Dynamic Chiropractic

MUSCULOSKELETAL PAIN

Think Outside the Box and the Spine, Part 2: The Ankle

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The extremities are often overlooked during physical exams and diagnoses. While patients may seek chiropractic because of a pain only in one area, the burden lies on us, as chiropractors, to give a thorough evaluation to determine if that pain is a result of a problem somewhere else in the body (e.g., back pain that actually stems from the hips).

Over the years, understanding and treating the extremities has moved to the forefront of my practice. Since the prevalence and presence of extremity involvement can be frequently overlooked and ignored, this is the second in a series of six articles dedicated to the extremities, covering clinical discussions of the feet, ankles, knees, hips, hands/wrists and elbows to the shoulders. Since we are working our way up the axial kinematic chain from the feet [see part 1 in the Feb. 12 issue], we move now to the ankles.

Ankle Biomechanics

The ankle, or talocrural joint, is a synovial joint that connects the distal ends of the tibia and fibula in the lower limb with the proximal end of the talus bone in the foot. The articulation between the tibia and the talus bears more weight than between the smaller fibula and the talus.

The joint is important in movement because it allows for dorsiflexion, plantarflexion, inversion and eversion. The medial malleolus of the tibia bone does not extend inferiorly as much as the lateral malleolus of the fibula, allowing more active and passive inversion of the foot, as opposed to eversion of the foot. The biomechanics of the foot and ankle are a series of isolated joints and segments and also an integrated unit during the functional activities of walking and running.[1]

Of clinical relevance are the biomechanics of the talocrural joint. A recent study was designed to determine whether a single high-velocity, low-amplitude thrust manipulation to the talocrural joint altered ankle range of motion. The study found that "manipulation of the ankle does not increase dorsiflexion range of motion in asymptomatic subjects. Ankles that displayed a greater pretest range of dorsiflexion were more likely to cavitate, raising the possibility that ligament laxity may be associated with the tendency for ankles to cavitate."[2]

Recall that when the foot is weight-bearing and the three arches are well-supported, the force from the ground goes up from the heel, into the ankle and upward to the knee. A well-supported ankle will be evidenced posteriorly by a mostly straight or vertical Achilles tendon.

When the foot arches are compromised by overpronation, they drop toward the floor. This in turn leads to excessive internal or medial rotation of the tibia. Oversupination will create a high medial arch, pushing the tibia into excessive external rotation. Either of these patterns will not only stress all of the foot, tibia and fibula bones, but also alter normal movement patterns of walking and standing.

It is critical that you look at your patient when they are standing or walking in front of you and identify if one or both of their ankles appear to be stressed. These areas are not often painful, so they can be missed.

Evaluation

Evaluation of these very important weight-bearing joints can be efficient. Realize that this joint is a place where past injuries can come back to haunt people the rest of their lives. Ankle sprains, Achilles tendonitis/rupture, and chronically flat or high-arched feet will take a toll here. Since a majority of the population only rehabs this joint if their injury is a major one, most patients who come to your office will have biomechanical problems related to stress.

Visual: The standing posture and gait observation will give you a quick idea of how stressed the ankles are. The presence of adequate foot support or overpronation / supination will be seen here. You will become skilled at identifying pes planus / cavus in the standing position, but the findings can be verified when the patient sits or lies down.

In observing the ankles while sitting or lying down, you can often find one ankle appearing a bit more enlarged than the other. This can indicate a past ankle sprain, especially when it is on the proximal, dorsal surface of the foot. There are often signs of poor circulation here, especially when the ankles appear to have edema or swelling in the seeming absence of any recent trauma.

Visually inspect the back of the ankles and note the appearance of the Achilles tendons. Does one appear thickened or have a knot in it, indicating a past tear or rupture? Do they appear so tight that the feet are in plantarflexion while the patient is in a prone or supine position?

ROM / Palpation: Here are the norms for active range of motion (AROM):

- Dorsiflexion: 45-50 degrees
- Plantarflexion: 0-20 degrees
- Inversion: 0-35 degrees*
- Eversion: 0-25 degrees*

**Occurs at the subtalar joint*

Passive range of motion (PROM) is especially telling in the ankle evaluation. Close your eyes and put the ankle through the four directions; feel if there seem to be restrictions due to bones jamming together compared to the muscle restriction of AROM. I incorporate my palpation into the PROM because I can get in and feel for swelling, tenderness and the general state of the tissues.

Orthopedic: Many of these tests will be obvious and necessary because of a mechanism of injury the patient has revealed during the exam. The most likely tests for ankle-related exams are:

- *Tinel's foot*: This is the tarsal tunnel test for tibial nerve. Tap just posterior and inferior to the medial malleolus.
- *Medial stability*: Bring the foot into passive eversion. Test the deltoid ligament in the medial ankle.
- *Lateral stability*: Bring the foot into passive inversion. Test the anterior/posterior talofibular and tibiotalar ligaments.
- *Anterior drawer*: Hold the heel with one hand and stabilize the dorsal foot with the other. Move the heel from posterior to anterior to test the anterior talofibular ligament.
- *Posterior drawer*: Hold the heel with one hand and stabilize the dorsal foot with the other. Move the foot from anterior to posterior to test the posterior talofibular ligament.

Remember that a majority of patients have no pain at the time they see a chiropractor. Orthopedic tests can help, but they may not give the answers needed. Even if these tests are negative, the biomechanics of the joint could still be a problem that warrants care.

Treating the Ankle

The anatomy of the ankle indicates that the talus, distal tibia and fibula are the main bones making up the joint. However, it is observed regularly in clinical situations that the navicular, cuboid and calcaneus are involved as well. Once you have applied the typical situation-specific therapies (ice / heat, EMS / stim / laser, etc.) and the joint is able to handle an adjustment, then the adjustment can be made. Whether you use a spring-loaded device, a drop table or your hands to give the adjustment, it is imperative to recognize how these bones tend to misalign. It will help if you palpate yourself or stand and put weight on your feet to feel how these bones move.

Adjusting the ankle has been proven to help after ankle sprains; in fact, one study found that "the mortise separation adjustment may be superior to detuned ultrasound therapy in the management of subacute and chronic grade I and grade II inversion ankle sprains."[3]

Adjusting the talus: This bone tends to misalign in an anterior and lateral direction (forward and out). Due to the nature of the bony anatomy of the talar dome, adjustments can be done utilizing a scooping motion with the forearms, created by the triceps contraction of the arms.

Adjusting the cuboid: This bone is located on the outside edge of the foot, proximal to the styloid process of the fifth metatarsal. Often this bone misaligns superior and lateral (up and out). The adjustment performed will involve moving this bone back down and in.

Adjusting the calcaneus: The heel bone is the point of impact when the foot hits the ground, so the pressure jams it upward. Think of this as a posterior / superior misalignment. Adjustments that have you contacting the calcaneus and moving it downward and forward will help release this bone and restore motion.

Taping / bracing: The ankle will likely be unstable in the early stages of care. The use of elastic or therapeutic-type tape is of considerable help to support the ankle. Do research when choosing a brand of tape to use because there is a wide variety of tapes available. Experiment with different styles of tape to see what works the best for your taping technique and your patients' needs.

Historically, a "figure 8" tape pattern, surrounding the ankle, proximal foot and distal tibia / fibula bones is used because it allows not only for good support, but also for some ROM, which helps healing occur faster.

Ankle braces can be helpful when a patient needs to play a sport or must be standing or weight-bearing for a long time. One must be cautious with some of these braces. Immobilizing the bones does not foster healthy ROM and weight-bearing. According to a recent study, there were "positive outcomes after treatment with an ankle brace compared with other functional methods, but our best evidence syntheses only demonstrated a better treatment result in terms of functional outcome."[4] I recommend braces that slip onto the foot and have strings to lace up, making it a more secure fit for the patient. Braces must be introduced as soon as possible to minimize healing time.

Do Your Homework

Ankle joints are important weight-bearing areas of the body. Their stability will help to positively influence the rest of the axial kinematic chain. If you have not focused on this area before, then

make time to practice. Experience will give you the feel for how the feet and ankles move properly or improperly. To learn more about extremity adjusting, I suggest you research and attend an extremity technique seminar that best serves your needs. Seminars aren't just for keeping up CEUs; they are also an excellent way to learn new techniques or hone current skills.

References

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