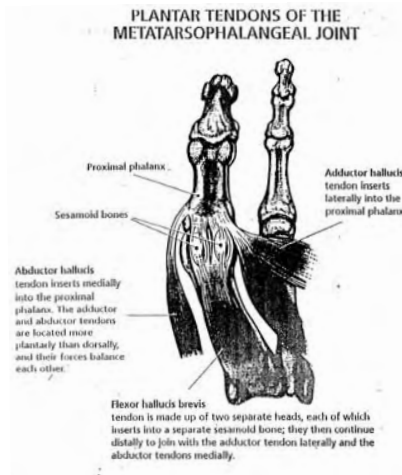


# Footprints

The newsletter of the Westside Podiatry Group

Westside  
Podiatry Group

The literature pertaining to 1st ray pathology is exhaustive. This Footprints issue is to provide incite and to introduce concepts that are often misunderstood. The 1st ray is an important stabilizer for the entire gait pattern and as such must receive its proper weight distribution during the midstance and toe-off phase of gait. Knee, hip, and back problems often result from improper weight distribution through the 1st ray and can cause early degenerative changes because of severe compensatory changes that take place during the gait cycle. The two primary deformities, namely, hallux valgus and hallux rigidus are the deformities often seen and should be treated as early as possible to prevent more severe degenerative changes in the foot and superstructure areas. Evolutionary changes from our arboreal existence has resulted in a bipedal gait. This has created atavistic changes throughout the generations, hereditary influences and unfortunately acquired changes which are enhanced by improper footwear we wear. We will discuss the characteristics of the two most common deformities of the 1st ray and try to explain the normal from the abnormal in an attempt for the physician and patient to recognize these changes in order to prevent further complications later in life.



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# Westside Podiatry

## Bunion Deformity

Bunion or hallux valgus is a deformity of the 1st metatarsophalangeal joint involving a medial prominence at the 1st metatarsal head and a lateral deviation of the hallux. Radiographic examination is a rarely appropriate or necessary in a primary care setting. Osseous changes, usually at the 1st metatarsal head, occur and are seen in moderate, severe, and chronic deformity. Clinically, individuals may present with complaint of pain, inflammation, callus formation, stiffness or inability to wear conventional footwear with comfort. Bunions have a strong hereditary basis and seem to be more common among women than men. Certain foot types (especially flexible flatfoot) predispose to the development of hallux valgus and are considered the primary etiology of bunion deformities. Other contributing factors include inappropriate shoe gear.

Range of motion at the 1st metatarsophalangeal joint may be restricted due to arthritic changes in the joint and osseous changes. Bursitis, tendinitis, ulceration or abscess formation may occur secondary to the bunion deformity. As the bunion deformity progresses, the hallux may overlap the 2nd toe. This may interfere with walking and balance, especially in older patients.

Surgical correction of the bunion deformity may be indicated in individuals that have pain, disability, and fail to respond to conservative management, such as changes in shoe gear, padding and strapping, stretching, orthoses, and physical therapy.

Bunion Deformity



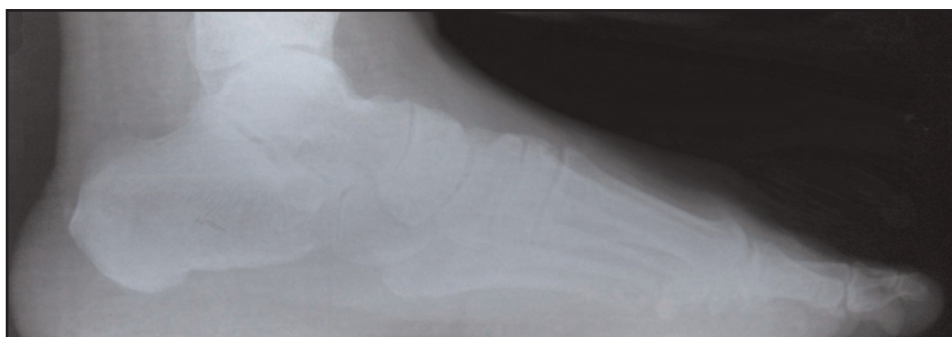
The Primary care physician should:

1. Diagnose the bunion through clinical examination. Acute inflammatory conditions should be treated with the appropriate combination of stretching exercises, non-steroidal anti-inflammatory drugs, padding and strapping, and physical therapy.
2. Recommend over-the-counter arch support devices or insole products, when appropriate. Advise on specific changes in foot wear.
3. Seek consultation from a podiatrist for possible fabrication of custom foot orthoses if over-the-counter arch supports fail.
4. Seek consultation from a podiatrist when the bunion deformity continues to be painful, even with changes in shoe gear, involves an ulceration or abscess, or in an individual with diabetes mellitus, poor vasculature, compromised immune system and any other disease that places the patient at risk.
5. Seek consultation from a podiatrist when patient fails to respond to conservative treatment and surgical correction may be indicated.

## QUESTIONS COMMONLY ASKED

“My shoes are tight at the front and slip at the heel!” “What is this bump?” “All my shoes are painful and get ruined.” “My 2nd toe is sticking up!” “I have such a painful callus.”..... These are just a few of the common complaints we hear when a patient presents with a bunion at their great toe joint. What causes a bunion?

Bunion —  
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Hyperpronation during the stance phase results in hypermobility of the 1st ray. The unlocking of the subtalar joint and midtarsal joint causes the peroneus longus muscle to lose its plantar flexory and stabilizing force on the 1st metatarsal encouraging dorsiflexory and varus forces on the 1st ray. Due to the muscular imbalance on the 1st metatarsophalangeal joint, the great toe and abductor hallucis muscle in conjunction with the sesamoid complex shifts lateral. The abducted hallux places a retrograde pressure on the hypermobile unstable metatarsal exaggerating the adduction of the 1st metatarsal. This causes an increase in the intermetatarsal angle, a metatarsal-cuneiform split, erosion of the chista and enlargement of the medial eminence of the 1st metatarsal.

Common chief complaints of patients with a bunion deformity include: great toe joint pain, shooting pains at the inner aspect of the great toe, painful callus build up, pain or stress fracture of the 2nd metatarsal, an overlapping 2nd digit/hammertoe of the 2nd digit, lesser metatarsal pain and burning at the 3rd interspace.

Deep great toe joint pain results from arthritic changes, spur formation and cartilaginous erosion. The incongruity of the great toe joint during the propulsive phase of gait causes the sesamoid complex to erode the chista and the phalanx to grate against the metatarsal head. Fibrosis, hypertrophic bone changes and decreased range of motion result at the great toe joint.

Shooting pains and numbness occur at the big toe due to a bunion secondary to compression of the medial dorsal cutaneous nerve by the hypertrophied medial eminence. Neuritis may also become exacerbated in the 3rd interspace due to a bunion. A bunion causes abnormal propulsion off the medial aspect of the foot. Consequently excessive pressure is placed on the lesser metatarsals aggravating neuroma type symptoms and lesser metatarsalgia.

## 2nd METATARSOPHALANGEAL JOINT



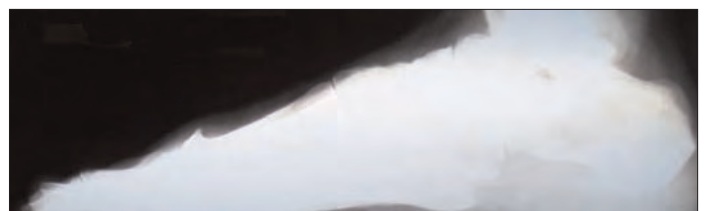
A contracture of the 2nd digit or stress reaction of the 2nd metatarsal are one of the most common sequelae associated with a bunion. As hallux valgus progresses, the great toe abuts against the 2nd digit forcing it to contract. Once a hammertoe forms, it places a retrograde force on the 2nd metatarsal causing it to plantar flex. The 2nd ray assumes more pressure due to the abnormal 1st ray position. A deep lesion may form on the plantar skin beneath the 2nd ray and dorsally on the 2nd digit hammertoe. It is common for the patient to develop a stress reaction or fracture of the 2nd metatarsal with the repetitive, excessive friction. Obesity, ill fitting shoe gear and terrain are factors that may increase the rate of progression of the bunion deformity and 2nd metatarsal fracture.

### TREATMENT

Conservative measures for treatment of bunions consist of shoe gear modification, padding, splintage and insert management. Surgical management for correction of a bunion deformity must be tailored to the etiology and severity of the bunion deformity. More proximal or base osteotomies are required for more severe bunions, juvenile hallux abductovalgus or bunions secondary to ligamentous laxity. Head or distal osteotomies may be used on bunions with a lower intermetatarsal deviation, bump pain with adequate range of motion and limited crepitus. The procedure chosen must be tailored specifically to the condition and presentation of the bunion. The integrity of the joint, bone and foot type must all be assessed. In addition, individual patient parameters such as age, ambulatory status, medical status and compliance must be considered.

The aforementioned biomechanical explanation for the etiology of a bunion is the most common. This is generally genetic in origin as the individual inherits the foot type that is predisposed to bunion formation. However other predisposing factors in bunion development include: rheumatoid arthritis, psoriatic arthritis, cerebral palsy, connective tissue disorders (Ehler-Danlos Syndrome, Marfans Syndrome) or due to trauma. The most common type of bunion affiliated with trauma is hallux rigidus.

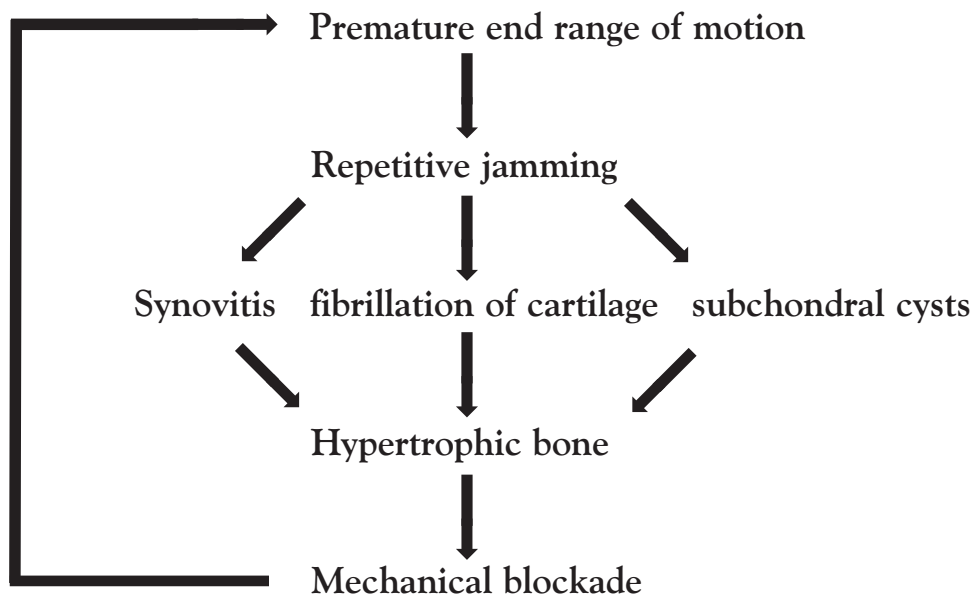
### HALLUX RIGIDUS



Hallux rigidus is a subset of bunion deformities. This is known as a dorsal bunion. The 1st metatarsal will elevate when it becomes unstable as opposed to abduct in the “classic bunion”. Factors which encourage a premature end range of motion to the 1st metatarsophalangeal joint include: hypermobile 1st ray, long 1st ray, excessively short 1st ray, degenerative joint disease, neoplasms, trauma, septic arthritis, neuromuscular disorders, systemic arthritides, osteonecrosis, infection or iatrogenic causes (surgically induced).

Due to the elevation of the 1st metatarsal, there is a premature end range of motion during propulsion causing repetitive jamming of the 1st metatarsophalangeal joint. This creates synovitis and fibrillation of the cartilage, subchondral cysts and hypertrophic bone creating a mechanical blockade. This becomes a cyclical and progressive disorder until the joint is destroyed.

### PATHOLOGY OF HALLUX RIGIDUS



Symptoms associated with hallux rigidus include: gradual onset of pain and limitation of great toe joint range of motion, a dorsal bump on the 1st metatarsal, pain on ambulation at the 1st metatarsophalangeal joint, under the big toe, the lesser metatarsals or shooting pain originating at the lateral aspect of the 1st metatarsal extending to the midfoot. The patient may develop a hyperextension of the hallux interphalangeal joint or lesions submet 2 and 3. Radiographic findings with hallux rigidus consist of a non-uniform joint space narrowing, flattening of the 1st metatarsal head, periarticular spurs, subchondral sclerosis, loose bodies of bone in the great toe joint, hypertrophy and disease of the sesamoid apparatus and erosive changes to the joint. The greater the severity of the joint disease, the more aggressive the treatment must be.

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## TREATMENT

Conservative measures may be employed successfully at the first stages when there is only some functional limitation of motion. These measures include shoe gear modification, orthotic management, accommodative devices and continuous passive range of motion. With a more advanced deformity, surgical management may be necessary to remove the hypertrophied spurs and decompress and re-establish the joint. The most severe hallux rigidus necessitates a joint implant or fusion of the joint to accomplish relief and proper gait function. Orthotic management is necessary following surgical correction. If a patient is not a surgical candidate, a rocker bottom shoe may help make the deformity more tolerable.

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## MYTHS

Shoes caused the bunion

My hammertoe just appeared

I have had the bunion all my life so the pain under my 2nd toe has nothing to do with it

The pain on the outside of my foot is separate from the bunion

## TRUTHS

The shoe may have aggravated and increased the progression of the bunion but did not cause it.

The hammertoe probably formed due to the pressure placed on it from the bunion and deviated big toe.

There is a relationship between the 2nd metatarsal pain and the bunion even though the bunion has been present for years. The 2nd metatarsophalangeal joint has been assuming an excessive amount of pressure for years to accommodate for the bunion. Now the 2nd metatarsal is injured.

Not necessarily - due to abnormal propulsion of the 1st ray, the lateral aspect of the foot is fatigued and developed overuse symptoms.