How To Use This Book

*Trail Guide to the Body* has seven chapters, six of which focus on different regions of the body. The topographical contours that can be seen on the surface of the skin and exercises to explore the skin and fascia are outlined first. These are followed by the bones and bony landmarks (the bone's hills, dips and ridges). The bony landmarks can be thought of as "trail markers." They are used as stepping-off points to locate muscles and tendons. Finally, other structures, such as ligaments, nerves, arteries and lymph nodes, are accessed.

Wherever possible, a region's bony landmarks have been strung together to form a trail (0.1). These trails are designed to help you understand the connections between structures. Without a path to follow, you, the traveler, would be lost in a jungle of flesh and bones with no idea of your trail's location. You and your travel partner will find the journey more enjoyable and valuable if you have a trail to lead you to your destination point.

Since bodies come in a variety of sizes and shapes, it might seem unrealistic that one trail guide could apply to all of them. If the terrain is never the same, what is the use of a map? Even though the topography, shape and proportion of each person are unique, the body's composition and structures are virtually identical on all individuals. The differences are simply qualitative. It is easy to find many structures on a person with a slender build and more challenging on a physique with bulky muscles or a large amount of adipose (fatty) tissue (0.2).

*Trail Guide to the Body* is designed around the following scenario: You follow along with the text and palpate on a partner (friend or classmate) who is on a bodywork table or seated in a chair. If you are a student, you are advised to proceed step by step, repeat certain methods when necessary, and explore the body along the way. If you are a more experienced practitioner, you may want to pick and choose your destinations.

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0.1 A bony landmark trail of the shoulder

- a  Spine of the scapula
- b  Medial border
- c  Superior angle
- d  Inferior angle
- e  Lateral border

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Each of us has a different body type ...  

... yet, even though our bodies are shaped differently ...  

... we all have the muscles, bones and other tissues described in *Trail Guide to the Body.*

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The procedures outlined in *Trail Guide to the Body* are gentle and rarely uncomfortable, yet it is best to practice on an individual with no serious health conditions. Your partner may either wear loose, thin clothing or be undressed and draped under a sheet to enable you to palpate more easily.

Sometimes your partner will be asked to lie or sit passively on the table. At other times, she may be asked to move a limb, bend a joint or contract a group of muscles. These movements should be done smoothly and according to the specific instructions of the text to enable you to explore the region thoroughly.

Talk to your partner before palpating so she will understand her role. Also, clarify beforehand which areas of the body you would like to palpate and explore so she will know what to expect.
**Sternocleidomastoid**

The sternocleidomastoid (SCM) is located on the lateral and anterior aspects of the neck. It has a large belly composed of two heads: a flat, clavicular head and a slender, sternal head (5.33). Both heads merge to attach behind the ear at the mastoid process. The carotid artery passes deep and medial to the SCM; the external jugular lies superficial to it.

- **Unilaterally:**
  - Laterally flex the head and neck to the same side.
  - Rotate the head and neck to the opposite side.
- **Bilaterally:**
  - Extend the neck.
  - Flex the neck.
  - Assist in inhalation.

**Sternal head:** Top of manubrium

**Clavicular head:** Medial 1/3 of clavicle

**Mastoid process of temporal bone,** lateral superior nuchal line of occiput

**C(1), 2, 3**

1. **Supine with practitioner at head of table.** Locate the mastoid process of the temporal bone, the medial clavicle, and the top of the sternum.
2. **Draw a line between these landmarks to delineate the location of the SCM.** Note how the two SCMs form a "V" on the front of the neck.
3. **Ask your partner to raise her head very slightly off the table as you palpate the SCM.** It will usually protrude visibly (5.35).

**With your partner relaxed, can you grasp the SCM between your fingers and outline its shape?**

**Pronunciation and etymology of anatomical terms**

**Look for Mr. Bones** sharing cautionary advice or other helpful hints

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**Key**

- **Name of structure** (icon indicates if it is on the DVD)
- **Introduction** describing a structure's function, depth and relationship to other structures
- A list of the **Action, Origin, Insertion and Nerve innervation of the muscle**
- **Illustration showing the Origin and Insertion**
- **Step-by-step instructions on how to palpatate a structure**
- **"Check It" questions will confirm your location.** They may ask you about your location in relation to a nearby structure or ask you or your partner to create a movement. Unless otherwise indicated, the answers to the questions should be, "Yes!"
- **Alternative palpatory routes**

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**Look for the small yellow boxes showing the position of you and your partner. Check out all the boxes for palpation tips, comparative anatomy and other curiosities**

**The techniques described in Trail Guide to the Body should be viewed as helpful tour guides. When first palpating, it is best to follow the specific instructions. After you have located a structure, it is recommended that you adapt and explore other methods to find the approach that works best for you. Wherever possible, an optional method for locating a structure has been included. As with any worthwhile journey, veering off course to explore other areas often leads to wonderful discoveries. Please feel free to veer.**
Palpation Hints

Palpation means “to examine or explore by touching (an organ or area of the body), usually as a diagnostic aid.” It is an art and a skill which involves 1) locating a structure, 2) becoming aware of its characteristics and 3) assessing its quality or condition so you can determine how to treat it.

The first two aspects of palpation—locating and being attentive to the body’s structures—require a thorough knowledge of functional anatomy and experience through mindful, hands-on practice. This is the focus of Trail Guide to the Body. Assessment—the third aspect of palpation—is a vast subject requiring a book of its own.

As an experience involving all the senses, palpation requires receptive hands and fingers, open eyes, listening ears, calm breath and a quiet mind. As you explore the terrain and texture of the body, be sure to bring along all of your sensing tools.

Making Contact

Let your hands and fingers be responsive and sensitive. Relaxed, patient hands will allow the body’s contours, temperature and structures to come more easily into your awareness.

For greater sensitivity and stability, try laying one hand upon the other, using the top hand to create the necessary pressure, while the bottom hand remains relaxed (0.3). This will allow the bottom hand to stay receptive as the top hand directs movement and depth.

Smaller structures can be located by using one or two fingertips (0.4). Larger structures are best palpated with your whole hand. By sculpting out all of the sides and edges, full-hand contact helps to define the complete shape of a region or structure and also allows for a greater understanding of the interrelationships of structures (0.5). When palpating, you may want to close your eyes (0.6) periodically to enhance your awareness.
Working Hard vs. Working Smart

Often in the excitement of trying to locate something (whether it be a muscle or a set of car keys), you search so earnestly that your mental and physical awareness begins to diminish. Frustration arises, your breath stalls and your hands ultimately become insensitive. You begin to work hard. Instead of working hard, you can work smart by reading the information about the structure before you palpate. Also, as you palpate, visualize what you are trying to access and verbalize to your partner what you are feeling.

Work smart by first locating the structure you wish to palpate on your own body before palpating it on your partner’s. Self-palpation will improve your kinesthetic understanding of what you are looking for on your partner. Also, read the information aloud. Hearing the language as you are reading the text will improve your understanding and retention of the information.

Lastly, be patient with your learning process. Allow yourself to “make a wrong turn and get lost” on the body. Chances are you are close to what you are seeking. By letting your senses recognize the body’s trail signs, you will get to where you want to be.

Less Is More

As you begin exploring the body, you might not be able to access things as readily as you wish. A common reaction is to press harder and deeper with your hands and fingers; however, instead of pushing into the muscles and other tissues, try to invite the tissues into your hands. Gentle contact will allow your hands to be sensitive, while excessive pushing only numbs the fingers, making for an uncomfortable experience for your partner (0.7).

Even deep structures are best accessed with mild pressure. Paradoxically, the deeper you move into the body, the slower and softer your touch needs to be. Ultimately, palpation at different levels of the body is not a question of pressure, but of intention. Having a clear intention as you seek out various structures will make for an easier, smoother journey.
Rolling and Strumming

When outlining the shape or edge of a bone, try rolling your fingers or thumb across, rather than along, its surface. This is similar to checking the sharpness of a knife by sliding your finger across the blade. Do the same with the ropy fibers of muscle tissue. Like strumming the strings of a guitar, this method will help you ascertain the muscle’s fiber direction and tensile state (0.8).

Movement and Stillness

If you were to compare the texture of newspaper with rough sandpaper, you would naturally want to rub your fingers across their surfaces. In contrast, when you lay your hand on an expectant mother’s abdomen, hoping to feel the fetus move, you naturally keep your hand still and quiet. Similarly, when you want to determine the fiber direction of a muscle or sculpt the shape of a bone, move your hands along its surface (0.9). However, when you want to feel a muscle contract or a bone move, keep your hands still and follow the movement. Put simply, if the structure you are palpating is stationary, move your hands across it; if it is moving, stay still.
Movement as a Palpation Tool

Throughout the text, you will be asked to create specific movement on a partner's body with or without that person's help. These movements will help to verify the location of structures as well as any changes occurring in the tissues as a result.

![Image of active flexion and extension of the elbow](image)

**Active movement** is performed by your partner. He actively moves his body while you palpate or observe the movement. For example, the text may say, "Ask your partner to slowly flex his elbow while you palpate his biceps brachii muscle." All active movements performed by your partner should be slow and smooth—as changes in tissue are difficult to follow during fast, jerky motions (0.10).

Sometimes you be instructed to ask your partner to contract and relax a muscle. For example, "To feel the forearm flexors, lay your hand on your partner's forearm and ask him to alternately flex and relax his wrist." The on-and-off aspect of this technique will not only help you locate muscles and tendons, but will also give you the opportunity to feel the difference between contracted and relaxed tissue.

![Image of resisted flexion of the elbow](image)

**Resisted movement** requires both of you to act: Your partner attempts to perform an action against your gentle resistance. For example, "To feel the elbow flexors contract, ask your partner to flex his elbow against your resistance" (0.12). As he meets the gentle resistance of your hand, no movement will occur at your partner's elbow. In this text, resisted movements are used to distinguish and compare the lengths, shapes and edges of different muscle bellies and tendons.

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An adult has over 600,000 sensory receptors in the skin—more nerve endings than any other part of the body. The fingertips are among the most sensitive areas, with up to 50,000 nerve endings every square inch. The fingertips are so sensitive that a single touch sensor can respond to a pressure of less than 1/1,400 of an ounce—the weight of an average house fly.

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**Passive movement** is the opposite of active movement: Your partner relaxes while you move his body. For example, when the text says, "Passively abduct and adduct the shoulder," you will move the arm while your partner remains passive and allows the action to occur (0.11).
Leonardo da Vinci (1452-1519), who dissected bodies secretly at night, was the first to depict his anatomical findings. His anatomical illustration, laid out in over 750 drawings, is not only detailed and accurate, but also reveals many of the structural variations that can be seen when comparing bodies.

The anomalies shown in the drawings were not a case of Leonardo the artist dominating Leonardo the scientist; as a true Renaissance man there can be little question that he drew exactly what he saw in the cadavers. The structures of the human body do not always conform to the standard anatomical model. Structural differences have been recorded in almost every muscle, bone, major blood vessel and organ in the body. Recognizing that the guidebook may not always coincide exactly with the geography of a particular body will help to prevent confusion and possible frustration.

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**When in Doubt, Ask the Body**

While palpating, you may be confused or have questions about the body’s structures and their whereabouts. **When in doubt, ask the body you are palpating.** For example, you may wonder, “What skinny tendon is this I see running along the top of the foot?” (0.13) The best advice would be to follow it in both directions and see where it leads you. If it runs from the big toe to the ankle and becomes taut when the toe is extended, it is the tendon of extensor hallucis longus (p. 378). **Always remember, you are never alone; the body is waiting to help you.**

All of the structures outlined in Trail Guide to the Body with their Latin or Greek names, unique shapes and buried positions, are inside you, your partner and your patients. These structures have been there for years waiting for you to discover them. Have faith and you will be able to locate them.

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**Three Principles of Palpation**

1. Move slowly. Haste only interferes with sensation. 2. Avoid using excessive pressure. Less is truly more. 3. Focus your awareness on what it is you are feeling. In other words, be present.

Also, you can practice your palpation skills on yourself at any time. Yes, you may get a few curious glances, but daily routines such as waiting in line or riding the bus are wonderful opportunities to explore the malleable skin, tiny bones and sinewy muscles of your forearms and hands.
Creating Your Palpatory Journal

Do you remember the first movie you ever saw? How about that initial bite (what would soon become) your favorite food? Chances are that these encounters created lasting impressions. You might recall details of later films or subsequent helpings of that scrumptious dish, but over time your senses and memory of those secondary encounters probably diminished.

Learning to palpate is no different. Our initial hands-on experiences can cast long shadows over future encounters. For example, exploring the shape, density and fibers of the deltoid muscle for the first time can be formative. But as you become more familiar and less surprised by the muscle, later encounters will leave less of an impact.

The repetitive practice involved with learning a new skill, such as the martial arts, dance or palpation, requires constant presence of the mind and body. It’s a difficult journey, but an invaluable one that can be enhanced by creating a palpatory journal. Like a personal diary, your journal is a chronicle of your hands-on experiences. You could store your palpatory stories in your head, but it’s certainly more effective to record them in a small notebook or on your computer.

Initially, your journal remarks may be broad and undefined. "The deltoid was tight." "The hamstrings felt ropy." As your palpatory instinct develops greater awareness of the body’s nuances, so will your ability to articulate your findings. "I was able to shift the fascia of the upper chest caudally but not laterally." "Left iliotibial tract was inseparable from vastus lateralis. Hypertonicity was an eight on a scale from one to ten."

Your notebook can also include impressions, ideas, questions and correlations. For example, "This week I palpated several different gastrocnemius muscles and noticed that four were particularly tender and had limited range of motion. Is this common or just coincidence?" Or "sixty-seven-year-old male: The superficial fascia surrounding his hamstrings felt like bubble wrap. I’ve noticed this with two other seniors."

Of course, journaling is a “head-based” activity and palpation is strongest when it is connected to the hands, heart and gut. You may want to abandon words altogether and, instead, use colored pens to draw your experiences, or speak your findings into a small tape recorder. The best part is that there are no right or wrong answers.

Over time, whether you have explored the tissues of twenty or two hundred individuals, your journal will begin to fill with your thoughts and findings. Your palpatory journal will have evolved into something else—a memoir where you can read through and reflect on all of your adventures.

Palpating a variety of bodies in succession can create an unparalleled hands-on experience. This can be easily accomplished with a "round robin," where you rotate with others to palpate a series of people. Classroom settings (above), study sessions with friends or even social gatherings offer opportunities for a round robin. The key to a productive round robin is maintaining awareness of the similarities and differences you are feeling from one person to the next.

Introduction | 9
Exploring the Textural Differences of Structures

This section is designed to help you identify and compare the physical characteristics of the various structures and tissues in the body. Understanding the textural differences between structures will help you to determine which techniques to apply on a particular body part in your hands-on practice.

Following are descriptions of various structures in their "normal," healthy condition. The tissue's basic structural design will be identical on everyone, but, of course, the particular quality or feel of a tissue will be as unique as the individual you are palpating. For example, a long-distance runner may have lean, sinewy bands of muscle tissue while an individual leading a sedentary lifestyle may have a very different quality to his muscles. Although the feel of the muscle tissue is different, its design and composition are the same.

**Skin**

Although often regarded as merely the body's covering, the skin is, in fact, the largest organ of the body (0.14). On an adult male, the skin can cover a surface area of nineteen square feet and weigh nearly ten percent of the total body weight. The skin averages about 1/20 of an inch in thickness, with the eyelids having the thinnest skin—less than 1/500 of an inch. The skin is intimately connected with the superficial fascia and deeper tissues, and its texture, thickness and flexibility vary throughout the body.

For example, palpate the skin on the back of your hand. Note its thin, delicate and pliable quality. Then turn your hand over and explore the palmar surface. Here the skin has a thicker, tougher layering.

**Bone**

Bones and bony landmarks (the hills, valleys and bumps on the surface of bones) are easy to distinguish from other tissues because they have a solid feel. Of course, the bones shift along with their surrounding structures during movement.

Sometimes other structures can feel like bone; for example, when a muscle contracts against resistance, its belly and tendons become very hard. Ligaments also can have a particularly solid quality. The shape and rigidity of bones and bony landmarks are constant, unlike muscles, which can transform from a soft to a hard state and back again.

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**You and Mr. Bones**

Most anatomy classrooms are haunted by a human skeleton. Hanging from a hook or set on a stand, it is most likely plastic, since real skeletons are difficult to dig up these days (which is how they were often acquired in anatomy's scandalous past). Real or not, close examination of a skeleton with your eyes and hands is an opportunity not to be missed. Why? Because palpation, to a large degree, is all about visualization. So, whenever you get a chance to spend some quality time with Mr. Bones, take it. After inspecting its pelvis and other features, you might discover that Mr. Bones is actually Mrs. Bones!
Muscle

Skeletal muscle, the voluntary contractile tissue that moves the skeleton, is composed of muscle cells (fibers), layers of connective tissue (fascia) and numerous nerves and blood vessels.

A muscle's infrastructure is similar to that of an orange: A broad sheet of fascia encases the whole fruit, deeper layers of fascia separate the orange into "wedges" (the portions you eat after peeling) and, finally, a thin coating of tissue surrounds each individual, tiny "bud" of fruit (0.15).

If we then apply this analogy to a muscle, a layer of fascia (epimysium) encases the muscle "belly," a deeper layer (perimysium) wraps the long muscle fibers into bundles and, finally, each microscopic muscle fiber is bound in fascia (endomysium) (0.16). Unlike an orange, however, a muscle's layers of connective tissue merge at either end of the muscle to form a strong tendon. The tendon attaches the muscle to a bone.

Muscle tissue has three specific physical characteristics which help to distinguish it from other tissues. First, muscle tissue has a striated texture—similar to a plank of unsanded wood. This is different from tendons, which have a smoother feel. The fibrous quality of a muscle belly is caused by bundles of muscle fibers running in a particular direction.

In order for a specific movement to occur, muscles have to play particular roles. A muscle (or group of muscles) that carries out an action is called the agonist, while a muscle that supports the agonist is called a synergist. A muscle that has an opposite action of the agonist is called an antagonist. So when you dorsiflex your ankle (p. 31), the agonist is the tibialis anterior. It is supported in this movement by two synergists, the extensor digitorum longus and extensor hallucis longus (p. 378). Playing the role of antagonists to the tibialis anterior are the gastrocnemius and soleus (p. 371). Conversely, when you plantar flex your ankle (p. 31), the roles reverse: Now the agonists are the gastrocnemius and soleus, the synergists are the other plantar flexors of the ankle and the antagonists are the tibialis anterior, extensor digitorum longus and extensor hallucis longus.
Second, the direction of the muscle fibers can be used to determine the specific muscle you are palpating. Depending on the shape and design of a muscle (see box below), the direction of its fibers may be parallel, convergent or diagonal. For example, the erector spinae muscles (p. 196) have vertical fibers that run parallel to the spine. Identifying their fiber direction can help you distinguish the erector spinae from the oblique and horizontal fibers of the other back muscles.

Lastly, muscle tissue is unique because it can be in a contracted or relaxed state. When a muscle is relaxed, it often has a soft, malleable feel; when contracted, it has a firm, solid quality. As the tension in muscle tissue changes, surrounding tissues like tendons and fascia also change, becoming taut or loose.

How can you palpate a muscle that is deep to a superficial, overlying muscle? In some areas, the overlying muscle can be shifted to the side. At other times, you can slowly compress your fingerpads beyond the superficial muscle into the deeper tissues, using the different textures and fiber directions as guides. This is similar to palpating through your sweater, shirt and skin to access a muscle in your arm.

Discover the three distinguishing features of muscle tissue by palpating your biceps brachii—the muscle on the front of the arm (0.17). Keep your arm relaxed and feel for the biceps' ropy fibers. Note how its fiber direction runs distally (down the arm). Then contract and relax the biceps and sense how it tightens into a solid mass and relaxes into a soft wad.

Muscle bellies have a variety of designs and shapes. Parallel muscles, as their name suggests, have long muscle fibers that run parallel to the length of the muscle. Pennate muscles have shorter fibers that run obliquely to their tendons.
Tendon

Tendons attach muscle to bone. More accurately, they connect muscles to the periosteum—the connective tissue which surrounds the bone (p. 11). Tendons are composed of dense connective tissue shaped into bundles of parallel collagen fibers. Each end of a muscle has one or more tendons.

Tendons come in a variety of shapes and sizes. Some are short and wide like those of the gluteus maximus at the buttocks. Others are long and thin such as the tendinous cables of your wrist. A broad, flat tendon is called an aponeurosis. An example is the galea aponeurotica (p. 262) that extends across the top of your cranium. All tendons have a smooth, tough, almost resilient feel to them, regardless of their shapes.

Locate the distal tendon of the biceps brachii by holding your elbow in a flexed position (0.18). First, locate the biceps' muscle belly and follow it distally toward your inner elbow. As you progress, the muscle belly will become more slender and, at the crease of the inner elbow, it will become a smooth, thin tendon. It may feel like a taut strand of cable. Explore around either side of this tendon.

Ligament

Ligaments connect bones together at a joint. Their task is to strengthen and stabilize joints. Like tendons, ligaments are made of dense connective tissue. But unlike a tendon's parallel fiber arrangement, a ligament's fibers have a more uneven configuration.

The design and length of ligaments vary. Many simply cross a joint and blend in with the deeper joint capsule, like the ankle's deltoid ligament (0.19). Others span a distance between several bones, like the supraspinous ligament of the back (p. 219).

Ligaments often have a dense, taut feel and sometimes their fiber directions are palpable. If you want to distinguish a tendon from a ligament, explore its attachments and variable tension. A tendon connects a muscle belly to a bone, while a ligament attaches a bone to another bone. A tendon will become taut or slack depending on whether it is shortened or lengthened or if its muscle belly is contracted. A ligament will remain taut throughout all movements or states of contraction.
Fascia

Like tendons and ligaments, fascia is a form of dense connective tissue. It is a continuous sheet of fibrous membrane located beneath the skin and around muscles and organs. This fascial system forms a three-dimensional matrix of connective tissue extending throughout the body from head to toe.

There are two types of fascia: superficial and deep. **Superficial fascia** is located immediately deep to the skin and covers the entire body. Often perceived as a thin sheet, superficial fascia is actually a spacial layering filled with adipose tissue, nerves, blood and lymph vessels, and connective tissue (0.20). The density of the superficial fascia varies from very thin (on the back of the hand) to quite thick (the sole of the foot).

**Deep fascia** has a more complex design. It surrounds muscle bellies, holding them together and separating them into functional groups. It also fills in the spaces between muscles and, like superficial fascia, carries blood vessels and nerves. Portions of the deep fascia penetrate into the muscle belly and encase each tiny muscle fiber.

Because of its ubiquitous quality, precise palpation of the fascial system requires an experienced, sensitive touch. On the next page are three simple exercises that can help you get a basic feel of the fascia and its relationship to other structures.
Explore Your Fascia

Pull up the skin on the back of your hand (0.21). Notice how the skin does not pull up entirely (as when you pull a baggy shirt away from your body). This is because the fascia is holding the skin down. Try this on your knee and various other parts of your body and notice how it is easier to lift the skin and fascia in some areas and more difficult in others (0.22).

This exercise is designed to give you a sense of the continuity of the fascial sheet throughout the body and of how pulling on one portion of this sheet can affect another. Draw a small “X” on your forearm. Place your fingerpads approximately two inches away from the “X.” Using the gentle pressure of your fingerpads, slowly move the skin of your arm in various directions away from the mark (0.23).

Notice how the “X” stretches and responds more easily when you pull in a certain direction, yet may not move as easily when pulled in another direction. As you continue, reposition your fingers farther away from the “X,” so, eventually, you are pulling across the skin of the hand.

Retinaculum

A retinaculum is a structure that holds an organ or tissue in place. In relation to muscular connective tissue, a retinaculum is a transverse thickening of the deep fascia which straps tendons down in a particular location or position. For example, the retinacula of the ankle stabilize the tendons which traverse the sharp curve of the ankle (0.24).

Most retinacula are superficial and accessible. A retinaculum can be distinguished from its deeper tendons by its different fiber direction. A retinaculum will have transverse fibers that run perpendicular to the deeper tendons.
Artery and Vein

Arteries and veins have distinct features that you can palpate. For example, the pulse of the heart can be felt when pressing on an artery but not on a vein. Arteries are often situated on the protected side of an appendage and buried deep to the musculature. Some veins can be palpated superficially and are easily seen on the dorsal surfaces of the hands and feet.

Locating an artery is not only necessary for determining the pulse, but also important when palpating other structures. For example, when palpating the sternocleidomastoid muscle in the neck, it is crucial for you to be aware of the location of the carotid artery (p. 271), the chief blood vessel supplying the head and neck, so you avoid pressing on it. If an artery is occluded for a sustained period of time during palpation, the distal portion of the appendage will begin to tingle or become numb.

Let your arm hang at your side for a minute, allowing the blood to fill the superficial veins of your hand and forearm. The veins will swell with the increased pressure and become visible (0.25). For more dramatic results, gently squeeze your forearm with your opposite hand or apply a tourniquet.

Bursa

A bursa is a small, fluid-filled sack that reduces friction between two structures (0.26). Situated primarily around joints, most of the body's six hundred bursae cushion skin, tendons, ligaments, muscle or organs from the hard surfaces of bones. They are also located between two muscles, two tendons, a tendon and ligament, or a muscle and ligament.

Bursitis, inflammation of a bursa, is a common disorder accompanied by tenderness in the area and crepitation (cracking and clicking sounds) of the joint. When inflamed, superficial bursae are easily palpable and sometimes visible. In their normal state, however, bursae are generally not palpable.

0.25 A tourniquet makes the veins of the forearm visible

0.26 Cross section view of knee, some of the bursae of the knee highlighted in red

William Harvey (1578-1657), often regarded as the first experimental scientist, discovered that blood circulates throughout the body. Along with his descriptions of the cardiovascular system, he explained how veins are equipped with valves that prevent blood from flowing backwards between heartbeats. To prove his theory, Harvey tied a tourniquet around an assistant's arm and allowed the blood to pool in the distal veins. He observed small swellings along the paths of veins, which he thought were valves. Harvey pressed on a valve and pushed the blood out of the vein to the next valve. As he held his finger on the distal valve, the proximal valve prevented blood from flowing backwards and the vein remained empty.

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Nerve

Nerve vessels are tube-shaped, mobile and tender when compressed (0.27). Although sections of nerves and plexuses (bundles of nerves) can be accessed throughout the body, they are best avoided. Compression or impingement of a nerve may create a sharp, shooting sensation locally or down the corresponding appendage.

Lymph Node

Lymph nodes collect lymphatic fluid from lymphatic vessels. They are bean-shaped and may range in size from a tiny pea to an almond. Lymph nodes are located throughout the body, with palpable groups of nodes found in the body’s creases, such as the groin, axilla and neck (0.28). Healthy lymph nodes are roundish, slightly movable and nontender. They differ from other glands, which are usually larger and have irregular, lumpy surfaces.

Adipose Tissue

Adipose (fatty) tissue is a form of loose connective tissue. It is deposited at many levels throughout the body, including the marrow of long bones, around the kidneys, the padding around joints and behind the eyeballs. Needless to say, some of these areas are outside the reach of this text. The most palpable location for adipose tissue is in the subcutaneous layer of tissue between the skin and superficial fascia. This layer of adipose varies in thickness throughout the body and may have different consistencies. Adipose usually has a gelatinous (jellylike) consistency, making it easy to sink the fingers into and detect deeper structures.

Stand up and squeeze the flesh of your own buttocks to feel adipose tissue. Yes, you might feel silly, but note the superficial layer of adipose. Then tighten the muscles of your buttocks and feel the textural difference between the adipose and the deeper muscles.
Learning Objectives

Why are you reading *Trail Guide to the Body*? To develop strong palpatory anatomy skills for your hands-on modality? Or because your instructor told you to read it? Well, in either case, it might be worthwhile to glance at *Trail Guide’s* learning objectives. Basically, these are the goals for you—the reader—as you explore the material. All eleven objectives listed below apply to chapters 2-7.

*Trail Guide* will help you **build your skills** so you will be able to:

1) Observe the surface anatomy of the body and confidently explore the **skin** and **fascial structures** of the body.
2) Palpate the **bones** and **bony landmarks** of each body region and explore the connections between them and the soft tissues.
3) Palpate each **muscle** from origin to insertion, feeling and describing its overall shape, edges and fiber direction(s).
4) Palpate the major joint structures, including **ligaments** and **bursa**, that are common sites of pain and injury in the region.
5) Palpate the landmarks within each body region that identify the location of underlying **nerves**, **blood vessels** and **lymph nodes** that you must be cautious of when practicing manual therapy.

As a manual therapist, it is essential to be fluent in three palpatory anatomy languages. First, **verbal** literacy, so you can accurately document your manual therapy sessions and communicate effectively with other health care professionals. Second, **visual** literacy, so you can observe the skin, topography and physical contours of your clients. Third, **palpatory** literacy, so you can confidently assess tissue condition and provide safe and effective manual therapy.

*Trail Guide* will help you **develop your knowledge** so you will be able to:

1) Describe the relationships between the **topographical contours** and underlying musculoskeletal structures as well as the texture, thickness and mobility of the skin and fascial structures in each body region.
2) Name and locate the **bones**, **bony landmarks** and **joints** for each region of the body and describe the connections between them and the soft tissues of the region.
3) Name and locate the **muscles** of the region, including their specific origins and insertions.
4) List and demonstrate the **action(s)** of each muscle.
5) Name and locate major joint structures, including **ligaments** and **bursa**, that are common sites of pain and injury in the region.
6) Name and locate the major **nerves**, **blood vessels** and **lymph nodes** that you must be cautious of when palpating each body region.