

SURGICAL REPAIR OF HALLUX LIMITUS WITH A JOINT PRESERVATION TECHNIQUE

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Hallux limitus is a common foot pathology that is effectively treated surgically. The symptoms include pain and limited motion at the first metatarsophalangeal joint (MPJ). The etiology of hallux limitus is as varied as are the treatment options. When the surgical treatment is matched with the etiology the results can be outstanding but when the procedure does not address the etiology the results can be short lived and disappointing. To get the optimal results, the diagnosis of the condition needs to be done before the joint is destroyed, and surgical correction is achieved by saving the joint surface and neutralizing the destructive forces.

SYMPTOMS AND ETIOLOGY

The initial symptoms usually include pain in the joint that occurs more often when wearing higher heeled shoes. Rarely does a patient complain of limited motion in the first metatarsal joint. Frequently the pathology will also include a bunion deformity, and this may be what prompts the patient to make an initial appointment. During the history portion of the examination, it is important to determine if the patient is having additional pain. The knees, hips, and back are common locations for pain to be located in the patient with hallux limitus.

The physical examination can confirm the diagnosis of hallux limitus and also help determine the procedure that should be used to correct the pathology if conservative treatment fails. The physical examination should include a review of the vascular, neurologic, dermatologic and musculoskeletal systems of the lower extremity.

In the patient with hallux limitus, it is important to thoroughly evaluate the relationship of the first MPJ to the rest of the foot. The first MPJ range of motion should be evaluated with the foot loaded and unloaded. Also check for the amount of motion at the first metatarsal cuneiform joint. Look at the position of the hallux relative to the other digits and the first metatarsal. Calluses can also give clues about hallux limitus. Calluses may be present under the second metatarsal head, and also at the level of the

interphalangeal joint of the hallux either directly planter to it or along the medial aspect. Evidence of previous foot surgery should be evaluated along with possible soft tissue contractures around the joint.

The final aspect in diagnosing hallux limitus is reviewing the radiographs. In moderate to severe cases, arthritic changes will be present in the first MPJ. These changes can include lipping of either the metatarsal or the proximal phalanx and joint mice within the joint. Narrowing of the joint space will give an indication of the condition of the cartilage. In some cases lipping of the joint margins will give a false image of narrow joint space. This will appear as though there is a great deal of cartilage destruction. To get a true picture of the joint space without using magnetic resonance imaging, look at the lateral outline of the metatarsal head (Figure 1). This outline will give an indication of the condition of the bone surface. If the normal contour is still present in spite of periarticular spurring, the joint surface is probably sufficient to perform a surgical repair that does not involve joint destruction.

The radiograph will also give important clues in determining the etiology of the pathology. Frequently a long first metatarsal relative to the second metatarsal is noted. The lateral view may show an elevation of the first metatarsal relative to the second metatarsal. Evidence of previous trauma



Figure 1. Notice the outline of the metatarsal head.

to the joint such as fractures or previous surgery may be noted. Examination of the other joints in the foot such as the hallux interphalangeal joint will give hints as to compensations that have occurred due to the limited motion of the first MPJ. Other signs of joint destruction such as gout or systemic arthritis can be seen on the radiograph (Figure 2).

Iatrogenic causes of hallux limitus can also be seen easily on radiographs (Figure 3). When hallux limitus is a result of a surgical procedure this can be a very complicated because often the original pathology needs to be corrected before the limitus can be fixed.

Treatment Options for Hallux Limitus

Conservative treatment for hallux limitus mainly involves slowing the progression of the pathology and treating the symptoms. In a foot with a hypermobile first ray, orthotics may provide some relief when the medial arch is supported. Low-heeled shoes help to maximize the range of motion that currently exists in the joint. Anti-inflammatories and cryotherapy help to relieve acute symptoms when they flare up. Suspicion of gout should be evaluated and if present, the appropriate treatment should be initiated along with hallux limitus treatment.

Many surgical procedures exist to correct hallux limitus. Rather than setting strict protocols

for each use of a particular procedure, the author prefers to look at this as a surgical process with decisions made as the procedure goes. In extreme cases end-stage procedure options such as arthrodesis or joint replacement can be performed. This type of joint cannot be salvaged and is not appropriate for the process that will be described.

Surgical Reconstruction

The dissection needs to be adequate to expose the first MPJ and allow for interspace dissection and a possible osteotomy. This will allow for a full range of steps that can help to eliminate the cause of the limitus. The author's preference is to use a dorsal incision and layered dissection to the level of the joint capsule. At this stage, soft tissue contractures can be released. First the lateral soft tissues are tested by checking the range of motion of the joint. If the hallux seems restricted by these structures or there is a lateral deviation of the hallux, the release should be performed. The later release should include release of the adductor tendon and sesamoid ligament. If needed, the lateral joint capsule can also be released.

The joint capsule is opened with enough dissection to adequately expose the metatarsal head and the proximal phalanx. All bone spurs should be removed along with any loose bone fragments in the



Figure 2. Hallux limitus associated with gout.



Figure 3. Hallux limitus from previous foot surgery.

joint. The minimal amount of joint capsule dissection off of the joint should be performed to minimize any postoperative scarring and adhesions. The range of motion of the joint is then tested again and if more motion is needed the metatarsal may either be shortened, such as in the case of a long first metatarsal relative to the second metatarsal, or plantarflexed, in the case of an elevated metatarsal. In some instances both shortening and plantarflexion may be needed.

A chevron osteotomy can serve to adequately change the position of the metatarsal. Several

variations of the osteotomy can be used, and it makes no difference what the angle of the cuts are as long as adequate shift can be accomplished and stable fixation can be used. The author prefers to use a long dorsal arm chevron osteotomy and screw fixation. The dorsal cut is a double cut along with use of an axis guide to maximize the reposition. There are a variety of ways to surgically correct hallux limitus. With a logical sequence of releasing steps, a joint can often be preserved in the process of increasing the motion of the joint.