A Massage Therapist’s Guide to Pathology provides tools—both within this textbook and online—to help you make informed decisions about working with clients who live with a variety of diseases and conditions. This User’s Guide shows how to put those tools to work for you.

Quick Reference to Pathologies
A full list of all the conditions with their subtypes and page numbers can be found in the Quick Reference to Pathologies located on the first pages of this book.

In Every Chapter
You’ll find features specifically designed to promote engagement and interaction with the chapter topics.

Learning Objectives
A list of Learning Objectives appears near the beginning of each chapter to help you prioritize what to focus on as you go through the material.

Sidebars
Sidebars contain information that is interesting but not central to a discussion. For instance, sidebars contain the cancer staging protocols for all the types of cancer discussed.
PLANTAR WARTS VS. CALLUSES

Plantar warts often look like simple calluses (the thick skin that grows on areas of the feet that is subject to a lot of wear and tear). The problem is that while people may file or trim off their calluses with no ill effects, to do the same with a plantar wart risks having the wart virus spread all over the foot, leading to more growths until it becomes impossible to walk without pain.

Massage therapists are in a unique position to observe their clients’ feet and notice the subtle differences between plantar warts and calluses. They may be able to give clients guidance about getting the right kind of care.

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>PLANTAR WARTS</th>
<th>CALLUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Anywhere/plantar surface of foot. Usually not bilateral.</td>
<td>Appears in areas of wear and tear, especially back of heels and lateral aspect of feet. Callus usually grows in a similar pattern on both feet.</td>
</tr>
<tr>
<td>Appearance</td>
<td>May be white, but with darker speckling under thickened skin; this is the capillary supply.</td>
<td>Thick, white skin.</td>
</tr>
<tr>
<td>Sensation</td>
<td>Very hard and unyielding, like stepping on a pebble.</td>
<td>No particular sensation.</td>
</tr>
</tbody>
</table>

### Notable Cases

Discover examples of public figures affected by a specific condition.

#### NOTABLE CASES

It is rumored that the original draft of Das Kapital was spattered with bloodstains from Karl Marx’s lanced boils. Many well-known athletes, including Peyton Manning, have had serious staph infections. Michael Jackson had a “MRSA-type” infection after a facial surgery.

### Compare and Contrast

These charts line up similar conditions for a side-by-side comparison.

#### CASE HISTORY 31 | WHIPLASH, THE CLIENT WHO SNEEZED

A massage therapist met with a first-time client approximately one year after the client was in a car accident. The client was still in considerable pain. He was referred with whiplash and was seeking massage under prescription from his doctor.

The therapist worked slowly and carefully and was encouraged by the client to go deeper into his neck muscles, all the way down to the transverse processes of the neck vertebrae. He felt better after the massage. His muscles were looser, and he had an improved range of motion.

Several hours later, the client sneezed. The force of the motion startled the therapist. The client said that he was in greater pain and more spasm and had much less range of motion than he had had before his massage. He returned for another session, but it was ineffective at reducing his pain and dysfunction.

He never sought massage again.

What is the lesson here? It is utterly and definitely whether the first massage put the client at risk for re-injuring himself just by sneezing. The therapist followed all the rules of good sense, worked with a doctor’s recommendation, and the client gave her about how much pressure felt comfortable. Yet it is necessary to entertain the possibility that the massage somehow did put the client at risk, even though the therapist was well informed and made what seemed to be the right decisions.

### Case Histories

Read stories about people who share a personal experience of living with a specific condition.

### Cross-references

Throughout the text, certain condition names are highlighted like this, indicating a topic that appears elsewhere in this textbook. Interested readers can find the relevant conditions and make connections to the discussion at hand.

### Explore and Apply

You’ll find chapter review questions in the Explore and Apply section at the end of each chapter. The questions are written at three levels of complexity:

- The first level, “Receive and Respond,” checks for basic understanding.
- Next, the “Application of Concepts” questions invite you to think about your knowledge in the context of real-life practice.
- Finally, the “What Would You Do?” questions are intended as open-ended discussion prompts to promote the integration of what you learn in pathology, business, ethics, and other parts of your massage therapy education.

These chapter review questions help to reinforce key concepts in multiple choice, matching, and short-answer formats and can be used as student assignments, study recommendations, or small group activities.

You’ll also find a list of Suggested Activities to help deepen your understanding of the material.
Chapter 1: Fundamental Concepts in Pathology

Chapter 1 introduces the language and the basic concepts that frame our discussion of pathology. Here you will find Greek and Latin word roots, basic vocabulary, a discussion of adverse effects and evidence-informed practice, a discussion of pathogens and their mechanisms, hygiene for massage therapy settings, and an overview of the inflammatory process. Chapter 1 also introduces specific aspects of critical thinking and practical application of knowledge and skills that will be reinforced throughout the text.

Chapters 2–11: The Systems and Associated Conditions

Chapters 2 through 11 are organized by body systems. Each chapter begins with an overview of how the system works when it is healthy to provide a context for what happens when disease or injury occurs. Then each condition is discussed with its definition, pathophysiology, signs and symptoms, treatment options, as well as the medications likely to be used to treat it. Additional discussions might include types of the conditions and possible complications. You will also find:

• “Meet Ms. Lee . . .” At the beginning of Chapters 2–11 readers are introduced to a client who lives with some combination of conditions to be covered in that chapter.

• In the Critical Thinking, Practical Application section at the end of the chapter you will be invited to form a session plan with carefully analyzed decisions about massage therapy or bodywork for that client. This exercise will give you a chance to use the information in the chapter to develop your critical thinking skills about how you will put that knowledge to work.
**Apply What You Know.** At the conclusion of every pathology topic you will find the feature, **Apply What You Know,** which contains a discussion of comparative risks and benefits regarding massage therapy in the context of the pathology, along with some specific ideas for appropriate client accommodations. If relevant research is available, a brief synopsis of that research will be found here, with notes to the articles cited at the end of each chapter.

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**Chapters 12: Cancer Concepts**

Although various types of cancer are covered in other chapters, Chapter 12 is solely dedicated to a discussion of massage therapy in the context of cancer in general. This chapter looks at the process of metastasis, what treatment options are available for cancer patients, and describes when and how massage therapy applications must be adapted for the special challenges of these diseases and their treatments.

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**Appendices**

**Additional Pathologies—At a Glance** (Appendix A) provides thumbnail sketches of about 100 conditions and subtypes that are not often seen in everyday practice but have some important relevance for massage therapists.

These helpful appendices are available as online resources:

- **Research Literacy** (Appendix B) picks up on themes introduced in Chapter 1 with guidance for how to become a research-literate professional, and how to use those skills to achieve the best possible client outcomes.

- **Medications** (Appendix C) is fully revised and updated, with emphasis on medication side effects and strategies for appropriate massage therapy accommodations.

- **Massage Therapy in Hospitals and Other Health Care Settings** (Appendix D) is an introduction to working in clinical situations. It covers basic concepts; it provides guidelines for integrating massage therapy with conventional medical care; and it prepares readers for further education in this important specialty.

**Glossary**

Don’t get stuck on unfamiliar words—consult the full glossary with definitions of key terms.
ONLINE RESOURCES FOR STUDENTS

Additional resources to support your learning in each chapter are available online in the “For Students” section at booksofdiscovery.com.

Videos View videos from each chapter to see the author simplifying complex ideas and providing a context to deepen your understanding.

Answers to Chapter Review Questions Check your progress with the answers to Chapter Review Questions.

Practice Intake Forms Practice critical thinking and session planning skills with intake forms from actual clients.

Bibliography Learn more about any given topic from the complete online bibliography.

Audio Glossary Discover how to correctly pronounce key terms and pathologies.

Suggested Readings Find a list of suggested readings to further your pathology education.

ONLINE RESOURCES FOR INSTRUCTORS

A Massage Therapist’s Guide to Pathology and its supporting materials have been configured to make teaching pathology as successful, satisfying, and rich as possible. The text can guide students from a basic pathology vocabulary up through complex session planning, with your help to identify the key decision-making points along the way.

PowerPoint PowerPoint slides are organized by chapter or by topic, so you can customize your own slide deck for each class.

Image Library Art from the text is available in an easily downloadable format.

Test Bank The Test Bank is thoroughly revised and updated, and contains over 1,000 items. Questions address each topic in the book and are written at two levels of complexity: Level 1 questions assess the retention of basic concepts, while Level 2 questions focus on application of knowledge. You can choose a selection of questions for a quiz or test. You can also use items from the Test Bank as independent study assignments to help reinforce material that is not addressed during class time.

Curricula Two syllabi with suggestions for both 40-hour and 60-hour pathology courses are provided for educators or school programs looking for guidance in building a usable teaching guide.

All of the teaching ancillaries coordinate with ELAP recommendations for curriculum development and assessment. You’ll also find a chart laying out ELAP recommendations for pathology education and where that content is located in A Massage Therapist’s Guide to Pathology.
Osteoporosis

Definition: What Is It?
Osteoporosis literally means “porous bones.” In this condition, calcium is pulled off the bones faster than it is replaced, leaving them thin, brittle, and prone to injury.

Demographics
Osteoporosis has been diagnosed in about 10 million Americans, but about 43 million others have a silent pre-osteoporotic condition called osteopenia. Women with osteoporosis outnumber men by about 4 to 1, for a variety of reasons. It is estimated that about 30% of postmenopausal women in the United States and Europe are at risk for osteoporosis, and about 40% of them will have at least one osteoporosis-related fracture in their lifetime.

Osteoporosis is more common among Caucasians and Asians than among other races. This condition is usually diagnosed in people older than 60, but it is closely tied to events, habits, and activities of earlier years.

In the United States, about 2 million hip, spinal, and wrist fractures are identified as complications of osteoporosis each year. These events lead to over 400,000 hospital visits and 180,000 nursing home admissions every year.

Primary osteoporosis is almost exclusively seen in mature adults, unless a genetic condition or other problem interferes with bone density in childhood. Young people who fail to achieve good bone mass by early adulthood are very much at risk for problems with bone thinning later in life.

Pathophysiology: What Happens?
Bones are composed of hard mineral deposits (mostly calcium phosphate) formed on an organized scaffold of collagen fibers. The volume of mineral deposits determines bone density. People normally accumulate most of their bone density by about age 20, but small gains are made until around age 30 to 35. After that point, either density is maintained at a stable level, or withdrawals are made from this “calcium bank.” The turnover of mineral deposits happens constantly, but this activity occurs in trabecular bone at a higher rate than in cortical bone. Osteoporosis develops when calcium is withdrawn from bone tissue faster than it is deposited.

Risk factors for osteoporosis are typically described as controllable or noncontrollable. Noncontrollable factors include gender (women are more at risk because of childbearing and breast-feeding, as well as having smaller bones to begin with); age; body size (smaller people are more at risk than are larger ones); ethnicity; and family history. Controllable risk factors include hormone levels, levels of calcium and vitamin D, medications, sedentary lifestyle, diet, and cigarette and alcohol use.

Osteoporosis can be the consequence of some other medical conditions, including diabetes, anorexia or bulimia, problems with absorption in the gastrointestinal tract, and hyper- and hypothyroidism. Rheumatoid arthritis and chronic obstructive pulmonary disease can cause it. Dangerously weak bones are also a common and serious side effect of both radiation and the drugs used to treat many forms of cancer.

Logically, high calcium consumption should lead to high bone density, and high bone density should be linked to a low risk of osteoporosis and bone fractures. However, many factors beyond calcium influence bone health, including the accessibility of other vitamins and minerals, exercise habits, pH balance in the blood (especially as it is influenced by protein consumption), other diseases, medications, and even emotional state. The factors that help to determine a person’s risk for osteoporosis boil down to variables in calcium absorption, calcium loss, and bone density maintenance.

- Calcium absorption. Calcium requires an acidic environment to be absorbed into the bloodstream. When the secretion of hydrochloric acid is reduced with age, it becomes harder to absorb dietary calcium.

Some vitamins influence how the body uses calcium. Vitamin D controls absorption and retention of this
important mineral. The body synthesizes vitamin D in response to direct sunlight (it takes about 15 minutes of exposure per day, depending on latitude), but vitamin D can also be easily supplemented. Vitamin K, found in many dark, leafy greens, also supports calcium absorption. Preformed vitamin A, however, can increase the risk of fractures if it is consumed in high quantities.

Some other substances also interfere with calcium uptake, including oxalates (found in spinach, chard, chocolate, and some other foods); alcohol; and insoluble fiber.

- **Calcium loss.** Calcium is constantly lost in sweat and urine. Some substances, specifically proteins, cause high levels of calcium to be excreted in urine. Diets high in salt are also associated with accelerated calcium loss.

  The onset of menopause is another big factor in calcium levels. Low estrogen secretion causes osteoclasts to speed up, and osteoblasts to slow down. Ultimately women can lose 30%–40% of their cortical bone and up to 50% of their trabecular bone density over a lifetime.

  Several other factors can lead to calcium loss. High caffeine consumption (more than three or four cups of coffee or servings of caffeinated soda per day) has been seen to have a negative impact. Other factors include medications (chemotherapeutic agents, corticosteroids, some diuretics, anticonvulsant drugs); hyperthyroidism; heavy alcohol use; smoking; inflammatory bowel disease (Crohn’s disease, ulcerative colitis); a history of eating disorders; and endocrine disorders, including Cushing’s syndrome, low testosterone, and low estrogen.

- **Bone density maintenance.** The shape and density of bones are determined by the activity of osteoclasts and osteoblasts. These cells work to remodel bones according to the commands of calcitonin, parathyroid hormone, estrogen, and progesterone. If hormones tell the osteoclasts to work faster than the osteoblasts, bone density declines. Osteoblasts and osteoclasts are most active in trabecular bone, which is found in epiphyses of long bones and in vertebral bodies. The loss of key struts of calcium deposits in these areas can cause bones to collapse.

Bones are not the only part of the body that needs calcium. Calcium is consumed in nearly every chemical reaction that results in muscle contraction and nerve transmission, and it is essential to blood clotting. It also works as a chemical buffer to help maintain proper pH balance in the blood. The body has a strict prioritizing system for these important functions: Chemical reactions that promote moment-to-moment survival are more important than maintaining the density of the vertebral bodies or femoral neck. Therefore, if blood levels of calcium are low, these bones give up some of their mineral structure to correct that shortfall.

When a person develops osteoporosis, it is usually because the balancing act between calcium absorption, calcium loss, and bone density maintenance is upset, so the calcium in the bones is pulled off faster than it is replaced. The bones, especially in the spine and femur, become progressively less dense, leaving the person vulnerable to the main complications of this disease: spinal or hip fractures (Figures 3.7–3.9).

**Signs and Symptoms**

Osteoporosis has no symptoms in its early stages. People who are at particularly high risk may undergo testing to try to identify it early, but it is often missed until complications, specifically fractures, develop.

Symptoms of osteoporosis center on pathologically weak bones. Thinned or collapsed vertebrae lead to a loss of height and the characteristic rounded “widow’s hump” of hyperkyphosis. Chronic or acute back pain appears

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**NOTABLE CASES**

Many celebrities have shared their osteoporosis experiences with the public, including actresses Sally Field, Blythe Danner, and the late comedian Joan Rivers. Several influential men have had this condition as well, including Pope John Paul II, Winston Churchill, Clarence Darrow, and very possibly Benjamin Franklin.
in this stage as the vertebrae continue to degenerate. Pain is worse with activity; it can be relieved by lying supine. Spasm of the paraspinal muscles is common, and patients may greatly limit their activity, even to becoming bedridden, to avoid exacerbating their discomfort.

**Complications**

People with osteoporosis are prone to fractures with little or no cause; these are called spontaneous or pathological fractures. Hips (usually the femoral neck rather than the ilium), vertebrae, and wrists are particularly vulnerable to breakage. Brittle ribs are often associated with osteoporosis due to corticosteroid use. And since in advanced age people are naturally low on both living osteocytes and growth hormone to support the healing process, it is difficult to recover from any injury of this severity. Most elderly people who break a hip due to osteoporosis never return to their pre-fracture levels of activity.

**Treatment**

Once osteoporosis has been recognized and rated for severity, a number of treatment options are available to keep it from getting worse. Pharmaceutical interventions include hormone replacement therapy to influence estrogen or calcitonin; bisphosphonates; selective estrogen receptor modulators (SERMs); and some others. None of these interventions is risk free, however, and osteoporosis patients must weigh risks and benefits of these medications carefully.

Exercise is almost always a part of the osteoporosis treatment strategy. Since bone remodels according to the stresses placed on it, weight-bearing stress ensures that maintaining healthy mass is a high priority. Diet also plays an important part in dealing with osteoporosis. Specific vitamins and other substances may improve calcium uptake, even for postmenopausal women, but that subject is outside the scope of this book.

**MEDICATIONS**

- Vitamin and mineral supplements, including calcium, vitamin D, and others
- Hormone replacement therapy (including calcitonin) to slow bone loss
- SERMs to slow bone loss
- Bisphosphonates to slow bone loss
- Parathyroid hormone analogues to accelerate bone growth
• RANK ligand inhibitors to interfere with osteoclast formation

**Prevention**

It is possible to prevent osteoporosis, feasible to slow it down or halt it, and difficult to reverse it. The causes of this disease vary, but they center on one theme: The time to build up calcium reserves is in youth and early adulthood. The skeleton grows in height until about age 20, but it continues to accumulate density until about age 30. After that point, it either stays stable or progressively demineralizes. Four key steps are recommended to achieve and maintain optimal bone density and avoid osteoporosis:

- **Get dietary calcium from absorbable sources.** Low-fat dairy products are convenient, but not the most efficient source for some people. Other recommended calcium sources include dried beans and greens: legumes and most green leafy vegetables. (Spinach and chard, while rich in calcium and other nutrients, also have oxalates that limit calcium absorption.) Calcium supplements vary in absorbability; calcium carbonate, calcium phosphate, and calcium citrate are generally recognized to have good accessibility.
- **Exercise.** Weight-bearing stress makes it necessary for the body to maintain healthy bone density.
- **Get vitamin D.** The Recommended Dietary Allowance for vitamin D is 200 units, or 5 μg/day. This can be ingested in supplement form or naturally synthesized by exposure to sunlight.
- **Avoid substances and behaviors that pull calcium off bones.** These include tobacco use, a lot of salt, too much protein, and excessive caffeine and alcohol.

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**Postural Deviations**

**Definition: What Are They?**

Although it is tempting to think about the spine like a strong, rigid ship’s mast, a column, or a tent pole held erect by muscular tension, it is actually much stronger than any of those. Healthy curves in the cervical, thoracic, and lumbar regions give the spine much more resistance to force and weight-bearing stress than it would have if it were straight. However, sometimes these curves are overdeveloped, which reduces resiliency and strength rather than enhancing it. Hyperkyphosis (humpback); hyperlordosis (swayback); and scoliosis (S, C, or reverse-C curve); and rotoscoliosis (scoliosis with a twist) are the specific postural deviations addressed here (Figure 3.10).

**Pathophysiology: What Happens?**

Postural deviations occur when the spine’s normal curvature is over-exaggerated or moves out of normal planes enough to cause problems. Mild forms may not cause any visible signs or impairment in function, but more severe cases can interfere with pain-free movement and overall function.

The causes of most postural deviations are not fully understood. As we explore this problem, we may find that causes are tied to multiple factors, including bone density, environmental exposures, genetic predisposition, and

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**OSTEOPOROSIS**

**Risks**

The primary risk for a person with osteoporosis who receives massage is that a fracture may occur because of undue pressure or problematic positioning on the table. It is important also to remember that elderly clients are unlikely to have only one pathology; this is a population that may have several problems in addition to osteoporosis that influence bodywork choices.

**Benefits**

Massage therapy won’t reverse osteoporosis, but it can be a helpful intervention for pain and limited range of motion. Any work that respects a client’s fragility while working for pain relief is safe and appropriate.

**Accommodations**

Clients with osteoporosis may need imaginative bolstering to create a setting in which it is safe and comfortable to receive massage. Pillows, bolsters, rolled-up towels, or other tools may be needed to firmly “nest” them into the table for maximum comfort. In addition to extra bolstering, clients with osteoporosis may benefit from having extra help getting on and off the table.

**Research**

Guo et al. report on a case in which an elderly man sustained a broken lumbar pedicle after receiving a back massage. This supports considering osteoporosis as a risk when working with older clients. On a happier note, some evidence indicates that even a single skilled massage may help elders with balance and postural stability, thus helping to prevent falls, which are a big risk for people with osteoporosis.

See citations 1–2 at the end of the chapter.