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Neuropathy: Diabetic Peripheral Neuropathy and Chemotherapy-Induced Peripheral Neuropathy

Also known as:

DPN, CIPN

Definition: Diabetic peripheral neuropathy—damaged and painful distal sensory and motor nerves secondary to uncontrolled blood glucose.

Definition: Chemotherapy-induced peripheral neuropathy—damaged and painful distal sensory and motor nerves secondary to the administration of a neurotoxic chemotherapeutic agent.

GENERAL INFORMATION

Diabetic Peripheral Neuropathy

- Multifaceted causes under continuing study; strongest evidence pointing to uncontrolled (high) blood glucose, vascular insufficiency, degeneration of nerve fibers secondary to oxidative debt (lack of oxygen)
- Most common complication of diabetes mellitus (DM)
- Classification based on blood glucose levels; degree of sensory, motor, or autonomic nerve involvement
- Onset: mild discomfort, developing insidiously; acute pain occurring after years
- Duration of acute pain about 12 months
- Progression to open wounds, ulcers; amputation common
- Prevalence in people who smoke, drink alcohol heavily, are hypertensive, have uncontrolled DM, or a long history of DM

Chemotherapy-Induced Peripheral Neuropathy

- Causes: administration of neurotoxic (nerve-damaging) chemotherapeutic agents, such as Taxol, Taxotere, Abraxane, Oncovin, Navelbine, Platinol, Paraplatin, and Eloxatin
- Sensory nerves most often affected
- Onset gradual, mildly symptomatic; discomfort increasing with each additional chemotherapy dose; usually moving proximal as pain worsens
- Duration usually several months, peak discomfort at 3–5 months after the final chemotherapy dose
- Most symptoms diminishing within a year; rarely irreversible
- Prevalence in people who drink alcohol heavily, are severely malnourished, and have previously undergone chemotherapy for an earlier cancer

Morbidity and Mortality

Diabetic Peripheral Neuropathy

About 10–20% of newly diagnosed diabetic patients suffer from DPN. Half of all elderly diabetics manifest symptoms, and approximately 30–50% of all diabetic patients with either type 1 or type 2 DM will manifest symptoms of DPN.

The most serious comorbidities include foot ulceration and lower extremity amputation. Although not life threatening, unless uncontrolled infection occurs in an already medically compromised patient, these secondary effects of DPN severely limit the patient's quality of life and are the most common cause of hospitalization in the diabetic population.

Chemotherapy-Induced Peripheral Neuropathy

The most serious concern for medical oncologists treating CIPN patients is that the condition can quickly become "dose-limiting"—that is, the pain or discomfort is so disturbing to the cancer patient that she may choose to discontinue taking the life-saving chemotherapeutic agent. The conundrum is that the discomfort, unto itself, may be minimal; but added to a medical journey already fraught with "too many medications," this side effect may be the "straw that breaks the camel's back," and the patient will refuse chemotherapy. Medical oncologists obviously consider this an understandable but highly unwise decision and therefore take great measures to try to reduce the symptoms of CIPN.

PATHOPHYSIOLOGY

The two main divisions of the nervous system are the central nervous system (CNS; the brain and spinal cord) and the peripheral nervous system (PNS). The PNS has two branches: the somatic nervous system and the autonomic nervous system. The somatic system, which includes the peripheral nerves, is composed of fibers that transmit sensory information *to the CNS* ("this cup is hot," for example) and transmit motor signals *from the brain to the skeletal muscle* (the ability to quickly put the cup down). Compared to other nerves in the body, these fibers are extremely long, traveling from the brain to the periphery of the body—the hands, fingers, feet, and toes.

To function properly, these fragile nerves must regularly receive generous amounts of carefully regulated nutrients and oxygen, and the body's blood glucose level must remain stable. Clinical studies indicate that the efficient functioning of the nerves is also directly related to the level of oxygen they regularly receive. When the blood glucose level spikes or remains high, or when a chemotherapeutic agent severely reduces the ability of peripheral nerves to utilize oxygen, there is a greater risk of DPN and/or CIPN. In addition, fiber length makes the nerves vulnerable to injury from physical trauma anywhere along a nerve's winding path to and from the brain and the distal body regions.

Diagnostic methods for both DPN and CIPN include simple subjective, symptomatic reporting of the location, duration, and intensity of the sensory or motor disturbance; observance of heel-toe gait; and the administration of electrodiagnostic, muscle strength, pinprick, cranial nerve, and nerve conduction tests.

OVERALL SIGNS AND SYMPTOMS

DPN and CIPN share common symptoms.

- Initial, subtle discomfort in a bilateral "stocking-and-glove" distribution of sensory and/or motor nerves
- Progressive sensory symptoms: paresthesias, such as burning, tingling, numbness, and a pins-and-needles sensation
- Motor symptoms: clumsiness, deep muscle aches and pains, spasm, and loss of strength
- Advanced sensory symptoms: allodynia (painful response to a stimulus that would normally not cause pain, such as the weight of bed sheets on the toes)
- CIPN symptoms more persistent and severe in cancer patients who are also diabetic

Massage Therapist Tip

Watching for Signs of Dry Gangrene

While diagnosing dry gangrene (the type of gangrene most often experienced by diabetic patients) is well beyond your scope of practice, you will examine your patient's feet before each protocol and should know the warning signs of this serious condition. On the feet, watch for an *extreme* sensitivity to touch, unusually cold patches of tissue, a small area of dark purple tissue, or, more alarmingly, a tiny spot (sometimes the size of a poppy seed) or larger area of black tissue. Any of these signs indicates possible gangrene, and your patient should see her physician immediately.

Massage Therapist Tip

Recognizing "Off-Label" Medication

Medications are approved by the U.S. Food and Drug Administration (FDA) for a specific use, such as to eliminate a certain bacterium. However, physicians have found other uses, often not related and not intended, for the same drug to treat very different conditions. This practice is called an "off-label" use of the medication. It is common among physicians, is well within standard medical care, and is often supported by multiple clinical studies showing additional uses for already established medications. Examples of off-label medication use are anticonvulsants and antidepressants to reduce paresthesias associated with DPN and CIPN.

Thinking It Through

Although most Thinking It Through sections in this text guide the therapist to reflect on client care questions, this one prompts the therapist to think through the complicated pathophysiology of peripheral neuropathy. This understanding is paramount if the therapist is to properly perform the protocol and positively instruct the patient in the all-important self-care homework assignments. The therapist must understand that peripheral neuropathies, starting as innocuous and mildly uncomfortable

SIGNS AND SYMPTOMS MASSAGE THERAPY CAN ADDRESS

- The poor blood circulation that is considered the primary cause of both DPN and CIPN can be profoundly improved with careful, localized, systematic, and frequent massage therapy techniques.
- The anxiety, insomnia, and fear that result from an initial diagnosis of diabetes or cancer can be decreased with careful, attentive, and soothing massage therapy.

TREATMENT OPTIONS

Multiple clinical studies focusing on the treatment of DPN indicate that the same protocols can serve as a guide for the treatment of CIPN. Early symptoms of DPN are often treated with physical therapy to address muscle weakness, pain, and the loss of balance, mobility, and strength. Transcutaneous electrical nerve stimulation (TENS) units are recommended for pain control. Physical therapists also teach patients vigilant skin care, and they can attend to open wounds, should the condition progress.

An occupational therapist becomes involved if the patient experiences severe loss of function (following an amputation, for instance) and needs instruction in adaptive skills and equipment.

Acupuncture is an effective tool for pain management in both types of neuropathy. Psychological counseling can help with quality-of-life issues.

Preventive methods include rigorous blood glucose regulation following a DM diagnosis. Monitoring the diet, observing good nutrition, and getting regular exercise are also paramount in preventing DPN. Combinations of B vitamins are often prescribed to reduce early-onset diabetic paresthesias.

No preventive measures have yet been identified for CIPN besides the already mentioned ill-advised decision to cease chemotherapy.

Common Medications: Diabetic Peripheral Neuropathy

Often during the course of pain management, topical creams are prescribed, such as capsaicin cream. Disadvantages include initial pain or discomfort upon application and messiness (it sticks to clothes and socks). These irritations, combined with the necessary four-times-per-day application, make patient compliance a challenge.

The following are medications used in the early stages of neuropathy when symptoms are merely perceived as uncomfortable or annoying:

- Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen (Motrin, Advil) and naproxen (Aleve, Anaprox, Naprelan, Naprosyn)

As the neuropathy progresses in severity, simple analgesics are no longer effective. The following off-label medications are then prescribed:

- Tricyclic antidepressants, such as amitriptyline hydrochloride (Apo-Amitriptyline, Endep)
- Selective serotonin reuptake inhibitors (SSRIs), such as paroxetine hydrochloride (Paxil) and sertraline hydrochloride (Zoloft)
- Tricycline antidepressants, such as imipramine hydrochloride (Tofranil)
- Ventricular antiarrhythmics, such as mexiletine hydrochloride (Mexitil)
- Anticonvulsants, such as gabapentin (Neurontin)
- Selective serotonin and norepinephrine reuptake inhibitor (SSNRI) antidepressants, such as duloxetine (Cymbalta)
- Anticonvulsants, such as pregabalin (Lyrica)

Common Medications: Chemotherapy-Induced Peripheral Neuropathy

Because CIPN is considered transient, and because the patient is already receiving so much medical treatment, physicians are generally reluctant to treat it. If the CIPN persists a year or more beyond the regular treatment for cancer, then either Lyrica or Neurontin is usually prescribed.

MASSAGE THERAPIST ASSESSMENT

Assuming the patient has been diagnosed with DPN or CIPN, the oral history taken by the massage therapist will clarify the location and severity of signs and symptoms. The therapist should perform a careful, detailed visual examination of the feet and hands, looking between toes and fingers and inspecting both dorsal and plantar surfaces. Gentle touch should also investigate significant changes in tissue temperature. Pregangrenous tissue can feel alarmingly cold. Gentle pressure is applied to the affected tissue with careful observance of the patient's response. Using the 0–10 pain scale will help the therapist determine the aggressivity with which she can then apply the appropriate protocol.

Charting all observations and responses will prove invaluable as the therapeutic relationship progresses, and in reporting improvement to the patient's physician.

THERAPEUTIC GOALS

It is reasonable to expect that the combination of frequent application of the protocol outlined later in this chapter, combined with daily self-care performed by the patient, can significantly reduce the painful symptoms associated with both DPN and CIPN. Case studies suggest that when the protocol is performed on CIPN patients, symptoms can be reversed, and quality of life enhanced, to the point that medication levels (Lyrica, Neurontin) can be reduced. Case studies involving diabetic patients indicate that pregangrenous tissue can be returned to health, and patients who previously lived with extreme foot pain can experience decreased pain and the full use of pain-free limbs.

MASSAGE SESSION FREQUENCY

- 60-minute sessions once a week for the duration of symptoms, performed by the massage therapist
- 15-minute self-care sessions every day, for each hand and/or foot for the duration of symptoms, performed by the patient
- Infrequent, nondetailed therapy is ineffective

MASSAGE PROTOCOL

This patient comes to you with myriad concerns. Her initial diagnosis of either diabetes or cancer is now complicated by irritating and/or painful neuropathic symptoms. This protocol, however, is aggressive. Although this may seem counterintuitive because the patient already is in a great deal of pain, the protocol starts gently. You must use all of your medical knowledge (be able to explain oxidative debt) and therapeutic massage experience (massage increases circulation), combined with a finely honed diplomacy (explain that you are going to start very, very gently and only progress in work "to her tolerance"), in order for the patient to benefit from this protocol. It often takes several sessions performed with gradual intensity to get the patient to the level that she can experience maximum therapeutic effectiveness.

You must also convince her to perform her homework assignments daily; this is not optional. Cells must be refreshed with richly oxygenated blood frequently, and unless she is willing to visit you every day, she must take on the responsibility of helping to heal herself at home.

Thinking It Through *(cont.)*

conditions, can lead to life-changing amputations (in the case of diabetic patients) and a severe decrease in the patient's quality of life (in both diabetic and cancer patients). This realization will strengthen the therapist's commitment to perform effectively—and potentially reverse or at least reduce symptoms.

All nerves need an abundance of oxygen to function and survive. One of my most impressive memories from massage therapy school was one instructor's insistence that "A nerve in pain is a nerve screaming for oxygen." He then went on to make the point using sciatic pain as a perfect example.

The exact cause of DPN and CIPN remains multifaceted, yet one cause recurs in most of the literature: oxidative debt or oxidative stress, which occurs when tiny, fragile peripheral nerves have inadequate oxygen.

Remembering one of the greatest benefits of mas sage therapy—that *massage increases circulation*—allows the therapist to deduce that (1) if massage therapy increases circulation and (2) if DPN and CIPN are on some level caused by a lack of cellular oxygen (poor circulation), then (3) any techniques that increase circulation to the peripheral nerves should decrease symptoms.

This reasoning enabled me to convince a team of medical oncologists at the Beaumont Hospitals, Rose Cancer Center, in Royal Oak, Michigan, to let me use the protocol found in

Thinking It Through *(cont.)*

this chapter on hundreds of oncology patients. Furthermore, a grant was written to the Department of Defense (for female veteran cancer patients suffering from CIPN), suggesting this protocol with the approval of the physicians.

Massage Therapist Tip

Checking the Bottom of the Feet

Diabetic patients are counseled by their physicians to regularly check their feet for signs of skin breakdown or gangrene. Some obese and/or arthritic patients, however, find a foot examination to be challenging. Here's a simple technique to help. Have the patient buy a relatively large two-sided hand mirror, one side magnifying the image and the other side reflecting a normal image. She places the mirror on the floor in front of a chair or at the side of the bed and sits down. She might want to leave the mirror under the chair or the edge of the bed to avoid having to bend down to pick it up each time. She observes the bottom of both feet, one at a time, by positioning the foot over the mirror as the mirror lies on the floor. Ask her to observe both feet in both sides of the mirror.

The protocol itself is quite simple, but the work is extremely detailed, with you working into every crevice of the foot, toes, hand, and fingers. If the 60-minute session includes two feet, you will spend *30 minutes on each foot*. If the session includes both hands and feet, *you will spend 15 minutes on each hand and then each foot*. It may seem incomprehensible that you can work on a foot for 30 minutes, but you are trying to displace, wash out, and return all venous blood from the depths of this foot or hand and allow the body to replace it with freshly oxygenated arterial blood.

Your goal is to massage "to the bone," which means your massage works through all superficial tissue until it pushes against the underlying bone.

Getting Started

Your patient need only disrobe to the extent that the hands and forearms or feet and calves are exposed. Positioning the patient supine on the massage table allows you the best access to perform your work, but the patient can sit in a comfortable chair; you can sit on a rolling stool and gain access to her hands and/or feet without straining your back. (A massage chair is not an option.)

Since the work into the foot includes detailed massage in between the toes and can last for up to 30 minutes, you may want to wash the patient's feet, or ask her to wash them. You can use a basin and towel (do not use soap because the feet may be sensitive to chemicals), or bring one warm, wet towel and one dry towel to the table and cleanse the feet. If this is not possible, you can wear non-latex gloves during the entire procedure, which is another acceptable and effective method for protecting your hands and performing the work. Few patients can feel the difference between skin-on-skin massage and glove-on-skin massage of the feet and hands.

All massage techniques are performed in the cephalic direction, toward the head. Stroke the patient's feet or hands frequently during this protocol to give her a chance to relax from the fear of being hurt and to assess tissue temperature and response.

HOMEWORK

Daily, detailed self-care is essential in order to improve or reverse the tissue damage caused by peripheral neuropathy. The patient can perform these exercises while reading, while watching TV, before bed, upon rising, or while taking a bath. Do whatever is necessary to ensure compliance, even to the point of creating a small check-off calendar for your patient that she shares with you at her next appointment. (The following instructions assume self-care to the feet, but they can be followed for the hands, as well.)

- It's very important for you to make time every day to perform this therapy. You'll be spending at least 15 minutes on each foot.
- Start by lightly massaging both feet. Squeeze and massage as deeply as you can tolerate. Don't cause pain.
- Perform range-of-motion (ROM) exercises at your ankles. "Write out" the entire alphabet in capital letters using your toes and ankle joint.
- Grasp the tip of one toe and massage and squeeze it as deeply as you can without causing pain. Work on the entire toe from top to bottom. Work all toes of both feet. Deeply stroke the skin of both feet *toward your knee* to "clean out" the area.
- Now squeeze and massage all the tissue of your feet in between the toes, on both the front and back surfaces of your foot. Massage as deeply as you can tolerate— squeezing, pressing, and massaging every area you can reach.
- Now aggressively stroke both feet from your toes to your knee, *with strokes moving in the direction of the knee*, to "clean out" the entire foot.
- Massage your calves.
- Repeat the ROM exercises at your ankles.
- Throughout the day, whenever you can, take your shoes off and rub your feet against the floor, bend your toes, and perform ankle ROM exercises. You can also roll a tennis ball under the sole of your bare foot while at work or watching TV.

Step-by-Step Protocol for Diabetic and Chemotherapy-Induced Peripheral Neuropathy of the Feet

Technique	Duration
Position the patient comfortably. Cleanse the feet, if desired.	
Gently examine both feet for cold patches, open sores, and reddened or purple blotches while simultaneously applying experimental pressure to determine the patient's pain tolerance.	2 minutes
Stroking, light pressure, using the pressure of your whole hand • Plantar and dorsal surfaces of one foot • Gastrocnemius, tibialis anterior; all tissue below the knee to the toes Repeat on the other foot.	1 minute (Total of 2 minutes)
Compression, light pressure, using the pressure of your whole hand • Plantar and dorsal surface of one foot • Gastrocnemius, tibialis anterior; all tissue below the knee to the toes Repeat on the other foot.	1 minute (Total of 2 minutes)
Stretching, to the patient's tolerance, full ROM • Every toe joint • At the base of the toes • At the ankle Repeat on the other foot and ankle.	1 minute (Total of 2 minutes)
Digital kneading, light pressure, to the patient's tolerance • Each toe from the distal tip to the base of the toe • Work on all toe surfaces, front, back, and both sides. Repeat on the other foot and ankle.	3 minutes (Total of 6 minutes)
Digital kneading, light pressure, to the patient's tolerance • In between each ligament of the foot, working from the base of the toes to the ankle • Knead the ball of the foot. • Knead the arch of the foot. • Knead the heel of the foot. Repeat on the other foot.	3 minutes (Total of 6 minutes)
Repeat the previous digital kneading process of all toes and the entire surface of the foot with your goal being to massage "to the bone." This will take a few sessions before the patient's pain subsides enough to "allow you in." Whether or not she is performing her homework massage will also be directly related to how deep you can get in and how quickly. In each session, progress from light work to massaging as deeply as you can, to her tolerance. This digital kneading takes up the bulk of your protocol. Repeat on the other foot.	10 minutes (Total of 20 minutes)

(continued)

Contraindications and Cautions

- **Neuropathy patients experience good days and bad days. Always perform the protocol to the patient's comfort level; therapy may well be "two steps forward, one step back."**
- **If there is nonresponsive cold tissue, or you notice any purplish blotches or breakdown of skin, refer the patient to her physician immediately.**
- **If a cancer patient discusses the possibility of stopping her chemotherapy because of her irritation with CIPN, advise her to speak to her physician.**
- **Keep orange juice and small candy bars handy when treating diabetic patients.**
- **Open wounds or sores are contraindications for local massage.**
- **A high percentage of cancer patients develop foot fungus as a result of a compromised immune system. This is highly contagious and can be picked up by the therapist. It is not wise, even if gloved, to work on a toe that is manifesting fungus until the condition is completely cleared up.**

Contraindications and Cautions *(cont.)*

- **If the foot has an unusually strong odor, noticeably different from an odor previously noted, this may be a sign of impending gangrene; refer the patient to a physician immediately.**

Technique	Duration
Effleurage, medium pressure • From the toes to the ankle, around the ankle, to the knee Repeat on the other lower extremity.	3 minutes (Total of 6 minutes)
Effleurage, petrissage, effleurage, deep pressure • From the ankle to the knee Repeat on the other lower extremity.	3 minutes (Total of 6 minutes)
Effleurage, petrissage, effleurage, digital and knuckle kneading, deep pressure • All toes, the plantar and dorsal surfaces of the foot, the ankle and the calf, to the knee Repeat on the other lower extremity.	3 minutes (Total of 6 minutes)
Stroking, using your whole hand • From the toes to the knee, anterior and posterior surfaces Repeat on the other lower extremity.	1 minute (Total of 2 minutes)

- Although your feet may be tender when you begin this homework, your goal is to work so deeply that you can feel bone underneath your skin. This may take some time. Be patient, and work as deeply as you can each time. Your most important goal is consistent, daily, deep work.

Review

1. Define DPN.
2. Define CIPN.
3. Describe the nerves that are affected by neuropathy.
4. Explain oxidative debt.
5. What are the symptoms of peripheral neuropathy?
6. Describe the symptoms of dry gangrene.
7. Explain how you might convince a patient, who is already in pain, the importance of the work you and she must perform on her feet and hands.
8. What homework assignments you will give your patient? How often must they be performed?

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Osteoarthritis

Also known as:

OA; Degenerative Joint Disease; Osteoarthrosis; Wear-and-tear Arthritis

Definition: A noninflammatory condition characterized by a degeneration of joint cartilage.

GENERAL INFORMATION

- Direct cause unknown; correlations to obesity, increased age, previous joint stress or injury, and repetitive joint use; genetic predisposition
- Slow onset, with symptoms usually appearing around age 40 or 50
- Lifetime duration; condition progressive
- Prevalence in people who are obese, older than 40 years of age, female, and those born with malformed joints, or who participated intensively in sports when younger, or who endured an accident
- Higher prevalence in the Native American population
- The most common form of arthritis, usually occurring in the hands, hips, knees, spine; uncommon in the jaw, shoulder, or elbow
- Among older adults, the most common cause of physical disability, especially OA of the knee
- *Not* believed to be an inflammatory condition, despite the medical suffix "itis"
- No cure

Morbidity and Mortality

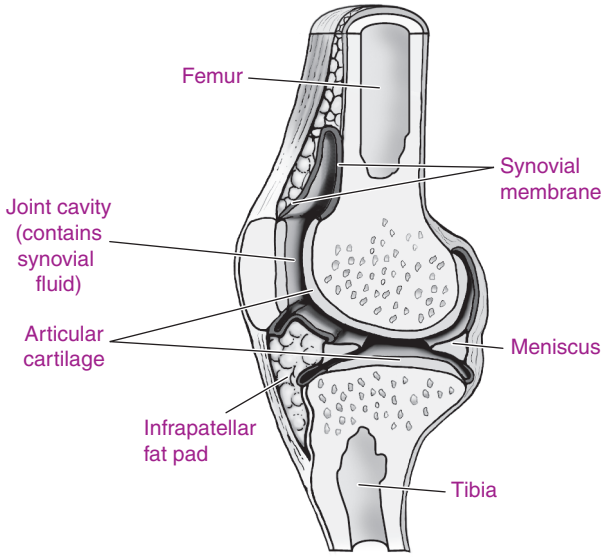
By age 65, approximately 70% of people X-rayed routinely for nonarthritic conditions will show OA involvement in at least one joint. Only 30% of this population have reported pain or other symptoms, supporting the evidence that OA can be clinically present but remain asymptomatic until after about age 50. OA affects more than 25 million Americans.

Although death from OA is uncommon, annual mortality estimations in the hundreds may be low because of the unreported deaths secondary to gastrointestinal bleed, which is a common side effect of many of the medications prescribed to treat OA.

Gout, rheumatoid arthritis, Paget's disease, and septic arthritis increase the risk of OA. Comorbidities include depression, anxiety, and quality-of-life issues, such as lowered self-esteem, job limitations or loss, and decreased enjoyment of recreational activities.

PATHOPHYSIOLOGY

A joint is composed of at least two articulating bones, the ends of which are covered with cartilage. Cartilage is a shiny, slick, almost rubbery material that contributes to smooth, friction-free joint movement. Surrounding each joint space is a synovial lining, which creates synovial fluid, the nourishing "oil" that lubricates the joint (Figure 26-1). As OA develops, articular cartilage begins to degenerate. The normally smooth, gliding cartilaginous surface is compromised by pits, fragments, and tears as bone spurs develop in the tightly packed space. Eventually, cartilage may wear away to the point that bone grinds against bone.



Knee joint

FIGURE 26-1 The role of cartilage in joint mobility. Cartilage surrounds the distal end of the femur and the proximal end of the tibia in normal knee articulation. Surrounding muscles become hypertonic as they compensate for joint instability secondary to cartilage thinning. From Moore KL, Dalley AF. *Clinically Oriented Anatomy*, 5th ed. Baltimore: Lippincott Williams & Wilkins, 2006.

Diagnosis is determined by a combination of the person's medical history and a physical examination, joint X-rays, and laboratory tests. X-ray results, however, can sometimes provide limited evidence of OA because cartilage breakdown is not visible on films. Physicians determine cartilage breakdown, therefore, by measuring joint space narrowing and the presence of bone spurs. Cyst formation and the presence of osteophytes (growths, sometimes called joint mice) further confirm a diagnosis of OA.

People who have OA complain of occasional flares, when joints are unusually painful, tender, and/or warm. These flares are not typical and are fleeting. If they persist and progress, the person should get medical attention.

OVERALL SIGNS AND SYMPTOMS

If symptoms include locally reddened skin, pain and swelling in the joint, and tissue that is hot to the touch, the condition is *not* common OA.

- Joint pain developing slowly, progressing over time
- Joint pain during use, after use, and/or after prolonged inactivity
- Joint tenderness upon light pressure
- Joint stiffness and decreased range of motion (ROM) upon rising and/or after prolonged inactivity
- Bone crepitus (bone-on-bone sensation, crunching, rubbing, or grating sound or sensation)
- Bone spurs or joint mice in and around the affected joint
- Occasional joint swelling, but with no signs of inflammation

SIGNS AND SYMPTOMS MASSAGE THERAPY CAN ADDRESS

- OA sets up perfect conditions for the presence of the pain-spasm-pain cycle, and this cycle can be broken with massage therapy techniques.
- Chronic pain is relieved by skilled massage therapy techniques that decrease trigger points and hypertonicity.
- Palliative techniques relieve anxiety and depression.
- Decreased ROM and stiffness are relieved by the application of deep heat and gentle, passive stretches.

TREATMENT OPTIONS

Although no cure exists for OA, a combination of medical and holistic treatments can reduce pain, increase mobility, slow the progression, and improve the person's quality of life. Treatment for early stage OA focuses on addressing pain level and immobility. Mobility is so important to joint health that some studies indicate underused muscles alone can contribute to much of the pain ascribed to arthritis. Lifestyle adjustments include maintaining good posture; observing a diet high in fruits, vegetables, and whole grains and low in refined sugar; controlling weight; using adaptive devices; and performing regular nonimpact exercise. Taking over-the-counter (OTC) pain medications and applying topical creams are other common, effective treatments.

Treatment for bothersome but not life-altering OA includes resting a painful joint for 12–24 hours, attempting to avoid using the joint for a few minutes every hour; performing regular, gentle exercise; and strengthening and stretching the muscles surrounding the affected joint. At this point, medication may be increased, but it is usually OTC. The use of heat and cold in the early and mild stages can be effective. Heat can be used to relieve stiffness; cold can relieve muscle spasm and more irritating pain. Maintaining ideal weight is highly recommended for all stages of OA.

At any stage, working with a physical therapist or personal trainer can help maintain joint mobility and strength. Adaptive devices, such as padded eating utensils and toothbrushes and pinchers for grasping items off the floor or from high shelves, may prove helpful. Complementary approaches, such as acupuncture, tai chi, yoga, and supplementation with ginger, glucosamine, and chondroitin, have also had limited success in clinical studies.

Joint replacement surgery, bone fusion surgery, the injection of hyaluronic acid derivatives into the joint, and bone debridement are reserved for the most severe cases.

Common Medications

There is a distinction between medications suggested for early-stage OA and those recommended for later stages. OTC medications for early OA include:

- Topical pain-relieving, counterirritant creams, rubs, and sprays, such as Bengay, Aspercreme, Icy Hot, Biofreeze
- Pain relievers, such as acetaminophen (Tylenol)
- NSAIDs, such as aspirin, ibuprofen (Advil, Motrin), or naproxen (Aleve)

As pain and stiffness become more than mildly uncomfortable, begin to compromise the activities of daily living (ADLs), and occasionally flare, the following medication may be prescribed, either alone or in combination with those listed previously:

- Centrally acting analgesics, such as tramadol hydrochloride (Ultram)

For severe OA, prescription painkillers may include narcotics and corticosteroids:

- Mildly narcotic painkillers, such as codeine or hydrocodone and propoxyphene (Darvon)
- Cortisone injections directly into the joint

Massage Therapist Tip

Advising Clients in the Use of Hot or Cold

People with OA are often confused about when to apply hot or cold packs to their aching joints. Here's how to help. If the joints are in excruciating, unrelenting pain, it is time to apply ice. If the joints are dully aching, the kind of pain most OA clients experience on most days, it is best to apply heat.

Thinking It Through

Clinical studies indicate that cartilage responds to exercise, as do muscle and bone; that is, cartilage health can be improved with activity. During exercise, the joint is flushed with fresh blood, waste products are forced out of the joint, lymphatic nodes further pump the joint clean of cellular waste, and bone remodeling occurs in response to even moderate weight-bearing. Conversely, immobility leads to decreased nutrient supply to the joint and hypertonicity to all surrounding muscles. This leads to the pain-spasm-pain cycle, further exacerbating the pain experienced by most people with OA. Exercise also improves mood by releasing neurochemicals in the brain, thereby offsetting the depression and anxiety that often accompany OA.

Taking into account the previous information, the therapist can ask himself the following when planning a massage session and assigning client self-care:

- How exactly is my client affected by his OA?
- What activities can he no longer engage in that he will miss the most?
- Which activities may serve as replacements for those previously enjoyed?
- What are his physical exercise limitations?
- Is he resistant to exercising, and if so, how can I help him overcome that resistance?
- Does he understand that immobility, even when he's in pain, further compromises his affected joints?

MASSAGE THERAPIST ASSESSMENT

Given the pervasiveness of joint pain and stiffness in the aging population, combined with the common medical knowledge surrounding the condition, many clients will present to a massage therapist with a self-diagnosis of OA. Before proceeding, it is best for the therapist to determine the presence of any signs or symptoms of true inflammation. Although a physician's order is not necessary to treat common arthritis, a therapist who discovers a reddened, warm, and/or excruciatingly painful joint should decline treatment and refer the person to a physician.

Questioning the client regarding symptoms should clarify that onset has been gradual. The discomfort or pain should not be debilitating, nor should the client present with joint immobility. Uncomfortable stiffness upon arising or after periods of inactivity should be the norm.

Upon palpation, the joint might feel slightly irregular, perhaps larger than the contralateral joint, but again, no heat should emanate from the tissue. Surrounding musculature is usually hypertonic; trigger points may be found proximal and distal to the joint, and the client may report or display compensatory behavior. ROM is probably compromised. The client should be able to pinpoint the exact location of discomfort, pain, or stiffness, although there may be a dull, achy radiating muscular pain up or down the limb. The symptoms should not reflect systemic malaise or pain.

If a therapist takes the time to understand the client's history, lifestyle, and goals, he will be able to determine an appropriate treatment regimen. Detailed SOAP notes will ensure accurate tracking of progression or digression.

THERAPEUTIC GOALS

The massage therapist's goals are directly related to the client's history, lifestyle, and personal goals. Whether the OA is mild or severe, the therapeutic goals include decreasing pain, increasing or maintaining ROM, decreasing joint stiffness, and reducing depression and anxiety.

MASSAGE SESSION FREQUENCY

For mildly uncomfortable OA:

- 60-minute sessions once a month, for the duration of the condition, performed in combination with diligent self-care

For more severe OA:

- 60-minute sessions once a week, for the duration of the condition, performed in combination with diligent self-care

For the most severe, debilitating OA, which may result in joint replacement or bone fusion surgery:

- 60-minute sessions once a week, immediately before and after surgery (At this point, the therapist is probably performing as part of a health care team.)
- 60-minute sessions every week until the person is pain-free or has reached a plateau of performance and pain

Infrequent massage therapy for all stages of OA will provide merely palliative relief.

MASSAGE PROTOCOL

Treating clients who have OA allows you to create a long-term therapeutic relationship. Since arthritis is progressive and symptoms can be relieved through active

therapy, you have a unique opportunity to use all of your persuasive and therapeutic skills. Become familiar with your client's disease progression, and tailor your therapy to his *very specific* goals. Encourage weekly visits and daily homework compliance. Be generous in complimenting even the small successes, and be compassionate with setbacks.

The OA protocol (here focused on the knee since that is the most common form of debilitating OA) uses basic massage therapy techniques to bring blood and nutrients to the damaged joint and flush waste products toward the head. Your therapeutic skills, combined with keen attention to your client's needs, should result in tangible improvement in his quality of life.

Thinking It Through *(cont.)*

- Does he understand that OA is progressive and that every small act of ROM and exercise can lead to a lessening of his pain and immobility?
- How can I clearly explain to him that the health of his bone, joint, muscle, and cartilage directly depends on how much he moves every day?

Getting Started

Keep hot packs and cold packs ready. Your client will present with different complaints at each session, and you want to be prepared. Experiment with various topical muscle creams. Applying these creams is well within your scope of practice. Read the ingredients aloud, ask the client about possible allergic reactions, and apply the substance deeply *to the affected joint and surrounding tissue only*. These products are not intended for full-body application. If you give the client take-home samples, emphasize that he should rub the cream deeply into his joint and muscles, and remind him to wash his hands before touching his eyes or going to the bathroom.

Position him on the table according to his comfort level; side-lying will require more pillows. He may prefer being seated in a comfortable chair. Awareness of the stage of his OA will help you determine positioning, treatment duration, and aggressivity.

In the following protocol, the client is positioned supine with a bolster or pillow under his knees and a pillow under his head for comfort. Total disrobing may not be necessary if you are focusing on the lower extremities.

Although most massage therapy techniques move *cephalically* or in the direction of venous flow, when attempting to increase localized blood flow, the direction of the therapeutic strokes is often *toward the affected joint*, whether or not this direction is cephalic.

HOMEWORK

Sound research supports the importance of giving your OA client moving and stretching exercises for self-care. Working within your scope of practice, you can develop homework assignments that can make a significant difference in his long-term quality of life. You may want to help him create a pain and/or exercise journal to track his progress.

- Use every opportunity during your day to stretch. While talking on the phone, for example, stretch your neck from side to side, pull your shoulders back, and bend at the waist. While watching TV, extend and contract your lower leg, first while pointing your toe, and then flexing at your ankle as hard as you can. Work all of your joints, not just your painful one.
- Buy a big exercise ball. Place it on the floor next to a wall or couch or a very steady object. While watching TV or anytime during the day, sit on it and bounce. Start by bouncing very slightly, to get your balance. Then work up to bouncing as high as you can, making sure you remain stable, while pushing off of the floor using with your thigh muscles. Note how long you can do this, and try to increase the bounce time every week.
- When you're experiencing a dull, achy joint and muscle pain, apply a *moist* hot pack. A hot water bottle or microwaved gel pack is excellent. Beanbags or rice packs are not effective. Place the pack over a thin layer of clothes and leave it on as long as it is comfortable. Do not go to sleep with the hot pack in place.

Step-by-Step Protocol for Osteoarthritis of the Knee

Technique	Duration
Apply a moist hot pack to the affected knee and surrounding musculature. Leave in place while performing relaxing techniques anywhere other than the affected limb.	5 minutes
Remove the hot pack. Using first gentle then progressively deeper touch, assess the affected joint and surrounding muscles. Assess ROM.	2 minutes
Compression, using your full hand, evenly rhythmic, medium pressure • Entire thigh and leg, from groin to ankle • Use caution when applying pressure around the knee	2 minutes
Effleurage, petrissage, effleurage, medium pressure, evenly rhythmic, working *toward the knee*. • Entire quadriceps complex; include distal attachments in the superior knee region	4 minutes
Effleurage, petrissage, effleurage, medium pressure, evenly rhythmic, working *toward the knee* • Entire lower leg complex, including tibialis anterior; include proximal attachments in the distal knee region	4 minutes
Effleurage, petrissage, effleurage, evenly rhythmic, deeper, to the client's tolerance • Entire thigh and leg, from groin to ankle, working *toward the knee* from both directions	4 minutes
Digital kneading, medium pressure • Proximal, distal, medial, and lateral patellar surfaces • Attempt to gently move the patella • Be aware of the presence of joint mice (osteophytes). Work around them with caution. • Be aware of hypertonicity in muscles near the knee joint.	5 minutes
Effleurage, deep to client's tolerance • Area around the knee, *work cephalically to begin to mobilize waste*	3 minutes
Digital kneading, medium pressure • All muscle attachments, large and small, in and around the entire joint	5 minutes
Effleurage, petrissage, effleurage, deep to client's tolerance • All muscle attachments of the knee joint, *work cephalically now to cleanse the joint*	5 minutes
Hold the knee in both hands, be still, provide comfort, ask the client how he is doing.	1 minute
Effleurage, petrissage, effleurage, medium pressure then light pressure, working cephalically • The entire thigh and leg	5 minutes

(continued)

Contraindications and Cautions

- **Do not apply a cold pack to a joint if a client has any circulatory disorder, such as diabetes, congestive heart failure, or edema.**
- **Do not treat the joint if the client is experiencing a flare; mild whole-body relaxation is an option and will provide palliative relief.**
- **Do not apply a cold pack to a flared joint without a physician's approval.**
- **Use caution, reduce the pressure, and limit ROM when treating unstable or slightly swollen joints or those containing bone spurs.**
- **The normal springy end-feel of a joint may be absent in clients with OA. ROM to the joint is important, but when performing passive ROM, use caution when reaching the presumed end of the joint's movement.**

Technique	Duration
Reassess ROM and local hypertonicity.	2 minutes
Massage the compensating contralateral leg using effleurage, petrissage, and effleurage. Note any areas of hypertonicity for special attention at the next session.	5 minutes
Relaxation massage techniques per the client's requested area, preferably not on the affected limb(s).	8 minutes

- When you're experiencing a sharper, more irritating and persistent joint pain, apply an ice or cold pack. A bag of frozen vegetables will do the trick. Apply the cold pack over a thin layer of clothes, and leave it on for not more than 10 minutes. Repeat every 30 minutes as needed.
- Walk with vigor, swim, or ride a bike. Engage in any form of *gentle* but daily cardiovascular exercise. Aim for 30 minutes five times a week, but start out at your own pace.
- Extend your morning shower a little longer if you find moist heat helps. Performing joint stretches in the shower is an excellent idea; make sure you hold onto a bar and stand on a secure mat.
- Consider keeping a journal of your "good days and bad days," especially noting your successes in exercise and movement.
- Breathe deeply throughout the day. Inhale as deeply as you can, hold it for a few seconds, and exhale forcibly.

Review

1. Define OA.
2. Is this an inflammatory condition?
3. Name the signs and symptoms of OA.
4. List the joint symptoms that would indicate a person is suffering from another related condition and should see a physician.
5. Explain the physiology of the importance of exercise and joint movement.

Contraindications and Cautions: *(cont.)*

- **Normal OA symptoms should be relieved at least minimally after four massage therapy sessions. If you cannot achieve at least minimal relief, the client's history (e.g., cancer or another other systemic disease) must be considered as a secondary cause of the joint pain, and the client should be referred to another health care professional.**

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27

Parkinson's Disease

Also known as:
PD

Definition: A chronic, progressive neurodegenerative movement disorder resulting from dopamine insufficiency in the brain.

GENERAL INFORMATION

- Etiology unknown
- Contributing causative (or risk) factors: aging, exposure to pesticides and herbicides, living in rural environments or near industrial plants and quarries, consuming well water, genetic predisposition
- Onset usually between ages 50 and 79; onset before age 40 increasing
- Occurrence second only to Alzheimer's disease in neurodegenerative disorders
- Chronic and progressive
- Prevalence in men
- No cure

Morbidity and Mortality

PD affects about 1 in every 1000 people in the U.S.; about 50,000 new cases are diagnosed annually. The prognosis is directly related to the severity of symptoms and the age of onset. An early-in-life diagnosis usually leads to a more dire prognosis.

Complications include multiple hospitalizations secondary to frequent falls and decreased dexterity and coordination. Comorbidities include constipation, urinary incontinence, sexual dysfunction, and multiple, serious medication side effects. Depression affects as many as 40% of PD patients usually because of chemical changes in the brain, combined with the profound toll the disease takes on the patient and his family. Anxiety, fear, physical restlessness, and the inability to easily change positions in bed lead to insomnia. About 15–30% of Parkinson's patients develop dementia in the later stages of the disease. Other late-stage comorbidities include memory loss, confusion, and hallucinations.

PATHOPHYSIOLOGY

A small, vitally important component of the cerebral cortex is the substantia nigra. As the regulator of smooth muscle movement and coordination, it must be bathed in the neurotransmitter dopamine in order to function properly. When the available amount of dopamine is compromised, smooth muscle movement is directly, progressively, and negatively affected. By the time motor signs emerge, 60–80% of the dopamine-deficient neurons have already been irreversibly destroyed.

Diagnosis is established after a complete physical and mental health history has been taken, followed by neurologic examinations. There are no laboratory or blood tests that confirm a diagnosis. An MRI or CT scan may be performed to rule out stroke or brain tumor.

OVERALL SIGNS AND SYMPTOMS

The following symptoms often occur well before the more obvious motor symptoms:

- A loss of the sense of smell
- Rapid eye movement (REM) sleep disturbances
- Daytime sleepiness
- Constipation

Following the previous symptoms, subtle early stage signs appear:

- Decreased dexterity
- The loss of fine movement coordination
- A compromised full arm swing during normal walking
- The absence of a toe-heel strike during normal walking
- The dragging of one foot along the floor while walking
- A very slight tremor in chin, lips, and/or tongue

As symptoms progress, the cardinal signs of PD appear:

- Asymmetric muscle rigidity, and deeply aching muscles, most commonly in the legs, face, neck, and arms
- Asymmetric tremors in the hands, arms, legs, or head when the person is awake and at rest, with resolution upon movement
- Changes in speech and gait

As the disease progresses, these symptoms compromise lifestyle and function:

- Freezing; a sudden, brief inability to move
- Relentlessly stiffened muscles
- A stooped, head-down, shuffling gait
- Trouble swallowing, leading to choking, coughing, or drooling
- Soft, monotonous speech
- A fixed, blank facial expression
- Dementia

SIGNS AND SYMPTOMS MASSAGE THERAPY CAN ADDRESS

Because of the complexity, severity, and progression of PD, it is strongly advised that a massage therapist work in close conjunction with other members of the health care team.

- The hypertonicity created by unrelenting muscle rigidity can be softened by the application of heat, gentle range-of-motion (ROM) exercises, stretches, and massage therapy techniques.
- The secondary risk of pneumonia and respiratory difficulties created by the head-stoop, forward-bending position can be addressed with intercostal muscle massage, gentle diaphragmatic massage, self-care homework assignments, and deep-breathing exercises.
- Depression, anxiety, restlessness, and insomnia can be reduced with soothing techniquesw that move the patient into a relaxed, parasympathetic state.

TREATMENT OPTIONS

Because PD progresses swiftly if left untreated, treatment is strongly advised as soon as symptoms appear. Although there is no known cure or reversal for the destruction

Massage Therapist Tip

Asking About Constipation

Any patient who is taking multiple medications and suffering from debilitating immobility is at risk for constipation. Remember that treating people with this uncomfortable condition is well within your scope of practice. Ask your Parkinson's patient at the beginning of each session if he has had a recent bowel movement. Suggest including a 15-minute colon massage protocol in your treatment to help relieve his discomfort (see Chapter 12).

of nerve cells in the brain, medications and, less commonly, surgery can quiet life-altering symptoms and slow the disease progression.

Thorough treatment depends on the patient's age at onset, overall physical condition, strict medication compliance, and adherence to an exercise and diet regimen. However, since medication side effects themselves can compromise a patient's health, the treatment plan is based on balancing the progressive symptoms of the disease with the profoundly adverse side effects of the medications. Medications are therefore given at minimum dose and often in combinations until symptoms demand a more aggressive regimen. Many physicians will adopt a "wait-and-see" attitude toward minor tremors and muscle rigidity to honor the patient's understandable hesitance about taking medication.

Physical therapy can address muscle rigidity, gait abnormality, and overall stiffness. Since PD profoundly affects muscles and places the patient at a constant risk for contracture, any form of gentle and consistent exercise, such as swimming, water aerobics, biking, walking, yoga, or tai chi, is strongly advised. Occupational therapy can help the patient make lifestyle modifications necessitated by his coughing, choking, or drooling. Speech therapy can address the slurred and/or monotone speech and flat affect that occur in later stages.

A healthy diet consisting of fruits, vegetables, and whole grains is suggested. Increased dietary fiber may help prevent constipation, which results from inadequate fluid intake (because of hand-to-mouth clumsiness) and an overall propensity toward immobility and abdominal tension.

When medications are no longer effective and/or the side effects are intolerable, deep brain stimulation (DBS) surgery can be performed. In this procedure, tiny wires are placed into the brain to electrically stimulate the motor control portions. DBS is not a cure and some symptoms may remain, but usually after the procedure, symptoms subside and the medication level can be reduced.

Individual psychotherapy, family counseling, and support groups are strongly recommended to address the inevitable anger, fear, sadness, and anxiety that accompany such a life-altering condition.

Common Medications

Medications that are prescribed for PD depend on the condition's progression. Taken in combination with many other medications, their efficacy decreases over time. PD medications have severe side effects and must be evaluated at least every 3–6 months by the treating physician.

The goal of PD medications is to try to correct the shortage of dopamine in the patient's brain. Because L-dopa, the primary and most effective Parkinson's drug, also causes the most severe side effects, it is not prescribed until later stages of the disease and/or is given in smaller doses in combination with other medications in the early stages.

The side effects of most PD medications include nausea, vomiting, dizziness, delusions, hallucinations, confusion, excessive daytime sleepiness, sexual dysfunction, irritability, and compromised protein assimilation. Increasing, decreasing, or suddenly stopping any of the following medications can be dangerous.

- Antiparkinson medications, such as pramipexole dihydrochloride (Mirapex), ropinirole hydrochloride (Requip), selegiline hydrochloride (Eldepryl), entacapone (Comtan), trihexyphenidyl hydrochloride (Apo-Trihex), and benztropine mesylate (Cogentin)
- Dopamine agonists, such as rotigotine (Neupro) and rasagiline (Azilect)
- Non-ergoline dopamine agonists, such as apomorphine hydrochloride (Apokyn)

MASSAGE THERAPIST ASSESSMENT

An early stage Parkinson's patient can be seen in a massage therapy setting; however, a later stage patient will most likely be seen in a hospital, rehabilitation institution, or

private home. Assessment includes evaluating ROM at affected limbs, palpating for muscle rigidity, determining if inhalation and exhalation are restricted, asking about the presence and level of pain, and determining whether the patient can be comfortably positioned for treatment. A family member may be present to help undress, dress, and reposition or clarify communication.

THERAPEUTIC GOALS

Reducing muscle rigidity can help the patient perform activities of daily living (ADLs). By identifying hypertonic muscles and trigger points, the therapist can help reduce the pain-spasm-pain cycle and modify, although not prevent, postural changes that lead to imbalance and instability. Deeply relaxing techniques can relieve anxiety and help improve sleep patterns. Gentle, persistent ROM exercises can prevent contractures. Deep-breathing exercises and diaphragmatic massage can help prevent pneumonia and respiratory complications. Palliative, gentle relaxing techniques can offset anxiety and reduce cortisol levels.

MASSAGE SESSION FREQUENCY

Since the condition is chronic and progressive, regular massage therapy is essential.

- 60-minute sessions once a week for the duration of the condition

MASSAGE PROTOCOL

Every choice you make to care for this patient must take into account that he feels as if his life is completely out of control. He can no longer perform the simplest acts of daily activity; the medications he is taking destroy clear thinking; he knows no matter what he does, the condition is progressive; and his family members, and his whole support structure, can do little to help. Gentleness, diplomacy, intelligence, and compassion are of utmost importance.

Ideally, you'll see this patient regularly, but he will present with a different set of aches, pains, and concerns at each session. His most pressing concern of the day is your treatment priority. Do nothing to stimulate him. All massage strokes, ROM exercises, and stretches are performed slowly, methodically, and with a keen eye for their effects on his tremors.

Ask about medication side effects so you can be prepared if he gets dizzy easily, is prone to having a sudden drop in blood pressure during position changes, is nauseated, or hallucinates.

Given the previous considerations, the following protocol is not presented in the usual step-by-step process. Instead, several techniques are suggested without recommended duration times. Choose those techniques that address your patient's concerns on any given day.

Getting Started

Positioning will be a challenge, so have plenty of pillows ready. Side-lying may be the best choice. Rearrange the room if his spouse or partner wants to be with him during the massage session. Have towels or tissues available for possible drooling or choking. Keep music and lights very low. Speak slowly but don't be condescending; he can hear you but may not be able to respond quickly and/or be easily understood.

The following protocol includes work on the patient's face. When transitioning to the face, be sure to wash your hands first. Perform all movements slowly and carefully with warm hands.

Thinking It Through

To truly understand the impact of this serious condition, the therapist might take a moment to imagine how uncontrolled motor skills could compromise a person's daily life. She can add to this awareness the knowledge that medications also have serious side effects. The therapist may not ask the following questions aloud, but throughout greeting and assessing and treating the patient, the answers might help her create a more compassionate treatment.

- How severe is his tremor? Does he need help undressing and getting onto the table?
- Can he comfortably reposition himself on the table; how much assistance will he need?
- Since the tremor is worse when he is still and lessens upon movement, what will be the most effective massage strokes that will help calm him?
- What is the muscle's response to continuous movement? Is the pain-spasm-pain cycle ever relieved?
- Can any gentle humor be found in this situation, such as when trying to work on a limb that is constantly moving?
- If the tremors stop and the patient deeply relaxes, and possibly falls asleep, is it possible to accommodate both his schedule and any subsequent massage appointments by allowing him to remain asleep?

Massage Therapist Tip

Recognizing Contractures

Contractures often develop in the muscles of a patient who suffers from a disease such as PD, or from persistent positioning that immobilizes a part of his body. Muscle that is normally mobile becomes hardened, static, and shortened, and the surrounding joint either has severely limited motion or can no longer move at all. Contractures occur because of unrelenting muscle spasm, fibrosis, sustained loss of muscle balance, muscle paralysis, or loss of movement in an adjacent joint. Contracted tissue has a significantly different feel from extremely hypertonic tissue; prolonged massage on contracted tissue will yield very little tissue softening and almost no increase in movement, whereas the same amount of work on hypertonic tissue will yield significant pliability and movement.

Step-by-Step Protocol for Parkinson's Disease

The performance of all the following techniques depends on the patient's symptomatic presentation at each session. Techniques that soften tissue are listed first and should always be applied before mobilizing tissue or performing ROM exercises. There is no correct order for the techniques. Duration may be from a few seconds, at which time you might determine a technique that brings on tremors and must be stopped, to several minutes. Patient tolerance and symptoms are your guides. Unlike other protocols, further instructions or precautions may be provided for each technique.

Technique	Duration*
Place your open, flat hands softly on any area of the body. Quiet your thoughts and note the level of tremors under your hands. Slowly assess each muscular portion of the body, looking for spasms, tremors, hypertonicity, skin sensitivity, and resistance to touch. The "entire body" instructions listed as follows refer to any part of the body tolerated by the patient.	
Compression, light pressure, move slowly, using your whole hand • The entire body, including the face	
Compression, firmer pressure, move slowly, using your whole hand • The entire body, including the face	
Effleurage, light-to-medium pressure, using your whole hand, slow even strokes • The entire body, including the face	
Effleurage, petrissage, effleurage, light-to-medium pressure, slow even strokes • All major muscles • Include trapezius, latissimus dorsi, pectoralis major and minor, deltoids, biceps, arm extensors and flexors, gluteus complex, hamstrings, quadriceps, gastrocnemius, soleus, iliotibial (IT) bands • Abdominal muscles will be extremely hypertonic; try to perform light-to-medium pressure, clockwise effleurage on the abdominal region	
Colon massage, performed slowly and carefully. See Chapter 12 for the entire protocol.	
Digital kneading, slow, rhythmic strokes, medium pressure • Intercostals from sternum to spine • Diaphragm, working up under the bottom of the rib cage • When intercostals massage is complete, ask the client to take a few very deep breaths.	

(continued)

Technique	Duration*
If you find a joint contracture, ask the patient's permission to *gently* work on this area. Effective measures to help reduce further contracture and/or bring pain relief to the contracted area: • Apply a moist hot pack for 5 minutes. • Effleurage the area and palpate deeply to determine the extent of tissue stiffness. • Digitally knead, using medium pressure, around and into all muscles and bones that comprise the affected joint. • Effleurage, petrissage, effleurage the muscles distal and proximal to the joint. • *Gently* attempt to mobilize the joint and muscles. This may not be possible, but often after the application of heat and detailed massage, the contracted joint can move even a quarter of an inch. Be vigilant in watching the patient's reactions.	
Passive ROM, being careful not to initiate a tremor near end-feel • All joints easily accessible given the patient's symptoms and position on the table	
Gentle resistance and stretching • Laying your hand flat first on the plantar and then the dorsal surfaces of each foot, ask the patient to push against your hand to his tolerance. • After he's performed this a few times, gently stretch all muscles, tendons, and bones of the foot and ankle. • Perform ROM exercises at the ankle joints.	
Digital kneading, gentle stripping, cross-fiber friction, using ample lubricant • Sternocleidomastoid (SCM) muscle, bilaterally • Scalenes • Superior trapezius • Occipital ridge	
Place your hands on either side of the client's face as if to embrace it. Rest for a moment. Then, digital kneading, light-to-medium pressure, circling clockwise and counterclockwise. • All facial muscles • Work along bony ridges including the mandible and zygomatic arches, around the eyes, and at the temporomandibular joint (TMJ) • Finish the digital work with long, slow, medium pressure strokes to the entire face	
At the end of your session, perform deep relaxation techniques that both you and your patient have determined help him relax. These techniques may include: • Energy work • Long, slow effleurage over the entire body • Rocking • Silence while simply holding various points on the body	

*Durations are not given for work with PD patients because their condition and concerns change from day to day. For further explanation, see text.

Contraindications and Cautions

- **Do nothing to stimulate the patient's sympathetic nervous system, speak slowly and clearly, lower the lights, and play music softly. Don't use deep-tissue techniques or vibratory tools.**
- **Identify hypersensitive areas of his skin, and stay away from them.**
- **Many PD medications seriously affect blood pressure; be sure to know whether he has high or low blood pressure, and if minor positioning changes make him dizzy or unstable.**
- **Positioning changes, as well as undressing and dressing, will take more time than usual; make sure he does not feel rushed because that will only exacerbate tremors. Accommodate your other clients' schedules so they are not inconvenienced.**
- **If your patient has previously experienced hallucinations, do nothing new or unusual during the sessions that you have not told him about ahead of time. As in all massage therapy sessions, prevent cell phones from ringing or unexpected interruptions from destroying the smooth flow of a session.**

HOMEWORK

Self-care for a PD patient can help slow, but not stop, the condition's progression. It can bolster his self-esteem, add much-needed humor to his life, and can help relieve respiratory complications. Don't overwhelm him with too much homework, but make sure he goes home from each session with at least one *written and clear* instruction. Gently hold him accountable at your next session.

- Speak the letters A, E, I, O, and U very slowly, greatly exaggerating the pronunciation and trying to stretch every facial muscle. Do this several times throughout the day.
- Hold onto a secure couch or the wall. March in place. Plant each foot securely before you pick up the other foot. Lift your knee up as high as you can; there is no need for speed. Performing this to gently paced music may help you keep moving. Start and stop at will several times during the session.
- Walk with purpose; swing your arms front to back while you walk, lightly bending your elbows. Plant your heel and push off with your toe. Try not to shuffle or take small steps while walking.
- Take very deep breaths several times throughout the day. Inhale deeply, hold it for a few seconds, and then exhale with vigor.
- When you're in bed, slowly roll from side to side several times.
- When you're in bed, roll your head and shoulders in one direction and your hips and legs in the opposite direction. Hold this position for as long as you can. Then roll your head/shoulders and hips/legs in the opposite direction and hold.
- Find ways to relax. Listening to soft music, try to concentrate on something beautiful, like a flower or the ocean. Avoid getting upset if you can.
- Watch funny movies that make you laugh.

Review

1. Describe the purpose of dopamine in relation to muscle movement.
2. Explain the early stage symptoms of PD.
3. Describe the symptomatic progression of PD.
4. Name several side effects of the medications given to treat PD.
5. List the effective measures of keeping a Parkinson's patient in a relaxed, parasympathetic state.
6. Explain several homework assignments that can be effective for these patients.
7. Is PD curable?

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Also known as:

Pseudo Sciatica, Wallet Sciatica, Hip Socket Neuropathy

28 Piriformis Syndrome

Definition: A neuromuscular entrapment syndrome resulting from compression of the sciatic nerve by the piriformis muscle, characterized by pain in the gluteals and along the posterior lower extremity.

GENERAL INFORMATION

- Multiple causes, including compression, irritation, or injury to the proximal sciatic nerve by a spasming or contracting piriformis muscle; hyperlordosis; anatomic abnormalities and/or extreme hypertonicity of the piriformis muscle; traumatic fibrosis; prolonged sitting; vigorous activity that involves explosive bending or twisting
- Often misdiagnosed as clinical low-back pain (LBP) associated with radiculopathy (pain radiating from the spine) secondary to lumbar spinal disc anomalies
- Onset gradual if lifestyle-related, sudden if trauma-related
- Duration of weeks or months
- Risk increased for skiers, tennis players, long-distance bikers, truck drivers, and taxicab drivers
- Prevalence in women

Morbidity and Mortality

Approximately 30–45% of people between the ages of 18 and 55 suffer from some form of LBP. Piriformis syndrome is categorized, along with sciatic nerve entrapment, herniated disc, direct trauma, and muscle spasm, as a leading contributor to LBP. About 50% of people experiencing this condition report a history of direct trauma to the buttock (often from a motor vehicle accident), a direct fall onto the buttock, a difficult childbirth, or a hip/lower back torsion injury. Comorbidities include degenerative lumbar disc disease, ischial tuberosity bursitis, and sciatica. Piriformis syndrome and sciatica are often confused, but they are actually two different (although anatomically related) conditions. (Sciatica is covered in Chapter 35.)

The most serious complications arise from improper diagnosis, which can lead to exacerbation of the symptoms, inappropriate treatments, unnecessary spinal disc surgery, and long-term disability and pain. The prognosis depends on early, accurate diagnosis and treatment. Recurrence is uncommon when rigorous therapy is followed.

PATHOPHYSIOLOGY

Clearly envisioning the anatomy and understanding the physiology of the gluteal complex will aid the therapist in treating this complicated syndrome. Table 28-1 and the figures will help simplify the structures and their functions (Figures 28-1, 28-2, and 28-3).

Hypertonicity of the piriformis and surrounding muscles leads to myofascial trigger points, resulting in nerve compression. Although a common cause of the condition is blunt-force trauma, even low-level, chronic compression over time (such as a wallet positioned in the same pocket for years) on the large but otherwise fragile sciatic nerve can cause piriformis syndrome. As seen in other conditions, such as temporomandibular joint (TMJ) syndrome and the pain-spasm-pain cycle, a nerve

TABLE 28-1 Structural and Functional Components of Piriformis Syndrome

Anatomic Structure	Origin and/or Insertion	Function	Notes
Sciatic nerve	Formed by nerve roots from lumbar and sacral nerve plexuses (L4-S2), courses through anterior sacrum before passing inferior to piriformis muscle	Supplies both motor and sensory function to skin and muscle of posterior thigh, posterior leg, and lateral and plantar surfaces of foot	Largest nerve in body; starts at lower spine, bifurcates in popliteal space to terminate in foot. Usually passes underneath piriformis muscle, but in 15% of people, passes *through* piriformis, creating greater propensity for nerve complications. Its path through tight bony and muscular spaces contributes to compression injury.
Piriformis muscle	Originates at anterolateral aspect of sacrum and upper margin of greater sciatic foramen; passes through greater sciatic notch; inserts on superior surface of greater trochanter of femur	Assists in *ab*ducting and laterally rotating leg; with hip in extended position, externally rotates hip; with hip flexed, allows hip *ab*duction	Flat, very strong, pyramid shaped; lies deep in gluteal complex
Superior and inferior gluteal nerves	Similar path to sciatic nerve; leaves sciatic nerve trunk, passes through canal above piriformis muscle	Primarily motor function; supplies gluteus medius, gluteus minimus, and tensor fasciae latae	Compression mimics piriformis syndrome
Tendinous bands at edges of piriformis muscle	Help attach muscle to bone		Can contribute to nerve compression

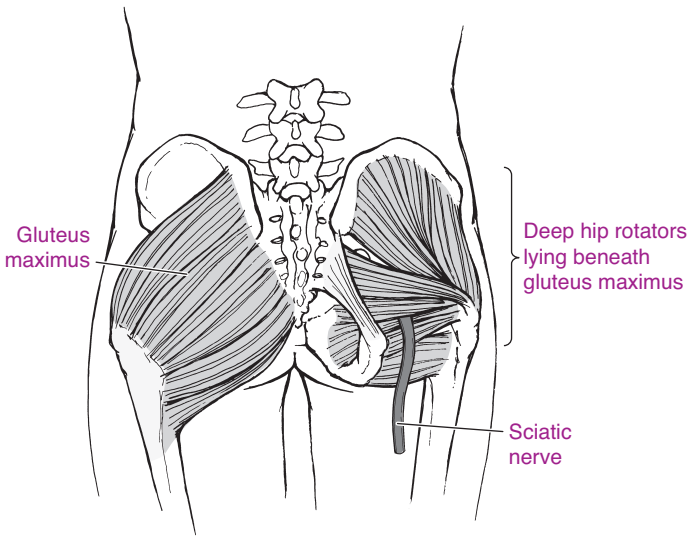

FIGURE 28-1 Deep hip rotators, gluteus muscles, and the sciatic nerve are all compressed into a compact space. From Hendrickson T. *Massage for Orthopedic Conditions*, Philadelphia: Lippincott Williams & Wilkins, 2003.

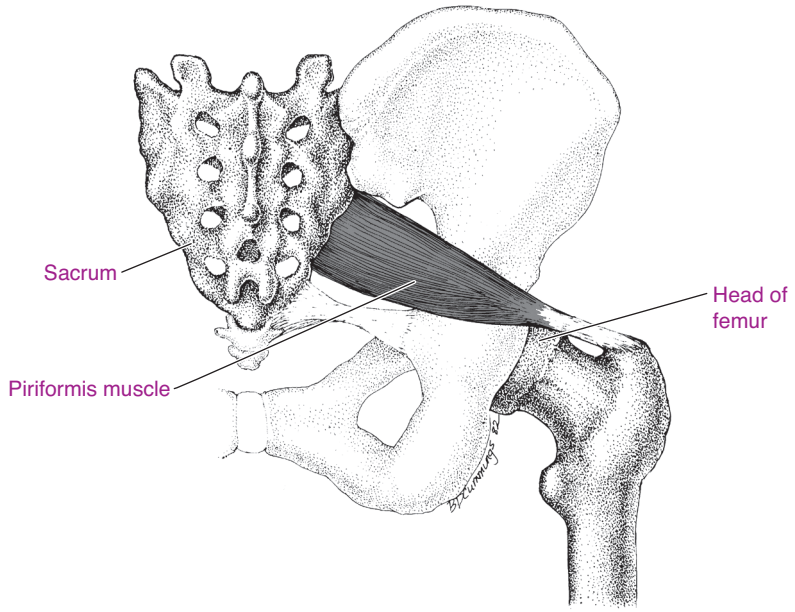

FIGURE 28-2 **The piriformis muscle and its attachments on the sacrum and the head of the femur. Modified from LifeART image. Philadelphia: Lippincott Williams & Wilkins.**

deprived of oxygen through compression or impingement will alert the body of its need for more oxygen by signaling often surprising pain.

Diagnosis is based on physical assessment, as well as the patient's neurologic history and any previous experience with pelvic trauma or childbirth difficulties. A digital rectal examination (DRE) is often included in the diagnostic process, since the muscle is directly accessible through the rectum and manual muscle compression will exacerbate the pain, thus confirming the condition. Although there is no single test to confirm

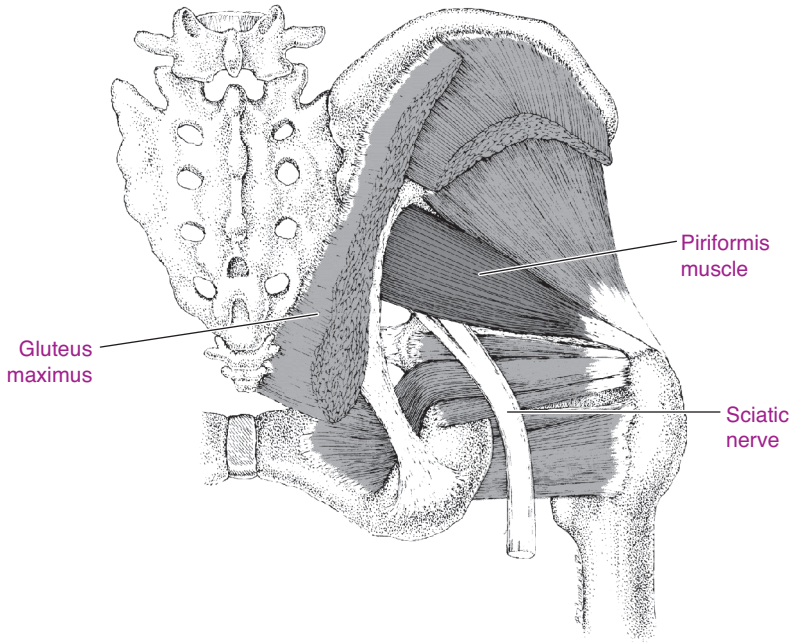

FIGURE 28-3 **The piriformis muscle and sciatic nerve lie directly beneath the gluteus maximus (cut away). Modified from LifeART image. Philadelphia: Lippincott Williams & Wilkins.**

a diagnosis, magnetic resonance neurography is a new diagnostic technique that has demonstrated a high degree of accuracy in pinpointing piriformis muscle asymmetry and sciatic nerve hyperintensity. A physician might order an X-ray, an MRI, and/or nerve conduction tests to rule out other conditions with similar symptoms.

OVERALL SIGNS AND SYMPTOMS

- Pain in the buttocks, coccyx, hip, groin, or posterior thigh
- Numbness or tingling radiating down the posterior leg and/or the lateral foot
- Increased pain with extended periods of sitting, climbing stairs, or squatting
- Spasm and/or hypertonicity in the piriformis muscle
- Weak hip *ab*duction
- A tender gluteal region
- Pain during bowel movements
- Hypomobility of the sacroiliac joint
- A shortened stride length
- A shortened leg on the affected side
- A splayed foot (noticeable lateral rotation) when lying supine

SIGNS AND SYMPTOMS MASSAGE THERAPY CAN ADDRESS

Piriformis syndrome is a soft tissue condition; therefore, it is well within the massage therapist's scope of practice to address many presenting symptoms.

- Nerve compression by surrounding hypertonic muscles can be addressed with layer-by-layer tissue softening.
- Pain, numbness, and tingling of a soft tissue structure secondary to nerve oxygen deprivation can be addressed using multiple massage therapy techniques.
- Muscle tenderness can be addressed with careful muscle-stimulating techniques.
- Anxiety and decreased quality of life can be eased using relaxing techniques that help the client achieve a parasympathetic state.

TREATMENT OPTIONS

The condition's mimicry of common LBP can easily lead the person to several physicians before a correct diagnosis is made and effective treatment begins. A sports medicine or orthopedic physician will most likely treat piriformis syndrome.

Treatment starts conservatively, with physicians or physical therapists (PTs) applying spinal/pelvic traction, introducing progressive stretches and strengthening techniques, carefully increasing range of motion (ROM), applying heat and/or cold, using ultrasound, and modifying the person's activities. A rigorous, daily regimen of home self-care is essential for complete recovery. Corticosteroid injection into the muscle belly is used if all conservative methods are unsuccessful. Surgery is the treatment of last resort.

COMMON MEDICATIONS

- Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen (Motrin, Advil)
- Local anesthetics, such as bupivacaine hydrochloride (Bupivacaine) and lidocaine topical (Lidocream, Lidoderm, Xylocaine)

MASSAGE THERAPIST ASSESSMENT

A massage therapist will not assess for the presence of piriformis syndrome but instead will treat the secondary symptoms, which will have been diagnosed by a

Thinking It Through

When a client lies supine, the normal anatomic position of the lower extremities is for the toes of both feet to point toward the ceiling or to *slightly* laterally rotate. When one foot or both feet dramatically splay out to the side (laterally rotate), it is often a strong indicator of the presence of LBP. Thinking through the structural effects of this apparently innocuous splaying will explain this helpful massage therapy assessment tool. The therapist should consider the following points:

- The lateral foot roll will necessarily pull the tibia and thus the knee out laterally.
- The lateral roll of the knee will pull the femur laterally.
- The femur's lateral roll will tug on its articulation at the hip, in the acetabulum.
- Even a gentle, consistent, abnormal pull of the head of the femur laterally out of the acetabulum abnormally stretches the entire gluteal and lumbar spine muscles, bones, discs, ligaments, and tendons.
- As the body attempts to correct and move into proper anatomic alignment, the constant, low-level, soft tissue battle creates hypertonicity in the entire region.

physician. Before planning the massage session, the therapist should ask the following questions while making observational assessments:

- Is the client seeing a sports medicine physician or an orthopedic or chiropractic physician?
- Has she received a corticosteroid or anesthetic injection into the buttocks region in the last 10 days?
- Has she had a rectal examination or treatment in the last 10 days?
- On a scale of 0–10, what is her pain level now?
- What is the exact path of the pain?
- What is the nature of the pain? Burning, numbness, tingling, dull, or achy?
- Is she guarding as she walks?
- Is she walking with an apparent limp, indicating leg shortening?
- Does she brace herself when she sits into or rises out of a chair?

THERAPEUTIC GOALS

Because piriformis syndrome is a soft tissue condition, it is reasonable for the therapist, working closely with a physician and/or PT, to help reduce the compressive force on the affected nerve, to reduce muscle hypertonicity, to facilitate improved posture, and to provide pain relief.

MASSAGE SESSION FREQUENCY

- Ideally: 60-minute sessions twice a week in the early, painful stages
- 60-minute sessions once a week as symptoms begin to subside
- 60-minute maintenance sessions once a month until symptoms are completely relieved

Massage Therapist Tip

Using Discretion When Touching the Gluteal Area

Effective therapy for piriformis syndrome requires detailed and thorough work on the entire gluteal complex. Whether it's the 1st or 10th session with this client, ask permission to touch the gluteal complex before you address this personal area. Be careful not to invade the gluteal fold. Working around binding underwear edges and continuously readjusting underwear will make the protocol clumsy. If you are comfortable and if your state regulations allow, ask the client if she would be comfortable removing her underwear, assuring her that you will keep her snugly draped at all times.

MASSAGE PROTOCOL

Effective treatment depends on clear visualization of the soft tissue structures underneath your hands, and a willingness to begin gently and move, layer by layer, to the depth the client can tolerate.

Although multiple trigger points deep in the piriformis are common with this condition, the step-by-step protocol does not instruct you to use aggressive trigger point techniques. (Trigger points are covered in Chapter 43.) Instead, the protocol leans heavily toward myofascial techniques and warming superficial tissue while working each thick layer of muscle until the piriformis can be palpated and manipulated. (Don't be perplexed by the use of the term "myofascial"; in this context, it indicates that you are working muscle and fascia, and it does not refer to any particular massage therapy method or training.) This can be effectively accomplished by static compression techniques, including the application of compression on a broad area using an open hand and/or forearm. While applying direct, nonmoving (static) pressure, you gently progress from light to deep pressure, waiting for the tissue to release, soften, or move ever so slightly. This movement signals the body's acquiescence and your ability to move even deeper. Use of the elbow (or knuckles or fists) is not suggested, because the untrained elbow, combined with inappropriate body mechanics, will damage the already compromised, fragile sciatic nerve.

Throughout this protocol, remember that the pain of this condition is *due to soft tissue compression*; therefore, your approach must be cautious, intelligent, and performed with constant client feedback. Applying too much pressure in the wrong direction can both alienate your client and exacerbate the condition. Understand the origin and insertions of the surrounding muscles, and work them *in the direction of origin*. This softens the muscle and will help prevent spasm.

Step-by-Step Protocol for Piriformis Syndrome

Technique	Duration
With the client side-lying, affected side facing up, place a pillow between her knees and ankles. Give her a "teddy bear" pillow to hold, which will help stabilize her rib cage and prevent her from rolling forward.	
Apply cold packs or hot packs as dictated by the tenor of the pain. Leave them in place while you begin distal relaxation techniques.	
Using slaying-the-dragon techniques, massage the shoulders, head, or feet to relax the overall body and help relax the painful site.	5 minutes
Remove the hot or cold packs. Drape snugly to ensure modesty.	
Using no lubrication, tissue mobilization, gentle-to-medium compressions, evenly rhythmic • Entire lumbar spine region from below T-12 to the superior sacrum; do not broach the sacral area or gluteals yet. • Note: Working on a client's lumbar region while she is positioned side-lying presents a body mechanics challenge for the therapist. Try sitting on a rolling stool tableside behind the client or on a large exercise ball, or kneeling, to bring your arms in proper alignment with the client's lumbar region. Do not bend or torque your lower torso awkwardly, or you may cause your own LBP.	6 minutes
Place your open, flattened hands on the hip and simply rest for a moment.	
Using no lubrication, with hands "glued" to the skin, begin moving superficial tissue in first small and then larger circles, moving both clockwise and counterclockwise. • Entire hip region • Entire gluteal complex from PSIS to sacrum, from superior ridge of the posterior pelvis to the ischial tuberosity; do not invade the gluteal fold.	4 minutes
Using lubrication, effleurage, light pressure, evenly rhythmic, superficial tissue only • Entire hip region • Entire gluteal complex from PSIS to sacrum, from superior ridge of the posterior pelvis to the ischial tuberosity; do not invade the gluteal fold.	4 minutes
Effleurage, petrissage, effleurage, deeper pressure, evenly rhythmic • Entire hip region • Entire gluteal complex from PSIS to sacrum, from superior ridge of the posterior pelvis to the ischial tuberosity	5 minutes

(continued)

Contraindications and Cautions

- **Modulate your elbow work on trigger points in the gluteal or piriformis complex. The sciatic nerve, and other surrounding nerves, is already compressed, and you can cause serious damage with an ill-placed, aggressive elbow.**
- **Don't perform cross-fiber friction if the client is taking anti-inflammatory medication.**
- **Don't perform either active or passive joint ROM. This client has been given a stretching and strengthening regimen by a PT who is working directly with a physician, both of whom know the exact anatomic damage to the area. Without that knowledge, you can cause harm with apparently innocuous joint ROM.**
- **Don't perform hip ROM on a pregnant woman who has LBP of unknown origin, especially if she is in her third trimester.**

Technique	Duration
Cross-fiber friction, medium pressure, working smoothly and calmly, not sporadically, being careful not to overstimulate the tissue • Bony prominence at the PSIS • Bony prominence at the head of the femur • Bony prominence along the lateral edge of the sacrum, including the coccyx • Gluteus maximus and minimus and piriformis muscles origins and insertions and belly	6 minutes
Effleurage, petrissage (using large, almost scooping movements), effleurage, medium pressure, evenly rhythmic • All cross-fibered areas	5 minutes
Jostling, using an open, flat hand, not knuckles or elbows, smoothly energetic but being sure to displace as much tissue as possible • Entire gluteal region	2 minutes
Using the fleshy (ulnar) side of your forearm or your flat, open hand, very slowly compress and slightly push the *insertion* of the piriformis muscle (at the greater trochanter) toward the *origin* (the lateral edge of the sacrum). Keep compressing and slightly pushing the muscle 1 inch at a time. Do not move to the next position until you feel the muscle complex soften under your contact. Your final position will be firmly pushing against the lateral bony prominence of the sacrum.	5 minutes
Petrissage, effleurage, petrissage, medium pressure, briskly • Entire gluteal and piriformis complex	3 minutes
With ample lubricant, effleurage, petrissage, effleurage • Lumbar spine region • Hamstring complex from popliteal fossa to ischial tuberosity • Note: Work the entire leg if the client complains of pain along the entire sacral nerve path, which would include the foot on the affected side.	7 minutes

Getting Started

Have hot packs ready to apply to distal hypertonic tissue and to use if the client complains of dull, aching pain. Cold packs can be applied to quiet a spasm and reduce sharp, stabbing pain. Have plenty of pillows to provide a comfortable side-lying position.

Appropriate draping is paramount since your work involves directly touching the hip and surrounding gluteal complex. You might choose to work through a thin layer of sheet, depending on your comfort and your client's level of trust, but the more effective work will be skin on skin. Your hands must be able to feel even the slightest shift and softening as you apply myofascial techniques.

This client will be in pain and thus holding herself, and she may find it difficult to relax. A soothing approach and environment, combined with suggestions to take a few deep breaths, may help her relax.

To make sure you are working directly on the piriformis muscle, which is deep to the gluteus maximus, use the following technique. With the client side-lying, palpate the posterior/superior iliac spine (PSIS) and the greater trochanter. Lay the heel of your hand on the PSIS and point your fingertips toward the greater trochanter. The piriformis lies deep to the gluteals in that pathway.

HOMEWORK

Although assigning extensive self-care is the norm for most conditions in this text, the fear of doing harm will restrain you from offering more than simple lifestyle suggestions while treating a client with piriformis syndrome. Encourage your client to perform the rigorous regimen she has been assigned by her PT. Here are some suggestions:

- If you must sit for extended periods, consider using a rocking chair with foam padding on the seat.
- If you're driving for any length of time, get out of the car hourly and walk around.
- If your local pain is acute, apply ice. If your local pain is dull and achy, apply heat.
- Before sleep, consider placing a pillow between your knees while on your side and a pillow under your knees while lying on your back. This will take some pressure off your lower back.
- Yoga and tai chi include gentle and effective stretching and strengthening exercises. Be sure to get permission from your physician and PT before beginning a class.

Review

1. List the muscles in the gluteal complex and their anatomic relationship to each other.
2. Describe where the sciatic nerve originates, explain its path, and discuss its function.
3. What other conditions does piriformis syndrome mimic?
4. What level of aggressiveness is appropriate when treating this syndrome?
5. Explain some lifestyle suggestions to help prevent recurrence.

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