Complete Summary

GUIDELINE TITLE

Diagnosis and treatment of first metatarsophalangeal joint disorders.

BIBLIOGRAPHIC SOURCE(S)

Clinical Practice Guideline First Metatarsophalangeal Joint Disorders Panel. Diagnosis and treatment of first metatarsophalangeal joint disorders. J Foot Ankle Surg 2003 May-Jun;42(3):112-54. [341 references] PubMed

GUIDELINE STATUS

This is the current release of the guideline.

**** REGULATORY ALERT ****

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory information has been released.

On April 7, 2005, after concluding that the overall risk versus benefit profile is unfavorable, the FDA requested that Pfizer, Inc voluntarily withdraw Bextra (valdecoxib) from the market. The FDA also asked manufacturers of all marketed prescription nonsteroidal anti-inflammatory drugs (NSAIDs), including Celebrex (celecoxib), a COX-2 selective NSAID, to revise the labeling (package insert) for their products to include a boxed warning and a Medication Guide. Finally, FDA asked manufacturers of non-prescription (over the counter [OTC]) NSAIDs to revise their labeling to include more specific information about the potential gastrointestinal (GI) and cardiovascular (CV) risks, and information to assist consumers in the safe use of the drug. See the FDA Web site for more information.

Subsequently, on June 15, 2005, the FDA requested that sponsors of all non-steroidal anti-inflammatory drugs (NSAID) make labeling changes to their products. FDA recommended proposed labeling for both the prescription and over-the-counter (OTC) NSAIDs and a medication guide for the entire class of prescription products. All sponsors of marketed prescription NSAIDs, including Celebrex (celecoxib), a COX-2 selective NSAID, have been asked to revise the labeling (package insert) for their products to include a boxed warning, highlighting the potential for increased risk of cardiovascular (CV) events and the well described, serious, potential life-threatening gastrointestinal (GI) bleeding associated with their use. FDA regulation 21CFR 208 requires a Medication Guide to be provided with each prescription that is dispensed for products that FDA

determines pose a serious and significant public health concern. See the FDA Web site for more information.

COMPLETE SUMMARY CONTENT

** REGULATORY ALERT **
SCOPE
METHODOLOGY - including Rating Scheme and Cost Analysis
RECOMMENDATIONS
EVIDENCE SUPPORTING THE RECOMMENDATIONS
BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS
IMPLEMENTATION OF THE GUIDELINE
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES
IDENTIFYING INFORMATION AND AVAILABILITY
DISCLAIMER

SCOPE

DISEASE/CONDITION(S)

First metatarsophalangeal joint disorders, including:

- Hallux valgus
- Hallux rigidus
- Hallux varus
- Sesamoid disorders
- Trauma
- Other disorders of the first metatarsophalangeal joint

GUIDELINE CATEGORY

Diagnosis
Treatment

CLINICAL SPECIALTY

Family Practice
Internal Medicine
Orthopedic Surgery
Podiatry

INTENDED USERS

Managed Care Organizations
Physicians
Podiatrists
Students

GUIDELINE OBJECTIVE(S)

To provide recommendations for the diagnosis and treatment of first metatarsophalangeal joint disorders

TARGET POPULATION

Individuals with first metatarsophalangeal joint disorders

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis

1. Significant history
2. Physical examination of the foot
3. Radiographic evaluation
4. Re-evaluation
5. Additional imaging, Tc scan, magnetic resonance (MR), computed tomography (CT)

Treatment

1. Footwear, shoe modifications
2. Ice
3. Over the counter analgesics
4. Patient education
5. Prescription anti-inflammatory nonsteroidal drugs
6. Orthoses
7. Corticosteroid injections
8. Referral to podiatric foot and ankle surgeon
9. Surgical treatment

MAJOR OUTCOMES CONSIDERED

- Pain associated with disorder
- Functioning; lifestyle
- Clinical response to treatment
- Progression of deformity
- Avoidance of disability
- Comfortable gait in normal shoewear

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not applicable

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

This clinical practice guideline is based upon consensus of current clinical practice and review of the clinical literature.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The recommendations for the diagnosis and treatment of are presented in the form of an algorithm with accompanying annotations. Algorithms are provided for the diagnosis and treatment of hallux valgus, hallux rigidus, hallux varus, sesamoid disorders, trauma, and other disorders of the first metatarsophalangeal (MTP) joint.

Diagnosis and Treatment of First MTP Joint Disorders (Pathway 1)

Pathology of the first MTP joint encompasses a variety of disorders from acquired orthopedic deformities and traumatic injuries to overuse problems and systemic disorders. These clinical problems typically involve the first MTP joint and are encountered daily by the foot and ankle surgeon. Six pathways and annotations follow for the diagnosis and treatment of: hallux valgus (Pathway 2), hallux rigidus (Pathway 3), hallux varus (Pathway 4), sesamoid disorders (Pathway 5), trauma (Pathway 6), and other disorders of the first MTP joint (Pathway 7).

Hallux Valgus (Pathway 2)

Significant History (Node 1)

Patients presenting with this deformity often have a significant family history of bunion deformity. The deformity may be noted in adolescence, although it is more prevalent in women older than 30 years. Symptoms may occur early or they may not manifest until later in life. Pain is generally associated with irritation at the medial subcutaneous bunion, although even significant deformities may be asymptomatic. The condition may be aggravated by short or tight footwear, particularly with regard to women's shoe gear. Hallux valgus is considered to be a progressive condition and patients present with varied degrees of deformity from mild enlargement of the metatarsal head to severe dislocation of the first MTP joint.

Significant Findings (Node 2)

Hallux valgus is readily apparent with clinical inspection of the patient. Significant findings may include a subcutaneous bony prominence or medial bump. The great toe is abducted or deviated laterally, often with a degree of axial or valgus rotation. Shoe irritation may result in a painful medial bursitis with inflammation surrounding the first MTP joint or neuritis of the adjacent medial dorsal cutaneous nerve. Patients note widening of the forefoot; this contributes to difficulty wearing shoes comfortably.

First MTP joint range of motion should occur completely within the sagittal plane, but with hallux valgus, the motion may be in an oblique manner with abduction and eversion during dorsiflexion. Adaptation occurs at the metatarsal articular surface with lateral deviation, and joint motion may become track-bound laterally. An assessment of the patient standing and limited gait analysis is undertaken. First ray hypermobility secondary to rear-foot pronation is generally considered

responsible for elevation of the intermetatarsal (IM) angle. Hallux valgus may also occur with a lesser degree of transverse plane deformity with limitation of joint movement and degenerative changes. This is referred to as hallux valgus rigidus.

Associated Findings (Node 3)

Hallux valgus can present with numerous associated findings that are part of a syndrome of forefoot derangement.

Radiographic Findings (Node 4)

Radiographic evaluation should include assessment of general radiographic parameters and angular relationships of the osseous segments involved in this deformity.

These parameters allow assessment of the severity of deformity and provide a basis for surgical procedural selection (Node 9). Radiographs should be weightbearing views of the feet and taken with the patient standing in the angle and base of gait.

Initial Treatment Options (Node 5)

When symptoms begin to interfere with a patient's lifestyle, initial treatment (eg, wider, lower-heeled shoes; bunion pads; ice; and over-the-counter analgesics) is often self-directed. Patients who are unresponsive to the initial treatment or unable to fulfill the self-directed regimen should be directed to a podiatric foot and ankle surgeon for evaluation.

Nonsurgical care involves patient education, including a discussion of the natural history of the disorder, evaluation of footwear, and prior treatment. Prescription anti-inflammatory nonsteroidal drugs may be indicated for symptomatic arthralgias or bursitis. Nonsurgical alternatives include shoe modifications, with pocketing of the medial shoe contour or wider causal shoes. Although there is no scientific evidence to support the efficacy of orthotic devices in the treatment of hallux valgus, symptomatic relief may be realized by some patients.

Surgical recommendations might be considered on the initial evaluation of hallux valgus deformity. Because hallux valgus is a progressive disorder and is often evaluated in the second or third stage, surgical consideration can be undertaken early in the course of treatment.

Clinical Response (Nodes 6, 7, and 8)

When nonsurgical care is rendered, the clinical response is assessed (Node 6). If the patient is doing well, initial treatment may be continued (Node 7). If there has been little or no improvement or if initial improvement deteriorates, surgical treatment is appropriate. If a primary care physician performed the initial evaluation and treatment, referral to a podiatric foot and ankle surgeon is indicated (Node 8).

Assessment of Deformity and Arthrosis (Node 9)

Hallux valgus deformity may be classified into stages 1, 2, and 3 (Nodes 10, 11, and 12). These stages are based on the progression and degree of deformity of hallux abductus (HA) and the intermetatarsal (IM) angle.

In each stage, surgical intervention includes a capsule-tendon balancing procedure (which may include medial exostectomy), a lateral release, and a medial capsulorrhaphy.

Surgical Treatment: Stage 1 (Node 10)

Stage 1 hallux valgus deformity is defined as an IM angle <12 degrees and an HA angle <25 degrees. Although the appearance of the deformity may not be significant, there is often deviation of the joint and medial enlargement of the first metatarsal head. Typically, soft tissue tendon balance and exostectomy with/without a distal osteotomy are performed to correct the deformity. If hallux abductus interphalangeus is present, a phalangeal osteotomy may be indicated (see Table 1 and Figures 3 and 4 in the original guideline document).

Surgical Treatment: Stage 2 (Node 11)

Stage 2 deformities are more significant and have an IM angle $\leq$ 16 degrees with an HA angle of $\geq$25 degrees. The joint congruency must be evaluated. Capsule-tendon balancing is performed with or without osteotomy of the first metatarsal and/or proximal phalanx. When hypermobility of the first ray is encountered or is in the presence of severe deformity, a metatarsal cuneiform arthrodesis may be considered. If hallux abductus interphalangeus is present, a phalangeal osteotomy may be indicated (see Table 1 and Figures 5 and 6 in the original guideline document).

Surgical Treatment: Stage 3 (Node 12)

Stage 3 deformities are considered severe and generally more disabling. These deformities have an IM angle that is usually >16 degrees and an HA angle $\geq$35 degrees. The MTP joint may be deviated or subluxed. Severe deformities often present with associated findings (Node 3) in addition to hallux valgus.

Deformities in this stage may be corrected through capsule-tendon balancing with an osteotomy of the first metatarsal and/or proximal phalanx. Double osteotomy of the first metatarsal provides an additional option. Determination of location of the osteotomy is influenced by the degree of deformity and/or the presence of associated degenerative arthritis. Metatarsal cuneiform arthrodesis may also be considered.

If hallux abductus interphalangeus is present, a phalangeal osteotomy may be indicated. In certain situations, first MTP joint resection arthroplasty, with or without a joint implant, or arthrodesis may be performed, as in the case of patients with rheumatoid arthritis or degenerative joint disease or in patients requiring revision surgery (see Table 1 and Figures 7-9 in the original guideline document).

In summary, hallux valgus deformity is an inherited, progressive deformity often associated with certain foot types, with symptoms aggravated by shoe wear. Although conservative measures may be used initially to reduce the symptomatology associated with this deformity, surgical repair is often necessary to correct the hallux valgus and its associated deformities.

Hallux Rigidus (Pathway 3)

Significant History (Node 1)

Patients who present with the condition of hallux rigidus usually do so with complaints of pain localized to the first MTP joint or joint stiffness. Onset of symptoms may be insidious or subsequent to injury; a history of an arthritic condition may be given.

Patient symptoms are often associated with increased activities or occupational demands that require patients to extend the first MTP joint; for example, stooping or squatting by a laborer. Symptoms also may be caused by shoes that irritate the soft tissues overlying the subcutaneous bony prominence or by high-heeled shoes that increase joint jamming. Patients may present with lateral metatarsalgia and/or suprastructural complaints secondary to gait alteration.

Significant Findings (Node 2)

The hallmark of hallux rigidus is the typical dorsal bunion caused by both the proliferative disease and the flexion at the first MTP joint. This position of hallux equinus results in retrograde elevation of the metatarsal and the uncovering of the dorsal portion of the articulation. Dorsiflexion is generally limited because of abutment of the articular surfaces of the phalanx and metatarsal head, and motion is painful with/without crepitus (see Figure 2 in the original guideline document).

Gait requirements for extension at this joint result in compensatory hyperextension at the hallucal interphalangeal joint.

Associated Findings (Node 3)

Compensatory gait patterns can lead to central metatarsalgia and plantar hyperkeratotic lesions at the hallucal interphalangeal joint or lesser metatarsal heads.

Radiographic Findings/Classification (Node 4)

Because hallux rigidus is a disorder of osteoarthrosis, the radiographic findings are characteristic of this arthritic process. Hallux rigidus is often categorized or divided into stages predominantly based on the progression of the osteoarthrosis. Regnauld proposed a 3-stage classification from developing arthrosis, established arthrosis, to ankylosis describing the end-stage joint disease. Later, a fourth stage was included to address the biomechanical imbalance without radiographic joint changes. This modified 4-stage classification has been adopted. Therefore, a patient may present with little to no radiographic joint findings (stage I) or severe

end-stage arthrosis, (stage IV) (see Figures 3-6 in the original guideline document).

Initial Treatment Options (Node 5)

Initial treatment options are symptom driven. Joint pain, capsulitis, or other acute episodic pain may be alleviated with the use of nonsteroidal anti-inflammatory drugs. Judicious use of corticosteroid injections may provide rapid relief, even in recalcitrant joint pain. Modalities that relieve inflammation and pain are often indicated.

Biomechanical treatment is often an integral component of initial treatment. Orthotic management in the treatment of hallux rigidus should attempt to improve the abnormal pathomechanics or to limit joint motion. Shoe modifications with stiff or rocker-bottom soles or extra-depth shoes may be helpful.

Early surgical intervention with performance of joint preservation procedures may be appropriate in patients with lesser degrees of arthrosis. Although it has not been proven, this may restore function and should be part of the patient education process.

Clinical Response (Node 6)

When nonsurgical care is rendered, the clinical response is assessed. If the patient is doing well, initial treatment may be continued (Node 8). If there has been little or no improvement or if initial improvement deteriorates, surgical treatment is appropriate. If a primary care physician performed the initial evaluation and treatment, referral to a podiatric foot and ankle surgeon is indicated (Node 7).

Surgery is considered in patients who continue with symptoms (Node 7), or simply prefer surgical intervention (Node 7). The surgical treatment of hallux rigidus will be predicated on recognition of the condition of the joint as one that is still salvageable through primary joint reconstruction or one that would be more appropriately treated with a joint-destructive procedure (see Figure 7 in the guideline document).

Surgical Treatment: Joint-salvage Procedures

Joint-preservation procedures usually use cheilectomy by itself or in combination with additional procedures. These procedures include cheilectomy, metatarsal osteotomy, and phalangeal osteotomy. Chondroplasty has also been performed as an adjunctive procedure in this group.

Cheilectomy

Cheilectomy is the resection of hypertrophic bony or osteochondral proliferation along the periphery of the articulation, which may be restricting joint motion. There is some debate about the appropriate amount of bone that should be resected. All osteophytosis should be resected from the metatarsal, phalanx, and sesamoids; some authors advocate aggressive partial joint resections.

Metatarsal Osteotomy

Metatarsal osteotomy is performed to plantarflex the first metatarsal, to transpose a distal segment in a plantar direction, to realign the metatarsal articular surface, or to shorten the metatarsal to achieve decompression. Both distal and proximal osteotomies have been performed for correction of these deformities; Figure 13 in the original guideline document shows the comparison of the surgical procedures.

The extent of elevatus will determine the anatomic location of the osteotomy. Distal first metatarsal procedures can provide for plantar displacement of the capital fragment, but to a lesser degree than a proximal osteotomy. Often moderate degrees of elevatus can be reduced simply through a joint decompression procedure (see Figure 8 in the original guideline document).

In cases of significant metatarsus primus elevatus, a proximal osteotomy should be considered. These procedures should be reserved for rigid or structural deformity, as opposed to positional elevatus. A variety of osteotomies have also been described to plantarflex the first metatarsal, such as the sagittal Z or crescentic osteotomy. Alternatively, the Lapidus first metatarsal-cuneiform arthrodesis with or without a bone graft may be considered (see Figure 9 in the original guideline document).

Phalangeal Osteotomy

Limitation of first MTP joint dorsiflexion in patients with hallux rigidus and the presence of an adequate range of plantarflexion may be addressed through phalangeal osteotomy. A dorsal-based wedge osteotomy within proximal phalanx realigns the toe and reduces the hallux equines.

A separate category of phalangeal osteotomies approaches the problem from the concept of joint decompression. By achieving relaxation of the first MTP joint, any secondary elevation of the first metatarsal as a result of hallux equinus should reduce (see Figure 10 in the original guideline document).

This should occur whether the relaxation is accomplished on the phalangeal side or on the metatarsal side of the joint.

Chondroplasty

At surgery, the first metatarsal articular surface must be evaluated. Degeneration of the cartilaginous surface is usually present predominantly centrally and dorsally. Chondroplasty by abrasion, with or without subchondral drilling, has been advocated to initiate cartilage repair of both chondromalacia and areas of full-thickness cartilage excoriation.

Joint-destructive Procedures

As the arthrosis of hallux rigidus progresses, the first MTP joint may be altered to such an extent that salvage procedures are not appropriate. Joint-destructive procedures include resection arthroplasty, implant arthroplasty, and arthrodesis.

Resection Arthroplasty

Resection arthroplasty of the first MTP joint may include excision of either or both sides of the joint. In the case of hallux rigidus with its severe proliferative activity and progressive loss of joint space, resection arthroplasty reestablishes joint space and allows movement.

The most commonly practiced resection arthroplasty is the removal of the base of the proximal phalanx. Resection arthroplasty varies from excision of only the proximal phalangeal base with cheilectomy of the first metatarsal head to resection on both sides of the joint.

The choice of procedure must be tailored to the age and the biomechanical demands of the particular patient. Resection arthroplasties are probably most appropriate for end-stage arthrosis in older patients with limited functional demands because of frequency of postoperative metatarsalgia.

Interpositional Implant Arthroplasty

Interpositional implant arthroplasty may be performed with hemi or double-stem implants. Hemi silicone implants were used in the past, but because of complications, they are no longer considered appropriate for patients with hallux rigidus. The second generation of hemi implants is metallic and requires less bone resection and less disruption of the intrinsic musculature; these may be considered in younger patients (see Figure 11 in the original guideline document).

Interpositional arthroplasty with double-stem silicone hinged implants is still a useful procedure for the end-stage arthrosis of hallux. Titanium grommets are recommended as an adjunct to minimize ectopic bone formation, although their main benefit may be in protection of the implant from the adjacent bone. Patients should be informed of the alternatives to implant arthroplasty and their potential complications.

Total Joint Replacement

Total joint systems have been designed for the first MTP joint generally as 2-component nonconstrained articulations in an effort to allow motion in more than 1 plane. Materials used for opposing articular surfaces are chosen for their low coefficient of friction and for their minimum wear characteristics. Numerous implant systems have been developed during the years, and several are still used clinically, although long-term clinical usefulness has yet to be established. Judicious use and strict criteria are recommended to avoid complications and problematic revisions.

Arthrodesis

Arthrodesis has been a mainstay of surgical treatment both as an initial treatment of end-stage disease and as a revision of prior surgical intervention. Although arthrodesis eliminates movement at the first MTP joint, it provides stability of the medial column and efficient weight transfer through the medial portion of the foot.

The technique of obtaining the arthrodesis is less a consideration than the actual position of the fusion (see Figure 12 in the original guideline document).

The sagittal plane position is based on the normal declination of the first metatarsal and the shoe types and functional demands of the patient. The transverse plane position is usually reflected to that of the lesser toes.

Hallux rigidus is a progressive osteoarthrosis of the first MTP joint, and although numerous etiologic factors exist, the most common are attributable to biomechanical defects. Surgical procedures have been discussed in light of appropriateness to the degree of joint arthrosis, based on classification.

The goal is to reduce pain and to improve the function of the foot. This means that a rational approach to joint preservation is necessary to salvage joints, whenever possible, particularly in the younger patient.

Hallux Varus Deformity (Pathway 4)

Significant History (Node 1)

Patients presenting with a hallux varus deformity usually have a history of previous first MTP joint or bunion surgery. The abnormal position of the toe makes wearing shoes difficult and painful. This often is a progressive deformity and may lead to a severe, disfiguring, and complex condition. Many patients present because of the cosmetic disfigurement of the toe and foot.

Hallux varus is usually a postoperative complication after bunion surgery. Other causes may include congenital or idiopathic variants, inflammatory arthritides, posttraumatic causes, association with complex congenital deformities such as clubfoot deformity or polydactyly, or secondary to neuromuscular disorders (Node 2).

Significant Findings (Node 3)

Hallux varus is a deformity of the great toe that manifests as a medial displacement of the first MTP joint. This malalignment can occur purely on the transverse plane with adduction of the hallux or can occur in combination with deformity on the frontal plane and/or sagittal plane. Patients who develop hallux varus may possess a long hallux and/or first ray. A loss of toe purchase occurs as a hallux hammertoe develops, often resulting in irritation and bursitis at the hallucal interphalangeal joint (IPJ).

Associated Findings (Node 4)

Progressive adduction of the great toe influences the lesser toes, which may also develop severe adductus. The forefoot deformity may result in compensatory rear-foot supination with lateral metatarsal overload. Shoe pressure on the adducted great toe may result in an ingrown toenail.

Radiographic Findings (Node 5)

Hallux varus presents with a unique set of radiographic findings that characterize the development and complexity of the individual deformity. Findings may include:

- Staking of the medial metatarsal head
- Negative hallux abductus angle
- Absence of fibular sesamoid (surgical excision)
- Negative intermetatarsal angle
- Medial subluxation of the tibial sesamoid
- IPJ flexion ± MTP joint extension
- Presence of degenerative joint disease
- Long first metatarsal

Treatment of Hallux Varus (Node 6)

Treatment options of hallux varus are dependent on the cause and the complexity of deformity. Congenital varieties may be asymptomatic and may require little intervention (Node 7). Treatment of postsurgical hallux varus may vary considerably and is predicated on the patient's symptoms, the degree of deformity, and the amount of time after surgery (Node 8).

Early Postsurgical Hallux Varus (Node 9)

In the initial stage of hallux varus, splinting may have a beneficial influence but is not effective as the deformity matures. Patients should be monitored both clinically and radiographically to assess progression. If reduction is not apparent, or if increasing severity is noted, patients may require prompting to correct the deformity at an early stage.

Late Postsurgical Hallux Varus (Node 10)

As the deformity evolves, hallux varus becomes more difficult to correct. Although progression of the deformity may be quite striking, patients may have a high clinical tolerance of the deformity.

Nonsurgical treatments include wider shoes with a deep toe box. Surgical treatment is tailored to the degree and complexity of deformity. Maturation generally yields soft tissue contraction, increasing severity of deformity, and complex forefoot malalignments, which may result long term in joint arthrosis.

Classification (Node 11)

Recommendations for surgical treatment are based on the following arbitrary classification:

- Type 1—MTP adduction: 1A, deformity alone; 1B, deformity plus arthrosis
- Type 2—MTP adduction plus IPJ flexion: 2A, deformity alone; 2B, deformity plus arthrosis
- Type 3—Complex multiplanar deformity

Type 1

Hallux varus, in its simplest form, is characterized by the adducted position of the great toe. Range of motion may be full and pain free (1A), or may become painful and limited as arthrosis progresses (1B). The deformity may be reducible or may show varied degrees of rigidity (see Figure 1 in the original guideline document).

Type 2

Hallux stability is lost, and flexion of the IPJ complicates the transverse plane deformity at the MTP joint. Range of motion may be full and pain free (2A), or may become painful and limited as arthrosis progresses (2B). These deformities may be reducible with manual manipulation but are difficult to maintain with simple soft tissue release (see Figure 2 in the original guideline document).

Type 3

These complex deformities have a combination of transverse, sagittal, and frontal plane abnormalities, generally combined with arthritic degeneration. Hallux purchase is lost with extensus, hammering, and rotation of the digit (see Figure 3 in the original guideline document).

This deformity is usually symptomatic and nonreducible. Irritation from shoe gear is common.

Surgical treatment is based on this classification and is described in (see Table 1 in the original guideline document.)

Hallux varus can be congenital or iatrogenic; successful management and treatment are dependent on a comprehensive evaluation of the deformity. Conservative and surgical management of hallux varus has been discussed, with the ultimate goal of relieving symptoms and reestablishing a functional joint.

Sesamoid Disorders (Pathway 5)

Significant History (Node 1)

Patients vary in age from adolescents to adults and may present with a history of trauma, although the onset of symptoms may be insidious. This may be an isolated problem or it may be associated with other first MTP joint pathology.

Significant Findings (Node 2)

Clinical examination may show swelling, discoloration or joint effusion, or may disclose none of these and appear relatively benign. Pain may occur on compression of either sesamoid, with passive range of motion of the joint and/or during ambulation.

Radiographic Examination (Node 3)

Positive radiographic findings may include:

- Fracture of 1 or both of the sesamoids (see Figure 1 in the original guideline document)
- Partition (sesamoid multipartite)
- Avascular necrosis (see Figure 2 in the original guideline document)
- Arthritic changes of the sesamoid (see Figure 3 in the original guideline document)
- Localized soft tissue swelling

If clinical examination and radiographs allow for definitive diagnosis, treatment should be directed accordingly. Nondisplaced or mildly displaced fractures, symptomatic partitions, and avascular necrosis may be initially treated with immobilization and offloading techniques. If these measures fail, or if a markedly displaced fracture is encountered, excision of the affected sesamoid(s) may be indicated. Degenerative/arthritic changes may be treated with offloading techniques, orthotics, anti-inflammatory nonsteroidal drugs, or localized injection. Surgery may be indicated if nonsurgical care is unsuccessful. Excision of a sesamoid(s) may result in a variety of postoperative problems including hallux varus, valgus, hammertoe, and/or extensus; the patient must be evaluated carefully.

Negative or Normal Radiographic Examination (Node 4)

If initial radiographic examination is negative for osseous pathology, soft tissue and cartilaginous disorders may be considered. These diagnoses include flexor hallucis tendinosis or rupture, capsuloligamentous injury (acute turf toe), and chondromalacia. A period of treatment including orthoses, physical therapy, anti-inflammatory nonsteroidal drugs, and possible injection may be considered.

Reevaluation (Node 5) is indicated after an appropriate time interval. If improvement is noted (Node 6), treatment is continued until resolution of symptoms. If an inadequate response to treatment is found (Node 7), further diagnostic imaging including technetium scan, magnetic resonance imaging, and computed tomography is indicated to rule out other pathology not shown by plain radiography.

Sesamoid disorders are not uncommon and are associated with variety of pathologies with various treatment options available.

Trauma (Pathway 6)

Significant History (Node 1)

Hyperflexion/extension or stubbing-type injuries are the most common causes of first MTP joint trauma. In some instances, the patient may not recall a specific episode of trauma. Crush injuries are a less common cause but they do occur particularly in industrial accidents. Patients may present immediately after acute trauma or sometime later because of persistence of residual symptoms.

Significant Findings (Node 2)

Physical examination of the traumatized first MTP joint may show pain on range of motion and the presence of deformity. There may be localized pain with weightbearing or with direct palpation. Significant soft tissue damage and vascular embarrassment may be present, particularly with crush injuries.

Radiographs

Radiographs are indicated in most cases of trauma to rule out fracture or joint dislocation. Evaluation of the sesamoids should be included.

Radiographs: Positive for Fracture or Dislocation (Node 3)

Fractures should be evaluated and treated appropriately. Special attention should be directed to maintaining or to restoring articular congruity and segmental alignment. Sesamoid injuries may be subtle and comparison views are often necessary. Significant intraarticular injury may require subsequent arthroplasty or arthrodesis.

Dislocations are relatively uncommon of the first MTP joint. Although most traumatic dislocations have occurred in the dorsal direction, there are a variety of reports that discuss dislocation in the transverse plane. When they occur, both dynamic and static deformities may follow, which may present similar to nontraumatic, developmental problems of the first MTP joint.

Acute treatment should be directed toward reduction of the joint dislocation (see Figures 1 and 2 in the original guideline document).

In most cases, this can be accomplished in a closed fashion. A period of immobilization is indicated to facilitate joint stability and is followed by range of motion exercises.

Later, repair and balance of the capsuloligamentous tissues may be necessary as dynamic deformities occur. Because most dislocations are dorsal, sagittal plane deviations are the most common posttraumatic deformity, secondary to soft tissue contracture and scarring. These may include hallux limitus, hallux rigidus, hallux hammertoe, and plantar flexion deformities.

Radiographs: Negative for Fracture or Dislocation (Node 4)

If no fracture or dislocation is identified, then symptomatic treatment is indicated, including rest, immobilization, local physical therapy modalities, and anti-inflammatory nonsteroidal drugs. Clinical response (Node 5) to treatment after an appropriate time is then evaluated. If improvement has been noted, then continuing treatment until symptom resolution is indicated (Node 6). If no improvement in symptoms has been appreciated, then reevaluation of the original diagnosis is indicated (Node 7). Consideration should then be given to other diagnostic modalities.

Traumatic injuries to the great toe and first MTP joint require accurate diagnosis and appropriate treatment. These may be associated with significant long-term morbidity.

Other Disorders of the First MTP Joint (Pathway 7)

Many additional, although less common, disorders exist that may produce first MTP joint pathology (see Figure 1 in the guideline document).

These include various arthritides, especially gouty arthritis. Other causes include infection, tumors (osseous or soft tissue), vascular and neurologic abnormalities, and the complex pathologies associated with the diabetic foot.

Significant History (Node 1)

Patients may present with acute or chronic joint pain. A complete medical history is indicated to rule out systemic disorders (eg, diabetes or past gout attacks).

Significant Findings (Node 2)

Edema, discoloration, and/or increased warmth may be present. Other joints may also be affected. Localized pain with weightbearing or on range of motion may be seen, as well as the presence of a soft-tissue mass or an abnormal topography.

Radiographic Examination

Radiographic examination should be undertaken as a general diagnostic tool (see Figure 1 in the original guideline document).

Radiographs: Positive Radiographic Findings (Node 3)

These may include joint erosions, fragmentation, or tumor. Soft tissue swelling or a mass may be identified. A working diagnosis should be established and proper treatment and/or referral initiated.

Radiographs: Negative Radiographic Findings (Node 4)

If radiographs are negative, further evaluation is indicated. Laboratory testing and further imaging studies such as technetium scan, magnetic resonance imaging, and computed tomography may be considered. Once a diagnosis is established, treatment and/or proper referral may be considered.

Systemic, metabolic, and other unusual pathologies may occur and need to be considered in the patient who presents with first MTP joint symptoms.

CLINICAL ALGORITHM(S)

Algorithms are provided for:

- Hallux Valgus
- Hallux Rigidus
- Hallux Varus
- Sesamoid Disorders
- First Metatarsophalangeal (MTP) Joint Trauma

- Other Disorders of the MTP Joint

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is not specifically stated for each recommendation.

This clinical practice guideline is based upon consensus of current clinical practice and review of the clinical literature.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate diagnosis and treatment of first metatarsophalangeal joint disorders

POTENTIAL HARMS

Not stated

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Clinical Algorithm

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Clinical Practice Guideline First Metatarsophalangeal Joint Disorders Panel. Diagnosis and treatment of first metatarsophalangeal joint disorders. J Foot Ankle Surg 2003 May-Jun;42(3):112-54. [341 references] PubMed

ADAPTATION

Not applicable: Guideline was not adapted from another source.

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GUIDELINE DEVELOPER(S)

American College of Foot and Ankle Surgeons - Medical Specialty Society

SOURCE(S) OF FUNDING

American College of Foot and Ankle Surgeons

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic Copies: Available in Portable Document Format (PDF) from the American College of Foot and Ankle Surgeons Web site.

Print copies: Available from the American College of Foot and Ankle Surgeons, 515 Busse Highway, Park Ridge, IL 60068-3150; Web site: www.acfas.org.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on December 18, 2003. The information was verified by the guideline developer on February 5, 2004. This summary was updated on May 3, 2005 following the withdrawal of Bextra (valdecoxib) from the market and the release of heightened warnings for Celebrex (celecoxib) and other nonselective nonsteroidal anti-inflammatory drugs (NSAIDs). This summary was updated by ECRI on June 16, 2005, following the U.S. Food and Drug Administration advisory on COX-2 selective and non-selective non-steroidal anti-inflammatory drugs (NSAIDs).

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