

# Metatarsal Joint Instability - Lesser Toes and Plantar Plate Deficiency

Toes are like teeth, you take them for granted until they hurt and then you realize how much you rely on them and are how much pain they can cause. Toe instability resulting in a rigid deformity is a common foot problem. A recent review speaks to new knowledge of toe instability and a surgical technique that should be utilized—specifically, repairing the plate.

In a healthy foot the tiny muscles of the feet and toes along with ligaments on the sides of your toe joints (collateral ligaments) and a thick piece of fibrous tissue on the pad of your feet and toes, called the plantar plate, help to resist the forces you undergo during walking and running. The second toe is most vulnerable to hyperextension because there is no muscle responsible for resisting your second toe moving towards your big toe. Authors of this review found that the plantar plate is primarily responsible for the stability at the second toe joint. If this plantar plate is torn, due to abuse or trauma, and not repaired, the toe instability becomes worse and typically results in a crossed toe.

Toe deformities go by various names depending on the direction the toe goes, but generally speaking a bent toe is called a *curled toe* which can turn into a toe stuck under or over the adjacent toe. Any deviation from a straight toe is an indication of instability and should be addressed to prevent future pain and walking difficulty.

Hammer toe is caused by outside pressure (like high heels), inflamed joints, and autoimmune diseases. Predisposing factors include genetics, a longer second toe, flat feet, and an already poorly aligned big toe. Curled toes, or hammer toes, most often happen to women older than 50 years old whose feet have been pressed into high heeled shoes with narrow toe boxes. Younger people can also develop hammer toe, however it is more rare. Often, these deformities are ignored until they become *fixed* or the bones have fused into place. Fused toes are problematic because as we push off with our back foot while walking, toes must bend and tolerate 40 per cent of our body weight.

Symptoms of toe instability are pain on the bottom of your toe where it meets your foot, toe swelling and numbness, a feeling of *walking on marbles*, and a gradual change in the direction of your toe towards encroaching on its neighbor. It may be uncomfortable to walk barefoot or feel better to walk on the outsides of your feet. Imaging, such as x-rays or MRI, can confirm hammer toe. However two simple tests combined show good diagnosis results: a *drawer test* to test the mobility of the toe by trying to pull a piece of paper out from under the toe in standing.

Treatment of hammer toe depends on the extent of the instability of the toe joints. Often, people do not seek treatment until the toe has completely crossed under or over and has become rigid. Conservative treatment is moderately effective for early stage instability and includes shoe modification (lower high heels, wider toe box, more cushion), pads placed in the shoes or orthotics in bottom shoes to redirect the forces across the foot during walking or steroid injections at the joint (keeping in mind that a steroid relieves pain but does disturb the already fraying tissues). Keeping your foot, ankle, and calf muscles strong can help, as well as checking in with a physical therapist to help correct any faulty movement patterns further up the chain.

Surgery is a common option, especially for more advanced stages of hammer toe. Two main approaches are used—one from the area from the sole of the foot and the other from the top of the foot. Surgeons trim any unhealthy tissues and suture any obvious tears in the plantar plate and collateral ligaments.

In the past the collateral ligaments have been the primary tissue repaired. However, the authors found better outcomes with surgery prioritizing plantar plate repair along with collateral ligament repair. They found that this helped significantly with lasting deformity correction and improvement in pain and a person's ability to function.

Reference: Jesse Doty, M.D. Metatarsophalangeal Joint Instability of the Lesser Toes and Plantar Plate Deficiency. In *American Academy of Orthopedic Surgery*. April 2014. Vol. 22., No 4. Pp 235-245.