CHARACTERISTICS OF SOFT TISSUE DYSFUNCTION

- **Soft tissue misalignment:** Soft tissue dysfunction creates misalignment relative to the neighboring soft tissue or joint.
- **Soft tissue torsion:** Misaligned soft tissue introduces an abnormal torsion or twist into the tissue. The abnormal twist decreases the water content of the tissue, leading to adhesions and abnormal function in the soft tissue and associated joint.
- **Adhesions:** Abnormal crosslinks may develop between the fibers, creating adhesions. Adhesions develop if the soft tissue and joints were not adequately mobilized after an injury, if the area adapted to the shortened position to avoid pain, or because of poor posture. The fibers stick together, losing their ability to glide. This limits normal extensibility (length) in the tissue and creates dysfunction in the muscles, joints, and nerves. Adhesions also prevent the normal broadening of the muscle fibers that occurs during muscle contraction, decreasing their function.
- **Fluid stagnation:** Sustained muscle contraction and adhesions in chronic dysfunction create fluid stagnation, disrupting the rhythmic waves of fluids that normally circulate through every region of the body. Stagnation causes decreased cellular activity, decreased nutrition, and the accumulation of waste products, reducing the tissue's ability to function normally and slowing down the body's constant cellular regeneration.
- **Neurological dysfunction:** Adhesions and fluid stagnation create abnormal neurological function, leading to muscle hypertonicity or inhibition and loss of coordination, balance, and postural stability.
- **Altered muscle performance:** Optimum function in the body for good posture and movement requires that the muscles crossing the joints are balanced in strength, extensibility (length), and normal neurological function. This is necessary for fine motor control, balance, and coordination. Dysfunction leads to patterns of sustained hypertonicity or sustained weakness (inhibition) in the muscles.
- **Joint restrictions and misalignment:** Loss of normal joint mobility is due to internal or external restrictions. Internal restrictions may be due to loss of glide between the joint surfaces. This is called *loss of joint play*. External restrictions may be due to shortened or tightened tissue surrounding the joint, such as adhesions in the ligaments and joint capsule or short and tight muscles. Joint restrictions and misalignment lead to impaired movement.
- **Emotional and psychological distress:** Clients in chronic pain are often afraid of moving, a condition called *pain avoidance behavior*, which leads to disuse, deconditioning, and abnormal function in the muscles and joints, predisposing the area to degeneration.
- **Biomagnetic disturbance:** In chronic conditions, the tissue becomes dehydrated because of the increased fiber content of the adhesions, which conduct electrical charge very poorly, owing to the decreased water content.[15]

THREE TREATMENT MODALITIES

This text introduces a unique combination of three modalities, performed in a specific protocol or "recipe" that has been found in 30 years of clinical practice to achieve the most efficient and effective success in the treatment of soft tissue conditions. How to apply these modalities varies dramatically depending on many factors, such as whether the client has an acute or chronic condition and the client's age, conditioning, and level of pain. The goal of massage and manual therapy is to provide the appropriate treatment specific to the client's condition to optimize the body's own healing potential. The underlying goal of this method of therapy is to induce profound relaxation while performing the techniques. This has been found to optimize the healing potential of the body and create the most successful outcome. The three modalities are as follows:

- **Soft tissue mobilization (STM):** This text introduces a new style of massage (soft tissue mobilization) called *wave mobilization*, which mobilizes the soft tissue transverse to the fiber in a rounded, scooping motion. These strokes are performed rhythmically and are modeled on ocean waves.
- **Muscle energy technique (MET):** MET is a method of manual therapy in which the client provides active resistance to the therapist's pressure. This technique provides rehabilitation for the nervous system.
- **Joint mobilization (JM):** The joints are the source of most of the pain and disability in chronic conditions. Passive movement induced to the joints helps to ensure their optimum function.

FOUR DIMENSIONS OF TREATMENT

The goal of massage and manual therapy is to induce change in the structure and function of the

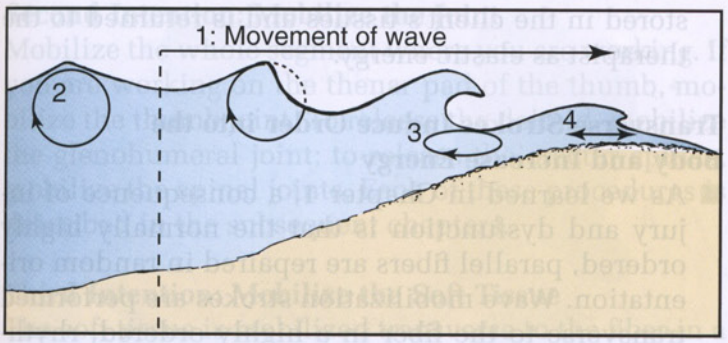

Figure 2-3. Ocean wave characteristics. ***1.*** The waves move perpendicular to the shoreline and perpendicular to the ground. ***2.*** A water molecule moves in a circular pattern by the passage of a wave. ***3.*** As the water becomes more shallow, the waves become flatter and more elliptical. ***4.*** Just above the sea floor, the wave moves not in a circular pattern but forward and backward.

- The highly organized structured water in the body results in a coherent system; that is, the water and protein complexes throughout the body tend to vibrate together.
- Water acts as a conductor of electricity.[12] When we compress and stretch the body, we are generating electricity due to the piezoelectric property of soft tissue. These waves of electrical charge (streaming potentials) are carried instantaneously to every cell in the body.

Characteristics of Ocean Waves

- Ocean waves move perpendicular to the shoreline (Fig. 2-3).
- The energy that moves through the ocean moves the water in a circular motion.
- As the ocean wave approaches shallower water, the interaction with the bottom slows the wave, making it more elliptical and flatter.[13]
- Waves just above the sea floor move back and forth instead of in a circular motion.
- Ocean waves ebb and flow in rhythmic cycles.
- Strong waves, such as storm waves, create a rounded, digging motion that erodes the beach (Fig. 2-4).

Wave Mobilization Strokes Mimic Ocean Waves

- The author has taken this natural pattern of how energy moves through ocean water and applied it to soft tissue therapy.
- The strokes are transverse (perpendicular) to the line of the fiber of the soft tissue.
- Just as water molecules are displaced in a circular pattern by the ocean wave, we want to mobilize the tissue in a circular pattern. The stroke is a circular scooping motion, in which you apply one-half of a circular motion as you scoop down into the soft tissue.
- The stroke becomes flatter, more elliptical, if you encounter greater resistance in the tissue or if the tissue is near the bone.
- For tissue that is next to the bone, we apply back-and-forth flatter strokes or transverse friction strokes. This is akin to the movement of water against the sea floor.

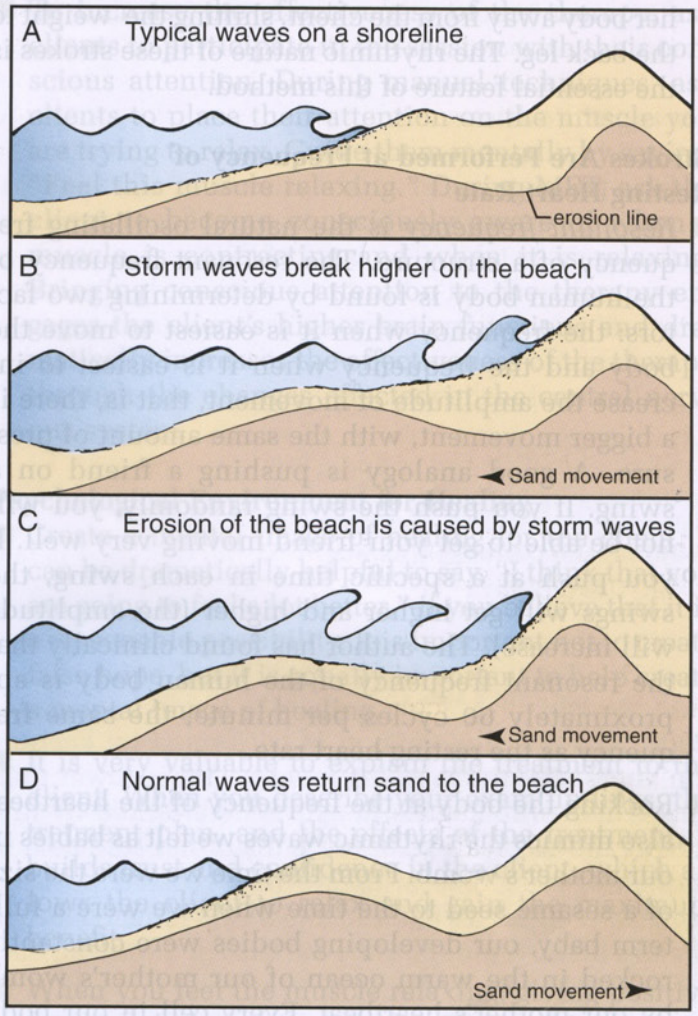

Figure 2-4. Strong waves, such as storm waves, create a digging motion that erodes the beach.

Characteristics of Wave Mobilization Strokes

Strokes Are Performed Rhythmically

- An essential feature of the wave mobilization strokes is that they are repetitive movements that are performed rhythmically, in what may be described as *rhythmic oscillations*. The therapist moves his or her body toward the client, compressing the tissue in a rounded, scooping motion, and then moves his or

Dysfunction and Injury of the Lower Back

FACTORS PREDISPOSING TO LOW BACK DYSFUNCTION AND PAIN

- **Lifestyle factors:** Sitting at a desk excessively, manual labor, excessive driving, obesity, lack of exercise.
- **Functional factors:** Posture, joint dysfunction, muscle imbalances, deconditioning, fatigue, altered movement patterns, emotional tension.
- **Structural factors:** Rheumatologic, endocrine or metabolic, neoplastic (tumors), vascular diseases, infection, congenital anomalies, pelvic and abdominal disorders.

PATHOGENESIS OF LOW BACK PAIN

The cause of LBP is controversial. A rational hypothesis, described by Kirkaldy-Willis and Bernard,[5] is outlined below.

THREE MOST COMMON FACTORS PREDISPOSING A PERSON TO AN EPISODE OF LOW BACK PAIN

1. **Emotional upset,** such as tension, stress, anxiety, fear, resentment, uncertainty, and depression. Emotional upset causes local areas of vasoconstriction and sustained muscle contraction that lead to muscle fatigue. These changes result in altered patterns of muscle contraction and movement.
2. **Abnormal function of the muscles** of the lumbopelvic girdle from poor posture, prior trauma, or deconditioning creates abnormal movement patterns and excessive stresses on the facets and disc. The result of these changes is that movement becomes restricted and painful. These restrictions of movement lead to fibrosis around the joint.
3. **Facet joint hypomobility (fixation)** is the loss of normal gliding of the joint. The three most common causes are muscle tightness, joint capsule adhesions, and intra-articular adhesions. As has been mentioned, this hypomobility has reflexive changes in the surrounding muscles, setting up a continuing cycle of muscle dysfunction and further joint dysfunction.

AN EPISODE OF ACUTE BACK PAIN USUALLY BEGINS AS A MINOR INCIDENT

These stresses on the musculoskeletal system can be compensated for until a minor incident overwhelms the resilient capacity of the body and tissue damage results, leading to acute pain.

The client reports a minor incident, such as gardening or reaching for a light object, and experiences an intense pain in the low back. The symptoms may also develop within a day or two. There are two different mechanisms of injury: (1) a rotational strain that typically injures the facet joints and (2) a compression force in flexion, which typically injures the disc. It is important to realize that in any given injury, the muscles, facets, and disc are all involved to some degree.

THE THREE STAGES OF DEGENERATION LEADING TO CHRONIC LOW BACK PAIN

1. **Dysfunction phase:** This minor trauma leads to inflammation of the synovial lining of the capsule, called synovitis, and to sustained hypertonic contraction in the erector spinae muscles, usually on one side of the lower back. The inflammation releases enzymes that cause minimal degeneration of the articular cartilage. Changes in the disc begin in the dysfunction phase with small circumferential tears in the annulus that become larger and form a radial tear that passes from the annulus to the nucleus. These tears increase until there is internal disc disruption, which can lead to a disc herniation in which the nucleus shifts position.
2. **Instability phase:** The dysfunction phase is often followed by a phase of instability, which is demonstrated by abnormal, increased movement of the facets. There is laxity in the joint capsule and the annulus of the disc and subluxation (partial dislocation) of the facets.
3. **Stable phase:** The last phase of pathogenesis is the stable phase, in which the body responds to the continuing degeneration by laying down connective tissue and bone. Continuing degeneration leads to bony spurs under the periosteum, enlargements of the inferior and superior facets, periarticular

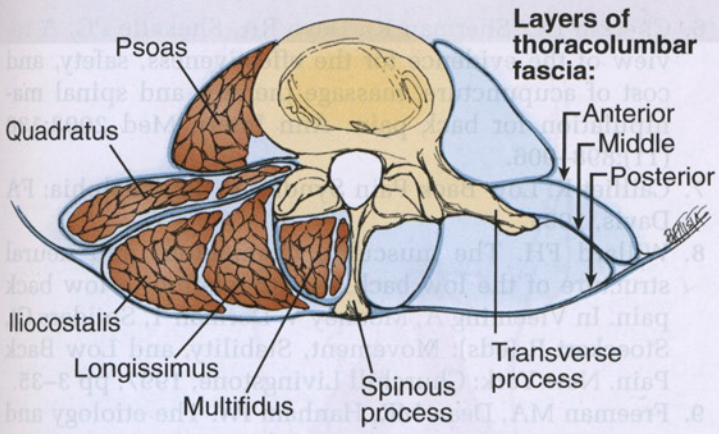

Figure 3-59. Anterior, middle, and deep layers of the thoracolumbar fascia. The three layers travel from the spinous and transverse processes of the lumbar vertebrae to the ilium.

- **Dysfunction:** L4 and L5 vertebrae experience the greatest stress in the lumbar spine because the lumbar lordosis tips these vertebrae down, creating a shear. The iliolumbar ligaments provide stability to the SIJ and the L5–S1 vertebrae. These ligaments shorten and thicken in chronic LBP. The deep lamina of the TLF travels from the lumbar transverse processes to the ilium.

Position

- **TP:** Standing, facing headward
- **CP:** Side-lying, fetal position; you might need to increase the lumbar curve slightly by bringing the knees away from the client's chest slightly to put the erector muscles in more slack.

Strokes

Now you are working the deepest layers of soft tissue between the medial aspect of the ilium and the spinous and transverse processes on the lowest lumbar vertebrae. The intention is to scoop transverse to the line of the fiber, broadening these fibers to release any fibrosis. It takes a great deal of preparation to work this deeply. These strokes are for chronic conditions only.

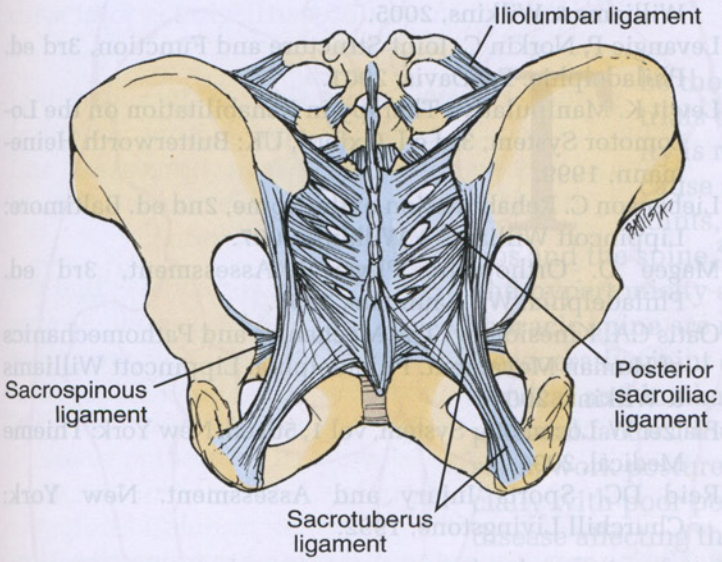

Figure 3-60. Iliolumbar ligaments.

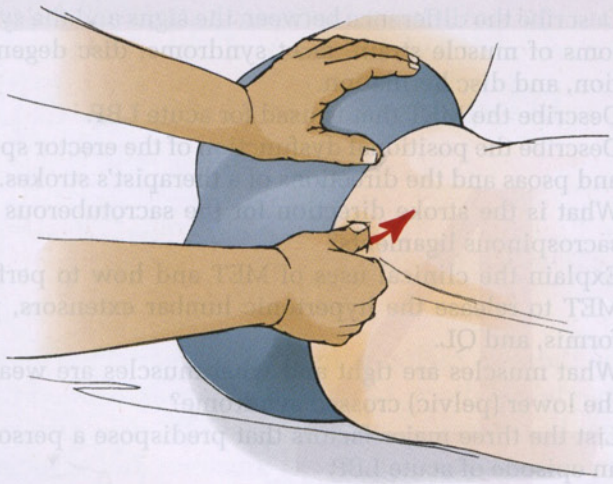

Figure 3-61. Supported-thumb release in three lines for the middle and deep layers of the thoracolumbar fascia and the iliolumbar ligaments.

1. Using the supported-thumb position (Fig. 3-61), place your working hand next to the spinous process of L4, which is at the level of the iliac crest. Your supporting hand rests on the ilium. Perform a series of 1-inch scooping strokes in a superior direction between the L4 vertebra and the ilium, transverse on the deep lamina of the TLF and iliolumbar ligaments. As you move onto your back leg, pull the client's ilium back with you slightly. As you scoop into the tissue, push the client's ilium toward your working hand. This brings the erectors into slack and allows for deeper work.
2. The second line of strokes begins at the L5 area, approximately 1 inch inferior to the first line. Perform another series of 1-inch scooping strokes in the superior direction. Continue your series of strokes to the ilium. Rock your entire body and your client's body as you perform your strokes. If you find fibrotic tissue, your strokes may become more brisk, but always maintain the rocking movement. Cover the entire area between L4–L5 and the ilium.

Study Guide

Lumbosacral Spine, Level I

1. List the names of the muscles in the seven layers of the back, from superficial to deep.
2. Describe the basic origins and insertions of the erector spinae, the psoas, and the QL.

much more susceptible to injury than is the lateral meniscus because it is far less mobile.

- **Treatment implications:** Injury causes swelling and potential subluxation, that is, misalignment. Assessment reveals a loss of active and passive extension. Lauren Berry, RPT, taught that if the torn tissues in the meniscus could maintain contact with each other and not separate, there would be an increased likelihood of repair. Because the outer one-third of the meniscus has a blood supply, tears in this region can heal.[4] A mobilization in the treatment protocol described in the text was taught by Berry and has proved remarkably effective in normalizing the menisci position to allow proper healing.

JOINT CAPSULE

- **Structure:** The joint capsule of the knee encloses the tibiofemoral and the patellofemoral joints (Fig. 9-2). It is attached to the femur approximately two finger widths above the patella and to the proximal tibia. The anterior part of the joint capsule can be divided into superficial and deep portions. The superficial portion is wide and loose, is thin in the front and sides, and is reinforced by the fascial expansion of the quadriceps muscle, called the **patellar retinaculum**. The retinaculum has several thickenings that are called the **patellofemoral** and **patellotibial ligaments.**[5] The deep portion of the joint capsule has two parts: (1) a deep transverse thickening of the retinaculum from the medial and lateral epicondyles to the patella and (2) the **meniscotibial ligaments,** also called the **coronary ligaments,** which help to stabilize the meniscus to the tibial plateau. The posterior capsule is strengthened by the tendinous expansions of the semimembranosus, popliteus, and gastrocnemius muscles. The oblique popliteal ligament, an expansion of the semimembranosus, interweaves with the arcuate popliteal ligament, a thickening in the posterior wall of the capsule. The synovial lining of the joint capsule has a thickening or fold, referred to as a **plica,** in the medial suprapatellar aspect of the knee in 20% to 60% of the population. If it becomes irritated, thickened, and fibrotic, it impinges on the medial edge of the medial femoral condyle.

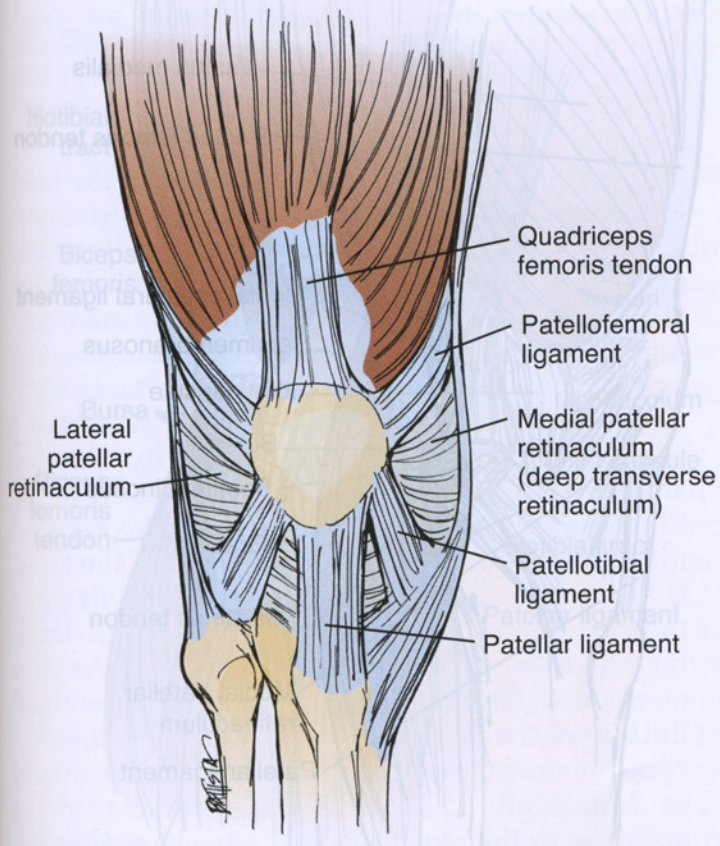

Figure 9-2. Anterior knee showing the patellar retinaculum. The superficial portion of the joint capsule interweaves with the retinaculum. The retinaculum has distinct thickenings, the patellofemoral and patellotibial ligaments.

- **Function:** The joint capsule provides stability to the joint and menisci, serves to lubricate the articulating surfaces, and provides a neurosensory role.[6] Tension is placed on the menisci through the ligaments that form part of the joint capsule when the quadriceps, semimembranosus, and popliteus contract.

- **Dysfunction and injury:** Joint capsule dysfunctions and injuries have connective tissue, muscular, and neurological consequences. Injury, repetitive stress, and surgery lead to synovitis, an inflammation of the synovial lining. When the knee is inflamed, it assumes a slightly flexed position as the capsule becomes relaxed and allows more fluid. A common result of prior inflammation is capsular tightness, and adhesions that develop between the joint capsule and bone, causing loss of normal ROM of the knee in a typical pattern. The knee loses about 20° of extension, and flexion is often restricted to only 90° to 100°. Since the normal lubricant (synovial fluid) is secreted only with joint movement, the joint becomes stiff and dehydrated. Restricted flexion leads to articular nerve dysfunction, which decreases sensory input from the mechanoreceptors and leads to arthrokinetic reflexes. Arthrokinetic reflexes typically inhibit (weaken) the quadriceps, especially the VMO, and tighten the hamstrings, especially the biceps femoris, and the ITB. These muscular imbalances lead to joint dysfunction and potential degeneration. The capsule can also develop *plica syndrome,* an irritation to the plica from repetitive stresses, such as running or swimming the breaststroke, or from trauma; this irritation causes pain, snapping, and stiffness at the anteromedial knee.[6]

Techniques

GUIDELINES TO APPLYING TECHNIQUES

A thorough discussion of treatment guidelines can be found on p. 86 in Chapter 2. In the method of treatment described in this text, we make two underlying assumptions: that pain or dysfunction in one localized area affects the entire region, and so we assess and treat an entire region rather than localized pain, and that pain that localizes in one tissue affects all of the structures in the region. Neck pain, for example, typically involves muscles, tendons, ligaments, joints capsules, facet joints, and IVDs. This is called *somatic dysfunction*, a term developed by osteopaths that is defined as "*impaired or altered function of related components of the somatic (body framework) system; skeletal, arthrodial (joint), and myofascial structures; and related vascular, lymphatic, and neural elements.*"[14] A simple muscle strain, for example, is not an isolated condition but affects the associated joints, nerves, and muscles that are compensating for the strain, as well as the vascular and lymphatic systems. The treatments described in this text address all the components of somatic dysfunction through three techniques: muscle energy technique (MET), soft tissue mobilization (STM), and joint mobilization. These techniques can be applied to every type of neck pain, but the "dose" of the technique varies greatly from slow movements and light pressures for acute conditions to stronger pressures and deeper-amplitude mobilizations for chronic problems. Each aspect of the treatment is also an assessment to determine pain, tenderness, hypertonicity, weakness, and hypomobility or hypermobility. We use the philosophy of treating what we find when we find it. Remember that the goal of treatment is to heal the body, mind, and emotions. Keep your hands soft, keep your touch nurturing, and work only within the comfortable limits of your client so that he or she can completely relax into the treatment.

THE INTENTIONS OF TREATMENT FOR ACUTE CONDITIONS ARE AS FOLLOWS

- To stimulate the movement of fluids to reduce edema, increase oxygenation and nutrition, and eliminate waste products.
- To maintain as much pain-free joint motion as possible to prevent adhesions and maintain the health of the cartilage, which is dependent on movement for its nutrition.
- To provide mechanical stimulation to help align healing fibers and stimulate cellular synthesis.
- To provide neurological input to minimize muscular inhibition and help maintain proprioceptive function

> ! *CAUTION: Stretching is* ***contraindicated*** *in acute conditions*

THE INTENTIONS OF TREATMENT FOR CHRONIC CONDITIONS ARE AS FOLLOWS

- To dissolve adhesions and restore flexibility, length, and alignment to the myofascia.
- To dissolve fibrosis in the ligaments and capsular tissues surrounding the joints.
- To rehydrate the cartilage, and restore mobility and ROM to the joints.
- To eliminate hypertonicity in short, tight muscles; strengthen weakened muscles; and reestablish the normal firing pattern in dysfunctioning muscles.
- To restore neurological function by increasing sensory awareness and proprioception.

Clinical examples are described below under "Soft Tissue Mobilization."

MUSCLE ENERGY TECHNIQUE

THERAPEUTIC GOALS OF MUSCLE ENERGY TECHNIQUE

A thorough discussion of the clinical application of MET can be found on p. 76. The MET techniques described below are organized into one section for teaching purposes. In the clinical setting, the METs and STM techniques are interspersed throughout the session. METs are used for assessment and treatment.

the body to rock the client and perform the stroke. Rock the client forward as you perform the massage stroke, and let the client rock back as you release the stroke, or gently pull the client back slightly as you move your body back. The therapist's body and the client's body move as one. Imagine a cloud of energy streaming through your hands and through your client rather than pressing on the client.

The therapist's muscles should remain relaxed, and the joints should remain open (i.e., in some flexion), because this allows the energy to flow. Tightening your muscles constricts your chi. Remain supple and relaxed, maintaining a slow and even breath from the belly.

THE SCIENCE OF HEALING ENERGY (CHI)

A new paradigm in biology and medicine has been hypothesized that was discussed in Chapter 1. Current research is discovering that electromagetic energy controls cellular function, including repair and rejuvenation. And it has been found that each person emits an electromagnetic field, which can, in theory, be focused for healing.[9] The energy that the word *chi* describes is infinitely bigger than a person's own electromagnetic field. In the author's opinion, it describes two different fields of energy. One is the earth's magnetic field. One portion of this field is called *Schumann resonances*, which are electromagnetic waves in the extremely low frequency spectrum, generated by 40 million lightning discharges that occur daily, which pump energy in the cavity formed by the earth's surface and the ionosphere. The lowest resonant frequency is 7.83 hertz, which is the speed of light divided by the earth's circumference. Research shows that this is the same frequency as is found in a deep meditative state and the frequency of brain wave activity that is common to all healers while they are working.[9] It is therefore plausible that therapists can learn to quiet their minds and resonate with the micropulsations of the earth's field and be able to utilize this energy for healing. It is possible that one of the reasons why the Taoists looked to nature as a source of inspiration was that they were able to enter deeper meditative states in nature because they were coupling their field with Schumann resonances.

The word *chi* also implies universal energy. In the author's opinion, this is the same as what quantum physicists call "zero point field (ZPF)."[10] ZPF describes the waves of energy that can still be detected at absolute zero freezing point, at which all molecular motion stops. They are waves of energy on the subatomic level conceptualized like waves in the ocean and represented in Figures 2.6, 2.7, and 2.8 below. Physicists describe 95% of the energy in the universe as invisible, so-called dark energy and dark matter, and many people believe that ZPF and this invisible energy are the same. This vast ocean of energy runs through each of us, and wave mobilization is theoretically one method that allows ZPF and Schumann resonances to be focused for healing.

THE THREE TECHNIQUES: WAVE MOBILIZATION, MUSCLE ENERGY TECHNIQUE, AND JOINT MOBILIZATION

SOFT TISSUE MOBILIZATION: THE WAVE MOBILIZATION STROKE

The wave mobilization stroke was developed by the author during the course of 30 years of clinical practice and daily practice of tai chi. The stroke was developed by using the insights of the Taoists on the nature of water, the principles of tai chi, and the insights of the author's mentor, Lauren Berry, RPT. Wave mobilization is a practical means to theoretically focus the biomagnetic field for healing. The development of wave mobilization was motivated by three objectives: (1) to translate the extraordinary clinical results of the quick, soft tissue manipulation techniques used by Lauren Berry into gentle massage strokes; (2) to create a massage style that is relaxing and nurturing while maintaining superb clinical results; and (3) to develop a massage technique that is also relaxing and energizing for the therapist. These goals were realized with **wave mobilization.**

Nature of Water

- Water is so supple that it will take the shape of whatever container it occupies.
- Water is so powerful that it will dissolve rocks to form canyons.
- Water makes up two-thirds of the body, surrounding every cell. Evidence suggests that unlike ordinary water, water inside the body is largely structured, having a density much higher than that of ice, allowing molecules to pack tightly together.[11] As was discussed in Chapter 1, water and protein (collagen) are charged molecules (dipole), forming tight structural bonds with each other. This water–protein complex forms tightly packed, highly ordered arrays that act like a liquid crystal, being extremely sensitive to weak electromagnetic fields such as those emitted by the hands of the therapist.