PEDIATRIC MASSAGE THERAPY

2nd EDITION

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MARYBETTS SINCLAIR, LMT
Corvallis, Oregon

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This book is dedicated to two groups of people.

First, those giants upon whose shoulders this work stands:
Judith Bluestone, Moshe Feldenkrais, Tiffany Field, Karen Olness,
Meir Schneider, Agatha Thrash, and Janet Travell.

and

Second, my children, Rachel and Daniel. I love you with all my heart.

FOREWORD

Perhaps the last place in the world one would think of looking to find evidence for the powerful effects of human touch and human contact on physical health would be in the social isolation of a soundproofed Pavlovian Chamber. Yet it was precisely there, in 1962, at the Johns Hopkins Medical School, where I first witnessed the remarkable ways that human touch could alter heart rate, blood pressure, and coronary blood flow in dogs. It was there too that I first had the privilege of meeting my graduate school professor, W. Horsley Gantt, M.D. (a physician who had studied with Ivan P. Pavlov for 7 years and translated his research into English), and come to learn of his research studies on what he called "The Effect of Person." He would have easily recognized Marybetts Sinclair's text, *Pediatric Massage Therapy*, as an elementary component of his "Effect of Person," and he would have been delighted to see it emerge as an integral part of pediatric care.

Ironically, 1962 was part of an era in which mechanistic medicine had reached its high water mark. Dr. Christian Barnard electrified the world when he performed the first heart transplant operation in South Africa in 1969, helping to solidify the impression that the human heart was nothing more and nothing less than a mere pump. A few years earlier, the genetic code had been cracked, and the double helix was unraveled, helping to reinforce the perception that all disease could be unraveled and controlled within a few years. In that era, it was difficult to generate much excitement in the scientific community about research findings demonstrating that petting a dog could elicit an immediate 50% reduction in heart rate or blood pressure or that human contact could elicit greater increases in coronary blood flow than vigorous exercise. There seemed to be little room within the protein molecules of the double helix or within air compressors helping to keep mechanical hearts beating to fully appreciate the vital importance of human touch or human contact on our physical health. It was an era in which Marybetts' text on pediatric massage would have had a difficult time finding a receptive audience.

Fortunately, over the past 40 years, much has changed. A large number of studies have shown that even the most elementary forms of human touch can have dramatic effects on the heart rate, heart rhythm, and blood pressure of patients in coronary care and shock trauma units. In the intervening years, an ever-burgeoning literature has shown that social isolation, lack of social support, and human loneliness are major contributors to sharply increased risks of disease and premature death. We have also come to understand that dialogue, both verbal and nonverbal, has highly significant effects on the human cardiovascular system and exerts a vital role in physical health. Our understanding also has come full circle in this regard. Now it is well recognized that not only can human beings elicit major changes in a dog's heart rate and blood pressure, but also that the simple act of petting a dog can have a reciprocal and equally profound influence on human cardiovascular health. We have come to recognize that dialogue is the elixir of life.

The most elementary component of dialogue begins at birth and involves tactile contact. Fortunately, few health professionals would argue any longer that pediatric massage does not have important, indeed vital, consequences for the health of infants and children. Marybetts Sinclair's revised and beautifully illustrated text, *Pediatric Massage Therapy,* is a gift to all health professionals. It is a source of great satisfaction to recognize that her book has found an enduring home within the health community. It is especially gratifying to recognize that legions of infants and children, not yet able to read her book, will be the primary beneficiaries.

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Consequences of Loneliness

PREFACE

PURPOSE

Because of an increased acceptance of massage by the general public and greatly increased educational requirements for massage practitioners, the field of professional massage therapy has expanded significantly in the last few decades. In addition to normal healthy people, many special populations who can especially benefit from massage have been identified, such as athletes, the elderly, and abuse victims. However, almost all of the emphasis has been on massage for adults. Little information has been available about why and how to apply the hands-on therapist's knowledge of massage to children. *Pediatric Massage Therapy* has been written to fill this gap in information. It provides students and the practitioners of massage with the information and tools they need to apply it to children. It contains information on using massage to: (1) enhance both the development and the quality of life of normal children, (2) treat a wide variety of pediatric aches and pains and injuries, and (3) improve the lives of children with disabilities in many ways.

APPROACH

Pediatric Massage Therapy is based upon my 30 years of experience of giving massages to infants, children, and adults in a variety of settings including health spas, private homes, counseling centers, infant massage classes, low-income medical clinics, nursing homes, chiropractic offices, and third-world medical clinics. During that time, I learned that massage could help relieve suffering caused by many types of injuries, many types of stress, and many chronic conditions. However, my close observation of adults and children also gave rise to many difficult questions, such as:

- How do children develop chronic tension in various places in their bodies at such young ages?
- How do children develop areas of hypersensitivity and deep tension, of which they can be completely unaware?
- How does emotional stress manifest itself in so many different places in their bodies at different times, and in such very different ways?
- Why do so many adults have deeply ingrained patterns of muscle tension whose effects can be alleviated with massage but never really go away?

These unanswered questions spurred me to study the process of normal child development, to investigate research on touch and massage, and to learn about many specific fields of knowledge that, in some way, touch upon massage and bodywork; these include psychology, the history of medicine, biology, medical and physical anthropology, and naturopathic medicine. I found classic case studies detailing the use of massage for various pediatric problems. I listened carefully to the experiences of a great variety of healthcare professionals who work with children and to the experiences of the parents, who know their children the best. Their stories were often inspiring and offered insight into the various effects of massage and caring touch, and into the questions mentioned above. Their well-documented anecdotes did not offer hard and fast rules, but instead, they provided an idea of the possibilities of massage with children and the importance of working with children while their open minds, hearts, and bodies can allow change.

Furthermore, because there are currently no sufficient large-scale, rigorous scientific studies that can document the effects of massage on children, the use of such information from healthcare professionals probably gives the best picture of the possibilities of massage therapy with children. Of course, not every positive effect seen by these professionals will be replicated by every other trained practitioner, but this should not stop us from considering the possibility of massage therapy being beneficial for a host of different conditions. As long as no unfounded claims are made and contraindications are observed, massage with children is safe; at the very least, children will be given the opportunity to experience safe and nurturing touch. Quite possibly, they will benefit from massage in many other ways.

Thus, I incorporate in this book the results of investigations and case studies from my own practice. I have also included clinical reports from as long as two generations ago, which clearly demonstrate that healthy touch during childhood has been a concern for a long time.

ORGANIZATION AND FEATURES

As mentioned above, it is the goal of this book to guide the reader on how to use massage with healthy children, children experiencing common discomforts or injuries, and children with disabilities. Thus, the first three chapters of the book, "The Benefits of Massage for Children," "Not a Miniature Adult: The Unique Dynamics of Pediatric Massage," and "Pediatric Massage and Hydrotherapy Techniques," cover general principles and techniques of pediatric massage that are useful for working with all children. Chapter 4, "Massage and Hydrotherapy for Pediatric Injuries," and Chapter 5, "Massage and Hydrotherapy for the Common Discomforts of Childhood," cover the treatment of common pediatric injuries and discomforts. Chapter 6, "Massage and Hydrotherapy for Children with Disabilities," covers a number of common pediatric disabilities and diseases, and how to use massage and hydrotherapy to treat the children who have them. Finally, Appendix A provides guidelines on how to instruct parents in using massage with their children.

The following features are included in the book as learning aids:

- Key Points at the beginning of each chapter provide critical learning objectives for students.
- Point of Interest Boxes highlight interesting facts and concepts related to the content.
- Case Studies put concepts presented in the text into a real-life context.
- Checklist Boxes summarize specific massage protocols in quick-reference lists.
- Review Questions at the end of each chapter allow students to self-review the information they've just read.

A NOTE ON GENDER LANGUAGE

Every effort has been made to keep the language in this book gender-neutral, except in portions of the book that relate exclusively to boys or to girls. However, in the instruction sections, when a child is pictured, the gender of that child is used.

A NOTE ON THERAPIES NOT SUBSTANTIATED BY SCIENTIFIC EVIDENCE

Hands-on therapies such as craniosacral therapy, acupressure, and Polarity therapy, are not accepted as valid by the scientific community at this time. However, because so many experienced, long-time practitioners and their patients have found that these therapies have important benefits, I have included information about them. Hopefully in the future, as research is done on these therapies and as our understanding of the human mind and body becomes more sophisticated, we will understand the mechanisms by which they work. (It is even possible that the explanations now given for their therapeutic effects may be shown to be invalid).

FINAL NOTE

It is important to understand that because children are so dependent upon adults for support, the quality of the environment in which they live has even more influence upon them than it does upon adults. For children to flourish, their immediate families, the societies in which they live, the type of schools they attend, the state of the environment in their communities, and the political situation in their countries must be healthy. Let us all work toward improving this "big picture" to support the physical and emotional health of our children.

Marybetts Sinclair, LMT

ACKNOWLEDGMENTS

A book such as this is never only the work of one person, and the author has many people to thank. First of all, thanks to Lippincott Williams & Wilkins for recognizing the desire of many massage therapists for a book like this and for helping me so much in bringing it to completion. A special thanks to my hard-working and dedicated editor David Payne. Developmental editor Laura Bonazzoli, the queen of turning straw into gold, deserves huge thanks for her excellent feedback, which was based on her wide experience in medical writing, great organizational and editorial skills, and her compassionate nature. This book owes its present improved form more to her help than to anyone's. Ruth Werner provided me with insightful, informed, right-on-the money criticism—thanks Ruth! Also, many thanks to my good friend Robert Baldwin for a heroic editing job and for those handouts from your high school writing class; I'm pretty sure I should have taken your class more than once!

Many thanks to all those who consented to be interviewed for the special needs chapter: Brian Athorp, Diane Keene, Mary Polk, Eugenio Bruni, Lyse Lussier, Pamela Marshalla, Kathy Knowles, Pamela Yeaton, Meir Schneider, Diane Charmley, Renee Weaver, Helen Campbell, Marty Folin, Larry Burns-Vidlak, Deborah Bowes, Ann Perrault, and Kathleen Weber. A special thanks to longtime myotherapist Bonnie Prudden for consenting to share her years of expertise.

The reference librarians at the Corvallis Public Library carried on their tradition of being resourceful, cheerful, and efficient throughout the writing of this book; they have been a huge help to me in all the writing I have done and to our family during our homeschooling years. Good Samaritan Hospital librarians Dorothy O'Brien and Anna Mihok came through for me at the last minute a number of times with obscure articles. Thanks to "Dear Diedrich" Dasenbrock for the wonderful photographs that served as the source of the drawings, and thanks to all my charming models and their parents. Additional photographs were kindly taken by Michael McWilliams. David Rini and Kim Battista have enriched the book immeasurably with their artistic skill in turning the photographs and other illustrations into gorgeous drawings.

My personal Corvallis community has given me great emotional support during some critical times, including my Poplar Place neighbors (Darrylann and Bill Peterson, Margaret and Joaquim Kummerow, Rolland Roberts, Lea Lutz, and Mauren Beezhold), Ann Huster, Karan Fairchild, Judi and Peter, my dear Mary Orr, Sharon Rose, Scott Gentry, Diana Artemis, Mark Giblin, the lovely Rolfettes, and the ever-supportive mom's group. A special thanks to Dean and Lila McQueen, whose support has been both gracious and kind and who gave me the tools to use my brain to more of its full potential. I am also deeply indebted to Michael McWilliams, whose support for my work has come in many forms and without whom *Pediatric Massage Therapy* would never have been written. I thank my wonderful children, Rachel and Daniel, who have been teaching me about being a parent and what it means to love a child since the day they were born. Surely they have taught me more about the growth and development of children than all the textbooks in the world. May their own children enrich their lives in as many ways as they have mine. And finally, thank you, Mom—I appreciate you more all the time.

Marybetts Sinclair, LMT

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CONTENTS

1

THE BENEFITS OF MASSAGE FOR CHILDREN

KEY POINTS

After completing this chapter, the student will be able to:

1. Explain the physiologic effects of massage with children.
2. Explain the emotional benefits of massage with children.
3. Explain the importance of touch in the emotional development of children.
4. Identify the major stressors in the lives of modern children.
5. Describe the signs of stress in modern children.
6. Describe the fight-or-flight reaction in children.
7. Explain how children may react when confronted with overwhelming levels of stress.
8. Describe the long-term effects of local physical stress and pain on children.
9. Describe mind-body approaches to stress-related health problems of children.
10. Explain how the individual's body image develops.
11. Explain how touch and massage help develop a healthy body image in children.

Every massage therapist has had the sad experience of treating adults who have come in for hands-on treatment, yet are afraid of being touched. As children, these fearful adults might have grown up in nontouching families or suffered physical trauma, painful medical treatment, or even physical or sexual abuse. With these experiences, children often learn to avoid and deny their need for touch. As a result, as adults, they may be touch deprived, socially isolated, and have difficulty forming and maintaining intimate relationships. Because receiving health care—especially massage therapy—almost always involves touch, it may be difficult for them to accept. In contrast, those who are exposed to sensitive, caring massage when they are children learn to have a healthy adult attitude toward touch. Giving and receiving massage is a normal part of their lives—a tool that helps them relax, helps injuries heal, and enhances their health.

Massage therapy can be equally important as a way to improve the quality of a child's life. This chapter will demonstrate that massage has proven physiologic benefits, reduces stress, and provides perceptual feedback that is vital to help children form a strong and positive body image. Chapter 4 will demonstrate how massage can treat common pediatric injuries, Chapter 5 will explore the many ways that massage can relieve common pediatric discomforts, and, in Chapter 6, the reader will learn that children with disabilities and chronic musculoskeletal problems can benefit tremendously from regular massage. From helping to heal birth trauma to soothing a stressed-out teenager, massage can dramatically help children. Many adults with long-term physical pain and dysfunction that began with a severe childhood injury or trauma could have escaped long-term effects if they had received massage therapy at the time of injury (see Figure 1–1).

PHYSIOLOGIC BENEFITS OF MASSAGE

Although comparatively little research has been done on the effects of massage on children, research has

FIGURE 1–1 ■ Massage therapists Dianne and Rich Keene use massage to help their son Tim. Photo courtesy of Theresa George, Warren, MI.

confirmed that massage with adults has the following effects:

- prevents chronic musculoskeletal problems through early treatment of fascial restriction and myofascial trigger points
- relaxes muscles
- stretches muscle and connective tissue
- increases venous blood and lymph flow
- relieves pain
- reduces heart rate and blood pressure (temporarily)
- promotes deep relaxation
- changes production of certain hormones
- promotes deeper breathing
- stimulates the flow of cerebrospinal fluid
- improves immune function
- reduces anxiety, insomnia, and depression[1-4]

This is a current discussion of the physiologic effects of massage with children; however, it is hoped that as more research is completed in the near future, far more information will be available. With little or no documentation that is specific to children available, firsthand observations can help us understand the effects of massage.

Before we begin, please note that splitting the experience of touch into different "effects" is an oversimplification of a truly complex process. As infants, all mammals, including humans, depend on the physical contact of their mother for both warmth and food; they will die without her contact. Our mammalian craving for touch is originally a matter of pure survival; our reaction to touch is primal, and the effects that touch has on us are profound. When one human being touches another, we respond with our whole being. In reality, physiologic effects cannot be separated from the emotional effects. Physiologic effects, emotional effects, and even spiritual effects all happen at once. Our knowledge about the effects of human contact is still rather primitive and will certainly change as we learn more. The study described in Point of Interest Box 1-1 demonstrates that only four decades ago, science thought that the effects of touch could be separated from the effects of one person on another. While this study may seem laughably primitive to today's reader, our present understanding about touch and its effects may soon be just as outdated.

PREVENTION OF CHRONIC MUSCULOSKELETAL PROBLEMS

Note: for more information on fascial shortening and trigger points in children, see Chapter 2, page 39.

Myofascial release techniques have been successful in releasing fascial restriction and changing posture in children (see Figure 1–2). Fascial restriction may occur in utero and be present at birth. For example, autopsies of infants who died at birth have disclosed fascial shortness along large functional areas, such as the

(text continues on page 4)

POINT OF INTEREST BOX 1–1
The Problem of Isolating the Effects of Touch

In a now-classic study, Temerlin et al. tried to separate the effects of "mothering" from that of tactile stimulation. Thirty-two institutionalized, developmentally disabled boys received special mothering for 10 minutes a day, 5 days a week, for 8 weeks. Group 1 received hugging, cuddling, and rocking, during which time the "mothers" continually rubbed the boys' skin. Group 2 received the same treatment except that the mothers wore long-sleeved plastic raincoats and surgical gloves. Group 3 received passive mothering; the mothers were sitting completely still with their arms at their sides, looking straight ahead and saying nothing. Group 4 also received passive mothering, except that the mothers not only sat motionless, they wore plastic raincoats and surgical gloves.

The boys who received active mothering with actual skin-to-skin contact made significantly higher weight gains than any other group during the period of the experiment. Two boys who had been mute began saying "ma-ma" to their "mother." The most striking finding of this study is that the children did respond physiologically and emotionally to what was only a small fraction of the normal loving interaction between mother and child. Today, we know that it is not possible to separate the effects of touch from the interaction between the person touching and the person being touched, and this study appears ridiculous in its attempt to do so. Because our understanding of touch and its effects is still evolving, however, our present knowledge may look just as primitive in the future. This study was also clearly unethical, subjecting the boys to probable emotional trauma, and would never be allowed to take place today.[5]

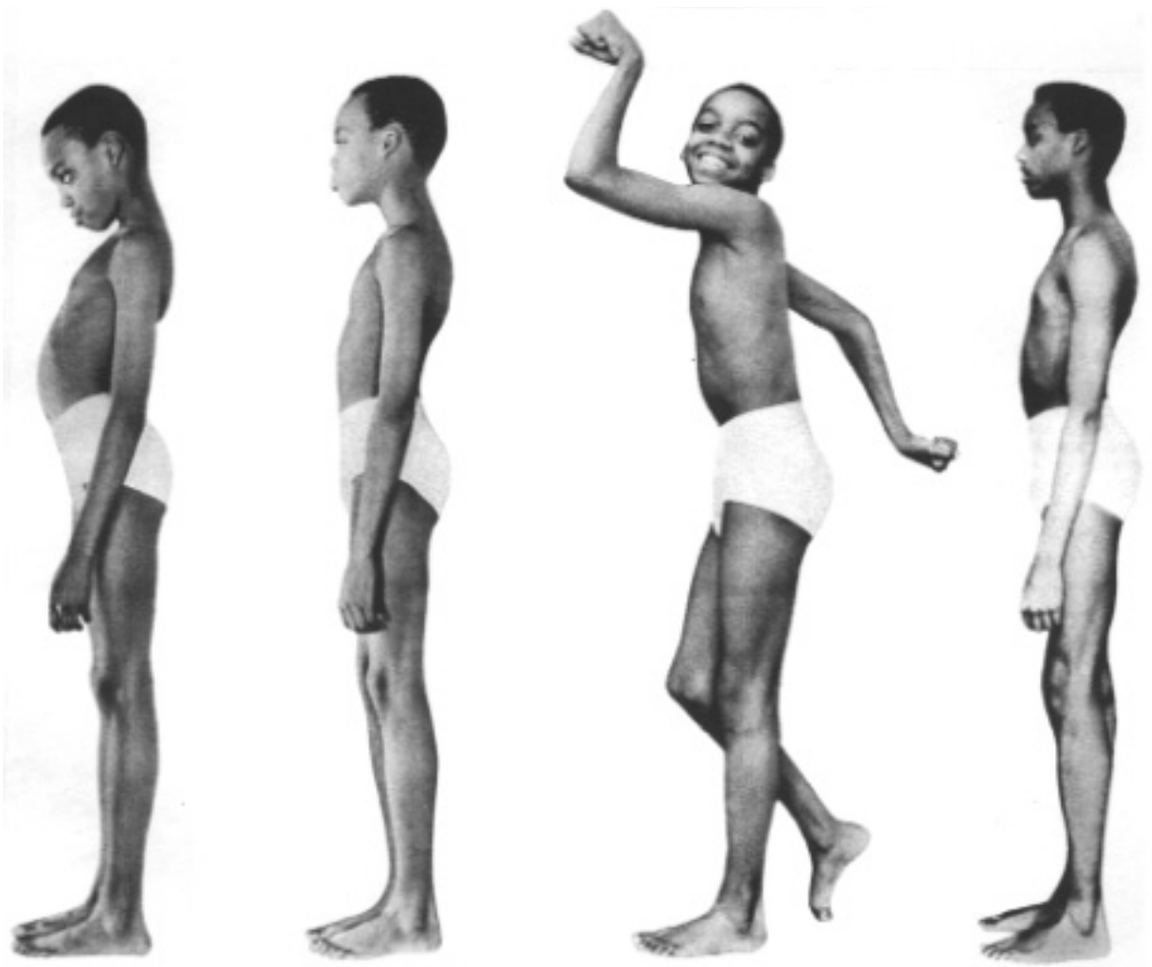

FIGURE 1–2 ■ Eleven-year-old boy, before and after ten rolfing sessions. Rolfing has greatly improved this boy's alignment. Reprinted with permission from: Toporek R: *The Promise of Rolfing Children* (monograph). Philadelphia, PA: Transformation Network, 1981.

lower back or the outside of the thigh, and muscle adherence to fascial wrappings. These fascial restrictions are probably caused by the child's position in utero.[6] Although children may appear to outgrow some deformities as they become increasingly mobile, fascial shortening may remain for life and have profound effects on movement and posture. For example, fibrous shortening of the sternocleidomastoid, acquired by a twisted neck in utero, may not only remain, it may cause discomfort and pain and affect the child's head posture, cervical spine mobility, and even the growth of the cranial bones (see Torticollis, page 147).

Myofascial trigger points are common in children (see Figure 1–3). They have been treated successfully

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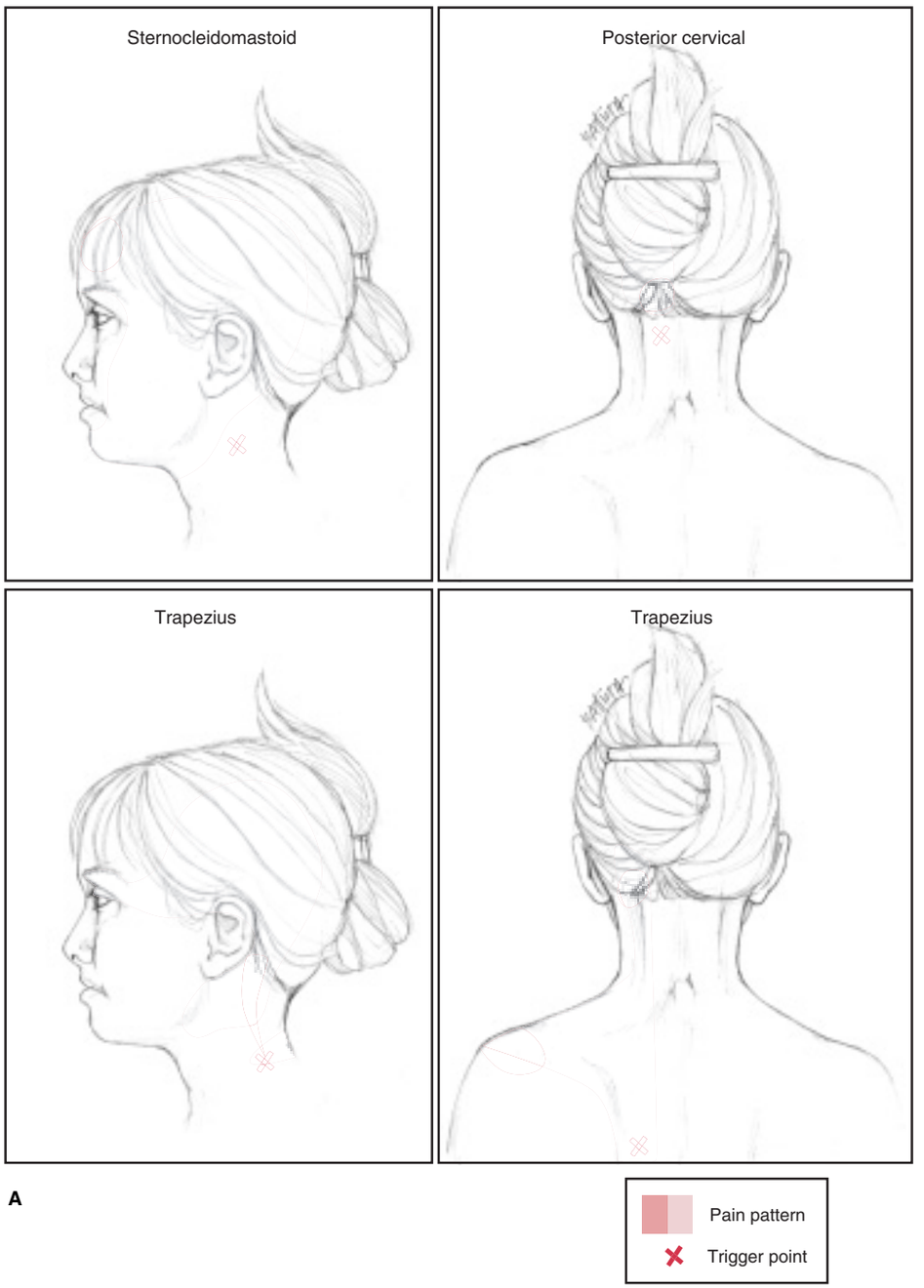
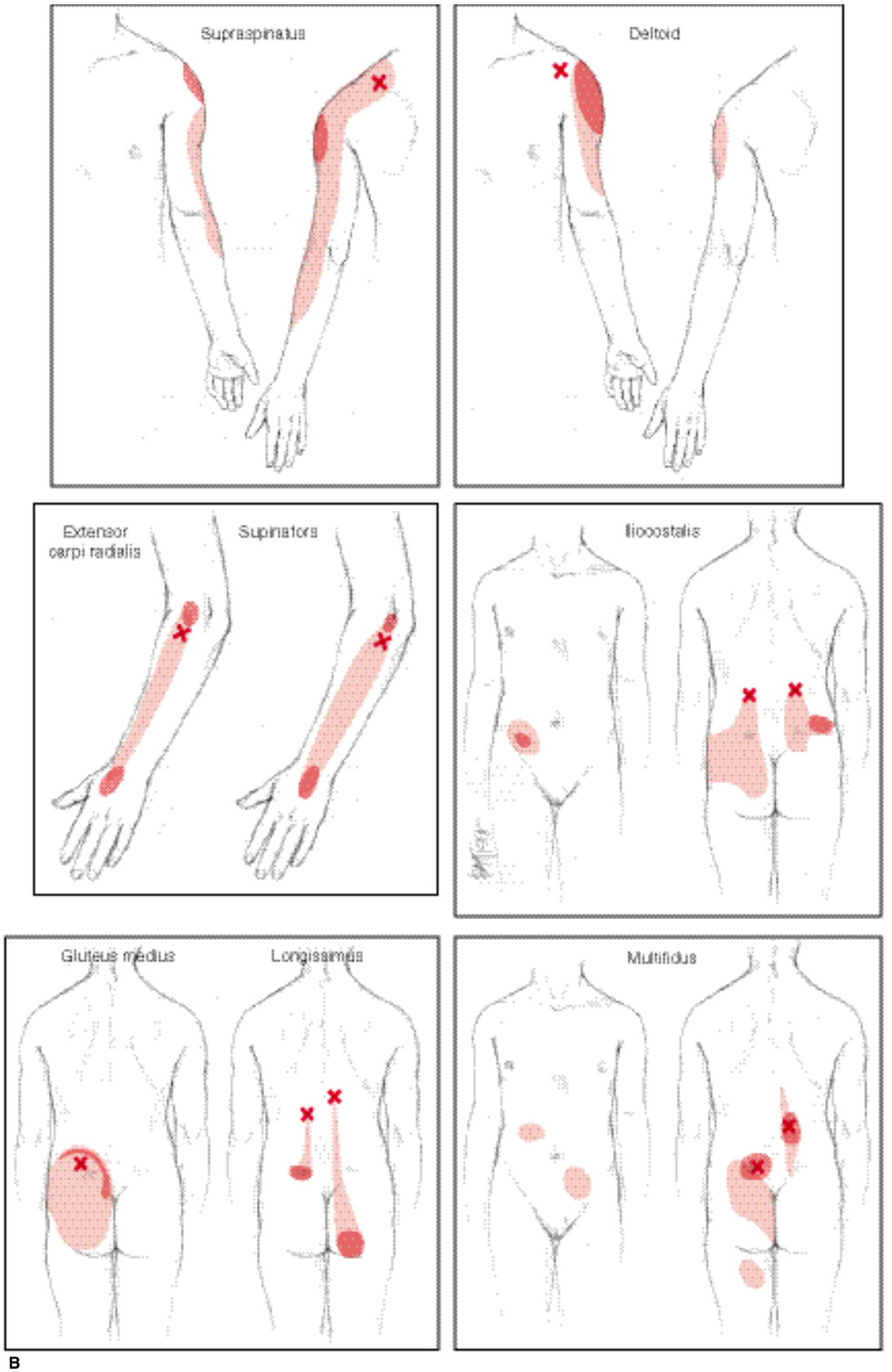


FIGURE 1–3 ■ Trigger points in children. Trigger points can be initiated by many factors, including physical trauma or injury, sustained contraction of a muscle, and prolonged poor posture.



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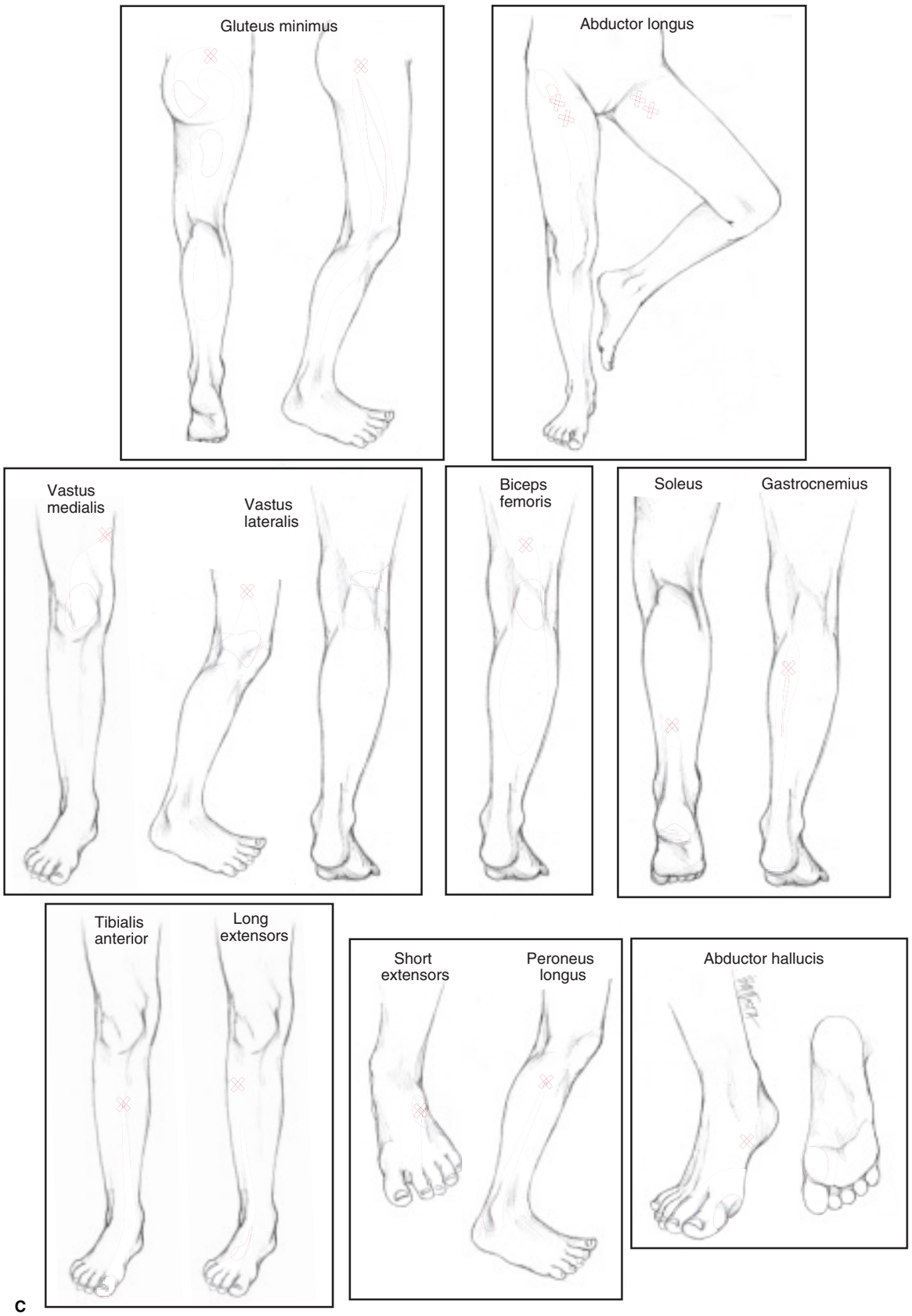

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with ischemic compression and deep friction, as well as with injection and coolant spray.[4,7-10] Trigger points can be caused by the position of the fetus in utero; the normal birth process; and by birth trauma, such as extreme pressure on the head, traction on the head, or a forceps delivery.

Trigger points in children may be also be initiated by upper respiratory and other infections and injuries.[7] Unless treated, these trigger points may cause problems during childhood and on into adulthood; for example, trigger points in the temporalis, occipitalis, and posterior cervicals, all of which may be caused by birth trauma, are known to induce migraine headaches in adults.[4]

MUSCLE RELAXATION

Hernandez-Reif et al. found that Swedish massage reduced spasticity and improved muscular flexibility in infants with cerebral palsy.[11] The authors noted decreased muscle tension in children with cerebral palsy and spinal cord injuries after massage. (Because both conditions originate from damage to the central nervous system, and this damage is not directly impacted by massage, massage must be frequent and regular to maintain improvement.) Normal children also have decreased muscle tension after massage. The therapist can see this decrease after a massage session—when the tense muscles of a certain area are more relaxed after massage, that area will lie flatter on the treatment table.

RELEASE OF RESTRICTIONS IN MUSCLE AND CONNECTIVE TISSUE

Certain types of massage manually stretch soft and connective tissue, such as skin, muscle, fascia, and scar tissue. After a massage session, the therapist can confirm this by palpation: Shortened muscle fibers or shortened connective tissue fibers will feel longer and more mobile after massage.

INCREASED CIRCULATION OF BLOOD AND LYMPH

Massage stimulates local circulation of blood. Blood vessels in the massaged area dilate and the blood supply to the massaged area increases, as much as tripling after 5 minutes of massage. Cardiovascular surgeon Mehmet Oz verified this effect by massaging the feet of a 16-year-old boy who had acute heart failure and a dangerously enlarged heart. Dr. Oz inserted a mechanical heart pump in the boy's heart as a temporary measure until a heart transplant was available. After the insertion of the mechanical pump, the boy's vital signs began to show that his condition was deteriorating because the pump's blood flow rate was very low (sensors in the pump showed exactly how much blood was being pumped out to his tissues). In desperation, Dr. Oz began to massage the boy's feet; as he rubbed and squeezed the boy's feet, the boy's blood flow rate began to rise. When massage was stopped, the rate would drop; when resumed, the rate would rise. After 45 minutes, the boy's blood flow rate finally stayed at a healthy level, and Dr. Oz was able to stop massage.[12]

The therapist can confirm the increase in blood flow by comparing the temperature of an area before and after massage with the hands—it will feel warmer, reflecting an increased flow of warm blood. The therapist can also confirm increased circulation by observing local color changes. For example, in a bedridden child or a child confined to a wheelchair, legs that are darker or dusky red will quickly become a more normal pink with a few minutes of Swedish massage. Sores, which are also dusky red, will quickly become a more normal pink after a few minutes of Swedish massage is applied to the general area of the sore. In certain areas of the body, such as the tops of the feet, veins refilling with blood can be seen after a compression stroke has momentarily interrupted the blood flow.

In adults, massage also enhances circulation of lymphatic fluid. Although research has not been done on the effects of lymphatic flow in children, firsthand observation confirms that massage moves lymphatic fluid. For example, children with swelling in the legs have decreased edema for 1 hour or more after 15 minutes of Swedish massage. This can be verified by visual inspection or by measuring the limb with a measuring tape.

There is a great deal of anecdotal evidence indicating that hands-on craniosacral therapy can affect the circulation of cerebrospinal fluid; at this time, however, no specific research verifies this change. Craniosacral therapy is believed to affect the flow of cerebrospinal fluid by freeing restrictions in connective tissue of the skull, spine, and sacrum, which then alters the rise and fall of cerebrospinal fluid within the meningeal compartment of the brain.[13] Future research will, hopefully, pinpoint the exact mechanisms.

ENHANCED IMMUNE FUNCTION

It seems likely that touch may influence immune function through alterations in the sympathetic nervous system. The stress of being separated from their mothers causes impaired immune function in a variety of young primates, either immediately or when they become adults. Young mammals that have been handled have better immune functions as adults than mammals that have not been handled.[14] Although numerous studies with premature and full-term infants

show that massage enhances growth and development, no long-term studies have determined if immune function is improved as well. Two small-scale studies at the Touch Research Institute showed immune function improvement when children received massage. Children with leukemia (average age, 7 years) improved on all blood count measures, including white blood cell count, after a 20-minute massage every night for 30 nights.[15] Field found that teenagers who were HIV-positive had improved immune function after receiving a 20-minute seated massage twice a week for 12 weeks.[16]

OPTIMAL HORMONE LEVELS

Massage affects hormone levels. Small-scale studies at the Touch Research Institute found that premature babies who are massaged gain weight faster, even when they consume the same amount of formula as those who are not massaged, probably because massage stimulates the production of food absorption hormones, such as gastrin and insulin.[17] Healthy, full-term babies receiving effleurage-based massage at bedtime for 2 weeks had increased melatonin excretion at night, resulting in the adjustment of the infants to sleeping during the night and being active during the day sooner than the control infants not receiving massage.[18]

Effleurage-based massage is associated with decreased levels of **cortisol** in both normal, full-term infants and children with asthma, serious burns, bulimia, juvenile rheumatoid arthritis, posttraumatic stress syndrome, and psychiatric problems. Typically, salivary cortisol levels are decreased immediately after therapy sessions; a general decrease in both cortisol and **norepinephrine** then occurs across the treatment period. Another study showed that the blood glucose levels of children who were diabetic fell to a normal level after 1 month of receiving effleurage-based massage from their mothers at bedtime.[19]

PAIN RELIEF

Massage is an effective treatment for many types of pain. Touch Research Institute studies confirm that effleurage-based massage can relieve pain in children with juvenile rheumatoid arthritis and children with severe burns.[20,21] Kubsch et al. performed an experiment with pediatric and adult patients in a hospital emergency department. A 5-minute fingertip massage on or near the site of the patient's pain significantly reduced the amount of pain they experienced. Their blood pressure and heart rates were also lowered.[22]

In another study, connective tissue massage and mobilization was effective in resolving the diffuse, persistent pain of **reflex sympathetic dystrophy** in 4 of 5 girls. The girls were placed on a program that included self-massage, at least 3 times a day, and weight-bearing and range-of-motion exercises. Immobilization, the most common treatment for this condition, is of little benefit in resolving pain.[23]

The author has observed that Swedish massage relieves musculoskeletal pain in children with cerebral palsy, muscular dystrophy, polio, and spinal cord injuries. Massage therapists Dianne and Richard Keene have used a combination of techniques, including Swedish, acupressure, reflexology, craniosacral, and myofascial release, to help relieve the severe headaches experienced by their son Tim, who has hydrocephalus.[24]

IMPROVED RESPIRATION

Massage encourages full and effortless respiration. Twenty minutes of effleurage-based massage given by mothers to their children with asthma every night at bedtime for a 1-month period resulted in fewer asthma attacks and increased peak air flow and forced expiratory flow rates.[25] A pilot study by the Office of Education in Santa Cruz, California, found significant improvement in asthma symptoms in disabled children who received 8 weekly sessions of Jin Shin Do.[26] Children with cystic fibrosis had improved air flow readings after 1 month of effleurage-based massage.[27] After a massage session, the therapist can both feel and see an improvement in respiration: the amount of ribcage expansion can be felt with the hands before and after massage and the amount of expansion can be seen before and after massage.

RELAXATION

Gentle touch is the foundation of every massage and bodywork technique. If it is perceived as safe and nurturing, it encourages a relaxation response through its effect on the autonomic nervous system. In a classic study in a hospital shock-trauma unit, Lynch et al. found that simple touch had dramatic effects on the heart rate and rhythm of both adults and children. This touch was simply the taking of a patient's pulse for 3 minutes without conversation. Certain patients for whom these effects were seen were in comas or near death.[28] Another study found that preschoolers fell asleep faster and slept longer at naptime after receiving effleurage-based massage, presumably because they were more relaxed.[29]

Field found significant decreases in anxiety in studies with children with asthma, bulimia, severe burns, diabetes, juvenile rheumatoid arthritis, posttraumatic stress disorder, and psychiatric problems. These studies showed that effleurage-like stroking—as briefly as 15 minutes daily for 1 month—improved sleep

patterns in sexually and physically abused children and in children and teens with psychiatric problems.[17]

The Santa Cruz Office of Education study found significant new signs of relaxation in 25 disabled children who received sessions of Jin Shin Do, including decreased insomnia, fewer temper tantrums, reduced body tension in gross motor activities, less frantic verbalizing, and more relaxed facial expressions.[26] In Eugene, Oregon, similar results were found in an acupressure project modeled after the Santa Cruz Jin Shin Do pilot study. Profoundly retarded and emotionally disturbed children were treated with a 30- to 45-minute acupressure session, twice a week for 6 weeks. Students showed improved relaxation during sessions and improvements in tension levels, body awareness, and class responsiveness.[30]

SENSORY STIMULATION

Massage can stimulate the nervous system; it is particularly important for children who are immobilized or otherwise lack normal tactile experiences. Massage strokes and passive movements help inform the child's brain about the many different qualities of her skin, such as its temperature, flexibility, and thickness. During massage, she also receives information about her body's position in space, its muscle tension, its movements, and its relationship to other people and objects in the environment. Point of Interest Box 1–2 illustrates that tactile stimulation can be crucial for normal development.[31]

Early sensory experience can have a profound impact on how the brain develops; there are probably measurable increases in brain growth for children who receive sufficient sensory stimulation over those who do not. Experiments with animals reared as pets, compared with animals reared in isolation, show that the pet's brains are heavier, thicker, and contain as many as 25% more **synapses** per neuron.[32] Tactile experiences must occur to normally develop those neurons, which are sensitive to tactile stimulation. Tactile stimulation in adulthood does not cause changes in brain growth because the most critical periods of brain growth are complete by age 7 (Land P, PhD, University of Pittsburgh, personal communication, January 2003).[33]

POINT OF INTEREST BOX 1–2

Effects of Extra Touch and Stimulation for Deprived Children

In 1990, massage therapist Faustine Settle spent 1 month as a volunteer in an orphanage in Nicoresti, Romania, where 115 multihandicapped orphans, ages 9 months to 16 years, lived. Conditions were extremely deprived, with a ratio of orphans to caregivers of 30:1. Economic conditions were so bad that no diapers were available and the orphanage was insufficiently heated. Prior to the winter of 1990, about 20 children died each year. During that winter, volunteer health professionals from abroad began arriving to take care of the children's needs. Their diagnosis of the cause of the high death rate in the orphanage was that the children were experiencing a failure to thrive due to touch deprivation and malnutrition.

Volunteers provided nurturing touch, including rocking, holding, and stroking. The room where Settle gave massages had to be locked while she worked with specific children because children were so drawn to the human contact that massage offered; she and other volunteers found that children screamed only when their work was finished and they put them down. Volunteers also treated infections, rashes, and fractures. Malnutrition was not addressed; children were not given more or better food. Only one child died that year. Because blood samples were not taken from the children, it is not possible to ascertain exactly what changed. However, because the children's nutrition was not improved, other profound physiologic changes evidently accounted for the decrease in the death rate.[31]

In 2000, pediatric nurse and massage therapist Diane Charmley volunteered in an orphanage in Romania. Her team of volunteers did daily massage with the children there. The volunteers also increased the amount of stimulation the children received in other ways, such as putting mirrors in the cribs to give the children something to look at, and moving them around instead of keeping the children in one place all day. Ms. Charmley did developmental testing with the children before and after massage and stimulation was offered; within 2 weeks, she found a marked improvement in their social behavior—they were much less apathetic and much more interactive (Charmley D, RN, personal communication, October 2002).

EMOTIONAL EFFECTS OF MASSAGE

RELIEF FROM PSYCHOLOGICAL DISTRESS

Caring human touch has an extraordinary power to soothe, reassure, and relieve anxiety. Triplett and Arneson studied nurses attempting to comfort hospitalized children (newborn to age 4). When the children were distressed and crying, they were usually quieted with a combination of verbal comfort (talking or singing) and tactile comfort (patting and rocking). Children who received talking or singing but were not touched, rarely quieted quickly. Of those who received verbal and tactile comfort, 88% stopped crying

after 5 minutes, compared with only 12% of the children who received verbal comfort alone.[34]

The need for tactile comfort is so strong in states of distress that children may instinctively try to comfort themselves with touch if there is no one else to give it to them. Family therapist Helen Colton treated an adult client whose mother had abandoned her at an orphanage when she was a small child. To comfort herself as a child, and later as an adult, she would hug herself and rock back and forth, repeating "I'm all I've got, I'm all I've got."[35] Field et al. found that after a 30-minute effleurage-based backrub for 5 days, teenagers in a hospital psychiatric ward were less anxious, slept better, and had lower cortisol and norepinephrine levels.[36] Another small Touch Research Institute study found that effleurage-based massage decreased anxiety and situational depression in children with posttraumatic stress disorder following Hurricane Andrew.[37]

THE IMPORTANCE OF CARING TOUCH

Robert Coles describes the power of touch to provide comfort and stability. He witnessed the courage of black children and their parents during the struggle for school integration in New Orleans in 1961. He was profoundly moved by the strength the young students showed as they faced white mobs. A mother of one child described her daughter's response to the school day: "My child comes home from school, and she's heard those white people shouting. She's not going to show them she's scared, not for a second, but she is scared, I know she is. And the first thing she does is come to me, and I hold her. Then she goes to get her snack, the Oreos and juice, and she's back, touching me. I'll be upset myself, so, thank God, *my* mother is still with us because I go to her, and she'll put her hand on my arm, and I'm all settled down again, and then I can put my hand on my daughter's arm! Like our minister says, the Lord touches us all the time, if we'll just let Him, and He works through each of us; so when my mother puts her hands on me and I put my hands on my child—it's God giving us strength."[38]

Touch between parents and children communicates caring, builds trust, and affirms their biologic connection. When touch is withheld during infancy or childhood, the effect on the emotional life of the individual may be profound and long lasting. Pediatrician Maurice Rosenthal interviewed 25 mothers of babies with eczema, as well as a control group of 18 mothers of babies without eczema. A significantly higher proportion of the babies with eczema had not received adequate physical contact, such as cuddling, and were often left to "cry it out" when there was nothing obviously wrong with them. Rosenthal felt that in certain predisposed infants, eczema was an indication that their needs for touch had not been met. A sudden decrease in physical contact—caused by abrupt cessation of breast-feeding, a maternal health problem, or the loss of someone to help with the baby—was followed rapidly by eczema in many cases.[39]

A 2½-year-old girl was referred to psychiatrist Philpe Seitz because she had been pulling her hair out for a year and was completely bald on one side of her head. The girl had been breast-fed for her first 2 weeks of life, then her mother abruptly stopped. She was then fed with a bottle and, later, solid foods. At 18 months, a punitive toilet training program was begun, including spankings and scolding. At this point, the girl began to refuse all solid foods, insisting on milk from a baby bottle. When feeding, she pulled hairs out of her scalp and rolled them against her upper lip and nose while the bottle was in her mouth. She stopped rolling the hairs the moment the bottle was removed from her mouth. On examination, the mother's nipples were found to have a ring of long, coarse hairs around them. When the girl was given a rubber nipple for her baby bottle that had a ring of coarse human hairs attached, she completely stopped pulling out her hair when feeding. Under stress, this small child had attempted to comfort herself by reproducing, as best she could, the exact type of tactile comfort she had received in only her first 2 weeks of life. The breast-feeding had clearly had a profound influence on her.[40] Biggar, after detailed observations of 94 3-month-old infants with their mothers, found that, when mothers consistently disliked having physical contact with their infants, those children were found to be unusually angry and aggressive at age 1 year.[41]

In a classic paper published in 1960, pediatric psychiatrists Kulka et al. observed that acute early tactile deprivation caused increased muscle tension in infants and might lead them to rock, bang their heads, or make other types of repetitive movements in an attempt to satisfy their own tactile and kinesthetic needs. Severe tactile deprivation as an infant may lead to hyperactivity or depression in childhood. Kulka treated a 7-year-old girl who was brought for psychiatric treatment because she was "bizarrely jumpy" and disturbing to the rest of her class in school. She was born premature; bottle fed; and, when her mother went back to work when the child was 5-weeks old, she was placed in a variety of homes. Her mother admitted she was not ready for the child and could not bear physical contact. Kulka treated children with similar histories by "babying" them—the child was allowed to sit on the therapist's lap, nurse from a baby bottle, ask to be rocked, and given soft toys to cuddle.[42] A similar approach was used by Zerbe when treating a 17-year-old female college student for bulimia. The student had not had a calm,

soothing, or involved mother who cared for her, and, consequently, she lacked the capacity to soothe herself or provide nurturance. She was given a small, furry bunny to hold during times of stress and was instructed to remember her therapist's concern for her.[43]

Pediatric psychiatrists Shevrin and Toussieng, who worked with severely emotionally disturbed children who were deprived of tactile stimulation during infancy, concluded that when there is a disturbance in tactile stimulation during infancy, children may deny their need for touch and begin to avoid physical contact altogether, keeping a physical distance from others or creating an elaborate fantasy life. When touched by a person they had affection for, they had tremendous emotional conflict over the touch, both craving it and fearing it. One patient was a 15-year-old girl who was hospitalized when she threatened to kill her mother and herself. She had been raised on a rigid timetable and, if she was not scheduled to be picked up and fed, left to cry for long periods. At age 1, she began rocking in her crib (a common way to compensate for the lack of tactile stimulation). On the recommendation of her pediatrician, her legs were then splinted to her crib for 1 week. During psychotherapy, she expressed conflict over touch and recoiled from the mere memory of having accidentally touched her therapist. At one moment when she felt warm feelings for her therapist, she reached out and touched him but then backed away in fright, saying she would kill him. Then she tried to choke him. She also told him, "You should stay away from me because I am glass and would break if you touched me."

A fearful, suicidal, severely asthmatic 9-year-old boy would remain close to his therapist, yearning for contact but ready to flee if touched. His mother had never received much attention from her parents and remembered being repulsed by sitting in her mother's lap. The boy's surroundings had been made as sterile as possible, and he was touched only when unavoidable. His mother was afraid of touching her son and avoided kissing him. He was 7-months-old before being touched by his father. After working with such severely disturbed children, Shevrin and Toussieng concluded that severe conflict over lack of tactile stimulation could be resolved only through a long and arduous therapeutic process.[44]

STRESSORS IN THE LIFE OF THE MODERN CHILD

Contemporary American children should be experiencing lower levels of stress than in the past. Consider the many improvements in pediatric health. Until about 200 years ago, three-fourths of all children died before age 5, mostly of infectious diseases. Vaccines, antibiotics, and public health measures, such as purification of drinking water and pasteurization of milk, have greatly reduced common pediatric illnesses and mortality rates.

The decreased amount of hard physical labor is another major improvement. Previously, children as young as age 6 or 7 were believed capable of working like adults and traditionally shared the burdens of unremitting domestic and agricultural labor. Child abuse and exploitation were common, and children were exposed to adult realities, such as sexuality and death. Around the end of the eighteenth century, Western society saw the rise of a new attitude toward children. Childhood was now considered a special stage in life, with attributes such as innocence, imagination, and closeness to nature. Conscientious parents struggled to preserve their children's innocence, shelter them from life's ups and downs, and keep childhood a carefree "golden age." Child labor laws were passed in the 1920s that prevented children from having to do so much physical labor. Modern conveniences made day-to-day life easier for all ages.

Childhood should now be much less stressful. Technology, however, has proved to have both benefits and drawbacks in modern society. The stressors discussed above have been replaced by psychological stressors. Social changes have caused parents to change their view of childhood and how children should be raised. Increasing numbers of parents now believe that children need an adult understanding of reality to prepare them to survive in an increasingly complex and uncontrollable world. Many parents no longer try to shield their children from adult realities such as violence, cruelty, sexuality, war, and natural disasters. Even those who would like to shield their children from these realities find it difficult to do so when both parents must work full-time and the extended family is no longer available to help care for children. Exposing children to adult realities before they are developmentally mature enough to handle them, however, can be highly stressful.[45]

Children are also treated more like adults; they are given far more choices that formerly would have been the prerogative of adults, such as choosing their own food, mealtimes, clothing, and entertainment. Having so many choices is a different type of stressor because, although children may seem mature enough to make decisions that once were made for them, too often this is not the case. Psychologist David Elkind, author of *The Hurried Child*, believes the new realities that send both parents into the workplace should not blind us to children's built-in limitations of responsibility, achievement, and loyalty. He feels it is important to recognize that children have special intellectual, emotional, and social needs that are not met when they are "turned loose" to care for themselves.[45] According to psychiatrist and eating disorder specialist

Katherine Zerbe, the end of family mealtimes and group dining experiences in college can contribute to the development of eating disorders. When children are left to fend for themselves, the responsibility of eating properly proves too great for most of them.[43]

Pediatrician Benjamin Spock stated that, although human beings do make some adjustment to stress, he felt children being brought up with these new stresses would become harsher, more intensely competitive, and more greedy.[46] Specific new stresses affecting children today are listed below.

Greater Exposure to the Adult World's Problems at Earlier Ages

The average American child watches 5 hours of television a day.[47] Violence, adult sexuality, crime, natural disasters, and other adult realities are readily accessible to children watching television. On September 11, 2001, and many times in the succeeding days, children watching television were repeatedly exposed to scenes of the World Trade Center collapse, with graphic images of destruction and death. Preschoolers have particularly highly active imaginations and may be more prone to worry after such exposure, but all children are susceptible to free-floating anxiety after being exposed to films or television programs they are not emotionally prepared to handle.[45,47]

As a representative of UNICEF, James Garbarino interviewed Kuwaiti children at the conclusion of the Gulf War in 1991. These children had been traumatized by firsthand exposure to Iraqi atrocities. Surprisingly, a follow-up study conducted 1 year later by psychologists Kathi Nader and Robert Pynoos revealed that more children were traumatized after the war was over by secondhand exposure to Iraqi atrocities on videotape as part of a Kuwaiti government political education campaign.[48]

According to psychologist Elkind, exposure to television represents a unique type of stress for children. "Television forces children to accommodate a great deal and inhibits the assimilation of material. Consequently, the television child knows much more than he or she can ever understand. This discrepancy between what children know and what they can process is the major stress of television."[45] Watching television also precludes free active play, one of the best ways for children to relax.

Television, however, is only one element of our media-saturated culture. Much of the music children listen to undermines impulse control through the glamorization of sex and drugs. These are messages to which children are particularly susceptible at an age when loss of impulse control can have disastrous consequences. The entertainment industry deliberately markets violent music, movies, and video games to underage children.[49]

Intense Media Pressure for Children to Be Thin

Media pressure to be thin is stronger now than at any time in the last two decades.[50] The ideal body type is now at the thinnest 5% of a normal weight distribution.[51] Typical beauty contestants and models weigh 13–19% below normal healthy weight.[52,53] Children's books have progressively portrayed girls as thinner over the last 80 years; no such trend has been seen for boys.[54]

Deterioration of Family Support

Children in America have been deeply affected by changes in the structure and living arrangements of the nuclear and extended family. Separation and divorce now affect 1 of 3 marriages.[45] In 1970, 85% of all children lived in a household with married parents; however, by 1993, this number dropped to 71%.[55] The amount of time parents spend with their children dropped 40% between 1965 and 1989.[56] Parents are working more and have less time for child rearing than in the 1970s and 1980s.[45] Because of the highly mobile American society, extended family members are often not geographically close enough to help single and working parents by spending time with their children. Many children spend more and more time alone or with their peers than ever before.

James Alan Fox, dean of Northeastern University's College of Criminal Justice, believes that the unraveling of the American family is responsible for much of the increase in juvenile violence (see page 15). According to Fox, "Too many parents are going off to work or otherwise ignoring their children before they've bonded. Without some substitute to become a child's emotional anchor, such as a grandparent, child-care provider, or family friend, the child is not going to be getting strong antiviolent messages and television may become the child's primary socializer." He stresses the need for both a national system of day care and for more and better schoolteachers to essentially fill the place of absent parents.[57]

High Incidence of Child Maltreatment (Physical and Sexual Abuse)

Each year, child welfare agencies in the United States receive more than three million allegations of childhood abuse and neglect, and collect enough evidence to confirm more than one million cases. In 2,000 to 3,000 of those cases, the child dies as a result of the abuse. Long-term effects of mistreatment include physical, emotional, and psychological problems.[58]

Loss of Religious Beliefs and the Support of Religious Communities

The impact of religious life, which has been a positive socializing source in the lives of American children for generations, has been declining since the 1960s. After a review of more than 50 national polls, time diaries, and surveys, sociologist Robert Putnam concluded that church participation (including not only attending church services but also participating in church-related activities, such as youth groups) has fallen by about 30% in the last generation. The number of children ages 3 to 12 and those in high school involved in church activities has declined significantly, and the number of incoming college freshman with no religious affiliation has increased.[59]

Increased Competition and Decreased Playtime

Parents are under more social pressure to enroll children in organized sports and other activities that may not be age-appropriate. Psychologist Davis Elkind believes there is little value and considerable risk in engaging young children in organized team or individual sports until, at least, age 6 or 7. Children may be forced into activity that is simply too much for their stage of body development. According to child psychiatrist Elizabeth Guthrie, "The entire specialty of pediatric sports medicine owes its existence to our allowing our children to 'overdo' it with sports."[60] Many parents feel pressured to enroll their children in an increasing number of activities, so that even an activity that the child enjoys may lose its appeal as it becomes part of a tightly packed schedule. Rather than letting children play, these types of activities transform play, nature's way of dealing with stress, into work.[45]

There is also increased pressure on many children to perform academically at an early age. For example, more children are taking college entrance exams at earlier ages. More than 172,000 students in eighth grade or lower took SAT or ACT college entrance exams in 2001, up 19% since 1996.[61] These tests are designed for high school students and, although occasionally appropriate for the younger child, they are great sources of stress for most children.

Educator and therapist Maureen Murdock, who teaches guided relaxation to her students, tells how children really feel when coping with a high-pressure lifestyle. "In an exercise that I once did with my third-grade class about what they didn't like in their lives, the symbol that appeared in all of their drawings was a ticking alarm clock. When I asked them to elaborate about the clock, typical responses were: 'I hate rushing from school to soccer practice' 'I never have any time to just sit'; 'I don't get enough time to play with my friends because my mom has to pick me up early so she can go someplace else.' In a similar exercise with older students, one commented: 'I thought teachers would let up on the work during senior year, but we have more than ever. I have no time for my friends.'"[62]

Inadequate Child Care

Today, more than 60% of mothers with a child younger than 2 years of age are employed. More than 3 million children have mothers who returned to work before their child was 1 year old.[63] Entering high-quality day care is associated with greater cognitive, emotional, and social competence in middle childhood and adolescence; however, many studies have found that the majority of American day care services are either mediocre or poor.[64]

The economic environment also contributes to the plight of America's children. In many of today's families, both parents must work full-time, and so children are often far less supervised than only a few generations ago.

Poverty

One of five children in America today lives in poverty. A child growing up in poverty is more likely to experience abuse, neglect, malnutrition, homelessness, and substandard day care. Factors such as poor diet, poor health care, and higher stress levels lead to worsened health in poor children.[65] Childhood poverty also places young people at risk for a range of long-term psychosocial problems, including failure in school, teenage pregnancy, crime, and drug abuse.

THE BEHAVIORAL EFFECTS OF STRESS ON THE MODERN CHILD

What evidence is available that indicates these new forms of stress are taking a toll on American children? A review of statistical data on the social and psychological problems involving children shows that many of them are becoming more common. In the past, most children did not encounter many of these problems before adulthood; as the problems become more common, they are altering the nature of childhood itself (Table 1–1).

High School Dropout Rates

In 1999, one of five teenagers aged 15 to 18 dropped out of school before graduation. Those with the lowest family incomes were five times as likely to drop out of school as those with the highest family incomes.[66]

TABLE 1–1 CHILD STRESS SCALE: LIFE EVENT SCORES (IN LIFE CHANGE) BY AGE GROUP

Life Events	Preschool	Elementary	Junior High	Senior High
Beginning nursery school, first grade, seventh grade, or high school	42	46	45	42
Change to a different school	33	46	52	56
Birth or adoption of a sibling	50	50	50	50
Sibling leaving home	39	36	33	37
Hospitalization of sibling	37	41	44	41
Death of sibling	59	68	71	68
Change of father's occupation, requiring increased absence from home	36	45	42	38
Loss of job by a parent	23	38	48	46
Marital separation of parents	74	78	77	69
Divorce of parents	78	84	84	77
Hospitalization of parent (serious illness)	51	55	54	55
Death of a parent	89	91	94	87
Death of a grandparent	30	38	35	36
Marriage of parent to stepparent	62	65	63	63
Jail sentence of parent for 30 days or less	34	44	50	53
Jail sentence of parent for 1 year or more	67	67	76	75
Addition of third adult to family (e.g., grandparent)	39	41	34	34
Change in parents' financial status	21	29	40	45
Mother beginning to work	47	44	36	26
Decrease in number of arguments between parents	21	25	29	27
Increase in number of arguments between parents	44	51	48	46
Decrease in number of arguments with parents	22	27	29	26
Increase in number of arguments with parents	39	47	46	47
Discovery of being an adopted child	33	52	70	64
Acquiring a visible deformity	52	69	83	81
Having a visible congenital deformity	39	60	70	62
Hospitalization of yourself (child)	59	62	59	58
Change in acceptance by peers	38	51	68	67
Outstanding personal achievement	23	39	45	46
Death of a close friend (child's)	38	53	65	63
Failure of a year in school		57	62	56
Suspension from school		46	54	50
Pregnancy in unwed teenage sister		36	60	64
Becoming involved with drugs or alcohol		61	70	76
Becoming a full-fledged member of a church/synagogue		25	28	31
Not making an extracurricular activity you wanted to be involved in (e.g., athletic activity or band)			49	55
Breaking up with a boyfriend or girlfriend			47	53
Beginning to date			55	51
Fathering an unwed pregnancy			76	77
Unwed pregnancy			95	92
Being accepted to a college of your choice				43
Getting married				101

This scale measures the amount of life change experienced by a child. Each type of life change requires a certain amount of social and psychological adaptation, which is stressful to the child. This scale is not an exact predictor of illness, because different children react differently when confronted with life change. It also does not measure subtle, but real, sources of stress in a child's life, such as poverty, dysfunctional family dynamics, loss of a pet, or school failure. In general, the more significant life change a child has experienced, the greater the child's susceptibility to illness. When children with acute or chronic physical or mental illness are studied, they are consistently shown to have had two to three times the amount of stressful events experienced by control groups of healthy children.

Between the ages of 4 and 6, the average child's total life stress score is approximately 75; between the ages of 9 and 12, the average score is approximately 100; and between the ages of 14 and 16, the average score may approach 200. If a child scores higher than these averages, she may be at risk of physical or emotional health problems.

Adapted from Heisel J, et al: The significance of life events as contributing factors in the diseases of children. *Behavioral Pediatrics*, 83:119-123, 1973

Increased Rates of Juvenile Crime

There has been a sevenfold increase in serious assaults committed by juveniles in the United States since World War II. Juvenile arrests for possession of weapons, aggravated assault, robbery, and murder rose more than 50% from 1987 to 1996. The rate of violence increased most in inner cities and among black males.[48] Experts believe many factors are involved, including widespread availability of guns, increased exposure to violence in the media, and less family support for children.[45] Television violence is responsible for up to 15% of all aggressive behavior in children.[48]

High Rates of Substance Abuse

The average age American children begin drug use is 12 years. The popularity of certain illegal drugs changes; for example, in 2002, use of marijuana declined and illicit use of prescription drugs OxyContin and Vicodin increased—but illicit drug use remains high. In 2002, 24% of eighth graders, 44% of tenth graders, and 53% of twelfth graders reported past use of some illicit drug. Also in 2002, 47% of eighth graders, 66% of tenth graders, and 78% of twelfth graders reported use of alcohol.[67] One national survey reported 39% of surveyed high school seniors had been drunk in the last 2 weeks. Alcohol-related accidents are the leading cause of death in teenagers.[68]

Increased Rates of Severe Depression

Signs of severe depression are more common in teenagers than in adults, and an estimated 8% of teenagers suffer from severe depression. The onset of depression is occurring earlier in life today.[69] Approximately one-half to one million prescriptions for antidepressants are written for American children and teenagers every year, and the number is growing. Even those psychiatrists prescribing antidepressants are undecided about their use.[60]

Increased Suicide Rates

The suicide rate among children ages 10 to 14 is 1.2 per 100,000. The teenage suicide rates were stable from 1900 to 1955 when they began to rise dramatically, from 4.5 per 100,000 in 1900 to 13 per 100,000 in 1992. Suicide is the third leading cause of death in teenagers. The strongest risk factors for attempted suicide in youth are depression, heavy use of alcohol or other drugs, and aggressive and disruptive behavior.[70]

Increased Sexual Activity

Sexual activity is beginning at younger ages, increasing risks of pregnancy and sexually transmitted diseases, including AIDS. About 50% of teenagers have sexual intercourse before graduating from high school. The United States has the highest teen pregnancy rate of any developed country, with more than 800,000 teenage girls becoming pregnant each year.[71]

High Rates of Eating Disorders, Including Anorexia Nervosa and Bulimia

One of 10 teens struggles with an eating disorder; 90% of teens with eating disorders are girls.[51] Many girls in primary grades are already trying to diet and, by fourth grade, 40% or more girls say they diet at least occasionally. Many of these young females may not have full-blown eating disorders, but are at risk of having poor nutrition at a time when their bodies are growing and they need optimum nutrition. Surveys taken in Ohio, Iowa, South Carolina, and Arizona show that 25–40% of primary grade girls and boys are worried about being "too fat." Researchers at University of South Carolina identified children as young as age 9 with severe eating disorders.[72-75] Many parents are deeply concerned about the long-term effects these fears may have on their daughters' health and happiness. The book *One Hundred and One Ways to Help Your Daughter Love Her Body* addresses these concern with ideas about how to teach young girls to "have an internalized image of their bodies as whole and wholesome, rather than a package of distorted parts that must be dressed up and displayed to their best advantage."[76] The first suggestion is for parents to massage their daughters, beginning when they are infants.

High Rates of Type A Behavior

Although no statistics are available on the incidence of type A behavior in children, many child specialists, including pediatricians, child psychologists, and educators, are alarmed by what they perceive as significant increases over the last two decades (see Point of Interest Box 1-3).[45] Pediatrician Steven Shelov believes that recent changes in the American value system foster negative type A behavior, including how the American culture defines success by the amount of material possessions and money one has, new pressure to enroll children in early educational and extracurricular activities, and the tendency to hurry children out of childhood too early. Children who by temperament are susceptible to this type of message may become driven and competitive at an early age. In contrast, type A behavior is lower in cultures that emphasize harmony, loyalty, and cooperation as part of their definition of success.[77] Exploiting values that lead to type A behavior, Bonne Bell Cosmetics Company markets a shower gel to teens called *Hyper*, with the motto, "I feel...like going sixty miles an hour."[78]

POINT OF INTEREST BOX 1–3
Type A Behavior in Children

Type A behavior is a cluster of certain behavioral traits, including impatience, restlessness, repressed hostility, and an excessive competitive drive. Persons with type A personalities walk fast, talk fast, and tend to do more than one thing at a time (such as simultaneously reading, eating, and watching TV). Their high tension level is revealed by rapid eye blinking, knee jiggling, and finger tapping. They have rapid and forceful speech patterns, and interrupt others frequently in conversation. These behaviors may cause them to become isolated from others. Type B personalities, by contrast, are easygoing, work without agitation, and relax without guilt. Often, they are actually more efficient than type A personalities.

The development of heart disease has been directly linked to type A behavior.[79] Type A patterns are usually established in childhood and persist into adulthood.[80] Cardiologist Meyer Friedman, who first coined the term *type A behavior,* has concluded that deep-seated insecurity is the root cause of the behaviors. He believes that this insecurity is most commonly caused by a failure to do well in school and that this insecurity causes the person to constantly compete against others.[81]

For children, the major drawbacks of type A behavior are social isolation and a greater probability of having heart disease when they are adults. As high cholesterol is a significant risk factor in the development of heart disease, the elevation in blood cholesterol levels found in both children and adults with this behavior pattern is worrisome. One study found that children, ages 10 to 17, who are type A personalities had higher blood cholesterol readings than type B children.[82]

A Duke University Neurobehavioral Diabetes Program study investigated whether diabetic children with type A personalities have a different physiologic response during times of stress than those with type B personalities. Type A and type B children played Super Breakout, a demanding video game, and then researchers tested their blood glucose levels. In general, the type A children showed an increase in blood glucose, while the type B children did not.[45]

Increased Attention Deficit and Hyperactive Behaviors

Prescription of Ritalin to treat hyperactivity increased six-fold between 1971 and 1989 and several hundredfold from 1995 to 2000. Many child psychologists and medical professionals believe Ritalin is increasingly prescribed for children with attentional and hyperactive behavior caused by stress rather than by a true neurologic dysfunction.[45,83] Ritalin is also being prescribed for younger and younger children.[84] For more information, see Chapter 6, page 165.

High Incidence of Psychosomatic Illness

Many American children suffer stress-related health problems at some point during their childhood. Pediatricians report an increase in stress symptoms in children, including headaches and stomachaches.[45]

CHILDREN'S BODILY RESPONSE TO STRESS

Although children encounter different types of stress than those affecting adults, their physiologic response to stress is the same. In the fight-or-flight response, the body's different systems react in various ways.[85] Even exposure to maternal stress hormones in utero can cause the child's body systems to react both physiologically and behaviorally (see Point of Interest Box 1–4).

- Adrenal glands release cortisol, an anti-inflammatory hormone. Continued high levels of cortisol hamper the immune system's ability to fight both minor and major illnesses, probably by destroying immune cells. It can also corrode connective tissue, leading to weakness in muscles, tendons, fascia, and ligaments, with an increased risk of injury. High levels may lead to damage in the brain, causing memory lapses, anxiety, a decreased attention span, and an inability to control emotional outbursts. The adrenal glands also release adrenalin hormone. Elwood et al. examined urine samples taken from children under both stressful and nonstressful circumstances. The samples revealed that under the stress of waiting to give a presentation in front of a class, 83% of girls and 89% of boys had a significant hormonal response, such as increases in adrenalin and noradrenalin.[90]
- The thyroid gland secretes the hormone thyroxin, which speeds up the body's metabolism. Excess thyroxin can lead to shaky nerves, insomnia, and exhaustion.
- Endorphin, a painkilling hormone, is released in greater than normal amounts by the brain. Eventually endorphin supplies are depleted and pain tolerance decreases.
- The entire digestive tract shuts down: the stomach and the large intestine virtually stop their secretions and movements, diverting blood to the skeletal muscles. Continued shutdown can lead to digestive discomfort such as cramps, nausea, bloating, and diarrhea.

- As described in Case Study 1–1, the secretion of hydrochloric acid in the stomach is affected by stress.
- The blood sugar level rises and, to metabolize it, the pancreas produces more insulin. Chronic elevation can cause one to crave sugar. Diabetes can be initiated or aggravated by excessive demands on the pancreas to produce insulin.
- Cholesterol flows from the liver into the bloodstream. Sustained high levels can cause deposits of cholesterol to accumulate in the blood vessels, leading to arteriosclerosis and heart disease.
- The heart beats harder and faster. On a long-term basis, this can lead to high blood pressure, increasing the risk of stroke and heart attack. Male newborns who are circumcised without anesthetic have measurable increases in heart rate and blood pressure for hours following the circumcision.[92] Preschoolers who have been assigned stressful tasks show measurable increases in both heart rate and blood pressure.[93] Even an isolated stressful event may cause marked increases in heart rate and blood pressure for an extended time. For example, three small girls suffered an extremely frightening event. One night, tied up and threatened with a gun by two gunmen who had broken

POINT OF INTEREST BOX 1–4

Exposure to Stress Hormones May Begin Before Birth

Babies born of mothers who have experienced severe psychological stress during pregnancy show delays in early motor development and such behavioral disorders as excessive anxiety and crying, hyperactivity, and a lower tolerance for frustration. By comparing the behavior of infants whose mothers had high stress during pregnancy with mothers who had high stress during the first year of the baby's life, Weinstock demonstrated that these behaviors are linked to prenatal life and are probably are caused by the maternal stress hormones released during stress at critical periods of fetal development. These findings have been confirmed in experiments with monkeys and rodents.[86]

Zuckerman found a significant association between maternal depression and low birthweight, poor growth, and behavior problems and speculates that maternal depression may make the child more likely to suffer from depression.[87,88] Intense anxiety during pregnancy is also associated with a wide range of difficulties, including low birthweight, newborn respiratory illness, and certain physical defects such as cleft palate and **pyloric stenosis**.[89]

CASE STUDY 1–1

STUDY OF HYDROCHLORIC ACID IN A HOSPITALIZED CHILD

Monica was born with her esophagus completely closed as a result of a birth defect. At 4 days of age, she had corrective surgery to make a temporary passage from her stomach to the surface of her abdomen. An opening was made on her abdomen that allowed her to be fed through a tube that went into her stomach. (At 20 months of age, she would have a permanent passage constructed under her sternum, between her esophagus and her stomach.) Because of family, personal, and financial stresses, Monica's mother was unable to adequately care for her, and the infant was twice hospitalized for a failure to gain weight. When she was admitted to the hospital for the second time, Monica was 15 months old; however, as a result of neglect and malnourishment, she was 8 to 12 months less developmentally mature compared with the average child her age. At 15 months for example, most children can crawl, walk, and kick a ball, and they are also learning how to do new actions such as how to go up and down a steep hill. By contrast, Monica was unable to sit up or even turn over in bed. She remained in the pediatric ward for 11 months until she gained sufficient weight to be ready for and recuperate from surgery and was physically fit enough to return home. While she remained in the hospital, she was studied by having gastric juice withdrawn from her stomach and her emotional states noted at the same time.

Researchers found that the rate at which her stomach secreted hydrochloric acid was intimately related to her behavioral and emotional states. Higher levels of physiologic activity (more active interactions with the environment) were paralleled by higher amounts of hydrochloric acid being secreted. For example, acid secretion was:

- at its very lowest level while she was sleeping
- slightly higher when she was awake but depressed
- still higher during states of irritation, displeasure, contentment, and joy
- at its highest level when she was in a state of rage, which was accompanied by loud crying, high-pitched wailing, screaming, and sobbing

Similar differences were found in Monica's heart and respiratory rates; during a period of depression, they became lower and, when she was angry and irritated, both markedly increased. After her surgery. Monica learned to stand, walk, and feed herself. She was then discharged home to her family, but remained significantly less mature in development compared with the average child her age.[91]

into their apartment, they witnessed the shooting of an older sister. When the girls were seen at a hospital psychiatric clinic the next day, they sat quietly and showed no outward signs of stress. However, their heart rates were still more than 100 beats per minute and their blood pressure rates were high.[94] For some children, the rise in blood pressure may be permanent. Cardiologist Samuel Mann has treated adults whose hypertension is not lowered by medication and lifestyle changes and found that it can be caused by unresolved emotional pain or trauma during childhood. Addressing these emotions has permanently lowered their hypertension.[95]

- All five senses become temporarily more acute, but repeated stress will eventually cause the senses to "burn out" and become less efficient. With chronic stress, the ability to concentrate is greatly diminished.
- Muscle tension increases, resulting in feelings of tension and stiffness, decreased freedom of movement, and, at times, muscular pain, such as muscle contraction headaches or stomachaches. The child finds it increasingly difficult to relax when not under stress.

THE EFFECT OF LIFE STRESS ON CHILDREN'S HEALTH

> Each child has an Achilles heel, an organ which responds to stress and creates symptoms which become the outlet for any unusual or excessive pressures in the child's life. It is important for adults to realize that children rarely 'fake' symptoms when they are overwhelmed by stress. Many symptoms arise as a way of coping with tension and are based on the normal stresses of growing up.[96]
>
> *—T. Berry Brazelton, MD*

Brazelton believes that when a child's stress load overwhelms his or her capacity to cope, the child may develop physical, emotional, or mental illness. The response to overwhelming stress is highly variable and may not only cause current symptoms, but also exacerbate illnesses that were already present (for example, a child with epilepsy might have increased seizures at a time of stress). Stomachaches, headaches, allergic reactions, and increased susceptibility to colds and flu are minor and extremely common signs of stress.[45,96] The wide range of major health problems associated with stress are as individual as the child herself. These problems may occur in any body system; the most common ones are identified in Checklist Box 1–1. As explained in Point of Interest Box 1–5, children may make improvements in many of their health problems by tapping the interconnection between their minds and their bodies.

CHECKLIST BOX 1–1
STRESS-RELATED HEALTH PROBLEMS IN CHILDREN

- ❑ cardiovascular system: migraine headaches and hypertension
- ❑ gastrointestinal system: ulcerative colitis, diarrhea, persistent vomiting, **encopresis**, recurrent abdominal pain, obesity, and anorexia nervosa
- ❑ respiratory system: asthma and chronic coughing
- ❑ urinary system: bedwetting and urinary frequency
- ❑ neuromuscular system: muscle contraction headaches and tics
- ❑ central nervous system: epileptic seizures
- ❑ skin problems: warts, habitual scratching, and anxiety-produced hives
- ❑ **conversion reactions**: hysterical disorders of motor function, including paralysis, blindness, back pain, dizziness, and hallucinations

Schaeffer C, Hillman H, Levine G: *Therapies for Psychosomatic Disorders in Children*. San Francisco: Jossey-Bass, 1979, p xiii-xx

Roghman examined the relationship between stress and illness in families with children younger than the age of 18. Mothers recorded both upsetting events and illnesses occurring in their families during 1 month. These records indicated that the likelihood of children developing fevers, colds, or other minor illnesses increased by 50% after a stressful event.[100]

For 4 decades, stress research has consistently shown a link between childhood stress and childhood illness. Heisel et al. studied children with major physical illnesses and found that their illnesses began after they had experienced twice the stress of control populations of healthy children.[101] Mutter and Schleifer studied children who were admitted to the hospital for acute illnesses, such as meningitis and asthma, and found that they had been exposed to more life stress in the previous 6 months than a control group of well children. In addition, the families of the sick children were less able to function well, so that there were less resources to enable the children to cope with stress when it did arise.[102] Greene et al. found that teenagers with recurrent somatic complaints with no organic cause reported higher amounts of life stress than those who had pain with an organic cause or those who had an acute minor illness.[103] The effects of stress may be cumulative. Major traumas in the first 4 years of life predispose a child to psychological problems when stressful situations occur in the teen years; having lived through two or more major family problems, such as divorce, loss, death, or separation, as a younger child increases the likelihood that a teenager

POINT OF INTEREST BOX 1–5

Mind-Body Approaches to Children's Stress-Related Health Problems Can Help Children Influence Their Physiology

In recent years, mind-body approaches have successfully helped children cope with organically caused diseases, stress-related health problems, and chronic conditions. When sensitively adapted to their needs, massage and bodywork techniques can be one of these mind-body techniques that are effective for children. By teaching children greater awareness of their bodies and how to consciously relax during massage sessions, children learn how to feel and control some internal body processes.[97]

Many problems have shown improvement with mind-body techniques, including learning disabilities; hyperactivity; emotional problems, such as phobias and test anxiety; and physical problems, such as tension headaches, asthma, and burn pain. Medical hypnosis has helped children to control many types of pain; make dental work more tolerable; recover from stress-related health problems; and improve chronic health conditions, such as cystic fibrosis, Tourette's syndrome, and head injury; and relieve pain and discomfort during a terminal illness.[98]

Children have also demonstrated that they can learn to increase their body awareness and control their muscle tension through biofeedback,[98] visual imagery,[62] hatha yoga,[99] and relaxation of different muscle groups.[98] Use of these mind-body techniques clearly shows that children are capable of influencing their own physiologic processes, if given the tools to do so. For example, psychologist Robert Hill has trained 11-year-old boys, using biofeedback, to consistently raise the temperature of a single finger to 103° to 104° F.[83]

When sensitively adapted to their needs, massage and bodywork techniques can be one mind-body technique that is effective for children. By teaching children not only greater awareness of their bodies, but also how to consciously relax during massage sessions, they learn how to feel and control some of their internal body processes.

will have psychological problems.[104] A high level of stress in childhood, particularly child abuse, also increases the likelihood of suffering from chronic pain as an adult.[105]

A child's response to stress depends on a number of different factors, including his or her individual temperament and particular Achilles heel, how emotionally healthy their families are, and what kind of coping skills and support they have. Interestingly, even within the same family, children may suffer different types of stress-related health problems. For example, Powell et al. treated 13 children, ages 3 to 11, whose growth was severely delayed: all were 30–66% of the expected height for their ages (see Figure 1–4). All had bizarre eating and drinking behaviors, and 11 of 13 had delayed speech. There was evidence of extreme neglect in all families, and malnourishment and physical abuse in many. Immediately or soon after being admitted to a convalescent hospital, all the children grew rapidly, at a much greater than normal growth rate for children their age. They received no medication or psychiatric treatment; tender loving care in the hospital was sufficient to start their growth again. The growth retardation observed in these children was caused by decreased growth hormone secretion, which was directly linked to their emotional deprivation.[106] However, not all of the children in

FIGURE 1–4 ■ Two 7-year-old girls. The girl on the left is of normal size for her age; the one on the right has growth retardation caused by extreme emotional neglect. Reprinted with permission from: Proffit W, Fields H: *Contemporary Orthodontics*. St. Louis: Mosby, 2001, p 54.

each family experienced growth retardation: in some families, it occurred in only one of the siblings. Even with two children with the same parents and the same home environment, it is not possible to predict which body system will be their Achilles heel.[93] If treatment for children with this type of growth retardation is delayed, or if children are returned to their homes without any improvement in the home environment, the long-term effects also include poorer language development, poorer verbal abilities, less social maturity, and a greater incidence of behavior problems.[107]

A more common symptom of stress overload is psychosomatic musculoskeletal pain. Sherry et al. reported on 100 children with musculoskeletal pain who were evaluated at a major pediatric rheumatology referral center and were found to have no organic disease. The typical child was a 13-year-old girl who had had severe pain for at least 1 year and who had been under a great deal of stress from school, family, or her own expectations. Only 8% of the children's families were emotionally healthy, and the children had been in psychologically stressful environments long before the onset of their pain. Most were in stressful family roles or had recently experienced major life events, such as a death in the family, frequent moves, or a parent with a major illness; 41% had experienced some type of trauma. After intensive physical therapy and psychotherapy, almost all the children became symptom-free and fully functional, which verified that their symptoms were not organic.[108]

LONG-TERM EFFECTS ON CHILDREN OF LOCALIZED TRAUMA OR PAIN

Massage therapists commonly find muscular tension in specific areas that have been contracted for many years; this is one of the major challenges of doing massage with adults. It often originates in the body's emergency response to injury. For example, if the jagged ends of a fractured femur are moved, they could lacerate the femoral artery and cause a child to bleed to death in a short time.[96] Movement of the fractured bone could also cause further damage to already injured soft tissue; therefore, when muscles around the fracture site spasm, they are preventing harmful movement. This reaction is dysfunctional, however, when muscles remain contracted after the bone is set and heals. A defensive reaction—fear of having the area retraumatized—can cause surrounding muscles to contract even when the fracture has healed. Deep tension and restriction remain and become the norm. The child (or adult) may have no idea of the connection between the original trauma and the present discomfort and pain. A memory of the original pain or trauma in the area may occur when the muscles in the area are deeply relaxed during a massage session; this indicates that there is still significant guarding even though the injury happened long ago.

Many patterns of chronic muscle tension in specific areas originate when there is localized trauma or pain in infancy or childhood. An example from before birth is the baby who was pricked in the neck by a needle while his mother was undergoing amniocentesis during the eighth month of pregnancy. At 16 months, spastic neck muscles around the area that was pricked pinned his head to one side and he could barely crawl.[109] It has been observed that babies in the neonatal intensive care unit come to know who takes blood samples and can be seen tensing their legs and feet when that person arrives. If blood samples are taken from a baby's feet over a long period, the baby's feet may become tense and hypersensitive (Fronzuto J, RN, neonatal intensive care, personal communication, December 1992). Children who have been intubated repeatedly often carry such deep tension in their throats that they resist swallowing and require special therapy. For example, the author treated a premature infant who was intubated immediately after birth. At home with her family and with no other physical problems, she still had to be fed through a stomach tube at age 3 because she refused to swallow solid food. Medical examinations could find no physical reason for her inability to swallow with ease.

Craniosacral practitioner and teacher Hugh Milne described a 40-year-old woman attending a craniosacral therapy class, who had experienced headaches from unknown causes for many years. When her sphenoid bone was touched gently by another student during class, the woman began to scream repeatedly, "She's pressing too hard," as she remembered her mother repeatedly squeezing her head with a great deal of pressure before age 5. As the craniosacral therapy released both her cranial restriction and the emotions associated with her pain, the woman reported that the feeling of head pressure she had experienced since the original trauma was permanently gone and that she felt an enormous weight was lifted from her psyche.[111] The author treated a 30-year-old woman who had been born with an incompletely developed hip socket. At age 10, she had radical, experimental surgery on the hip joint. During the 2 weeks she was hospitalized, her parents were not allowed to visit her, and she felt terribly abandoned. After four sessions of Swedish massage and myofascial release on her hips and legs, including the surgical scar itself, she began to have nightmares about her stay in the hospital and not being able to see her parents.[110]

Sustained contraction of a muscle, as might happen when a child is in pain, can cause the development of a myofascial trigger point, which could lead to chronic discomfort or pain. Aftimos treated a 7-year-old girl with two trigger points in the sternal division of one sternocleidomastoid muscle. The girl was experiencing pain and limitation of motion in her neck and ipsilateral cheek and eye from the trigger points. They had developed secondary to pain and irritation from an enlarged and painful tonsillar lymph node when she had an upper respiratory infection. He also treated a 10-year-old boy with severe flank pain caused by a trigger point in the ipsilateral external oblique muscle, which developed from splinting the chest wall when he had pneumonia. Dr. Aftimos treated both children when they were sick—before they developed the trigger points and pains. He later treated the trigger points with vapocoolant spray and stretching, which completely resolved their pain.[7]

Exposure to significant pain in infancy or early childhood may have another effect as well—it can alter the child's (and later, the adult's) perceptions and reactions to pain. Porter et al. reviewed the research on the long-term effects of pain in infancy and concluded that children who experienced the chronic stress and repeated physical pain of a neonatal intensive care unit will react with more anxiety and stress and will feel more pain when given vaccinations than children who were not in a neonatal unit. They are likely to have this reaction of increased anxiety and stress in any situation in which they will have to experience pain. Many nurses and doctors who work in prenatal intensive care units are deeply concerned about the long-term effects of the pain and invasive procedures the infants must undergo. The majority of the tactile interactions for infants in intensive care are clinical in nature, such as endotracheal suctioning, insertion of intravenous lines, heel pricks, and arranging respirator tubes, and many of these interactions are painful. Porter concluded that anesthetic should be given before painful procedures to prevent these long-term effects.[111]

Similar conclusions have been drawn from animal studies. Newborn rat pups stimulated with painful stimuli four times a day have significantly lower pain thresholds compared with rats that received repetitive nonpainful stimuli during the same period. During adulthood, pain-stimulated rats had an increased preference for alcohol, increased anxiety, and defensive withdrawal behavior. It seems that, once activated during sensitive periods of development, the adrenocortical system may behave differently in reaction to subsequent stress. The nervous system may be structurally and functionally changed as a result of early pain and stress, so that specific populations of synapses may be stimulated and others destroyed. Gray et al. reported on a study that compared the response of two groups of infants to a standard heel lance procedure. One group of infants wore only a diaper and laid on their mother's bare chests, and the infants in the other group were swaddled and lying in a crib. After the painful heel stick, the infants in skin-to-skin contact with their mothers cried 82% less, grimaced 65% less than the swaddled infants, and did not have the extreme increase in heart rate of the swaddled infants.[112] Based on these results, it appears that a combination of careful use of anesthesia and skin contact (including massage) in the neonatal intensive care unit could be the ideal intervention to alleviate stress and to prevent future anxiety regarding pain.[112,113]

MASSAGE THERAPY AS AN APPROACH TO CHILDREN'S STRESS-RELATED HEALTH PROBLEMS

Although stress may be at the root of many childhood health problems, it can also worsen those problems with an organic cause. Almost any condition which a child suffers can be worsened if he or she is under a lot of stress. For example, stress may truly be the basis of a child's struggles with muscle contraction headaches or stomachaches; in this case, regular massage can help release tension and reverse this problem. Asthma and epilepsy, however, are not caused by stress, but may be significantly worsened by it; children with asthma and epilepsy may have fewer attacks or seizures when their tension levels are lower. Massage does not deal with the cause of the stress; however, it can be tremendously supportive by enhancing the child's fundamental internal physiologic processes, helping her release tension, and helping her feel nurtured and supported. Feelings of isolation and loneliness, which are often part of the child's stress, are combatted by sensitive and caring touch. More than receiving simply a clinical regimen of proscribed massage strokes, that touch has the capability to affect a child on an emotional and psychological level. By teaching the child to relax through the basic and advanced relaxation sequences, children will not only feel less tense, but learn that they have a measure of control over their physiology. Many specific massage treatments for stress-related health problems are found in Chapters 5 and 6. In Chapters 4 and 5, the reader will learn specific techniques that can ease pain, treat soft-tissue dysfunction, and stimulate normal physiologic processes. In Chapter 6, the reader will learn how relatively simple massage techniques can be specifically used to treat a variety of childhood disabilities,

increasing their comfort, improving their mobility, and stimulating their normal physiologic processes.

INCREASED PERCEPTUAL FEEDBACK AS A BENEFIT OF MASSAGE

In addition to its physiologic and emotional benefits, massage therapy also provides children with perceptual feedback, which is essential to the development of a healthy body image.

THE IMPORTANCE OF A HEALTHY BODY IMAGE

Body image is a person's "mental picture" of his or her body (see Figure 1–5). This mental representation of the physical self is made up of the perceptions of the body's individual parts and planes, and also its size, weight, shape, boundaries, and relationship to the rest of the world.[114,115] Each person's body image develops from her unique physical, emotional, and cultural experiences.

Body image is central to the sense of self and self-organization. Children need a distinct and relatively stable body image to perceive themselves and others accurately and to interact well with their environment. A distinct body image is necessary for good balance, good spatial orientation, and precision of movement. A child with a vague body image may be clumsy because she is unable to orient herself in space or in relationship to other objects.

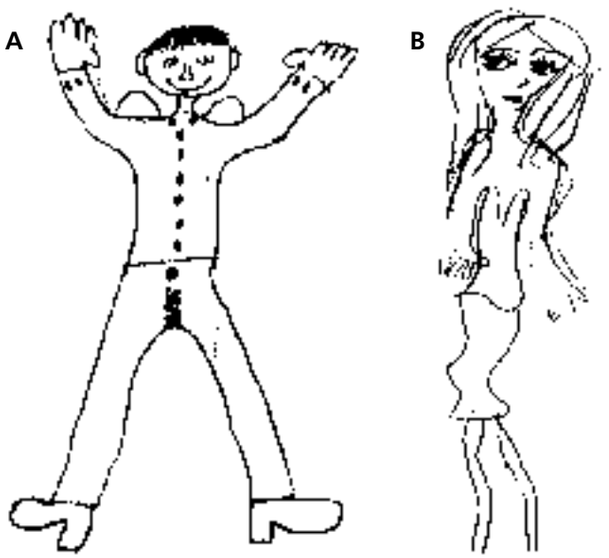

FIGURE 1–5 ■ Self-portraits by two children. Having a child draw a self-portrait is one way to assess her body image; the drawing can indicate how well the parts, planes, and boundaries of her body are perceived. Drawing A is by a healthy 9-year-old boy. Drawing B is by a 12-year-old girl with schizophrenia. Blaesing S, Brockhause J: The development of body image in the child. *Nursing Clinics of North America*, 7:603-604, 1972.

The definiteness of children's body boundaries, or how well defined and structured they perceive their bodies to be, is basic to their identity. Children with vague, indefinite, or distorted body images may not actually know where their bodies start and where they stop and exactly where the rest of the world begins. Their body images are like a distorted reflection in a fun house mirror, with some of their body parts blackened out, which may lead to high anxiety and low self-esteem. According to psychiatry professor David Krueger, "Individuals who have an inauthentic image of their bodies typically describe the sense of never having lived in their own bodies, of never having inhabited them. Their bodies never seem to be their own; their bodies do not become integrated as a seamless aspect of the self. In some instances eating, exercise, or other self-stimulating physical activities are attempts to create a sensory bridge to feeling and inhabiting one's body."[116] Because the definiteness of the child's body boundaries is basic to her identity, if she has an indefinite or weak sense of her boundaries—that is, she lacks a clearly defined line between herself and the rest of the world—she will feel incapable of protecting herself. Intimacy, which involves some boundary loss, may seem frightening. A child with a weak body image may be threatened by normal attempts to interact with her physically or socially. Or she may have a tendency to slap, punch, push, or otherwise intrude upon others to show affection. If, however, she has a sense of her body boundaries being too strong, she will feel safe letting her feelings out but she may also feel lonely and numb.[117] Weak or distorted body images can be caused by a number of different factors, including:

- Negative touch experiences, such as physical abuse (see Chapter 6, page 157).
- Touch deprivation. Healthy touch experiences during childhood are perhaps the single most important contributor to a healthy body image.
- Problems with neurologic development. These may result in weak or poorly developed neurologic functions, such as the ability to distinguish the various nuances of touch or the ability to develop proprioception from the information coming into the brain.[118]
- Stress and strife. Chronic conflicts may lead people to develop rigid personality styles, which can manifest as rigid body posture and armor-hard body boundaries. Psychologist Wilhelm Reich believed that parents who emphasize inhibition

and self-control raise children with this type of boundary.[43] Such people may be attracted to thrill-seeking behavior, alcohol abuse, or drug abuse to increase the intensity of their sensations.

Many aspects of a child's body image can become distorted, including her size, weight, shape, body parts, the distinctness of her body boundaries, and her distance from other people and objects. For example, we have all experienced a change in our perceived size when we stand beside a particularly large or small person. Lack of body awareness or misperceptions of the body may be noted during massage therapy. For example, many people have little or no awareness of muscular tension, even in tight areas. Others appear to conceive of their bodies as almost two-dimensional—they are aware of the front and back aspects of their bodies, but they have little awareness of the sides of their bodies. Or, some people may be aware of the upper part of their bodies, but have little true awareness of their lower bodies; some are aware of the right side but not the left side.

Anorexia nervosa is an extreme example of severe body image distortion; in fact, it is defined as *a disturbance in the way in which one's body weight, size, or shape is experienced*.[43] An anorexic girl may refer to herself as plump or fat when others see her as skeletal. A study of 214 anorexic and/or bulimic young women found that 75% of them were not able to correctly estimate the size of their body parts. When asked to estimate the size of their biceps, calves, thighs, waist, abdomen, hips, and bust, 75% perceived the parts as one-tenth to one-third larger than the actual size. By contrast, a control group of women without eating disorders rarely estimated the size of their body parts incorrectly by more than one-twentieth of the actual size.[119] Anorexia most often develops from an overwhelming importance being given to one's physical appearance, profound body dissatisfaction, and a deep conviction of physical defect.[120] The emaciated teenage girl who looks in the mirror and sees a fat person lacks a healthy body image to help ground her in reality.

Can touch therapy play an essential role in building that healthy body image? Studies of adult women with anorexia nervosa have found that they have a strong desire for nurturing touch and that they feel that they were deprived of touch as children.[121] A small study of young women with anorexia found that the women had less dissatisfaction with their bodies after effleurage-based massage performed twice a week for 5 weeks.[122] Hopefully, this research will be conducted with children as well as adults and that it will show that massage can have a more powerful effect if administered earlier in life.

HOW A HEALTHY BODY IMAGE DEVELOPS

The foundation for a healthy body image is developed during infancy. Childhood and teenage experiences then continue to shape its development.

Infancy

At birth, infants possess a fairly well-developed capacity for registering and associating sensory impressions received through contact with other human beings. Touch is the most mature of the senses at birth; babies can feel much better than they can see, hear, or even taste.[123] The construction of body image begins in the first few days of life, as infants interact with people and objects in their environment. They begin to have a variety of new tactile experiences not experienced in the womb, including different temperatures, new movements, the handling by different people, and the textures of fabric and skin. They also process the input of sound, taste, movement, and vision. Their body image gradually builds from these different sensations. During this period, adequate somatosensory stimulation and tactile stimulation, in particular, are critical for developing a healthy body image. Rocking, holding, and massaging are excellent ways to meet this need. Bathing or swimming are also excellent because water exerts pressure in all directions to provide one type of tactile stimulation to the skin and the temperature of the water adds another type.[117] Each touch stimulates a mental image of the area touched and, eventually, the cumulative effect of these mental images is the ability to localize the body parts and their functions.[124] When infants lack adequate sensory stimulation, especially that of touch and movement, their body image as children will be weak and possibly distorted. As noted earlier, they will be anxious and have difficulty forming normal emotional attachments to significant others and their ego development will be impaired.[125]

A variety of circumstances increase the likelihood that an infant will be touch-deprived. One is a tendency for the infant to be hypersensitive to all stimulation. Brazelton studied a group of infants who had no identified physical problems who were, however, difficult to nurture because of their hypersensitivity. As one attempted to rock them gently, they stiffened, arched away, and sometimes had a series of bodily startles that resulted in inconsolable crying. If one looked in their faces or talked to them, they looked frightened and turned away. Such infants are difficult for even the most well-intentioned parents to care for. The parents may begin to pull away from the infants, interacting with them less and less as their attempts to nurture and comfort repeatedly fail. The infants do not receive the one thing that might normally coax them

out of their hypersensitivity—loving touch—and their hypersensitivity may never be overcome. Through no fault of the parents, this hypersensitivity may lead to a type of touch deprivation. Brazelton found that these babies could be reached if parents learned to change their approach by slowing down, cutting down on stimuli during interactions, and dealing with their baby in a low-keyed manner. For example, feeding time needed to be in a dim, quiet room with other stimulation avoided during the feeding process, including singing to or playing with the baby.[96]

Other circumstances might cause an infant to be touch-deprived: a mother with too many small children to care for; a mother who becomes seriously depressed or ill; a mother who has to return to work without having high-quality day care; an anxious and self-involved mother who cannot adequately respond to her infant's specific needs for comforting and feeding; and major stress or upheaval in a family.

Psychiatrist Katherine Zerbe, who specializes in the treatment of eating disorders, believes that failure to care adequately for the infant not only causes a false or distorted body image but that, in a peculiar way, eating disorders may be an attempt to self-cure such early touch deprivation.[43] Baby monkeys used in classic touch deprivation experiments by Harlow could see, hear, and smell their mothers but not touch them. As a result of this bizarre experience, when the baby monkeys became adults they had such distorted body images that they sometimes mutilated themselves or stared at body parts as if they were foreign objects.[126]

At the other extreme from deprivation, excessive intrusion into the infant's boundaries can cause problems as well. Physical or sexual abuse can weaken the sense of the body being whole (see Abuse section, Chapter 6, page 157). The invasiveness and use of physical restraint in some medical procedures can also affect body image. The result may be that the child has a weak sense of her body as a private domain.[127]

Early Childhood

During the toddler stage, the body image continues to develop and parental attitudes continue to make an indelible impression on the child's concept of himself, his body, and its functions. How children are touched when sick, what kinds of games parents play with them, how they are dressed, toilet trained, and so on, all contribute to the formation of body image.

As children develop in size, shape, and motor skills, their body image is continuously reshaped. During the preschool years, a child's body image becomes clearer and more conscious. Because preschoolers are gaining an awareness of a separate self inside a body that belongs to them, they may feel more anxious about getting hurt or being in a situation in which they might experience pain.[128] At this stage, however, they are not as worried about how their bodies appear to others as might be older children. Nonetheless, if there is conflict with adults about any specific body area, a body image distortion may develop; for example, if there is parental conflict about touching the genitals, a body image distortion can develop in the genital area.[117]

Middle Childhood

During middle childhood (ages 6 to 12), children begin to compare their bodies with those around them as they learn how to interact with others. Cultural attitudes begin to influence the child's body image (see Point of Interest Box 1-6). For example, in a culture in which plumpness is taken as a sign of health or prosperity, a naturally chubby girl will be treated differently than in a culture in which thinness equals beauty. If they have been teased because they look different, children who are disabled may see their bodies as ugly or deformed. A large study of body image attitudes found that childhood teasing about appearance led to a negative body image and a tendency to develop an eating disorder.[129]

Adolescence

The onset of adolescence confronts all children with the task of revising their body image. The personal frame of reference that they have developed has to be reconstructed to accommodate the many normal changes in body structure and function that occur at a dramatically rapid rate.[127] These rapid physical changes lead the teenager to be more self-conscious and increasingly preoccupied with their body image and the question, "Am I normal?" The young teenager's concern with body image is characterized by a preoccupation with self, uncertainty about appearance and attractiveness, frequent comparison of his or her own body with those of other teenagers, and increased interest in sexual anatomy and physiology.[127] Dieting, exercise, and cosmetic surgery, such as liposuction and breast enhancement surgery, are becoming increasingly common in teenage girls[130] and may be used to help make the body fit the cultural ideals.

By the end of adolescence, the major concern with body image has largely abated—growth is no longer proceeding at such a rapid rate and teenagers have integrated their physical changes into their body image.[128] Cultural and parental attitudes toward the body continue to influence the older teenager's body image. A poll of 33,000 women found that women with mothers who were more critical of their appearance were more likely to have a negative body image.[131]

POINT OF INTEREST BOX 1–6

Cultural and Parental Attitudes about a Child's Body Influence Her Body Image

Fortunately, Natasha N., age 6, has a mother who is not preoccupied with how her daughter fits the cultural standard. One evening when taking a bath, Natasha looked down and complained to her mother that her thighs were too fat. This striking statement by a 6-year-old occurred after Natasha had been teased by a friend at school about her weight. Slightly plump, Natasha worried that she had disappointed her parents and had not lived up to their expectations of what she should be. She asked solemnly why her mother's legs were more slender than hers.

One could infer that Natasha was trying to identify with her mother and, perhaps, compete with her a bit, too. Natasha's mother was attuned to these and other issues at hand: she recognized the growing preoccupation of young children, like her daughter, with the cultural stereotype and with the shape of their own bodies. She reassured Natasha that, as she grew to womanhood, her figure would change: the "fat" that she was seeing would be redistributed on her body and used to feed her children. This sensitive mother then empathetically explained, "Someday you will need some fat to feed your little ones just as I fed you. It's not bad for little girls or women to have fat on their bodies. They need this fat because it will later be put to good use and keep them healthy."

Natasha was unconvinced. For quite some time, she continued to complain to her mother about her "fat legs." Because of what Natasha had seen in the media and heard discussed by her friends, her mother had to spend a great deal of time educating and reassuring her daughter about what was normal. Peer attitudes, originating and reinforced by cultural views, were not easily overcome, even by this sympathetic and involved parent.[43]

THE ROLE OF MASSAGE IN THE DEVELOPMENT OF A HEALTHY BODY IMAGE

Massage Provides Perceptual Feedback

There are at least four different kinds of nerves of the skin in all mammals. Just under the epidermis, nerves that end in Meissner corpuscles are responsible for sensations of itching and light touch. Deeper within the dermis are insulated fibers that innervate the pacinian corpuscles; these onion-layered miniorgans allow perception of pressure. Ruffini corpuscles, deeper in the dermis, respond to heat in one temperature range, while Krause end bulbs pick up temperature changes at another range.

Uninsulated nerves that terminate at the dermal-epidermal junction are the nerves predominantly responsible for detecting subtle pressure changes at the skin surface. The deeper nerves, well-insulated with myelin, have more weighty functions, including the perception of pressure, deep pain, and temperature changes. In aggregate, it is these nerves that give us our outer sense of self and provide sensations of impending forces that may injure us severely.[132]

—Mark Lappe, MD

All humans need a certain amount of tactile stimulation to maintain a healthy body image. Without any perceptual feedback, we soon experience serious distortions of our body image, such as changes in the perceived size or weight of different parts of our body. Massage is a rich source of perceptual feedback that can stimulate the various nerves in the skin and construct a realistic, well-defined body image. Massage techniques can give children a tremendous amount of information about their bodies. For example, a long effleurage stroke from the hand to the shoulder and back can tell a child exactly how long and how wide the arm is, in effect creating an outline of the area for the brain. Varying amounts of pressure provide gradations of feedback to pressure receptors in the skin and muscles. Direct pressure techniques, such as ischemic compression and acupressure, give feedback on density and tension of muscle tissue. Tapotement can give the child a sense of the solidity of different areas of the body. Range of motion techniques can give the child information about how the bones relate to each other and how heavy the parts of the body are. Stretches can give a sense of the length and plasticity of muscle tissue. Positional changes during massage, such as lying on the side, can give an awareness of more than just the front or the back of the body. The temperature of the therapist's hands and the massage oil or cream provides thermal feedback as well.

The Touch Research Institute found that Swedish massage given twice weekly to teenage girls who were hospitalized for bulimia led to a less-distorted body image after 5 weeks.[17] Infant massage instructor Helen Rowe tells of a similar success with a 7-year-old girl with a thyroid disorder. The child was the size of a 3-year-old and, when someone drew around her body on butcher paper, she was upset to see just how small she was. After receiving infant massage techniques, however, she remarked that she felt much taller.[133] Massage is physically pleasurable and leaves a strong impression in the child's mind because pleasurable touch enhances the perception of the touched part.[127]

The Santa Cruz California Office of Education pilot study found significant improvement in body image in many of the 25 children who were disabled who received 8 weekly sessions of Jin Shin Do (see Figure 1–6). One boy became more aware of the difference between his right side and his left side. Another had increased internal awareness of his body, with improvements in his ability to control his movements.[26]

Massage Reinforces Body Boundaries

Self-touching is one common way that people reinforce their body boundaries; it tells the self "the edge of me is there and intact." The patient cited earlier is an example of how a child used self-touching to comfort herself and reinforce her boundaries.[35] Nursing professor Irene Riddle suggests that when restraining children in the hospital, positioning them so that they can self-touch can be an important way of validating their boundaries.[127] Massage can reinforce the child's boundaries in much the same way, as the repeated laying on and taking off of the hands increases awareness of their edge—where the body stops and the world begins.

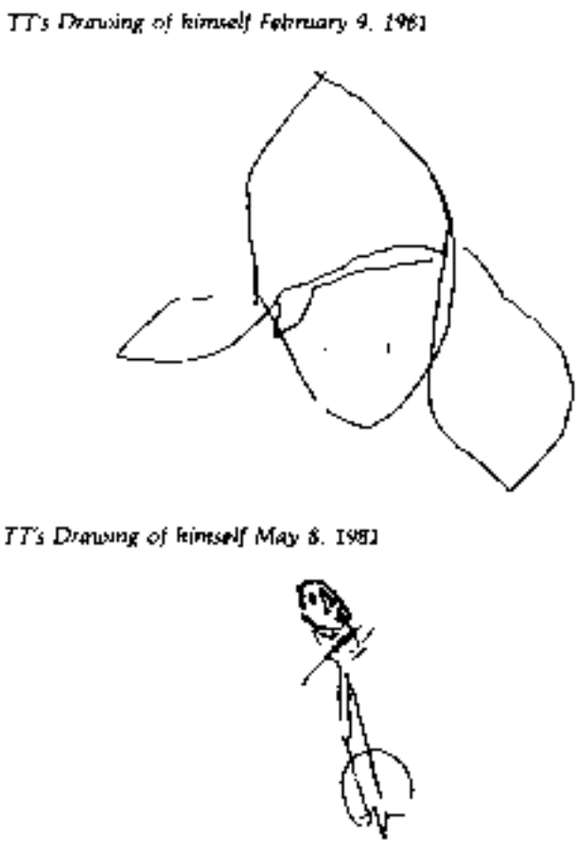

FIGURE 1–6 ■ Body image before and after eight sessions of acupressure. Self-portraits provide many indicators of self-esteem, as well as motor control. This 6-year-old boy was in a special education program; he had aphasia and gross and fine motor coordination problems. His second self-portrait indicates that his body awareness has noticeably increased. Reprinted with permission from: St. John J: *High Tech Touch: Accupressure in the Schools*. Novato, CA: Academic Therapy Publications, 1987, p 66.

Massage Enhances a Sense of Body Intactness

Riddle recognized the need for touch to enhance the child's sense of body wholeness. She felt that confinements, restraints, extensive bandages, traction, and casts all limit the child's mobility and may seriously decrease the tactile, kinesthetic, and visual perceptions he needs to define his body boundary and his location in space. Riddle called for nursing intervention to be specifically designed to provide the child with adequate perceptual feedback. She felt that this principle could be incorporated into the caring process through the use of touch, through encouragement of the full range of passive movements, and by whatever active movements the child was capable of. Simple games such as "Where's your leg? Here's your leg!" "Where's your foot? Here's your foot!" when carried out with the daily bath could also help a child maintain a sense of intactness even when immobilized.[127] Those who work with children who are blind or visually impaired recommend lots of tactile stimulation to help the children develop a healthy body image.[134]

Massage Shows Respect for the Child's Body

Riddle points out that, in many health care settings, children are not afforded the same respect as adults, and she believes that children can never learn to respect their bodies unless they are first shown that respect.[127] Susan Thompson, a massage therapist who was born with a cleft palate, illustrates the impact on her body image from the medical care she received. "My earliest memories of touch are unpleasant ones. I have effectively blocked out many details of my 17 operations, but can clearly remember the nauseating smell of ether, the painful removal of stitches from my lip and nose, and the anger and humiliation I felt at being physically restrained with wooden arm splints tied down to my bed. Touch became associated with a sense of bodily invasion." Many years later, Hakomi bodywork helped her to restore respect for her body.[135]

During massage, show respect for the child's body by obtaining her permission to be massaged, giving her privacy, and protecting her from being inappropriately exposed. By listening carefully to what she prefers in terms of strokes and pressure and avoiding the areas where she clearly does not want to be touched, the therapist teaches the child that she has the right to have her bodily needs met, that she can have control over her body, and that she can set appropriate boundaries.

REVIEW QUESTIONS

1. Identify five scientifically validated physiologic effects of massage with children that can also be confirmed by firsthand observation.
2. Explain how massage and nurturing touch can benefit a child emotionally.
3. Discuss the major stressors affecting American children today and the evidence that a high stress level is affecting them in various ways.
4. Discuss the physiologic effects of the fight-or-flight response to stress.
5. Explain how massage therapy can help treat high levels of stress and stress-related health problems in children.
6. Give five examples of pain or trauma to a specific area of the body that can cause muscular shielding in a child.
7. Give five examples of mind-body approaches to addressing a child's physical and emotional problems.
8. Discuss the importance of the body image to a child's personality.
9. Discuss the normal development of a healthy body image. What can disrupt this normal development?
10. Explain how massage can enhance the development of a healthy body image.

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2

NOT A MINIATURE ADULT: THE UNIQUE DYNAMICS OF PEDIATRIC MASSAGE

KEY POINTS

After completing this chapter, the student will be able to:

1. Describe the musculoskeletal differences between a child's body and an adult's body.
2. Summarize the physical, emotional, and cognitive growth and development of children during different stages of childhood.
3. Explain the process by which myofascial restriction and myofascial trigger points may develop in the early years of childhood.
4. Explain how a hands-on therapist would practice massage differently with children of different ages.
5. Explain the importance of establishing ground rules with the parent and child before treatment.
6. Understand the importance of establishing and maintaining appropriate boundaries with children who are receiving massage, and with their parents.
7. Describe the process of taking a confidential medical history for a pediatric client.
8. Describe the supplies that are needed for successful massage therapy with children.

The transformation of a human being from a tiny infant to a full-grown adult is a complex, sophisticated process. At each stage of transformation, however, obstacles may arise that can interfere with children becoming adults who are at home in their bodies, free of musculoskeletal pain and with a healthy attitude toward touch. These obstacles include emotional trauma, injuries, and physical or emotional abuse. Sensitive caring massage can go a long way towards helping children heal their negative effects and develop in a healthy way. In this chapter, we look at normal child development to give you an understanding of how children can be helped by massage during different developmental stages. We begin by describing the major musculoskeletal differences between a child's body and an adult's body and continue by discussing each unique stage of pediatric growth and development. We conclude the discussion with ideas on how to customize massage therapy to individual children and how to prepare to work with children, including taking a pediatric medical history.

POINT OF INTEREST BOX 2–1

***Typical Vital Signs for Various Stages of Childhood*[1,2]**

Pulse or Heart Rate

1. Infant: 160
2. Preschool child: 120
3. School-age child: 100
4. Teenager: 80

Systolic Blood Pressure

1. Infant: 80
2. Preschool child: 90
3. School-age child: 92
4. Teenager: 100

Respiratory Rate

1. Infant: 40
2. Preschool child: 30
3. School-age child: 18
4. Teenager: 12

FIGURE 2–1 ■ An Infant Depicted as a Miniature Adult. This medieval depiction of Jesus as an infant looks incongruous to the modern eye because the artist really portrayed a miniature adult. The features that we recognize as characteristic of an infant, such as a disproportionately large head and soft facial features, are not depicted here. Until he reaches adulthood, the muscles of the chest, abdomen, legs, and feet will not really be this well defined, nor will the bones of his lower extremities be so stout and well developed. "The Virgin and Child with Angels," c. 1450, by Apollonio de Giovanni. Courtesy of the Fogg Art Museum, Harvard University Art Museums, The William M. Prichard Fund. Photo by Rick Stafford.

THE GROWTH AND DEVELOPMENT OF CHILDREN

During the childhood years, body tissue grows far more rapidly than that of an adult. Together with physical growth, major advances occur in such areas as coordination, strength, self-control, reasoning, and the ability to relate to others. Maturation happens in a fairly predictable sequence of developmental leaps, as children's bodies, minds, and abilities develop and expand (see Figure 2–3). New abilities develop in each stage of childhood, based on those skills that have already developed. For example, children must learn to crawl before they can walk, and to walk before they can run. Although children are natural candidates for sensitive, caring massage, they may present the therapist with different needs at different ages. Also, child development does not always fit into neat categories; at any given time, a child may be ahead of the average development in some areas and behind in other areas. However, thinking this way about childhood is useful to begin to make sense of the many different things that happen as a child grows.

THE FIRST 3 YEARS OF LIFE—A BRIEF REVIEW

Although this book does not discuss infant massage, a review of the first 3 years of life is necessary to understand the foundation of childhood growth and development. Development is defined as *the acquisition and refinement of different skills.*

Physical Development

During the first 3 years of life, children's bodies grow and develop rapidly in many amazing ways. By the end of the first year, a child weighs three times as much as at birth; the head has grown as much as it will for the remainder of childhood.[3,17] By the end of the second year, a child's brain has tripled in weight, as the nerve cells, which formed before birth, are sculpted by experience and interconnections continue to multiply.[18] This rapid growth and maturation of the brain is reflected by major leaps in all areas of development.

Much of the newborn skeleton is immature at birth; the pelvis and legs are still primarily cartilage, the baby's vertebrae are all the same shape, and the skeleton is made up of 330 separate bones.[19,20] However, by the end of the third year, the spine, femurs, tibiae, and the arm and hand bones are nearly twice as long as at birth.[20] Due to this rapid bone growth, a child's height increases an average of 10 inches a year. By contrast, even at the peak of height growth during puberty, children grow only about 4 inches a year.[17] This growth process continues until the child reaches full height—in the middle or late teens (Figure 2–3).* In the first 3 years, not only has bone growth continued at a rapid pace, the extreme flexion typical of full-term babies

*Ossification of the skeleton takes place gradually. The baby's vertebrae begin to shape individually, and the 330 bones of the infant skeleton eventually fuse, becoming the 206 bones of the adult skeleton.[5]

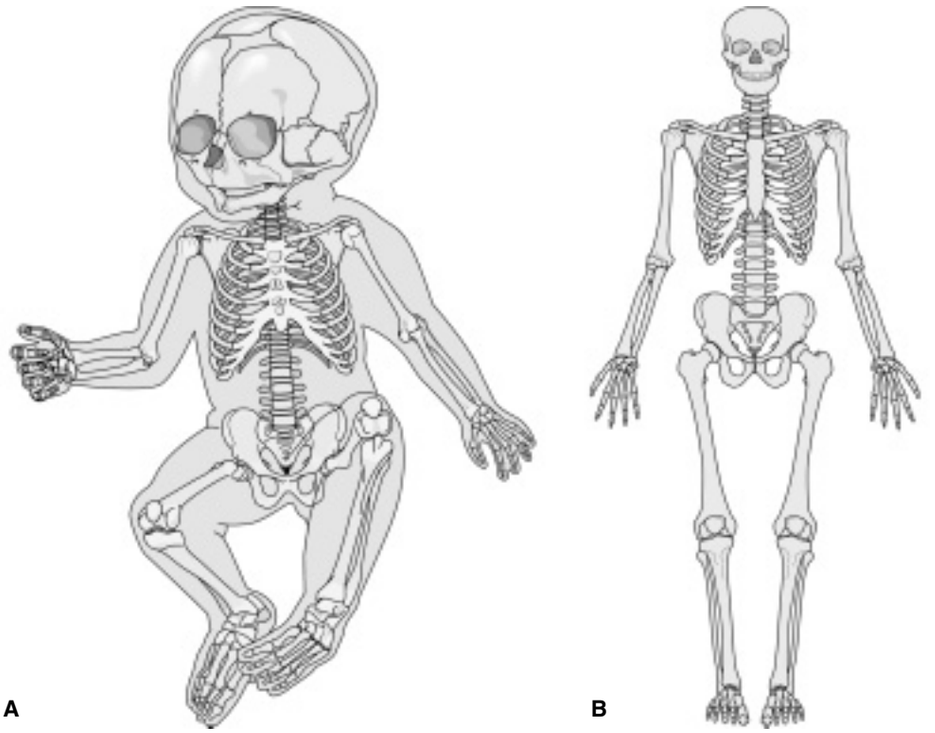

FIGURE 2–2 ■ Newborn Skeleton Versus Adult Skeleton. Note the dramatic differences in the shape, number, and degree of ossification of bones between the newborn skeleton **(A)** and the adult skeleton **(B)**. LifeART images, ©2004, Lippincott Williams & Wilkins. All rights reserved.

has also decreased because they are no longer folded up in utero and they begin to creep, crawl, and walk.[21] By age 3, children may have already acquired significant musculoskeletal issues as a result of their position in utero, the birth process, infections, and injuries. These issues may be the precursors of postural problems and soft-tissue pain (see Point of Interest Box 2–2, page 39).

Motor Development

During the first 3 years, acquisition of motor skills also proceeds with great speed. Children have progressed from being virtually helpless—unable to raise their heads or roll over—to small people who can walk, run, throw overhand, dress themselves, pedal a tricycle, and control their bowels and bladder. They are capable of many activities requiring eye-hand coordination, such as stacking cubes and drawing circles. Visual motor skills have progressed from the infant's initial ability to barely fix on and follow a bold bright object, to now being able to use both eyes together, locate objects in space, follow moving objects (and move the eyes without moving the head), and perceive depth. Visual acuity (sharpness) at birth was 20/600; some children may reach 20/20 by age 3, but many will not see that well until age 5.

Cognitive Development

During the first 3 years, children make major advances in cognitive development. As newborns, their activities were mostly reflexive; as their brains developed, they progressed to simple repetitive behaviors, imitative behavior, and questioning. By age 3, children are curious and enjoy novelty; they begin to develop a sense of self as they are increasingly able to differentiate themselves from their environment. They begin to use language and symbols to represent their environment, and can "pretend" play. During these years, they come to perceive the outer boundaries of the body more specifically and their internal states as separate from their external body boundaries.

Emotional and Social Development

With consistent loving care from a mother or mother substitute, children form deep emotional attachments, which are the basis of healthy emotional relationships in adulthood. During the first 3 years, they also form an awareness of themselves as separate from others. They begin to have stranger anxiety (the fear of unknown adults) and also fear separation

A

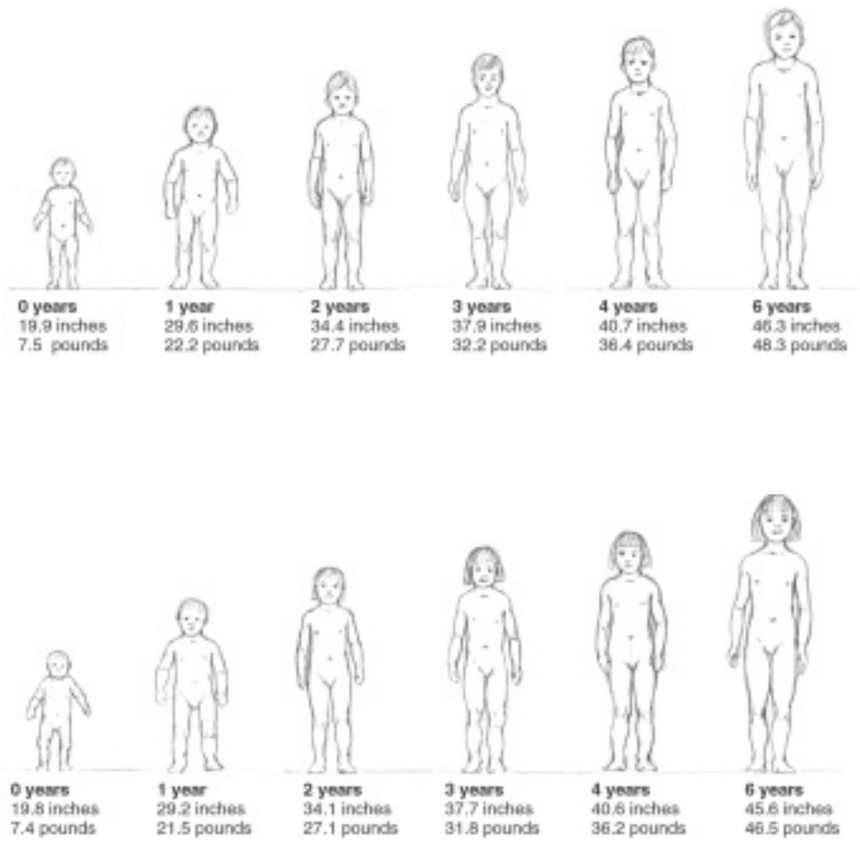

FIGURE 2–3 ■ Stages of Physical Growth During Childhood, From Birth to Age 18. These numbers are averages for American children. A boy's development is shown in the top row; a girl's development in the bottom row.

from their parents. Their language development proceeds at a great pace as well. By age 3, most children have all of their basic language skills. They progress from having no speech and communicating only by crying to speaking their full name, using three-word sentences, and even using the future tense.

Behavior regression is one indicator that children younger than age 3 are under high levels of stress; they regress to behaviors that belong to an earlier, outgrown stage of development. Under high levels of stress, toddlers may regress to infantile behaviors. They may begin sucking their thumbs, after having stopped for months, or begin crying uncontrollably; become hypersensitive to noise; or have nightmares or other sleep problems.

THE PRESCHOOLER—AGES 3 TO 6

Physical Development

Children become taller and heavier during the preschool years, but not as rapidly as before. Between the ages of 3 and 6, the average child grows 3 inches and gains 3 to 5 pounds per year.[18] During these years, children's trunks and legs grow longer, their shoulders grow lower and broader, their necks lengthen, and their chests gradually broaden and flatten. Bowlegs and knock-knees are common until age 5. Joint hypermobility, which is normal at birth, begins to decrease and continues to do so throughout childhood.[22] As infants and toddlers, children breathed mostly with their diaphragm and only minimally

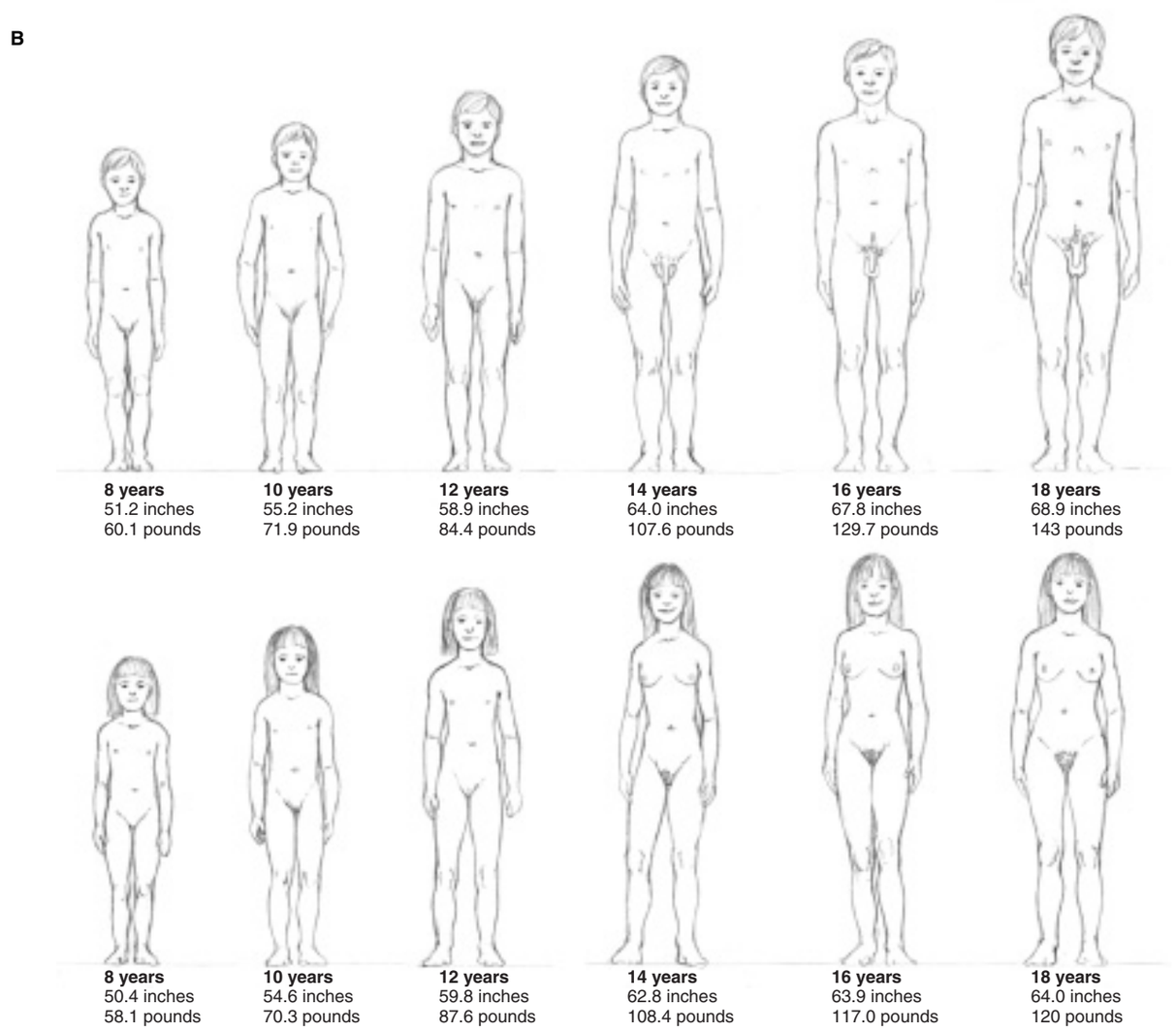

FIGURE 2–3 ■ (Continued)

with their chest wall muscles; now they begin to breathe with both.

- The average 3-year-old child weighs 31 pounds and stands 37″ tall.
- The average 4-year-old child weighs 36 pounds and stands 41″ tall.
- The average 5-year-old child weighs 38 pounds and stands 44″ tall.
- The average 6-year-old child weighs 41 pounds and stands 46″ tall.

Motor Development

From ages 3 to 6, most children are able to move around with increasing confidence and competence; they continue to make advances and refinements in gross motor skills, such as running, climbing, and walking. When running, a 3-year-old may have difficulty turning corners and stopping quickly and may often fall down; by age 6, the same child can run in a faster and more controlled way and seldom falls down. Three-year-olds can sit on a riding toy and push it with their feet; by age 6, they can ride a small bicycle.[18] They continue to improve at fine-motor skills such as drawing and dressing themselves. Visual skills requiring the coordination of the two eye muscles continue to develop, but the average child's visual system is not yet mature enough for sustained close tasks such as reading.[23]

Cognitive Development

During the preschool years, children are increasingly able to acquire knowledge and beliefs about their en-

vironment, interpret sensory events, and register and receive information from memory. They also begin to reason and understand symbols and images. They have an increased ability to process and express information, to problem-solve, to remember, to concentrate, and to understand. They have no sense of time and do not yet have a complete understanding of the concepts of left and right. Children love imaginative play, such as playing "dress-up" in which they take different roles, and may play happily for long periods. This type of play helps develop both cognitive and motor skills.

Emotional and Social Development

Preschoolers continue to move toward a less egocentric view of the world and begin to have a sense of limits and consideration for others. They begin to learn to repress and control their aggression, but still act impulsively much of the time and are in the early stages of learning self-discipline.

The preschooler is not particularly worried about his appearance; however, children of this age often feel anxious about getting hurt. Fear of injury may start with images of being broken, damaged, or having lost a part of themselves. Adhesive bandages are beloved by this age group because they provide a tactile and visual reinforcement of body boundaries, which preschoolers feel are threatened after injuries. Preschoolers may also focus intensely on potential pain, such as going to the doctor for immunizations.[24] Children who experienced an unusual amount of pain during infancy may exhibit greater anxiety about potential pain.[25] Preschool children may still have stranger anxiety but, in general, they are now less worried about being separated from their parents.

The use of language continues to become more complex and sophisticated; preschool children are able to make longer and more complete sentences and use many more words. (The average 6-year-old has a vocabulary of more than 2,000 words.) However, they are still not fully capable of articulating their feelings.

Under stress, preschoolers may become irritable, anxious, or overly fearful. Common behaviors include uncontrollable crying, an exaggerated fear of being alone, anger, and eating or sleeping problems.

THE SCHOOL-AGE CHILD—AGES 6 TO 12

Physical Development

During middle childhood, children continue to grow in a variety of ways. Slowly but steadily, they grow taller and heavier. The skull and brain grow slowly because they are already at virtually their full size. During these years, the bones continue to lengthen, broaden, and become ossified; however, they are still weaker than mature adult bones. Muscles continue to grow larger and stronger as well. Growth is not steady and there may be growth spurts followed by plateaus.[17] As the bones grow, a child's height increases about 2 inches a year.

The "growth spurt" of puberty, a period of fast growth that continues for 2 to 3 years, begins at the end of this stage of childhood; at about age 10 for girls and age 11 for boys. It accounts for about 25% of the final adult height and 50% of the adult's ideal body weight.[17] During a growth spurt, a child may grow as much as 4 inches a year.

- The average 8-year-old child weighs 59 pounds and stands 51″ tall.
- The average 10-year-old child weighs 71 pounds and stands 55″ tall.
- The average 12-year-old child weighs 86 pounds and stands 59″ tall.

Motor Development

Because children's muscle strength doubles during their school-age years, they can handle greater physical demands in athletic activities; however, they can be easily injured because their bones are not yet fully ossified and their immature muscles can be strained or torn. With brain development and plenty of practice, they continue to gain more control over their movements. Their greater precision of movement and coordination leads to gains in balance, agility, and reaction time. Posture improves and children are steadier on their feet. Fine motor skills, such as model building, drawing, and writing, also continue to improve.

Cognitive Development

During middle childhood, the brain continues to mature. Although its size increases only slightly, myelinization and lateralization of the cerebral hemispheres continues. Children begin to develop a better understanding of cause and effect, and their language abilities and communication abilities also continue to develop.[18] Their ability to localize and communicate physical symptoms is not yet well developed; however, the therapist who hopes to get a complete verbal description of symptoms will probably be frustrated.

Emotional and Social Development

As they mature, school-age children become increasingly independent from their parents, but they still need and want parental authority to help them cope with their expanding environment. Peers become more important to them, and children begin to try out their skills in comparison with their peer groups. They play

primarily with same-sex friends, and best friends are important. During these years, children begin to develop a greater understanding of right and wrong and their ability to control their impulses continues. They are also increasingly able to relate to new adults without fear.

Signs that school-age children are under high levels of stress include behavioral problems, such as excessive worrying, irritability, not attending to school or friends, and withdrawal from others. Physical manifestations can include headaches, stomachaches, insomnia, and loss of appetite.

BOX 2–1

MUSCULOSKELETAL DIFFERENCES BETWEEN CHILDREN AND ADULTS

Children are truly not just miniature adults; the human body is not fully mature until about age 20. Here are some of the differences the hands-on therapist will encounter between the bones and soft tissue of children and those of adults:

- When infants are born, their cranial bones are not fused; instead, the bones are separated by gaps, or soft spots, called fontanels. This allows for significant molding to take place during the birth process. During the first 2 years of life, the fontanels gradually close and sutures are formed that permit the skull to expand easily as the brain grows. The cranial sutures do not firmly unite until about puberty. Sutures are not completely calcified, even in the adult, but contain collagen, elastic fiber, blood vessels, and nerve fibers.[3,4] Unlike the adult skull, the shape of the skull in childhood is so changeable that it may be permanently altered by the application of force.*
- Compared with the prominence in the adult face, a child's face and jaw are relatively underdeveloped at birth. This makes it easier for the head to pass through the birth canal. As a result, there is a greater growth of facial structures than of cranial structures during childhood—the face increases in size to a greater extent than does the rest of the skull.[9]
- The child's periosteum is thicker, stronger, and more biologically active than the adult's.[10]
- Until **ossification** is complete, a child's bones are not as hard or dense as an adult's bones (see Figure 2–4). For example, the cranial bones at birth are the consistency of a paper milk carton.[11] Because children's bones are not as strong as adult bones, they are more prone to fractures; adults are more likely to have soft tissue injuries, such as ligament sprains or dislocations.[10] However, a child's fractures heal more rapidly as a result of a more active periosteum and a more abundant blood supply to the bone. The younger the child, the more rapid the healing.[10]
- Children are more flexible than adults and have joints that are hypermobile compared with adult joints. Because the child's spine is more mobile than an adult's, a force that could cause a spinal cord injury in an adult may not injure a child. Instead, the force can be more easily dissipated over a greater number of segments, and the spine will "give" rather than break.[12] Children's tendons, muscles, and ligaments gradually become more rigid as they grow, and the greater range of motion of most joints will gradually disappear. An infant's backs and hips bend so much, for example, that they can bend over from a sitting position and lie across their straightened legs. During early childhood, young children can still touch their toes with their legs straight but they are not able to bend as far forward. By adulthood, many will find it difficult to touch their toes at all. True **hypermobility**, however, is present in only a small percentage of children.[13]
- From birth, a child's skeletal muscles become progressively stronger until about age 20; they gain weight at about the same pace. Their strength remains at that level for 5 to 10 years and gradually decreases throughout the rest of life.[14]
- Children begin to develop measurable muscle tightness as they grow. Increasing height and weight are correlated with an increasing incidence of muscle tightness in the triceps, rectus femoris, tensor fascia latae, thigh adductors, hamstrings, quadratus lumborum, trunk erectors, levator scapulae, upper trapezius, hand flexors, and finger flexors. This muscle tightness increases from ages 8 to 16 and then usually remains constant. It does not decrease unless it is treated with stretching exercises or other therapy. Children who are not physically fit have more muscle tightness.[15]
- Children's muscle tissue is not as dense as that of adult's and, therefore, requires less pressure. However, their muscles are not fragile; children can tolerate and enjoy firm pressure.

(*continued*)

*The skull during infancy and young childhood is mobile and will change shape in response to pressure, both external and internal. In many places around the world including Europe, Africa, and North and South America, people have taken advantage of the mobility of an infant's skull to intentionally alter its shape for aesthetic reasons. (The skull has been purposely deformed.) Tying hard, flat objects to the front and/or the back of the skull flattens the frontal and occipital bones; wrapping the head with tight cloth bands produces a circular depression around the entire circumference of the skull. Inadvertent deformities occur as well; for example, wrapping an infant in a hard cradle board puts pressure on the lower occiput, causing it to flatten.[5,6] The success of the "Back-to-Sleep" SIDS prevention program, which warns parents to always place newborns on their backs when putting them to sleep, has increased the number of flat spots occurring on the occiput.[7] Deformities also occur when torticollis causes an infant or child to sleep with the head turned in one direction, which places the face and skull under constant pressure.[8] The cranial bones grow in response to internal pressure, as well; the entire top of the skulls of children with **hydrocephalus** is enlarged as the bones grow to accommodate the increased intracranial pressure.[9]

BOX 2–1

MUSCULOSKELETAL DIFFERENCES BETWEEN CHILDREN AND ADULTS (*Continued*)

- Normal body posture is different for children than for adults. The typical child ages 2 to 3 years has a protruding abdomen and a mild lumbar lordosis (swayback). By age 6, with increased strength of the abdominal and other muscles, there is less lordosis. Newborns are top-heavy because of their proportionately larger head and because their center of gravity is at the xyphoid process. By late childhood, with increased growth of the extremities, their center of gravity shifts to the upper, anterior edge of the first sacral vertebrae.
- A child's body is smaller than an adult's. An effleurage stroke, performed with the whole palm on an adult, may need to be done with only the fingertips in a small area on a child.
- A child's skin is softer and more mobile and sensitive than an adult's skin. However, it is extremely strong. The skin of a child can withstand over 25 pounds of force applied laterally before tearing.[16]

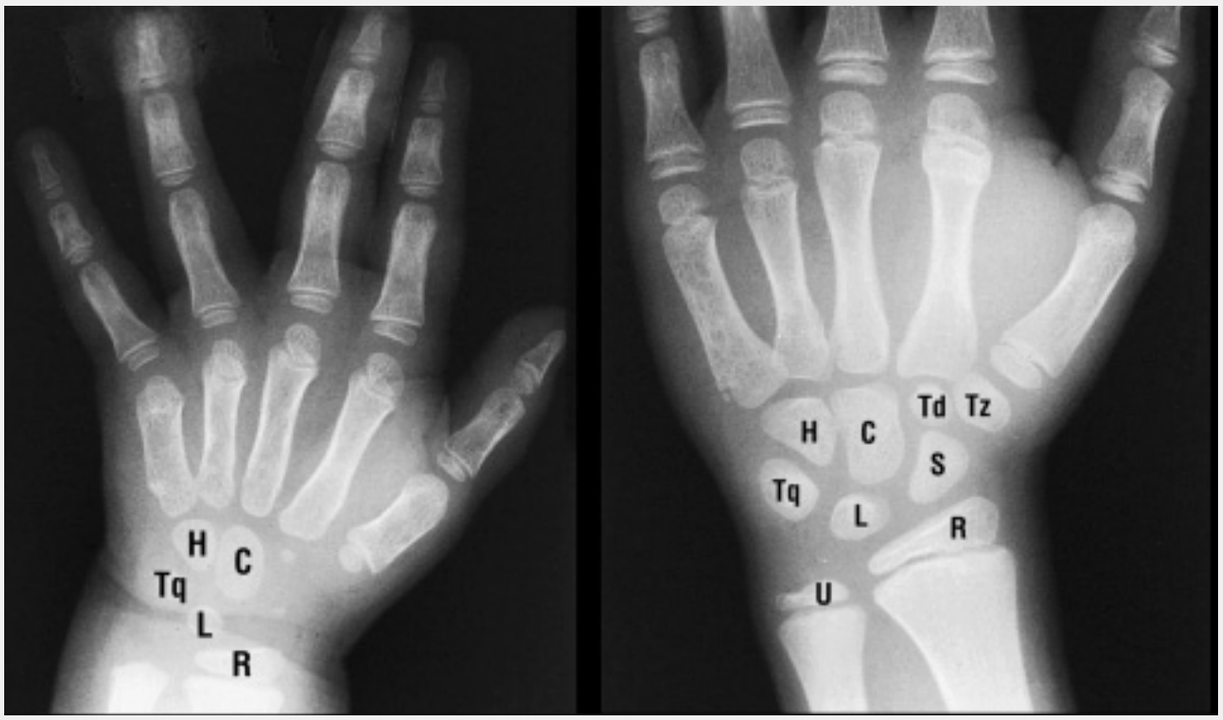

FIGURE 2–4 ■ Ossification of the Hand and Wrist Bones in a 2-Year-Old Child and an 11-Year-Old Child. Image courtesy of Dr. D. Armstrong, University of Toronto, Toronto, Ontario, Canada.

THE TEENAGER—AGES 12 TO 18

Physical Development

During the years from 12 to 18, a teenager grows rapidly and is forced to adjust to many physical changes in a short time; body proportions become more and more like those of an adult, and body image undergoes major changes.

As they grow, girls add proportionately more fat; boys, more muscle. Both of their muscles become larger and more developed in response to bone growth. As more and more cartilage becomes bone, the bones also become larger, as well as heavier. The great increases in a teenager's height are a result of this bone growth, first in the legs and then in the trunk. Teenagers are generally 80% of their adult height when they are 12 years old; by age 17, they have reached 95% of their adult height.[26] The head does not grow much because the brain is already at its adult weight by age 6. At the end of the growth spurt, males will be, on the average, 6 inches taller than females. At the end of puberty, the teenager's original cartilage has been almost completely replaced by bone, and the cartilage cells and the growth plates stop multiplying and disappear.

As their bodies grow, teenagers' proportions become more like an adult. Different parts of the body

(text continues on page 41)

POINT OF INTEREST BOX 2–2

Early Causes of Myofascial Restriction and Myofascial Trigger Points

1. Fascial restriction caused by the position of the fetus in utero.

   In a now-classic study of myofascial restriction, the dissection of the bodies of two infants who had died at birth revealed many of the same restrictions that are common in an adult. Fascial shortness was found along the outside of the legs, as well as a buildup of gnarled fascia along the bottom of the pelvis. Fascial wrappings of individual muscles, such as the pectoralis major and the upper trapezius, had already adhered to the muscles themselves. Tight muscles were found in the lower back as well. R. Louis Schulz, the Rolfer and anatomist who directed the dissection, believes that these restrictions were primarily caused by the infants' position in utero (Schulz RL, personal communication, May 2001).

   "Around the sixth month of pregnancy, size limitations in the uterus become a factor in the development of fascial patterns. For example, when the legs are folded within the uterus, tension may be created between the kneecap and the hip. Where there is this kind of pressure, the stimulation causes a heavier concentration of fibers, forming a thickened sheet of fascia . . . The child's position in the uterus is, thus, important in its structural development and alignment. Whether the head is to the right or to the left of the knees, where the arms are in relationship to the spine—these factors establish the individual pattern of the vertebral column . . . Such primary rotations are augmented and compensated for by intrauterine limitations during late pregnancy."[1] Based on his expertise as a scientist, as well as a bodyworker, Schulz believes that these rotations in the fetus continue in the structure of the adult. However, this has not been scientifically proven.

   The position in utero may also influence the fascia of the lumbar area. According to Schulz, "The knee-up position in the fetus makes an almost direct line of restriction across the pelvis between the

(*continued*)

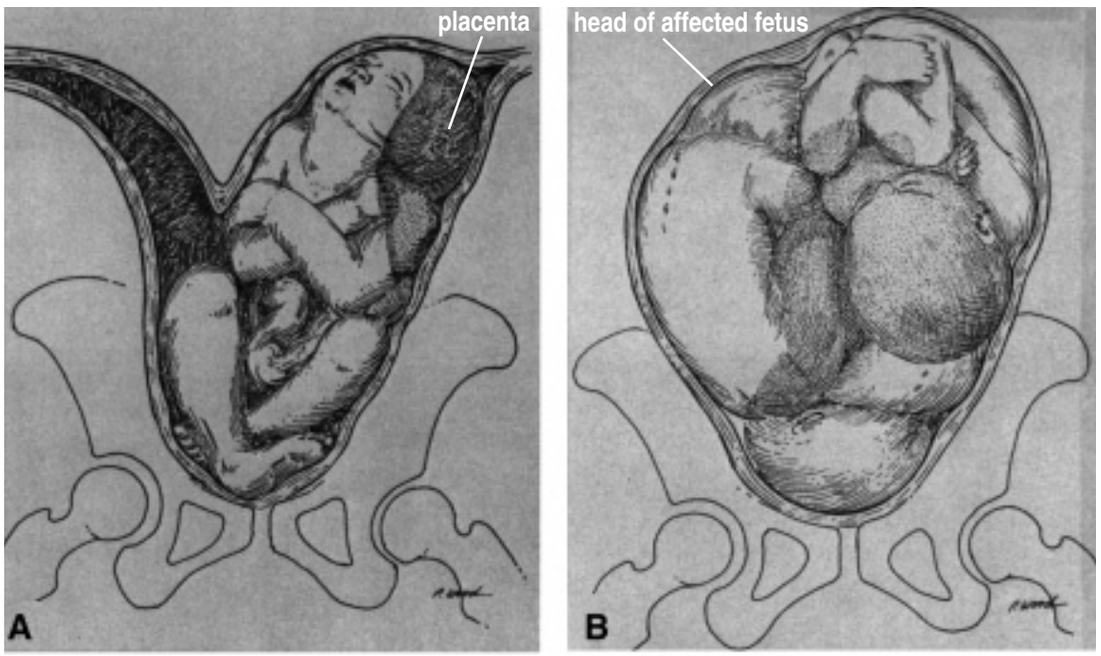

FIGURE 2–5 ■ Uterine malpositioning, leading to premature fusion of the metopic suture, which is between the two halves of the frontal bone at the forehead and normally closes by age 8. In both cases, the sutures closed before birth because the fetal head was positioned so that there was no room for the frontal bones to grow and expand laterally. Both children were born with a triangular configuration of the head, narrow foreheads, ridging where the metopic suture would have been, and close-set, slanting eyes. **A**, The fetal head is tightly impacted together with the placenta in the limited space of the left horn of the mother's uterus. Note the anterior position of the placenta and the constricted position of the fetus' neck. This bicornate (two-horned) uterus is a rare malformation (Drawing based on ultrasound). **B**, The fetal head of the triplet who is head-up is tightly wedged between the hips of the two triplets who are head-down. The mother is a small woman whose uterus is not large enough to accommodate all three triplets without extreme crowding (Drawing based on radiograph). Reprinted with permission from Graham L, et al: Metopic craniostenosis as a consequence of fetal head constraint: Two interesting experiments of nature. *Pediatrics*, 65:1000-1002, 1980.

POINT OF INTEREST BOX 2–2

Early Causes of Myofascial Restriction and Myofascial Trigger Points (Continued)

lower back and the inside of the thigh. This stress line is continuous with the fascial thickening on the small of the back. The combination is a compressed, leaning S-curve between the lower back and the leg. This structure is functional in the womb and as the child crawls. But as the body begins to stand, the shortness is felt as a restriction that inhibits secure upright balance. Gradually, as demand for stable movement increases, this tissue must lengthen or, as is more usual, the growing child finds compensations around the shortness to serve its needs. The lumbar spine may come too far forward or the legs may be pulled up and into the body. There are numerous examples of such restrictions and connections as the child develops in the womb."[1]

2. Myofascial trigger points caused by the fetus's position in utero.

   Long-time myotherapist Bonnie Prudden has found that every newborn has myofascial trigger points, which she believes are largely a result of the effects on the body of the position in utero. She likens this position to "sitting in a chair for 4 straight months with your head tucked between your knees" (Prudden B, personal communication, February 2003).

3. Deformities caused by intrauterine crowding.

   When there is insufficient space for the fetus, a variety of deformities may result, including clubfoot, bowing of the long bones, hip dislocation, and fibrous shortening of the sternocleidomastoid, leading to **torticollis.** An arm that is pressed against the face can prevent the maxilla or mandible from growing normally.[2,3] The legs are usually more tightly constrained than the arms because of their greater size. If the fetus is lying in a transverse or oblique position and there is no room for the fetal head to expand as it grows, some of the sutures may fuse together before birth. In the same way, the crowding of two or more fetuses in the uterus can prevent the head from growing and lead to premature fusing of sutures.[4-6] Crowding can also cause other deformities. For example, the author observed two boys from different sets of twins in infant massage classes. One boy lay under his larger sister in utero; at birth, his second and third cervical vertebrae were fused together and one side of his skull was flattened. The second boy had been side-by-side with his twin sister. A number of ultrasounds in the last months of pregnancy showed that the twins were head down. The boy's head was turned sharply to the left, and he had no room to move his head in any other position. At 3 months, his head was still turned sharply to the left, just as it had been in utero. He never looked even slightly to the right and resisted any attempt to turn his head in that direction. Physical therapist and Feldenkrais instructor Deborah Bowes treated a baby whose mother was a tiny woman from the Philippines and whose father was a tall, Caucasian man. The baby was too large for her mother's uterus and, for some time before birth, her mouth was compressed against the inside of the mother's pubic bone with sufficient force to leave a dent above her upper lip. After birth, the baby refused to open her mouth and had to be fed through a stomach tube (Bowes D, personal communication, September 1992). Deformities may also be caused by a breech position in utero: an infant may be born with muscular torticollis, scoliosis, hip dislocation, clubfoot, and other musculoskeletal defects.[2,7]

4. Effects of birth trauma.

   Birth trauma may cause trigger points on the head as a result of pressure on the head, particularly during a difficult labor and/or forceps or a vacuum delivery (see Birth Trauma, page 100). Once activated, trigger points may be latent or active, but they never disappear. They may remain as a cause of myofascial tightness and pain throughout life. For example, trigger points in the temporalis, occipitalis, and posterior cervicals, all of which may be caused by birth trauma, are known to induce migraines.[8]

   Traction on the head during delivery may cause strain to the suboccipital muscles, leading to torticollis, scoliosis, asymmetrical muscle development, and head tilting. Breech delivery may also cause damage to the upper trunk of the brachial plexus, as the head is tractioned and tilted laterally to deliver the head (see page 101). Fracture of the humerus or clavicle may occur simultaneously.[7] Due to neck stiffness and pain, infants with suboccipital strain may also be unusually restless or unhappy.[9]

5. Infections and injuries.

   Trigger points in small children may be initiated by upper respiratory and other infections.[10] Injuries, such as falls, may also cause soft tissue problems. For example, the author's son jumped out of a child's backpack at age 7 months and severely sprained his wrist. Toddlers are at risk of injury because they are not aware of potential dangers, such as hot objects, dangerous heights, and other hazards. Among children age 3 and younger, 25% have had more than one injury since birth that required medical treatment.[11] Fractures of the phalanges and metacarapals are common in the first 2 years when the children are learning to walk. Fractures of the tibia are common in the toddler years.[12]

(*Continued*)

POINT OF INTEREST BOX 2-2

***Early Causes of Myofascial Restriction and Myofascial Trigger Points* (Continued)**

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grow at different rates, which make some children look or feel awkward or gawky. For example, the hands and feet often grow before the hips and shoulders. Some teenagers may go through a period of tripping over their feet or banging into things. Gradually, however, the growth of different parts of the body stabilizes, teenagers become more accustomed to their new form, and their gawkiness disappears.

The growth of reproductive tissue (testes and ovaries) is minimal during childhood; at puberty, there is a huge growth spurt that continues throughout adolescence. Girls begin to menstruate and must cope with breast development and other changes in body shape; boys begin to experience erections, nocturnal emissions, and cracking voices. These developments can cause them to feel anxious or embarrassed.

- The average 12-year-old weighs 86 pounds and stands 59″ tall.
- The average 14-year-old weighs 108 pounds and stands 63″ tall.
- The average 16-year-old weighs 123 pounds and stands 66″ tall.
- The average 18-year-old weighs 132 pounds and stands 67″ tall.

Motor Development

Strength, coordination, and stamina continue to develop as teenage bones and muscles mature. Many athletic abilities peak at age 17 or 18. As a result of this physical vigor, teenagers often have feelings of strength and confidence that are new to them. Unfortunately, these feelings, combined with high energy levels and feelings of invulnerability, make teenagers especially prone to risk-taking. Sadly, injuries are the leading cause of death in this age group.

Although visual motor skills should also be at their peak, one national health survey of 7,000 American youths, ages 12 to 17, found that 12% had moderate to severe eye muscle imbalance in the lateral plane; 1 of 12 had significant eye abnormalities, with the most prevalent problem being **strabismus**.[17] A period of high stress, caused by such events as a death or divorce in the family, a move to a new home, or a negative learning situation in school may precipitate vision problems.[27]

Cognitive Development

Many mental abilities continue to develop during the years from 12 to 18, so that teenagers are increasingly capable of mature memory and attention. Their abilities grow in abstract thinking and problem-solving, and greater sophistication in reading and writing becomes possible. Teenagers become capable of thinking in hypothetical terms and imagining all the possibilities inherent in a situation; however, they continue to have a feeling of invulnerability—bad things happen to others, not to me—which may cause them to be repeatedly at risk.

Emotional and Social Development

The major challenges of the teenage years are:

- To become independent, with one's own identity and sense of self, while still staying related to others. Searching for their own unique identity is part of normal teenage development but, as they move away from what has been their major source of self-esteem—their parents—teens may feel a sense of emptiness.
- To make sense of relationships and the need to feel a sense of belonging and companionship. A

teenager's happiness and psychological well-being is strongly tied to feeling that he has social support and is being included in peer groups. Teenagers also begin to define themselves as sexual beings and begin to explore romantic love.
- To learn how to make appropriate decisions, through trial and error, input from others, and natural consequences.
- To learn how to assume personal responsibility for their actions.
- To adjust to a rapidly changing body.

These are major developmental tasks for any individual and can cause major stress. Most teenagers weather this process well, but approximately 20% of teenagers suffer deeply and experience extreme inner turmoil.[28] Signs of stress may include depression or behavior problems, such as excessive anger, low self-esteem, rebellion, and breaking rules. Bru et al. found that a high level of life stress was significantly associated with increased teenage misbehavior in school, such as bullying, fighting, and disrupting the classroom.[29] Physical manifestations include headaches, stomachaches, insomnia, and loss of appetite. Wide mood swings and ready expressions of anger, coupled with feelings of inadequacy and difficulty asking for help, make parenting the teenager more challenging than with any other age-group.

Teenagers may test authority as a way to better define themselves. Lack of impulse control is still common, but this tends to diminish as they mature.

POINT OF INTEREST BOX 2–3
Advice on Massage for Children From 1918

Babies do not always like their toes interfered with, but recourse may be had to the oft-told tale of 'How this little pig went to market, and this little pig stayed home.' It is difficult to get a child of one or two years to lie on its face, so the back has to be done in a sitting position; astride on the lap of the mother or nurse and facing her is a good plan. Young children are happier on the mother's or nurse's lap during a séance . . . The ages of the little patients range from a few weeks to 10 or 12 years. Ten minutes at a time is sufficient for quite a baby; with older children 10 minutes to begin with, then 20, then 30. Thirty minutes is the maximum, 5 minutes of which should be given to the spine, which it is always well to add to the local treatment. . . Delicacy of touch, cheerfulness of manner, and unbounded sympathy are essential qualifications in the masseuse who undertakes the treatment of the little ones.

—Margaret Palmer (from Lessons on Massage, *which was published in its fifth edition in 1918. Palmer used Swedish massage to treat children with polio, cerebral palsy, spinal curvature, chorea, rickets, clubfoot, and other orthopedic problems.)*[30]

ADAPTING MASSAGE THERAPY TO CHILDREN OF DIFFERENT AGES

WORKING WITH PRESCHOOLERS

Preschoolers present a real challenge for the hands-on therapist. Because of their stage of intellectual development, it is not always possible to elicit their cooperation with rational explanations of the importance of massage. You will need to use extra patience, playfulness, and understanding to coax them to be still for any time. Any coercion or restraint will not only violate their boundaries, it will prejudice them against you. An example of the worst-case scenario is a preschooler who, accompanied by his mother, visited a well-known Rolfer and ended up crouched under a tabletop, screaming loudly. The Rolfer later admitted that he had no experience with children and, consequently, no idea how to prepare the child for bodywork. The classic advice of Margaret Palmer[30] (see Point of Interest Box 2–3) is still appropriate when working with preschoolers today.

Dr. T. Berry Brazelton[31] tells of receiving a phone call from the mother of 4-year-old Laura, who had a severe stomachache. Laura had experienced several severe stomachaches in the last few months, which were cared for by following the advice he gave over the telephone. With this particular stomachache, however, Dr. Brazelton felt he needed to examine Laura personally or she would need to be seen in the hospital emergency department.

"I felt her belly in order to find out where her pain was located. Laura looked at me knowingly as I attempted to distract her from the pain in her belly. On my examining table, she seemed very worried about herself. She whimpered so convincingly that I felt an urgency to help her. Her mother stood watching us, with anxiety in her face. 'She certainly can't be faking. She'd never leave her own birthday party to get you to examine her. She's been looking forward to her birthday for weeks! And she never got to blow out her candles or eat her cake!' At this reminder, Laura's groaning increased in intensity. Even as I came near her, she began to wince and guarded her abdomen. So worried was she, that the muscle wall of her abdomen was too tense for me to palpate it successfully. I could not tell whether it was from pain.

I lifted Laura onto her mother's lap, holding her teddy bear. I told her I wanted to feel his belly too. I asked her to

flex her legs up on her abdomen. I put my hand firmly on her belly, but without pressure. Meanwhile, I assured her that I wasn't going to hurt her and that I would see that her bellyache got 'fixed.' She looked at me with anxiety about what I might find. When I listened with my stethoscope, I was reassured. There were bowel sounds all through her abdomen. The gurgles and growls that are a normal accompaniment to bowel activity become decreased or absent in an inflamed or obstructed area. When there is an acute appendix cooking, the bowel sounds will be absent in that area.

I asked her to hold her beloved teddy bear so I could see where his pain was. She assured me he had no stomachache. As she held him, I pressed on his sawdust-filled belly and he let out a squeak. We both laughed, and I pressed him in another spot. No squeak! We both laughed harder. Meanwhile, with the other hand, I had been kneading her belly. As she watched me play with her teddy, couched in the safety of her mother's arms, she had relaxed. As she became distracted, I was able to palpate her abdomen, to reassure myself and her concerned mother that she was all right."[31]

Dr. Brazelton used four principles that are essential when working with preschoolers:

1. Reassurance. Laura was told she was not going to be hurt and that her stomachache would be "fixed." She was able to sit on her mother's lap, a place of great safety.
2. Distraction. Dr. Brazelton was able to distract Laura from his examination of her stomach by playing with her teddy bear. Other ways to distract a child are singing, telling stories, and using toys or other interesting objects to hold the child's attention (see Figure 2–6).
3. Warmth and playfulness. Preschoolers naturally appreciate an adult who is willing to joke and be silly with them. They are reassured and often charmed by an adult who is able to "think like a kid." For example, during the ball rolling portion of massage (Chapter 3), you might be giving a massage and playing a game at the same time, by using a ball that squeaks or has a bell inside it or by using the ball to play a variation of "the eensie-weensie spider."

FIGURE 2–6 ■ Toys and other interesting objects can help the therapist win the cooperation of a reluctant child.

4. Sensitivity to the child's feelings. Notice that Dr. Brazelton made no attempt to restrain Laura when she was examined; instead, he found a way to examine her that she could accept without resistance.

Some additional guidelines to make massage therapy more effective with preschoolers include the following:

- Ask parents to bring their children when they are rested. Morning is probably the best time of day. Many children are still taking naps at this age, so be sure to ask parents when the child would normally take a nap.
- Preschoolers will need more familiarity with you and your environment than an adult. Ordinarily, most preschoolers won't be comfortable arriving at a completely unfamiliar place (your office) and having a stranger massage them. Unless you go to their house or they are unusually comfortable with massage and strangers, you may want to have them visit your office for a few minutes before they come in as a patient. Even if they simply come in for 5 minutes, look around, and play briefly, the experience will increase their comfort level immensely; they will not be going to a "strange" place when they return. An ideal situation would be to have them drop in with their mother or father, play with a toy that interests them, and have a snack or pat a live animal, such as a friendly kitten or a nonaggressive dog. (Ask about allergies to cats and dogs before exposing a child to animals.)
- The massage environment should have toys or other objects that are of interest to children, and it should be safe to explore. A variety of massage tools, such as rollers, interesting shaped objects, and tools with different textures, will keep the child interested in what you are doing. Hairbrushes—both soft, baby brushes and the somewhat stiffer adult brushes—are excellent for skin stimulation. All items should be washable and should be washed after each patient.
- A favorite music tape may be brought from home to make children more comfortable. If they have a special comfort object, such as a stuffed animal or blanket, ask the parents to bring it along.
- Modesty is not usually an issue to preschool children; however, you should always ask if undressing is permissible and ask the child's parent to remove the child's clothing. Small-sized drapes may be used, but it is often difficult to keep a drape on wiggly children.
- Because children this age cannot verbalize their feelings as well as older children, you may need to be even more sensitive to nonverbal cues of resistance or pain, including flinching, holding the breath, grimacing, or tensing other parts of the body. If children seem nervous about a stranger touching or examining them, have the parent do as much of the first massage as possible. Begin by teaching the parent some simple massage strokes, avoiding strokes that are painful.
- With rare exceptions, preschool children will not lie still for as long as adults. They have shorter attention spans, and their small bodies do not require as much massage. To encourage them to lay still, take a playful approach as you do the massage; try singing, for example, or playing games or giving them a variety of toys or massage tools to entertain them. Parents are often helpful at knowing what toys their child especially likes or how to keep them amused. Massage therapist and speech/language pathologist Peggy Jones Farlow combines face massage with a game her grandmother played with her as a child. She begins with strokes that go from the child's forehead down to his chin and back up to his forehead several times while saying to the child, "If I lived up here (palms on forehead) and you lived down here (stroke to child's chin), would you come up to see me?" (stroke upward again to child's forehead). I'd come all the way to see you! But first I would go over the mountains (thumbs over eyebrows). I'll slide down this hill (thumbs across the bridge of the nose to the cheeks). Roll down this little hill and up this one (finger rolls downward on upper lip and thumb rolls upward on bottom lip). I'll walk all around the lake (fingertip taps around lips). We can go fishing in the lake (hands make fish-mouth by pulling cheeks together)!" She finishes off the face massage with an ear-rub. "Our ears are used for listening. Sh-sh-sh! Listen. What can you hear?"[32]
- It may not be possible to do specific massage in a small area; children may become bored and suddenly flip over during a massage stroke, so that an effleurage of the back may suddenly become an effleurage of the stomach! To complete a particular number of strokes on a particular area, massage the child for a few minutes, then massage his mother or father for a few minutes, and then massage the child again. Massage therapist Margaret Palmer recommended 10 minutes of massage initially, gradually working up to 30 minutes.[30] The author has found this to be an appropriate guideline for most preschoolers. A full-body Swedish massage for a child may require about 30 minutes, compared with about 60 minutes for a teenager or adult. Extra patience is required for the preschooler. The author did a home visit for a family with a disabled 2-year-old girl

and her three brothers. Because she was only able to be still for 10 minutes, we alternated 10-minute massages: first she was massaged , then one of her brothers was massaged, then she was massaged again, then her mother was massaged and, finally, the little girl received a third 10-minute session.

- Explain what you are doing. Use simple language that children can understand, but do not talk down to them. Studies have shown that children actually have little cognitive knowledge of the body and how it functions until about age 9.[33] Even if children do not fully understand what you are saying, your attempt to communicate shows respect.
- Be sure that any potentially hazardous items, such as Hydrocollator tanks or paraffin baths, are well out of reach. There should be no sharp or breakable objects in the therapy room.
- After receiving a few sessions and becoming familiar with the situation, most preschoolers will be comfortable and happy when they come for their massage session. Make the end of the session more fun for them by giving them a small item, such as stickers, a packet of brightly colored adhesive bandages, bubble wands, or a miniature stuffed animal. Do not give them candy.

WORKING WITH SCHOOL-AGE CHILDREN

Working with school-age children is somewhat different than working with preschoolers; they have a longer attention span and often do not need coaxing to lay still. They are better able to talk about their feelings and can identify areas that are sore or uncomfortable. By this age, children may have more need for massage to help resolve musculoskeletal issues because they are likely to have had more injuries than younger children. Modesty may be more of an issue than for preschoolers.

Guidelines for working with school-age children:

- School-age children are now on a school schedule; the most likely time for their treatments will be after school. After a full day of school and then traveling to your office, however, some children will be overloaded with stimuli. In that case, it will be better for them to arrive a few minutes before their session to allow them to have a few minutes to themselves. This may be accomplished by letting them play quietly in your waiting room with a book or a toy. Or, they may choose to do this in the massage room while the parent receives a short massage.
- Children of this age are more likely than preschoolers to feel comfortable with someone they have never met before; however, it is still ideal for the child and parent to briefly visit the therapist's office before their first appointment. This is especially important if the child is at all apprehensive.
- Toys are not needed to occupy a school-age child as much as a younger child, but objects that are new and interesting, which the child may handle without fear of breaking, will make your office more appealing. The author has a collection of real animal skulls that children may handle; a variety of massage tools; and a collection of balls of different sizes, colors, and textures, including some that make noise.
- It is important to respect a child's modesty. If the child is more comfortable remaining clothed, shorts or bathing suits are good options.
- School-age children often enjoy talking to their therapist, and you may find yourself engaged in interesting conversations. Ask children about family pets, family members, friends, favorite activities, school, what they want to be when they grow up, and other details about their lives. Children have much to offer in their outlook and enthusiasm for the world, and it is great fun to interact with them in this way.
- Children of this age are often intellectually able to understand the benefits of massage, if it is explained to them. They are also old enough to learn relaxation skills.
- Ask the child often about what is the right pressure and type of touch; not only does this make the child more comfortable, it helps him or her have a feeling of control.
- A treatment session may be 30 minutes or more, depending upon the child's attention span and age.
- Joint hypermobility has significantly decreased since the child was a preschooler, but you should exercise caution and not overstretch the school-age child.
- Although their muscle tissue is denser than that of preschoolers, school-age children do not need as much pressure as does an adult.

WORKING WITH TEENAGERS

Although teenagers are more physically and emotionally mature than school-age children, their concerns around their changing body image and sexuality can lead to uncertainty about being touched by a stranger in a personal way. As children grow older, they receive progressively less touch from parents and relatives and, by adolescence, they are receiving

CASE STUDY 2–1

Background

Eleven-year-old Mary has a history of an inherited, nonprogressive muscle disorder (muscular atonia). Similar to muscular dystrophy, this inherited condition causes muscle weakness; however, it is not progressive. Mary's left hip was prone to dislocation from birth. She was in a **spica cast** as an infant and had a femoral **osteotomy** at age 6 to reposition the head of her left femur deeper in the socket. At age 11, she began having problems with left hip pain; a fall appeared to increase her pain and, since that time, Mary had been unable to completely extend her left hip. She could not bear weight on her left foot; when she did, the pain was an "eight" on a scale of one to ten. She was recently seen by an orthopedic surgeon; unaware of just how sensitive her hip was, his examination to determine range of motion was excruciatingly painful. Mary, therefore, tensed her entire leg, and the physician was unable to elicit a full range of motion. Under general anesthesia, when she was not guarding the area, the physician found that her hip did indeed have full range of motion.

Mary had other musculoskeletal problems associated with atonia. Her legs were different lengths as a result of the osteotomy that had never corrected, with secondary scoliosis. She also developed lordosis as a result of compensating for weak pelvic musculature whenever she tried to stand. Although she had no palpable pain around the left femoral head or around the hip socket, she had palpable pain along her hip flexor tendons; specifically, the sartorius and rectus femoris. Her range of motion was: passive flexion of the left hip to about 90 degrees; hip extension was -45 degrees. Mary was referred for massage therapy by her physical therapist to increase her left hip range of motion, stretch a possible hip contracture, and relax the hip joint muscles to decrease pain.

Her mother accompanied Mary for her first visit and all subsequent visits. She entered in a wheeled walker with a seat. She and her mother gave her history. Mary reported pain located in her left groin, near the pelvic insertions of the left adductor muscles. Due to the extreme pain she experienced in the left hip during orthopedic assessments, she was wary of having a stranger manipulate her hip and the surrounding soft tissue.

Treatment

Upon palpation, the therapist found that Mary's left hip adductor tendons were tense and hypersensitive at their medial attachments on the pubic bone, as were her left sartorius and rectus femoris tendons, just distal to the anterior superior iliac spine. Muscle tone was greater on her noninvolved leg, which she used as a supporting leg when she was not in the wheeled walker. The scoliosis and lordosis were noted as well. Her initial massage treatment consisted of superficial effleurage and petrissage to her legs, hip joints, iliopsoas muscles, and entire back.

The therapist told Mary that she would reduce the pressure at any time Mary felt it was too much, and that Mary should tell the therapist whenever she experienced pain.

No range of motion was attempted during her first visit because of the extreme pain Mary experienced during her orthopedic examination. Her mother was taught how to do superficial effleurage strokes, which she performed at the same time that the therapist was massaging Mary. Mary's mother would do superficial effleurage on one leg, perhaps, as the therapist was doing deeper massage on the other leg. Mary experienced a positive feeling of relaxation after her first session and only mild soreness in the left inner thigh and hip area. Mary had been receiving physical therapy on a regular basis from a female therapist and, because only her mother and a female massage therapist were present during her massage sessions, disrobing was not an issue. Mary was draped for her sessions, with only the treated area exposed.

During the next five sessions, Mary was given a contrast treatment (alternating heat and ice) to the left upper thigh and hip before massage to both relax the muscles of the thigh and hip joint area and to somewhat numb them. In addition, the treatment engaged her interest because it was novel. Her mother assisted in the ice massage portion of the contrast treatment, with considerable joking about the coldness of the ice. Paraffin dips were also used twice on her feet, partly for their therapeutic effect and partly to engage her interest.

After the first two sessions, passive range-of-motion exercises to both hips were added to her treatment. After five sessions, deeper effleurage and petrissage and myofascial release were added to her treatment, always at a depth that Mary could comfortably tolerate. Treatment concentrated on her legs, hip joints, iliopsoas, abdomen, and entire back. Mary was occasionally positioned so that the left hip could be moved in novel ways, stretching tissue that was not being stretched through normal activities such as walking. For example, a small footstool, covered with padding and a sheet, was placed on the massage table, and Mary was positioned across the stool. This position was similar to being on all fours. Her mother supported Mary in this position as she performed active range of motion of her left

(*Continued*)

CASE STUDY 2–1

(Continued)

hip joint. She received massage of the hip, especially around the hip joint, while her leg was in both internal and external rotation.

After a few sessions, it became obvious to the therapist that Mary's mother was under a continuous high level of stress. She had another child with the same condition and was deeply concerned about her daughter. She often arrived exhausted after a long workday, followed by an hour's drive to the therapist's office. Thereafter, a few minutes were used to give the mother a short massage of the back or neck and shoulders. This massage was done at the beginning of the session and was deeply appreciated by Mary's mother. Mary happily spent that time looking at books or other objects in the therapy room, talking with the therapist and her mother, and playing with a kitten. Then Mary was helped onto the treatment table, and her mother was encouraged to put up her feet and relax while Mary received her massage.

Response

A reduction in the tension of Mary's adductor and hip flexor muscles was observed after two massage sessions; she experienced only slight soreness for a few days postmassage in the area of her left hip. After five treatments, her physical therapist stated that Mary's range of motion in the left hip had increased by about 30%, and Mary stated that, not only was her pain reduced by about one-third, she could move her left leg more easily and the leg felt "looser." Mary was seen weekly for 10 treatments, then every other week as a maintenance program. Although she had a number of problems that massage therapy was unable to address, such as the scoliosis caused by her leg length discrepancy, her massage treatment not only relieved her pain and increased her range of motion, but taught Mary that she had a right to speak up and tell her doctors and therapists when she was experiencing pain. Her mother learned how to apply simple hydrotherapy and Swedish massage techniques that could be used at home. Mary had also added another caring adult, the therapist, to her support system.

Discussion Questions

1. How was Mary's musculoskeletal system injured or affected by the atonia in her left hip area?
2. What symptoms did Mary have as a result of the atonia in her left hip area?
3. What therapeutic modalities were used, including massage therapy?
4. What personal issues did the therapist need to be sensitive to in addition to the musculoskeletal issues that Mary was being treated for?

only a small portion of the touch they received as younger children. (Some touch-starved teens may even become sexually active, when all they really wish for is to be touched or held, rather than to have sex.[34]) For this reason, receiving the amount of touch involved in a massage may be a challenge for them to adjust to. Teenager concern about modesty may be greater than for younger children. Contrary to the understanding of many adults, adolescence can be a very stressful stage of life. Because they are growing and developing at such a rapid rate, teenagers may feel uncomfortable inhabiting their rapidly changing and often unfamiliar bodies. Massage can be an effective tool to help them cope with stress, to become more comfortable in their changing bodies, and to learn to care for their bodies in a healthy way. In addition, teenagers have much to offer the therapist—a unique and fresh slant on life, idealism, and tremendous energy.

Guidelines for working with teenagers include the following:

- Increase the teenager's comfort with the idea of a massage by letting them first watch a session with a parent or friend or by first meeting you and seeing your office. This will not be necessary for all teenagers, but is helpful for those who are tentative. Another option is to first offer the teenager a shorter session in a "safe" body area, such as a massage of the head, neck, and shoulders or the feet and lower legs.
- After taking a medical history, explain to the teen and parent what you plan to do and what you consider appropriate therapy, and ask if all their concerns have been addressed. If the teenager does not want the parent present after the medical history, the parent should remain in the waiting room for the duration of the session. After the first session, it is the prerogative of the family to decide if a parent needs to be there.
- A therapy session may be the same as for an adult; 60 minutes is not too long.
- Holding the teenager's attention to complete

their therapy is not the concern it was with younger children. Offer careful explanations of what you are doing and be available to talk about the stresses in the teenager's life; this is more likely to be brought up in later sessions as the teenager develops trust in you.

- Teenagers may feel uncomfortable with a massage therapist of the opposite sex. When the first contact is made with a parent of a teenager, ask if the teen would prefer a male or a female therapist, and refer to another therapist if appropriate.
- Because concerns about modesty may be greater than with younger children, a special effort should be made to address them. Many teenage clients prefer to remain clothed, especially for the first few massages. Techniques that may be done without disrobing include Swedish massage of the hands, feet, and head; foot reflexology; techniques using rocking, pressure points, compression, or range of motion; and energetic techniques.
- Some teens may be reassured if you are more clinical at first and give a medical explanation of what you are doing. For example, you could use a model of a human skeleton to explain why you are massaging a particular area.
- Stress the relaxation aspect of the massage, and teach a simple relaxation sequence (see Chapter 3). One tremendous postinjury benefit of massage for teens is the opportunity to release tension and guarding caused by pain and discomfort. The author worked with a 14-year-old girl who had dislocated her kneecap doing a kick in karate class. Not only was this injury excruciatingly painful, it also required surgery for knee joint damage. After preparing her knee with an alternating heat-and-ice treatment, effleurage and petrissage strokes were performed around the joint. She was told that the massage would not hurt. She and the author discussed the effect of holding chronic tension in the knee, and she was taught how to visualize healing inside the knee to release tension. The girl was given oil to gently massage into her knee twice a day, partly to stimulate the circulation and partly to help release tension and help her knee feel more like a normal part of her body. This type of treatment can help teach teens to prevent long-term soft-tissue problems by teaching them to recognize and release guarding and tension.
- Painful deep work is not advised unless there is a valid and important reason, which is agreed on by the therapist, teen, and parent. Teens need to know that they do not have to tolerate pain and that they have the right to speak up and tell you how they feel. Tell them that it is fine if they experience a little pain, if they feel that the technique is helping to "work out" tension; however, if the pain causes them to tense other areas of the body (such as gritting their teeth or grimacing), the therapy is not helping them relax.
- Use caution when speaking to a teenager about his or her body. Concern with physical appearance is natural for teens, and tactless or cruel remarks can wound deeply. If, for example, a teenage boy says something derogatory about his "scrawny" appearance, rather than commenting on his external appearance, be supportive of his health and well-being. You might tell him that his internal feelings of comfort and relaxation matter as much as his external appearance and, that after he leaves high school, there will probably be less social pressure about appearance. At the same time, it is a good idea to be positive about the teenager's physical body. Most of them are in glowing health, and it is always possible to find something both honest and positive to say, if only about skin color or texture, muscle tone, or body function. For example, you might comment on the fact that their immune systems are working well or that they are obviously strong and vigorous. Massage therapist Jane Megard teaches teens that those areas of the body that they are not pleased with may hold more tension. She teaches teens to relax those areas, and talks to them about how to love and nurture them.[35]
- Teens who are interested in sports, especially competitive sports, are motivated to heal their injuries and improve their athletic performance and are often excellent candidates for massage.

PREPARING TO WORK WITH CHILDREN

In the previous parts of this chapter, you gained an understanding of the unique stages of pediatric growth and development and how massage therapy can be adapted to each stage. We now turn to specific ways to prepare for giving massages to children. The final section of this chapter covers four topics:

- Establishing ground rules with the parent and child
- Boundary issues
- Taking a confidential pediatric medical history
- What you will need to set up a good massage environment for a child, including necessary supplies

ESTABLISH A SAFE ENVIRONMENT WITH CLEAR GROUND RULES

Many of the principles and ideas in this section are drawn from the experience of Denise Borrelli, PhD

(Borrelli D, Boston, MA, personal communication, February 2003), long-time massage therapist and psychotherapist.

Begin your first meeting with the parent and child by reviewing the parent handout (see Box 2-2). This will help answer any questions and prevent future misunderstandings. For clarity, these issues are expanded here:

1. Age of consent. Patients are not legally considered adults until age 18, unless they have been legally emancipated.
2. Confidentiality is the basis of trust between you and your clients, no matter at what age. However, if a child should divulge any activity that was putting him at risk, from physical danger to drug abuse, it is your responsibility to ensure his safety by informing his parents. If a child has been abused, the same is true. In the extremely unlikely case of a child revealing parental abuse to you, it is your legal responsibility to notify the child authorities or the child's doctor.
3. Preventing the child from experiencing unwanted touch is essential to a healthy therapeutic relationship. To avoid any confusion about those areas where the child does not want to be touched, after the medical history is complete, tell parents where you will be touching the child and what areas are off-limits.
4. You may refuse to treat a child if there are medical contraindications to massage or if you feel you cannot establish a good relationship with the family. Be prepared to refer the child to another massage therapist.
5. Children may or may not want their parent in the treatment room or on the premises when they are being treated. Until at least age 10, a parent should be on the premises. However, many teenagers would be insulted by the idea that they need an adult nearby! After age 10, you, the parent, and the child should make this decision together.

BOX 2–2

INFORMATION FOR PARENTS

1. Because your child is younger than 18, you must give your consent for treatment. The only exception is if your child is an emancipated minor.
2. Everything that you and your child tell me is strictly confidential. There are only two possible exceptions to this rule:
   - If your child should tell me something in confidence that I feel is an indication that she is putting herself at physical or emotional risk, I would ask the child to tell you that confidence in front of me; failing that, I would tell you myself.
   - If I need to speak with your child's doctor about medical issues of concern. When you give permission for your child to receive massage therapy, you are also giving me permission to speak with your child's doctor.
3. For their protection, children should already know that no one should touch them in any area that would normally be covered by a bathing suit, with the possible exception of health care providers, and then only with parental permission. After doing your child's medical history, we can discuss where massage strokes are appropriate. Should there be a need to do massage any place that is normally covered by a bathing suit, I will tell you and we can decide together with your child if that is acceptable. To respect your child's modesty, all parts of the body that are not being massaged will be draped with a sheet or towel at all times. (Drapes may not always stay on a wiggly, small child.)
4. As a health care professional, I reserve the right to refuse to treat your child if I feel there are medical contraindications or other problems that rule out my type of therapy. I will be happy to refer you to another therapist or appropriate health care professional, should that be the case.
5. Parents should remain in the treatment room with their child during the taking of the medical history and remain on the premises if the child is younger than age 10. Between the ages of 10 and 18, the parent's presence is optional. If parent, child, and therapist are all comfortable, the parent may leave the premises.

Setting Appropriate Boundaries With Children

When giving massages to children, it is important to realize that the power imbalance between an adult and a child is even greater than the normal power imbalance in a therapeutic relationship between two adults. Professional helping relationships often develop an element of transference, in which the parent-child relationship is unconsciously reestablished. According to physician Eric Cassell, "Tenderness is associated with our parents, and we transfer our permissiveness in this regard to parent surrogates." Healers become parent figures, and we transfer to them many aspects of the parental role, as well as "the right to lay hands on us, to be tender to us, and to pass through our territorial defenses."[36] Such transference often makes it difficult for adult clients to tell their therapist something they think the therapist may not want to hear, such as "Ouch, I really don't like what you're doing" or "Actually, I hate having my feet touched." When an adult is massaging a child, transference may be even greater, and it may be even more difficult for the child to indicate discomfort or unhappiness. Also, because children are taught to respect adults as authority figures, they may be afraid to speak up when they don't like what the therapist is doing. For this reason, it is vital for the well-being of the child that the parent and therapist respect the

child's boundaries and provide an environment where she can safely state her feelings. Part of the value of the massage experience for children lies in teaching them how to interact in a healthy way in a situation where it is possible to have their boundaries invaded. To create a safe, protective environment for both therapist and child, in which there is no danger of the child's boundaries being violated, it is vital for the therapist to be clear about what is appropriate.

If a parent insists that a child receive massage, you may be caught in the middle. Gently, but firmly, let the family know that, if necessary, you will wait to do massage until the parent and child are in agreement. You should never be put in the position of massaging a child against his or her will.

Having the parent present, for at least the first session, helps children feel protected when they are unsure of what to expect from the experience. Basic guidelines for giving children a massage in a way that respects their personal boundaries include the following:

- Explain what you are going to do and why; giving the parent a massage in front of the child is an excellent way to prepare the child for what is going to take place.
- Limit your touch to what has been contracted for by the parent; for example, do not change the diapers of a small child. During the medical history, ask if there is any body area that should be avoided. For their protection, most children should already know that no one should touch them in any area that would normally be covered by a bathing suit, with the possible exception of health care providers, and then only with parental permission.
- It is important to ask verbal or nonverbal permission of the child before touching and whenever resistance is encountered during a massage. Recognize that it may be difficult for the child to say no; ask the parent for feedback occasionally as well.
- Obtain the consent of the child before massaging a new area of the body. For example, ask, "Is it okay if I massage you here?"
- Drape the child carefully, uncovering only the area that is to be massaged, although with wiggly, small children this may not always be possible. Respect the child's modesty and remain alert for nonverbal signs of discomfort when an area is undraped. Ask the child's permission before undraping any area.

Examples of boundary violations with children include the following:

- A young boy is rolling around on the treatment table, and the therapist, who is trying to give him a massage of the back, finds that the child has suddenly rolled onto his back and does not want to turn back over. The therapist insists that the parent turn the child over and hold him still until the back massage strokes are completed. This is a boundary violation. A more positive way to deal with this situation would be to suggest that the parent read to the child and put the book on the table with the pages facing up. If the child wanted to look at the book, he would have to return to a prone position, and the therapist could complete the back massage while the parent kept the child happily distracted. Another positive response would be to massage the child's face or chest until he flipped over again. Alternatively, the parent could offer the child some type of incentive for lying on his belly for 5 more minutes until the therapist completes the massage. Notice that with these better responses, the child has been coaxed, not coerced, and his boundaries have not been violated.
- A 10-year-old boy with cerebral palsy is still in diapers. Before he receives his massage, his father decides that the child should have his diaper changed. He changes the boy's diaper in the therapist's office while chatting with the therapist. The therapist has committed a boundary violation because, although the boy may not realize it, his privacy has been violated. It would clearly be inappropriate for a 10-year-old boy without special needs to have his genitals exposed and this boy should be no different. The therapist should have left the room and allowed the boy to be changed in privacy.

Now for some examples of a successful way to massage a resistant child and not violate his boundaries; one, a short anecdote and, the other, a full case history, which can be found on page 52 (Case Study 2–2).

The author once worked with a 13-year-old boy with severe abdominal pain that had been diagnosed as a stress reaction by his physician (recently, a close family member had died and the boy's parents had divorced). His mother had made his appointment, and he was clearly uncomfortable with the entire idea. He even brought a buddy along for emotional support. He lay down on the massage table fully clothed and was willing to pull up his shirt to expose his abdomen, but no more. He received abdominal massage for 45 minutes, with his mother, his friend, and his little sister present. At the end of the session, he was pleased with how much better his abdomen felt, thanked the author profusely, and left in a positive frame of mind. To insist that his family members and friend wait outside or that he disrobe would have violated his personal boundaries; instead, be-

cause his privacy and feelings were respected, his experience was a positive one.

Setting Appropriate Boundaries With Parents

Clear boundaries protect children, parents, and therapists, and will help make the massage experience safe and comfortable. The following guidelines will help you establish and respect personal boundaries:

- Be sure you understand what boundaries the parent feels are appropriate. For example, the author has encountered parents in infant massage classes who felt strongly about not taking off the child's diapers, although the infant massage protocol calls for the diapers to be off. In one class, the mother of an infant flatly refused to remove any of the child's clothes. The therapist can ask about these feelings during the medical history. A tactful way to do this would be to ask the parent what rules the family has about what parts of the body should be covered and what parts of the body need not be covered.
- Remember that you are not a parenting specialist; therefore, giving advice or making value judgments about parenting is not appropriate, even if the parent requests it.
- Refrain from making value judgments about the child's body or personality.

The following are examples of boundary violations with parents:

- A mother of a 4-year-old girl with chronic stomach pain has brought her for a massage. At the conclusion of the massage, she asks the therapist if the child's pain is from emotional stress. The therapist confirms this and gives the mother advice on the family situation that is causing the stress. This is a boundary violation. The therapist should have referred the mother to the child's pediatrician to rule out any organic illness or should have recommended counseling. This does not mean massage is contraindicated; on the contrary, it may be appropriate for relieving the child's pain and releasing emotional stress and tension in the abdominal area. However, the massage therapist does not have the training or the legal authority to diagnose the causes of chronic abdominal pain.
- An anorexic mother brings her young daughter to a massage therapist because she feels that her own anorexia is related to the lack of touch she experienced as a child. She hopes for a better touch experience for her child. The therapist shows her how to massage the child and asks how the mother's anorexia developed and what her childhood was like. Some of her questions are very personal. This is a boundary violation because the mother was not coming to the therapist for counseling.

TAKING A CONFIDENTIAL PEDIATRIC MEDICAL HISTORY

The client medical history should be filled out by the parents of children younger than age 4; by the parents of children ages 4 to 10, with the help of the children; and by children ages 10 to 18. Inform older children that all information is confidential. Listen carefully to the parents, as well as to their children, and, no matter what their concerns, support them as the expert when it comes to their own child. Credit them with having brought the child to you for massage therapy because of their concern for their child's well-being.

The history-taking process gives the child a chance to observe you from a distance and become more comfortable with you before any hands-on contact. A preschooler will probably be most comfortable on the parent's lap. An older child may be seated comfortably across from you and near the parent. Approach the child from the same height, not from above. For example, if the child is sitting on a chair, kneel on the floor so you are at about the same eye level.

Address as many questions to the child as you can and remember to ask about any concerns or thoughts he might have. However, recognize that children often have difficulty localizing and communicating symptoms. In one study, 25% of children between ages 9 and 16 were not able to provide even one characteristic of their headache, such as whether it was severe, mild, pounding, squeezing, sharp, dull, or throbbing.[37] Therefore, the parent will often need to supply more information, particularly with smaller children. Because children are not skilled at localizing and communicating symptoms, you need to be even more acutely aware of nonverbal communication. The experience of receiving massage therapy may substantially help these children to identify body feelings. A confidential medical history has been provided in Figure 2–7. Readers may photocopy and use this form in their practice without obtaining further permission.

ESTABLISHING A COMFORTABLE MASSAGE ENVIRONMENT

Small children can become more easily chilled than adults because they have a relatively large surface area for their body weight. The treatment room should be kept at a minimum of 70° F. Have chairs for parents or other family members to use and pillows or child-sized chairs for children to sit on. Remove all items that would be dangerous to a small child, such

CASE STUDY 2–2

Background

Jane is 11 years old. An American family adopted her at age 5 from an orphanage in Poland. She was brought to a class on massage for children with disabilities because her adoptive mother was concerned about her tactile defensiveness and her inability to form emotional attachments. Her mother hoped that massage would help improve Jane's sleep, help Jane accept touch more readily, and help her be more trusting of others.

Jane and her older sister were left in the care of an aunt when Jane was younger than age 2; both were eventually taken to an orphanage. When she was adopted, Jane had to leave her sister behind; however, 1 year later, the same family adopted her sister, and they were reunited. Jane had endured early separation from her family three times—once from her parents, once from her aunt, and once from her sister. She had not been touched much at the orphanage and, when she arrived in the United States, physical examinations and other touch experiences were extremely difficult for her. Jane is tactile-defensive, has attention deficit disorder, and suffers from severe insomnia (it takes her 2 hours to fall asleep each night). She has a reserved, serious air about her.

Treatment

Jane and her mother came into the classroom the first day and observed the class in session, with children of different ages receiving massage, and Jane was adamant that no one would touch her. Students in the class designed a strategy to coax rather than coerce the girl to participate in any way. One student played with Jane for 2 hours the first day, sharing a variety of puzzles and other toys; they ate snacks together, went outside to watch a mother eagle feed her eaglets, and observed the class. Jane's mother was given a seated massage and did not disrobe, although many of the children were undressed and draped for their massages. Some children were receiving hydrotherapy treatments as well. Many children and parents came and went that first day, but Jane continued to be adamant that no one was going to touch her.

Response

The next day, Jane arrived in a good mood and ready to play. Again, no one pressured her to receive massage. She played with various toys, ate snacks, and went for a walk outside, accompanied by the student she had made friends with the day before and another child. After walking outdoors, Jane and the other child realized their feet were dirty. The first child had his feet washed and then massaged. Jane decided she should have her feet washed also. As a student was washing Jane's feet off with a washcloth and a towel, Jane asked if the student might "make her feet shiny" too, and the student applied oil and massaged her feet. And that was how she received her first massage.

In a somewhat modified form, the principles of reassurance, distraction, playfulness, and sensitivity that were used successfully with 4-year-old Laura (see page 43) were also successful with Jane. And far more important than receiving any specific massage technique, Jane's boundaries had been respected and she had asked for touch. From that time on, she could begin to receive the benefits of specific massage strokes.

Discussion Questions

1. Why was the simple act of Jane's being able to receive touch more important than any massage technique?
2. What were the simple but appropriate measures taken to win Jane's cooperation in participating in the class? Can you think of any other methods that could have been tried?
3. What would have been some mistakes in trying to approach Jane?
4. What would be a logical next step for performing massage with Jane?

as hot water tanks or other heat sources, paraffin baths, sharp objects, and breakable objects.

CHILD-FRIENDLY SUPPLIES

- Toys, stuffed animals, and objects that are interesting and safe for the child to handle. A Raggedy Ann doll is useful to show the child how a leg or arm feels when it is loose and floppy. Preschoolers are often greatly comforted by a favorite object, such as a security blanket or familiar toy, and it may be brought along to make the child feel more secure.
- A variety of massage tools and balls. Let children handle the massage tools and show them how they are used. The balls will also be used for massage. The author has a collection of balls that have different sizes and textures; some have bells inside or squeak when they are pressed, and children enjoy these very much.
- Treatment table or floor pad. Children ages 2 to 4 may prefer to sit on a parent's lap, at least initially. Many small children are better massaged on the floor, as they are more likely than older children to roll off of a massage table. For work-

Confidential medical history for use with a pediatric massage therapy client

Name: _____ Telephone: _____

Address: _____ City: _____ State: _____ Zip: _____

Referred by:_____

Date of birth: _____ Grade in school:_____

Are you currently under a doctor's care? _____ Doctor's name:_____

Birth history:

Premature? _____ Problems? _____

Breech position?_____ Caesarean? _____

Please check if you now have, or ever had, problems with the following:

☐ skin disease ☐ joint pain or swelling ☐ other pain

☐ headaches ☐ contagious illness or disease ☐ insomnia

☐ epilepsy or seizures ☐ tension or soreness in a specific area ☐ extra sensitivity to touch or pressure

How is your health in general?

Any chronic health problems?

Any operations in your lifetime?

Injuries:

sprains_____ car accidents _____

broken bones _____ any other major trauma, such as falls or bicycle accidents _____

dislocations _____

concussions or other head injuries _____

Any recent injuries, hospitalizations, or illnesses?

Are you taking any medications?

How much stress have you been under recently?

Where does your body tend to store stress? For example, do you get headaches or stomachaches when you are worried about something?

Is there anything else you would like me to know?

When you receive a massage, you will not be touched in any area that would usually be covered by a bathing suit (shorts for boys, two-piece bathing suits for girls). Is there any other area that you do not want to be touched?

I understand that massage/bodywork is not a substitute for medical examination and treatment. I further understand that massage is for the basic purpose of relaxation, release of muscular tension, and the enhancement of health through increasing circulation and energy flow.

By my signature below, I hereby agree that my child shall receive massage or bodywork from _____, and agree to remain on his/her premises unless that parent, the child, and the therapist are in agreement that the child may remain when the parent leaves.

I hereby give _____ permission to speak with my child's pediatrician if there are any issues of concern.

Signature of Parent or Guardian _____

FIGURE 2–7 ■ Confidential Medical History Form.

ing on the floor, you can use a vinyl or fabric-covered foam pad and cover it with a sheet. These are available in physical therapy catalogs. For older children, use a massage table.

- Have a tape or CD player available. Parents may bring their child's favorite music, which may be played at a low volume during the session.
- Massage lubricants. Use natural oils such as safflower or grape seed oil. Do not use nut-based oils, such as peanut or almond oils. Lotions made from these types of oils are excellent as well. Small children should not be exposed to adult concentrations of essential oils; these should only be used if you have special training on how to use them with children. A small amount of vanilla extract may be added to massage oil for scent; it is not as concentrated as an essential oil. Keep oils and lotions in squeeze bottles because there is a greater likelihood of them being knocked over when working with a small child.
- Linens. It will be helpful to have both adult-sized linens (sheets, blankets, and towels) for teenagers and smaller sheets and blankets for younger children. Use linens, not only for draping, but also for keeping children warm.
- Hydrotherapy supplies. These could include a Thermopore moist heating pad, a hot water bottle, a Hydrocollator steam pack, an ice pack, and small bath towels. If using a Hydrocollator pack, the water tank should be safely out of the way, such as in another room. Use extra caution to ensure that the child is not burned by any heat applications, and inspect the treated area more often than you would with an adult.

The reader has now learned a great deal about the difference between a child's body and an adult's body, and about how children grow and develop physically, emotionally, and cognitively. In addition, the reader has learned how to establish clear boundaries and ground rules to create a safe environment for the child, parent, and therapist and how to take a confidential medical history. Finally, the actual physical items needed to establish an appropriate environment for massaging children have been discussed. In the next chapter, we will turn to the actual techniques of hands-on pediatric massage therapy.

REVIEW QUESTIONS

1. Describe the musculoskeletal differences between a child's and an adult's body. How would you adapt massage strokes to appropriately treat those differences?
2. Compare and contrast the physical and motor development of children during different stages of childhood.
3. Compare and contrast the cognitive development of children during different stages of childhood.
4. Compare and contrast the emotional and social development of children during different stages of childhood.
5. Discuss three different mechanisms by which myofascial restriction and myofascial trigger points may develop in the early years of childhood, and give examples of each.
6. Describe guidelines for winning the trust and cooperation of children during all three stages of childhood.
7. Describe three musculoskeletal differences between children and adults. How would you tailor massage therapy to treat those differences appropriately?
8. Explain the importance of establishing ground rules with the parent and child before treatment. Give three examples of these ground rules from the parent information handout.
9. Describe the process of taking a confidential medical history for a pediatric client.
10. Why is it important to establish and maintain appropriate boundaries with children who are receiving massage and with their parents? Name three ways the therapist can do this.
11. Describe the process of taking a confidential medical history for a child.
12. Describe the ideal massage environment for providing massage therapy to children.
13. Describe the supplies needed for massage with children.

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