesis generation, 76  
   metacognitive skills, 75–76  
   narrative reasoning, 76  
   problem-based approach, 75–76  
   procedural reasoning, 76  
 Clinical stress, 201  
 Closed questions, patient assessment, 77  
 Clothed massage, work-related problems, 258  
 CNS *see* Central nervous system (CNS)  
 Cochrane Collaboration, 4  
 Cognitive reflective practice, 82  
 Cognitive skills, clinical reasoning, 75–76  
 Collagen  
   connective tissue, 14  
   remodelling, wound healing, 48–49  
   skin, 11f  
   weakening as contraindication, 62  
 Collagen type I, 14  
 Collagen type II, 14  
 Colle’s fracture, 229  
 Colon  
   deep stroking, 160, 163f  
   finger kneading, 164f  
   kneading, 160  
   massage of, 263  
   vibrations, 160, 165f  
 Communication, learning disabilities, 261  
 Complementary and Natural Health Care Council, 6  
 Complementary medicine,  
   orthodox *vs.*, 4  
 Complex decongestive physical therapy (CDP), 213  
 Complex physical therapy (CPT),  
   lymphoedema, 213  
 Compressive force, expressive, 92  
 Conditional reasoning, clinical reasoning, 76  
 Congenital dislocated hips, 265  
*The Cong Fou of the Tao-tse*, 5  
 Connective tissue, 14, 224  
   biomechanics, 14–16  
   collagen fibres, 14  
   creep, 15  
   hysteresis, 15  
   load, 15  
   relaxation, 15  
   stress–strain curve, 14–15, 15f  
   visco-elastic properties, 15  
   cell types, 14  
   collagen fibres, 14  
   glycosaminoglycans, 14  
   massage effects, 33–35  
   matrix hydration, 16  
   myofibroblasts, 16  
   stress, 204t, 225  
 Connective tissue manipulation (CTM),  
   171–172  
   acute zones, 171  
   autonomic nervous system, 171  
   chronic zones, 171  
   connective tissue zones, 171  
   definition, 171  
   fascial (fazien) technique, 172, 173f  
   flat (flashige) technique, 173f, 177  
   indications, 172  
   parasympathetic nervous system, 171  
   skin (haut) technique, 172–177, 173f  
   subcutaneous (unterhaut) technique, 173f, 177  
   sympathetic nervous system, 171  
 Connective tissue zones (CTZs), 39–40,  
   40f, 171  
 Consent, intellectual impairment,  
   246–247  
 Constipation, 263  
 Contact dermatitis, essential  
   oils, 89  
 Containment, baby massage, 264  
 Contraction, wound healing, 48,  
   50–51, 56  
 Contraindications for massage  
   *see* Cautions/contraindications  
   (for massage)  
 Cortical response, soft tissues, training  
   response, 237  
 Cortisone studies, manual lymphatic  
   drainage, 215–216  
 CPMaSTT (Chartered Physiotherapists  
   Interested in Massage and Soft  
   Tissue Therapies), 6  
 CPT (complex physical therapy),  
   lymphoedema, 213  
 Creatine kinase (CK), 28  
   studies, 30  
 Creep, connective tissue  
   biomechanics, 15  
 Crepitus, palpation, 74  
 ‘Crossed pattern,’ neuromusculoskeletal  
   disorders, 224–225  
 CTM *see* Connective tissue  
   manipulation (CTM)  
 CTZs (connective tissue zones), 39–40,  
   40f, 171  
 Cue acquisition, clinical reasoning, 76  
 Cue interpretation, clinical reasoning, 76  
 Cuneatus nuclei, 59f  
 CV 4 acupoint, 193f, 194  
 CV 6 acupoint, 193f, 194  
 CV 7 acupoint, 193f, 194  
 CV 12 acupoint, 193f, 194  
 Cyriax friction massage *see* Deep  
   transverse friction (DTF)  
 Cyriax, James, 120
- ## D
- Dampening, facilitated segment, 39  
 Data analysis, solution development, 79  
 Data management, treatment  
   planning, 79  
 Decubitus ulcers *see* Pressure sores  
   (decubitus ulcers)  
 Deep cervical lymph nodes, 166f  
 Deep friction massage  
   headaches, 230  
   scar tissue, 34  
 Deep laminar venous plexus, skin  
   circulation, 12  
 Deep stroking, colon, 160, 163f  
 Deep transverse friction (DTF), 34, 34f,  
   120–122, 123f  
   features, 122  
   healing, stage of, 120  
   hydrocortisone *vs.*, 120–122

- Deep transverse friction (DTF)  
(*Continued*)  
iontophoresis studies, 120–122  
phonophoresis studies, 120–122  
position, 122  
purpose, 122  
soft tissue lesions, 120
- Deep vein thrombosis (DVT), 28  
as contraindication, 53  
Homan's test, 54f
- Definition (of massage), 5–6
- Degeneration, neuromusculoskeletal disorders, 224–225
- Delayed onset muscle soreness (DOMS), 30, 32  
sports massage, 239
- Deltoid muscle, 130f
- Dementia, 255–256  
hand massage, 255–256  
quality of life, 255
- Depression, 202–205  
definition, 202  
neuromusculoskeletal disorders, 226  
older people, 254
- de Quervain's syndrome, 231–232
- Dermatomyositis, as contraindication, 62
- Dermis, 10, 11f  
innervation, 12–13  
palpation, 70  
smooth muscle, 10–11
- Desquamation, 10
- Destructive thyrotoxicosis, 62–63
- Diffusion, fluid system dynamics, 16
- DOMS *see* Delayed onset muscle soreness (DOMS)
- Doppler sonography studies, reflextherapy, 196
- Dorsolateral funiculus, 59f
- 'Double crush' scenario, 56
- 'Dowager's' ('buffalo') hump, 225
- Dressings, venous ulcer massage, 55
- DTF *see* Deep transverse friction (DTF)
- DVT *see* Deep vein thrombosis (DVT)
- E**
- Effleurage, 98  
arms, 129, 131f  
back, 99f, 137  
cancer therapy, 211  
face, 160, 167f, 168f  
fingers, 139f  
forearm, 99f  
hands, 130, 138f
- hydrostatic oedema, 54
- hypothenar eminence, 140f
- legs, 131, 143f, 144f
- neck, 91–92, 91f, 142, 154f, 155f
- sports massage, 241
- static muscle work, 257
- work-related problems, 258
- Elderly *see* Older people
- Electromyography (EMG), muscle studies, 30
- Elevation, prolonged, arms, 92
- EMG (electromyography), muscle studies, 30
- End-feel, palpation, 73
- Endocrine gland proximity, as contraindication, 62–63
- Endocrine system, stress, 204t
- Endogenous opiates, 60
- Endorphins, 60
- Endothelium, inflammation, 45–47
- Enkephalins, 60
- Environment, 92–93  
equipment, 92–93  
infection control, 93  
temperature, 93  
therapist, 93
- Epidermal cell migration, wound healing, 48
- Epidermis, 10, 11f  
palpation, 70
- Erector spinae, neuromusculoskeletal disorders, 224–225
- ERLLP (exercise-related lower limb leg pain), 244
- Essential oils, 87–89, 90t  
adverse effects, 88  
anxiety, 88  
cancer therapy, 210, 212  
choice of, 88  
contact dermatitis, 89  
degradation, 87  
HIV/AIDS, 220  
medical history, 88  
phototoxic reactions, 89  
relaxation massage, 87  
sedative massage, 207  
*see also specific oils*
- Europe, massage legislation, 4
- Excessive reaching, 92
- Exercise-related lower limb leg pain (ERLLP), 244
- Explanation from practitioner, 23
- Extensor retinaculum muscle, 130f
- External oblique muscle, 130f
- F**
- Face, 160  
effleurage, 160, 167f, 168f  
finger kneading, 160  
lymphatic drainage, 166f  
muscles, 166f  
patient positioning, 160  
plucking, 160, 169f  
segmentmassage, 181f  
tapping, 160  
vibrations, 160  
wringing, 160, 170f
- Facilitated segment, 38–41, 38f  
dampening, 39  
definition, 38–39
- Fascia  
skin, 11f  
soft tissues, training response, 237
- Fascial (fazien) connective tissue manipulation, 172, 173f
- Fascial layer  
palpation, 70  
skin, 11f
- Fast pain, 56–57
- Fat *see* Adipose tissue
- Fat cells, connective tissue, 14
- Fatigue, sports massage, 239
- Fazien (fascial) connective tissue manipulation, 172, 173f
- Febrile conditions, as contraindication, 61
- Feed forward mechanisms, soft tissues, training response, 237–238
- Feet, 131–136  
clapping, 131  
hacking, 131  
kneading, 131, 148f  
muscle shaking, 131  
therapist position, 91, 91f
- Fibroblasts, connective tissue, 14
- Fibrositis, massage effects, 28–29
- Fibrous structures, palpation, 74
- Finger(s)  
effleurage, 139f  
kneading of, 141f
- Finger kneading  
arms, 129  
back, 137, 149f  
colon, 164f  
face, 160  
knees, 131  
neck, 142, 157f  
paravertebral muscles, 157f

scalene muscles, 157f  
 static muscle work, 257  
 work-related problems, 258  
 First intention, wound healing, 48, 49f  
 Flashige (flat) connective tissue  
   manipulation, 173f, 177  
 Flat (flashige) connective tissue  
   manipulation, 173f, 177  
 Flexor spasticity, 251  
 'Flight or fight' response, 201  
 'Floppy' babies, 265  
 Fluid balance, 21  
   oedema, 52  
 Fluid system dynamics, 16–17  
   adipose tissue, 17  
   capillary–interstitial fluid, 17, 17f  
   diffusion, 16  
   lymphatics, 16  
   massage effects, 25  
   osmosis, 16  
   plasma proteins, 17  
 Flushing, massage effects, 25  
 Forearm, effleurage, 99f  
 Foreign bodies, as contraindication, 61  
 Fractures, 229  
 Fragile skin, as contraindication, 62  
 Free nerve endings, skin, 11f, 13f  
 Friction massage, 106–114, 113f  
   hypertrophic scars, 50  
   manipulation 1, 114  
   manipulation 2, 114  
   work-related problems, 258  
 Frontalis muscle, 130f, 166f  
 Frozen shoulder, 231  
 Full body massage  
   aromatherapy, 89  
   sedative massage, 207, 207b  
 Full-range passive stretching, myofascial  
   trigger points, 227–228

## G

Gastrocnemius muscle, 130f  
 Gastrointestinal system, stress, 204t  
 GB 20 acupoint, 187, 191f  
 GB 21 acupoint, 187, 191f  
 GB 25 acupoint, 187, 191f  
 GB 30 acupoint, 187, 191f  
 GB 31 acupoint, 187, 191f  
 GB 34 acupoint, 187, 191f  
 GB 39 acupoint, 187–190, 191f  
 GB 40 acupoint, 191, 191f  
 GB 41 acupoint, 191, 191f  
 Genitourinary system, stress, 204t

Georgii, Augustus, 5  
 Geranium oil, 90t  
 Glutamate, pain, 57–59  
 Gluteal area, pounding, 118f  
 Gluteus maximus muscle, 130f  
   reinforced kneading, 151f  
   wringing, 153f  
 Glycosaminoglycans, connective  
   tissue, 14  
 Goal formulation, treatment  
   planning, 79  
 Goal identification, treatment  
   planning, 80  
 Golfer's elbow, 231–232  
 Gracilis nuclei, 59f  
 Granulation tissue, wound healing, 48  
 Group therapy, 205  
 GV 4 acupoint, 192, 192f  
 GV 14 acupoint, 192, 192f  
 GV 20 acupoint, 187, 191f  
 Gynaecology, 267

## H

H3 acupoint, 193f, 194  
 H5 acupoint, 193f, 194  
 H7 acupoint, 193f, 194  
 Hacking, 114, 116f  
   arms, 129, 136f  
   biceps muscle, 136f  
   feet, 131  
 Haematocrit, 28  
 Haemorrhages, as contraindication, 61  
 Hamstring complex, muscle strain,  
   243–245  
 Hand(s), 129–131  
   effleurage, 130, 138f  
   kneading, 130, 141f  
   manipulations, 130–131  
   patient positioning, 129, 132f  
   picking up, 131  
   trauma, 232  
   wringing, 130, 142f  
 Hand massage  
   dementia, 255–256  
   mental health, 259  
 Hand mobility, palpation, 70,  
   71f, 72f  
 Headaches, 229–230  
   deep friction massage, 230  
   tension, 30, 229–230  
 Heart disease/disorders  
   as contraindication, 62  
   oedema, 52

Heat, chronic inflammation, 47  
 Histamine  
   connective tissue biomechanics, 16  
   inflammation, 45  
 Historical aspects, 5–6  
   recent trends, 6  
 HIV/AIDS, 219–220  
   CD4 T-cells, 219–220  
   essential oils, 220  
   hygiene, 219  
   immune system response to massage,  
     219–220  
   infections, 219  
   natural killer cells, 219–220  
 Holistic medicine, 3–4  
   definition, 3–4  
 Homan's test, deep vein thrombosis, 54f  
 H (Hoffman) reflex, 31  
   neurological disorders, 251–252  
 Hydrocortisone, deep transverse  
   friction *vs.*, 120–122  
 Hydrostatic oedema, 53–54  
   aims, 53  
   cancer, 212–213  
   effleurage, 54  
   media, 54  
   position, 54  
   principles, 54, 54b  
   self-care, 54  
   Swedish massage, 64  
 Hygiene  
   HIV/AIDS, 219  
   lubricants, 91  
   venous ulcer therapy, 55  
 Hypertrophic scars, 49–50  
   friction massage, 50  
 Hypoalgesia studies, 252  
 Hypodermis, 11f  
 Hypothalamus, 59f, 202f  
 Hypothenar eminence, effleurage, 140f  
 Hypothesis evaluation, clinical  
   reasoning, 76  
 Hypothesis generation, clinical  
   reasoning, 76  
 Hysteresis, connective tissue  
   biomechanics, 15

**I**

Iatrogenic lymphoedema, 213  
 Immune system  
   response to massage in HIV/AIDS,  
     219–220  
   stress, 204t

- Impingement injury, shoulder complex, 246
- Implants, as contraindication, 61
- Infections  
as contraindication, 61  
environmental control, 93  
HIV/AIDS, 219
- Inflammation, 45, 46f, 64  
acute, 47b  
bradykinins, 45  
chronic *see* Chronic inflammation  
as contraindication, 61  
endothelium, 45–47  
histamine, 45  
massage effects, 33  
neutrophils, 47  
noradrenaline (norepinephrine), 45  
oedema, 52  
phagocytosis, 47  
resolution, 47  
white cells, 47
- Informed consent, mental health, 259
- Infraspinatus muscle, 130f
- Inguinal lymph nodes, 19f
- Innervation, skin *see* Skin
- Intellectual impairment  
consent, 246–247  
sports massage, 246–247
- Interactive sequence, learning disabilities, 261–262, 261t
- Intermediate plexus, skin circulation, 12
- Intermuscular haematomas, 242–243
- Interpersonal reflective practice, 82
- Interstitial fluid pressure, lymphatic system, 18
- Interviews, 77
- Intimacy issues, cancer therapy, 210
- Intramuscular haematomas, 243
- Iontophoresis studies, deep transverse friction, 120–122
- Isotope clearance studies  
massage effects on circulation, 26  
oedema, 215
- J**
- Joint capsules, palpation, 73
- Joints, 224, 225
- K**
- Kaposi's sarcoma, 212–213
- Keloid scars, 49–50
- Ki 3 acupoint, 191, 191f
- Ki 7 acupoint, 191, 191f
- Ki 8 acupoint, 191, 191f
- Kirlian photography, 24
- Kneading, 98–103, 101f  
arms, 101f, 129  
back, 101f, 137, 149f, 150f  
colon, 160  
feet, 131, 148f  
fingers, 141f  
hands, 130, 141f  
legs, 131, 146f  
neck, 142, 156f  
petrissage, 101f  
reinforced *see* Reinforced kneading  
small intestine, 160, 162f  
thigh, 131  
*see also* Finger kneading
- Knees, 131  
finger kneading, 131
- Krause's end bulb, 13f
- L**
- Labour, 266
- Lactate dehydrogenase (LDH), 28  
studies, 30
- Langer's (Kraissl's) lines, skin, 10
- Laryngeal lymph nodes, 166f
- Latissimus dorsi muscle, 130f
- Lavender oil, 88, 90t
- Layer palpation, palpation, 70
- LDH *see* Lactate dehydrogenase (LDH)
- Learning disabilities, 261–262  
behavioural problems, 262  
communication, 261  
interactive sequence, 261–262, 261t  
physical disabilities, 262  
quality of life, 261  
sensory awareness, 261–262  
social interaction, 261
- Legislation/licensing, 4
- Legs, 131  
effleurage, 131, 143f, 144f  
kneading, 131, 146f  
picking up, 131, 147f  
stroking, 131
- Lemon oil, 90t
- 'Les Autres,' sports massage, 248
- Ligaments  
contracture, 51  
palpation, 73
- Limb deficiency, sports massage, 247–248
- Limbic system, 59f  
spinal cord, 57–59
- Limbs  
lower *see* Feet; Legs; Lower limb  
upper *see* Arms; Hand(s)
- Ling, Per Henrik, 5
- Liv 3 acupoint, 193f, 194
- Liv 8 acupoint, 193f, 194
- Ll 4 acupoint, 192f, 193
- Ll 11 acupoint, 192f, 193
- Ll 15 acupoint, 192f, 193
- Ll 20 acupoint, 193, 193f
- Load, connective tissue biomechanics, 15
- Locus ceruleus, 59f
- Long manipulations, stance, 91–92, 91f
- Long stroking, 94, 95f
- Long-term illnesses, 209–222  
*see also* specific diseases/disorders
- Lower limb, 131–136, 232, 232b  
patient positioning, 131  
*see also* Feet; Legs
- Lu 5 acupoint, 193f, 194
- Lu 7 acupoint, 193f, 194
- Lu 9 acupoint, 193f, 194
- Lubricants, 85  
advantages, 85  
animal origins, 86  
application, 89  
disadvantages, 85  
hygiene, 91  
mineral oils, 86–87  
older people, 254  
reapplication, 89  
sedative massage, 207  
spillage avoidance, 89  
temperature, 89  
vegetable origins, 86–87  
*see also* specific lubricants
- Lucas-Championnier, Just, 5–6
- Lymphatic system, 17–19, 19f  
face, 166f  
fluid system dynamics, 16  
interstitial fluid pressure, 18  
lymph movement, 17–18  
lymph vessel composition, 17, 18f  
neck, 166f  
nodes *see* Lymph nodes; *specific nodes*  
oedema, 52  
structure, 214f  
thoracic duct, 18

- Lymph movement, 17–18
- Lymph nodes  
back, 137  
structure, 18  
*see also specific lymph nodes*
- Lymphoedema, 212–216  
complex decongestive physical therapy, 213  
complex physical therapy, 213  
iatrogenic, 213  
manual lymphatic drainage, 213–214  
obliterative, 213  
parasitic, 213  
primary, 213  
secondary, 213–214  
*see also specific types*
- M**
- Macrophages  
chronic inflammation, 47  
connective tissue, 14
- Malignant disease *see* Cancer
- Manual lymphatic drainage (MLD), 214–215  
aims, 214  
cortisone studies, 215–216  
efficacy, 215–216  
lymphoedema, 213–214  
media, 214  
oedema, 51–52  
pneumatic pressure *vs.*, 216  
principles, 214  
pump technique, 217–218, 217f  
rotary technique, 219  
scoop technique, 219  
self-massage, 215, 216  
serotonin studies, 215–216  
stationary circles, 217f, 218  
stroking, 214  
techniques, 216–219  
*see also specific techniques*
- Masseter muscle, 166f
- The Masseuse's Pocket Book*, 4
- Mast cells, connective tissue, 14
- Mastectomy, plastic surgery, 253
- Mastoid lymph nodes, 166f
- Maternal bonding, baby massage, 263–264, 265
- Matrix hydration, connective tissue, 16
- Maturation phase, wound healing, 49, 50
- MBV (mean blood velocity), massage effects, 26–27
- McMillan, Mary, 6
- Mean blood velocity (MBV), massage effects, 26–27
- Mechanical stress, mast cell activation, 24
- Media  
hydrostatic oedema, 54  
manual lymphatic drainage, 214
- Medial lemniscus, 59f
- Medical history, essential oils, 88
- Medulla, 59f
- Medullary reticular formation, 59f
- Meine Bindegewebe* massage, 6
- Meissner's corpuscles, 13, 13f
- Mennell, J B, 6
- Mental health, 258–260  
aims of therapy, 259  
body image problems, 260  
client–therapist relationship, 260  
environment effects, 259  
hand massage, 259  
informed consent, 259  
musculoskeletal problems, 259  
self-massage, 260  
studies, 260
- Meridians, acupressure, 185–186
- Merkel's discs, skin, 11f, 12, 13f, 37–38
- Metacognitive skills, clinical reasoning, 75–76
- Metastases, as contraindication, 61, 63
- Midbrain, 59f
- 'Milking' massage techniques, myofascial trigger points, 227–228
- Mineral oils, lubricants, 86–87
- MLD *see* Manual lymphatic drainage (MLD)
- Mode of dress, therapist, 93
- $\alpha$ -Motoneurone excitability, massage effects, 31
- MTPs *see* Myofascial trigger points (MTPs)
- Muscle(s), 130f  
damage, 226  
delayed-onset soreness *see* Delayed onset muscle soreness (DOMS)  
face, 166f  
fibrositis, 28–29  
haematomas *see* Muscle haematomas  
massage effects, 28–31  
 $\alpha$ -motoneuron excitability, 31  
pain, 29–30  
palpation, 70–73  
prolonged activity, 92  
proprioceptors, 29f  
shaking *see* Muscle shaking  
spasm, 226–227  
spasm cycle, 29, 29f  
static loading, 257  
strain *see* Muscle strain  
stress, 204t  
studies, 31  
tears as contraindication, 61  
tone *see* Muscle tone
- Muscle energy techniques, sports massage, 242
- Muscle haematomas, 242–243  
intermuscular, 242–243  
intramuscular, 243
- Muscle rolling  
static muscle work, 257  
work-related problems, 258
- Muscle shaking  
arms, 129, 135f  
brachioradialis muscle, 135f  
feet, 131
- Muscle strain, 243–246  
hamstring complex, 243–245  
intrinsic risk factors, 244–245  
overuse injury, 244–245
- Muscle tone, 19–20  
massage effects, 29
- Musculoskeletal stress prevention, occupational health, 256
- Musculoskeletal system, 223–224  
connective tissue, 224  
joints, 224  
mental health, 259  
sedative massage as prophylaxis, 205  
*see also* Neuromusculoskeletal disorders
- Myofascial release, reflex therapies, 177–180, 178f
- Myofascial trigger points (MTPs), 227–228, 227f, 228f  
back pain, 231  
full-range passive stretching, 227–228  
'milking' massage techniques, 227–228  
palpation, 74  
symptoms, 227  
treatment, 227–228
- Myofibroblasts, 16

## N

Narrative clinical reasoning, 76  
 National Association of Nurse Massage Therapists, 6  
 Natural killer (NK) cells, HIV/AIDS, 219–220  
 Neck, 137–142  
   acupressure, 188f  
   effleurage, 91–92, 91f, 142, 154f, 155f  
   finger kneading, 142, 157f  
   kneading, 142, 156f  
   lymphatic drainage, 166f  
   patient positioning, 137  
   picking up, 142  
   skin rolling, 142  
   wringing, 142, 158f  
 Neck pain, 229–230  
   studies, 230  
 Nerve fibres, 58f  
   skin, 13  
 Neural tension, wound healing, 56  
 Neuroendocrine system, stress, 24  
 Neurological disorders, 251  
   H-reflex amplitude, 251–252  
   normal movement, 251  
   Rood approach, 251–252  
   soft tissue mobilizations, 252  
 Neuromuscular technique (NMT), 40–41, 120, 121f  
 Neuromusculoskeletal disorders, 223–234  
   disease factors, 228–229  
   mechanical factors, 224–228  
   postural factors, 224–228, 225b  
     anxiety, 226  
     chronic back pain, 226  
     connective tissue stress, 225  
     'crossed pattern', 224–225  
     degeneration, 224–225  
     depression, 226  
     'dowager's' ('buffalo') hump, 225  
     erector spinae, 224–225  
     joints, 225  
     muscle damage, 226  
     muscle spasm, 226–227  
     sarcomere loss, 225  
     studies, 226  
   *see also* Musculoskeletal system;  
     specific diseases/disorders  
 Neuropeptides, pain, 57–59  
 Neutrophils, inflammation, 47  
 NMT (neuromuscular technique), 40–41, 120, 121f

Nodules, palpation, 74  
 Noradrenaline (norepinephrine), inflammation, 45  
 Norepinephrine (noradrenaline), inflammation, 45  
 Normal movement, neurological disorders, 251  
 Nucleus raphe magnus, 59f  
 Nucleus reticularis gigantocellularis, 59f

## O

Objective patient assessment, 76–77  
 Obliterative lymphoedema, 213  
 Occipitalis muscle, 130f  
 Occipital lymph nodes, 166f  
 Occupational health, 256–258  
   adverse neural tension, 256–257  
   causative factor massage, 257  
   musculoskeletal stress prevention, 256  
   repetitive strain industry, 256  
   sedative massage, 205  
   static muscle work reduction, 257  
   symptoms, 256–257  
   treatment, 257, 258  
   work-related upper limb disorders, 256  
 Oedema, 51–52, 64, 229  
   in cancer, 212–213  
   *see also* Hydrostatic oedema;  
     Lymphoedema  
   causes, 52–53  
   control of, 52  
   fluid balance, 52  
   heart disease/disorders, 52  
   hydrostatic *see* Hydrostatic oedema  
   inflammation, 52  
   isotope clearance studies, 215  
   lymphatic system, 52  
   manual lymphatic drainage, 51–52  
   massage effects, 33  
   pain, 51–52  
   treatment efficacy, 215–216  
 Oils, essential *see* Essential oils  
 Older people, 253–256  
   depression, 254  
   lubricants, 254  
   personal autonomy, 254  
   positioning, 254, 255f  
   privacy, 254  
   quality of life, 253–254  
   residential care, 254  
 Open wounds, as contraindication, 61

Ophthalmic plastic surgery, 253  
 Opiates, endogenous, 60  
 Orange oil, 88  
 Orbicularis oculi muscle, 130f, 166f  
 Orbicularis oris muscle, 130f, 166f  
 Orthodox medicine, complementary medicine *vs.*, 4  
 Osmosis, fluid system dynamics, 16  
 Osteoarthritis, 228  
 Outcome evaluation *see* Treatment planning  
 Overuse injuries  
   muscle strain, 244–245  
   wheelchair use, 247  
 Oxytocin, connective tissue biomechanics, 16

## P

P 3 acupoint, 191, 191f  
 P 6 acupoint, 191, 191f  
 Pacinian corpuscles, 11f, 13, 13f  
 Pain, 56–60, 252–253  
   analgesics *vs.* massage, 34  
   cancer therapy, 210  
   C fibres, 57  
   chronic inflammation, 47  
   glutamate, 57–59  
   hypoalgesia studies, 252  
   massage effects, 32–33  
   mechanisms of, 56–60  
   neuropeptides, 57–59  
   oedema, 51–52  
   perception, 32  
   postsynaptic inhibition, 60  
   presynaptic inhibition, 59–60  
   sensory nerve endings, 57  
   in spinal cord, 57–60  
   spinal cord injuries, 247  
   studies, 32  
   subthreshold excitatory postsynaptic potential, 57  
   in tissues, 56–57  
   transcutaneous electrical nerve stimulation *vs.* massage, 253  
   whole body massage, 252  
 Palpation, 67–74  
   abnormalities, 73–74  
   dermis, 70  
   end-feel, 73  
   epidermis, 70  
   fascial layer, 70  
   hand mobility, 70, 71f, 72f  
   joint capsules, 73



- layer palpation, 70
- ligaments, 73
- muscle, 70–73
- peripheral nerves, 73
- subcutaneous layers, 70
- synovium, 73
- tendons, 73
- training exercises, 69–70
- Papillae, skin, 10
- Parasitic lymphoedema, 213
- Paraspinal muscles, back pain, 231
- Parasympathetic nervous system, 36, 37*f*
  - connective tissue manipulation, 171
- Paravertebral muscles, finger kneading, 157*f*
- Parotid lymph nodes, 166*f*
- Patellofemoral pain syndrome, 245
- Pathological principles, 45–66
  - local factors, 45–53
  - see also specific diseases/disorders*
- Patient assessment, 76–78
  - closed questions, 77
  - interviews, 77
  - objective assessments, 76–77
  - presenting condition, 76–77
  - subjective assessments, 76–78
  - see also Clinical reasoning*
- Patient draping, 93–94
- Patient permission, 23
- Patient positioning, 93–94
  - abdomen, 142–159
  - arms, 129
  - back, 137
  - deep transverse friction, 122
  - face, 160
  - hands, 129, 132*f*
  - lower limb, 131
  - neck, 137
  - older people, 254, 255*f*
  - prone on treatment couch, 93–94
  - reflextherapy, 196
  - side-lying on treatment couch, 94
  - supine on treatment couch, 93
- Peanut oils, allergies, 86
- Peau d'orange, palpation, 73
- Pectoralis major muscle, 130*f*
- Peppermint oil, 88
- Performance athlete, 235
- Performance-specific functional asymmetry, 238
- Periaqueductal grey matter, 59*f*
- Periosteal massage, reflex therapies, 180–184
- Peripheral lymphatics, 19*f*
- Peripheral nerves, palpation, 73
- Permission, from patient, 23
- Personal autonomy, older people, 254
- Petrissage, 98–106
  - kneading *see* Kneading
  - picking up *see* Picking up
  - rolling, 98, 103–105, 107*f*
  - shaking *see* Shaking
  - static muscle work, 257
  - work-related problems, 258
  - wringing *see* Wringing
- Phagocytosis, inflammation, 47
- Philosophical reflective practice, 82–83
- Philosophy (of massage), 3
- Phonophoresis studies, deep transverse friction, 120–122
- Phototoxic reactions, essential oils, 89
- Physical disabilities
  - learning disabilities, 262
  - sports massage, 247–248
- Physical Treatment by Movement, Manipulation and Massage*, 6
- Picking up, 98, 106, 110*f*
  - arms, 129, 133*f*
  - back, 137
  - hands, 131
  - legs, 131, 147*f*
  - neck, 142
  - thigh, 131
  - triceps muscle, 133*f*
- Piezo-electrical effect, connective tissue massage, 33–34
- Pigment cells, connective tissue, 14
- PIR (post isometric relaxation), 242
- Plasma cells, connective tissue, 14
- Plasma proteins, fluid system
  - dynamics, 17
- Plastic surgery, 253
- Platysma muscle, 166*f*
- Plethysmography studies, circulation, 25–26
- Plucking, face, 160, 169*f*
- Pneumatic pressure, manual lymphatic drainage *vs.*, 216
- POMR (problem-oriented medical record), treatment planning, 80, 81*f*
- Positional release techniques, sports massage, 241–242
- Positioning *see* Patient positioning
- Post isometric relaxation (PIR), 242
- Postnatal depression, 263–264
- Postsynaptic inhibition, pain, 60
- Post-thoracotomy pain, 32
- Post-traumatic stress disorder (PTSD), 260
- Posture, 91–92
  - base of support, 91
  - see also Neuromusculoskeletal disorders*
- Pounding, 114–117, 118*f*
  - gluteal area, 118*f*
- Practical Treatise on Massage*, 5–6
- Pregnancy, 266
- Premenstrual syndrome, reflextherapy, 196
- Presenting condition, patient
  - assessment, 76–77
- Pressure gradients, circulation, 25
- Pressure sores (decubitus ulcers)
  - as contraindication, 55–56
  - spinal cord injuries, 247
- Presynaptic inhibition, pain, 59–60
- Preterm infants, touch, 22
- PRICE (protect, rest, ice, compression, elevation), 242
- Primary lymphoedema, 213
- Privacy, older people, 254
- Problem analysis, treatment planning, 79
- Problem-based approach, clinical reasoning, 75–76
- Problem definition, treatment planning, 78–79
- Problem identification, treatment planning, 78
- Problem-oriented medical record (POMR), treatment planning, 80, 81*f*
- Problem recognition, treatment planning, 78
- Procedural reasoning, clinical reasoning, 76
- Professional reflective practice, 83
- Prolonged elevation, arms, 92
- Prolonged muscle activity, 92
- Proprioceptors, muscle, 29*f*
- Protect, rest, ice, compression, elevation (PRICE), 242
- Psoriasis, as contraindication, 61
- Psychomotor reflective practice, 82
- PTSD (post-traumatic stress disorder), 260
- Pulmonary system, stress, 204*t*
- Pump technique, manual lymphatic drainage, 217–218, 217*f*

## Q

- Quadratus labii superioris muscle, 166f
- Quadriceps femoris muscle, 130f
- Quality of life (QoL), 209
  - cancer therapy, 210
  - dementia, 255
  - learning disabilities, 261
  - older people, 253–254

## R

- Randomised clinical trials, cancer therapy, 210
- Reactive pain, 57–59
- Reciprocal inhibition (RI), sports massage, 242
- Recreational athletes, 235
- Rectus abdominus muscle, 130f
- Redness, chronic inflammation, 47
- Reflective practice, 82–83
  - cognitive, 82
  - interpersonal, 82
  - philosophical, 82–83
  - professional, 83
  - psychomotor, 82
- Reflexes, 35
- Reflexology, 186
- Reflex points, acupuncture, 186, 187–194, 191f
- Reflex therapies, 171–198
  - connective tissue manipulation
    - see* Connective tissue manipulation (CTM)
  - myofascial release, 177–180, 178f
  - periosteal massage, 180–184
  - segmentmassage, 180, 181f
- Reflextherapy, 194–196
  - baroreceptor reflex
    - sensitivity, 196
  - bronchial asthma, 196
  - as diagnostic tool, 196
  - Doppler sonography studies, 196
  - patient position, 196
  - premenstrual syndrome, 196
  - purpose, 194–196
  - zones, 195f
- Regional applications, 129–170
  - see also specific body parts*
- Reinforced kneading
  - back, 137, 151f
  - gluteus maximus muscle, 151f
- Relaxation, 21–44
  - connective tissue biomechanics, 15

- Relaxation massage, 199–208
  - essential oils, 87
  - see also* Sedative massage
- Repetitive strain injury (RSI), 256
- Residential care, older people, 254
- Resolution, inflammation, 47
- Respiratory disorders, 252
- Rete cutaneum, skin circulation, 12
- Rete subpapillare, skin
  - circulation, 12
- Reticularis magnocellularis, 59f
- Reticular layer, skin, 10
- Retroauricular lymph nodes, 166f
- Rheumatoid arthritis, 228
- Right lymph duct, 19f
- Right of treatment, cancer therapy, 63–64, 211
- Risorius muscle, 166f
- Rolling, 98, 103–105, 107f
  - skin *see* Skin rolling
- Rood approach, neurological disorders, 251–252
- Rosemary oil, 88, 90t
- Ross, Araminta, 4
- Rotary technique, manual lymphatic drainage, 219
- Rotator cuff tendinitis, 231–232
- RSI (repetitive strain injury), 256
- Ruffini's corpuscles, skin, 11f, 13, 13f
- Ryodoraku acupuncture therapy, 186

## S

- Safety
  - cancer therapy, 211–212
  - lubricants, 86
- SAID (specific adaptation to imposed demand), 236–237, 236f
- Sarcomere loss, 225
- Sartorius muscle, 130f
- Scalene muscles, finger kneading, 157f
- Scapula release, 231–232
- Scars
  - deep friction, 34
  - hypertrophic *see* Hypertrophic scars
  - keloid, 49–50
  - massage, 229
  - wound healing, 48
- Scoop technique, manual lymphatic drainage, 219
- Sebaceous gland, skin, 11f
- Secondary intention wound healing, 48, 49f
- Secondary lymphoedema, 213–214
- Sedative massage, 204–205
  - essential oils, 207
  - forms of, 207
  - full body massage, 207, 207b
  - lubricants, 207
  - musculoskeletal disease prophylaxis, 205
  - occupational disorders, 205
  - research studies, 205–207, 206t
  - 3-minute slow-stroke back massage, 207
- Segmentmassage
  - back, 181f
  - face, 181f
  - reflex therapies, 180, 181f
- Segmentmassage: Massage Reflektorischer Zonen*, 6
- Self-massage
  - hydrostatic oedema, 54
  - manual lymphatic drainage, 215, 216
  - mental health, 260
  - venous ulcers, 55–56
- Sensory awareness, learning disabilities, 261–262
- Sensory cortex, 59f
- Sensory nerve endings, 57
- Sensory organs, skin, 9–10
- Sentinel lymph nodes, 19f
- Serotonin studies, manual lymphatic drainage, 215–216
- Seyle's hypothesis, stress, 204f
- Shaking, 98, 106, 112f
  - muscles *see* Muscle shaking
  - sports massage, 239
- Shiatsu, cautions, 62
- Shoulder, 245–246
  - frozen, 231
  - impingement injury, 246
  - throwing skills, 245–246
- Sitting posture, 224f
- Sjögren's syndrome, 228
- Skin, 9
  - abrasions, spinal cord injuries, 247
  - arteriovenous plexus, 11f
  - circulation, 11–12
    - blood flow rate, 9–10
    - deep laminar venous plexus, 12
    - intermediate plexus, 12
    - rete cutaneum, 12
    - rete subpapillare, 12
    - superficial plexus, 12
  - collagen fibres, 11f
  - condition, lubricant disadvantages, 86
  - dermis *see* Dermis

- desquamation, 10  
epidermis, 10, 11f  
fascia, 11f  
fascial layer, 11f  
hypodermis, 11f  
innervation, 12–13, 13f  
  autonomic nervous system, 38  
  dermis, 12–13  
  free nerve endings, 11f, 13f  
  Krause's end bulb, 13f  
  Meissner's corpuscles, 13, 13f  
  Merkel's discs, 11f, 12, 13f, 37–38  
  nerve fibres, 13  
  Pacinian corpuscles, 11f, 13, 13f  
  Ruffini's corpuscles, 11f, 13, 13f  
  sensory organs, 9–10  
  specificity, 13  
  touch receptors, 22  
Langer's (Kraissl's) lines, 10  
papillae, 10  
reticular layer, 10  
sebaceous gland, 11f  
stratum basale, 10, 11f  
stratum corneum, 10, 11f  
stratum granulosum, 11f  
stratum spinosum, 11f  
stress, 204t  
stretch marks (striae gravidarum), 10–11  
structure, 11f  
*see also specific anatomical structures*  
sweat gland, 11f  
temperature regulation, 9–10  
tension lines, 12f  
thickness, 9–10  
wrinkling, 10–11  
zona germinativa, 10
- Skin rolling  
  back, 137  
  neck, 142  
  static muscle work, 257  
  work-related problems, 258
- Skin (haut) technique, connective tissue manipulation, 172–177, 173f
- Skin temperature, massage effects, 27
- Skin traction, lubricant disadvantages, 86
- SI 3 acupoint, 192f, 193  
SI 6 acupoint, 192f, 193  
SI 11 acupoint, 192f, 193
- Slow pain, 56–57
- Small intestine, kneading, 160, 162f
- Small-range manipulations, stance, 91f, 92
- Smooth muscle, skin dermis, 10–11
- SOAP, treatment planning, 80–81
- Social interaction, learning disabilities, 261
- Society of Trained Masseuses, foundation, 4
- Soft tissue(s), 236–238  
  acute injury, 242–246  
    PRICE (protect, rest, ice, compression, elevation), 242  
  CNS response, 237  
  cortical response, 237  
  fascia, 237  
  feed forward mechanisms, 237–238  
  lesions, deep transverse friction, 120  
  performance-specific functional asymmetry, 238  
  regularity, 237  
  specific adaptation to imposed demand, 236–237, 236f  
  whole body myofascial release, 237
- Soft tissue mobilizations (STMs), 252
- Solution development  
  data analysis, 79  
  treatment planning, 79
- Solution implementation, treatment planning, 80
- Sp 6 acupoint, 191, 191f  
Sp 9 acupoint, 191, 191f  
Sp 10 acupoint, 191, 191f
- Specific adaptation to imposed demand (SAID), 236–237, 236f
- Spinal cord  
  A-beta fibres, 57–60  
  A-delta fibres, 57–59  
  C-fibres, 57–59  
  limbic system, 57–59  
  pain, 57–60
- Spinal cord injuries  
  pain response, 247  
  sports massage, 247
- Spirometry studies, circulation, 25–26
- Sport, skill demand, 238, 238f, 238t
- Sports massage, 30, 235–250  
  benefits, 241t  
  casual athlete, 235  
  cerebral palsy, 248  
  in competition, 238–239  
  delayed onset muscle soreness, 239  
  fatigue, 239  
  fatigue recovery, 239  
  shaking, 239  
  vibration, 239  
  warm-up routine, 238–239
- definition, 235  
effleurage, 241  
intellectual impairment, 246–247  
'Les Autres', 248  
limb deficiency, 247–248  
maintenance massage, 240–241, 240f  
  primary patterns, 240  
  secondary patterns, 240  
muscle energy techniques, 242  
performance athlete, 235  
physical disabilities, 247–248  
  *see also specific diseases/disorders*  
positional release techniques, 241–242  
post activity, 239–240  
  delayed onset muscle soreness, 239  
  recreational athlete, 235  
  spinal cord injuries, 247  
  Swedish massage, 236  
  visually impaired, 246
- St 34 acupoint, 193f, 194  
St 36 acupoint, 193f, 194  
St 44 acupoint, 193f, 194
- Stance, 91–92  
  long manipulations, 91–92, 91f  
  small-range manipulations, 91f, 92  
  transverse manipulations, 91f, 92
- State-Trait Anxiety Inventory, 205–207
- Static loading of muscle, 257
- Stationary circles, manual lymphatic drainage, 217f, 218
- Stationary holding, cancer therapy, 212
- Stationary pressure techniques, contraindications, 62
- Sternocleidomastoid muscle, wringing, 158f
- Sternomastoid muscle, 130f
- STMs (soft tissue mobilizations), 252
- Stratum basale, skin, 10, 11f  
Stratum corneum, skin, 10, 11f  
Stratum granulosum, skin, 11f  
Stratum spinosum, skin, 11f
- Stress, 201–202, 203f  
  adrenocorticotrophic hormone, 22  
  associated diseases/disorders, 204t  
  autonomic nervous system, 201  
  cancer therapy, 209–210  
  neuroendocrine changes, 24  
  Seyle's hypothesis, 204f
- Stressors, 23–24, 201  
  definition, 23–24
- Stress-strain curve, connective tissue biomechanics, 14–15, 15f

- Stretch marks (striae gravidarum), 10–11
- Striae gravidarum (stretch marks), 10–11
- String wrapping, massage effects on circulation *vs.*, 27
- Stroke patients, 252
- Stroking, 94–97
  - abdomen, 160, 161*f*
  - back, 137
  - cancer therapy, 212
  - legs, 131
  - long stroking, 94, 95*f*
  - manual lymphatic drainage, 214
  - thousand hands, 94–97, 97*f*
- Subclavian vein, 19*f*
- Subcutaneous layers, palpation, 70
- Subcutaneous (unterhaut) technique, connective tissue manipulation, 173*f*, 177
- Subcutaneous tissue, 12
- Subjective assessments, patient
  - assessment, 76–78
- Submandibular lymph nodes, 166*f*
- Submental lymph nodes, 166*f*
- Substance P, 27
- Subthreshold excitatory postsynaptic potential, 57
- Superficial cervical lymph nodes, 166*f*
- Superficial plexus, skin circulation, 12
- Suprasegmental reflexes, autonomic nervous system, 37
- Sweat glands, skin, 11*f*
- Swedish massage
  - cancer therapy, 212
  - hydrostatic oedema, 64
  - sports massage, 236
- Swelling
  - chronic inflammation, 47
  - palpation, 73
- Sympathetic nervous system, 35–36, 36*f*
- connective tissue manipulation, 171
- Synovium, palpation, 73
- T**
- TAC-TIC patterned tactile stimulation, baby massage, 264
- Talc, safety aspects, 86
- Tapotement, 114–119
  - back, 137
  - clapping, 114, 115*f*
  - hacking, 114, 116*f*
  - pounding, 114–117, 118*f*
  - tapping, 114
  - vibration, 114–117, 119*f*
- Tapping, 114
  - face, 160
- Tea-tree oil, 90*t*
- antimicrobial effects, 88
- Technik der Massage*, 5–6
- Techniques (of massage), 85–128
- Temperature
  - environment, 93
  - lubricants, 89
- Temporalis muscle, 166*f*
- Temporal lobe, 59*f*
- Tendons, palpation, 73
- Tennis elbow, 231–232
- Tension headaches, 30, 229–230
- Tension lines, skin, 12*f*
- TENS (transcutaneous electrical nerve stimulation), massage *vs.*, 253
- Teres major muscle, 130*f*
- Terminal illnesses, 209–222
  - see also specific diseases/disorders*
- TH 3 acupoint, 192*f*, 193
- TH 5 acupoint, 192*f*, 193
- TH 14 acupoint, 192*f*, 193
- Thalamus, 59*f*
- Therapeutic effects (of massage), 21–44
  - see also specific tissues*
- Therapeutic touch techniques, cancer therapy, 212
- Therapist, environment, 93
- Thermoregulation, spinal cord injuries, 247
- Thigh, 131
  - kneading, 131
  - picking up, 131
  - wringing, 104*f*, 131, 145*f*
- Thoracic duct, 19*f*
- lymphatic system, 18
- Thousand hands, 94–97, 97*f*
- Thrombus, as contraindication, 61
- Throwing skills, shoulder complex, 245–246
- Thyrototoxicosis, destructive, 62–63
- Tissue(s)
  - effects of massage, 22–24
    - see also specific tissues*
  - interfaces, palpation, 74
  - loss, wound healing, 48
  - pain, 56–57
- Tissue layers, 24–25
  - movement of, 24
- Touch, 22, 23
  - development of, 22
  - preterm infants, 22
- Touch receptors, skin, 22
- Tracheal lymph nodes, 166*f*
- Traditional Chinese medicine, meridians, 184*f*, 185
- Training exercises, palpation, 69–70
- Traité de la Massothérapie*, 5–6
- Transcutaneous electrical nerve stimulation (TENS), massage *vs.*, 253
- Transverse manipulations, stance, 91*f*, 92
- Trapezius muscle, 130*f*
  - wringing, 151*f*
- Trauma, 229
  - hands, 232
  - oedema, 53
- Treatment planning, 75–84
  - data management, 79
  - goal formulation, 79
  - outcome evaluation, 80–82
    - goal identification, 80
    - problem-oriented medical record, 80, 81*f*
    - SOAP, 80–81
  - problem analysis, 79
  - problem definition, 78–79
  - problem identification, 78
  - problem recognition, 78
  - solution development, 79
  - solution implementation, 80
    - see also Reflective practice*
- Triceps muscle, 130*f*
  - picking up, 133*f*
  - wringing, 134*f*
- U**
- Ultrasound, reflextherapy Doppler studies, 196
- Ultraviolet sensitization, essential oils, 89
- Undiagnosed cancer
  - contraindication, 212
  - as contraindication, 64
- Unterhaut (subcutaneous) technique, connective tissue manipulation, 173*f*, 177
- Upper limb problems, 231–232, 231*b*
  - see also specific diseases/disorders*

## USA

- history of massage, 6
- massage legislation, 4

**V**

- Vasodilation, 24
  - massage effects on circulation, 27
- VDUs (visual display units), 257
- Vegetable lubricants, 86–87
- Vein compliance, oedema, 52
- Venous ulcers, 55–56
  - aims, 55
  - principles, 55
  - self-care, 55–56
- Vibrations, 114–117, 119f
  - calf, 119f
  - colon, 160, 165f
  - face, 160
  - sports massage, 239
- Visco-elastic properties, connective tissue, 15
- Visual display units (VDUs), 257
- Visually impaired, sports massage, 246

**W**

- Warm-up routine, sports massage, 238–239

- Weaning, baby massage, 266
- Wheelchair use, overuse injuries, 247
- White cells, inflammation, 47
- Whole body massage, pain, 252
- Whole body myofascial release, soft tissues, 237
- Work-related upper limb disorders (WRULDs), 256
- Wound diameter, 55f
- Wound healing, 48–51, 49f, 51t, 64
  - adherence, 56
  - cell connections, 48
  - circulation increase, 50
  - collagen remodelling, 48–49
  - contraction, 48, 50–51, 56
  - as contraindication, 61
  - deep transverse friction, 120
  - epidermal cell migration, 48
  - first intention, 48, 49f
  - granulation tissue, 48
  - massage effects, 50
  - maturation phase, 49, 50
  - neural tension, 56
  - scar formation, 48
  - second intention, 48, 49f
  - tissue loss, 48
- Wringing, 98, 103, 104f
  - Achilles tendon, 104f
  - arms, 129, 134f

- back, 104f, 137, 151f, 153f
- face, 160, 170f
- gluteus maximus muscle, 153f
- hands, 130, 142f
- neck, 142, 158f
- static muscle work, 257
- sternocleidomastoid muscle, 158f
- thigh, 104f, 131, 145f
- trapezius muscle, 151f
- triceps muscle, 134f
- work-related problems, 258
- Wrinkling, skin, 10–11
- WRULDs (work-related upper limb disorders), 256

**X**

- <sup>133</sup>Xe clearance technique, massage effects on circulation, 26

**Y**

- Ylang-ylang oil, 90t

**Z**

- Zona germinativa, skin, 10
- Zygomaticus major muscle, 166f