Tarsal Coalition

INTRODUCTION
Tarsal coalition is a condition in which the bones in the hindfoot do not fully separate during growth and development. When the bones don’t fully separate, a connection or coalition remains between the bones. In early childhood, the bones are primarily made of cartilage that grows and gradually turns into bone. As the bones develop, a soft coalition becomes stiffer and can be injured during normal activities. Any of the bones in the hindfoot can be joined, but the most common are those between the calcaneus and the talus bones (48%) or the calcaneus and the navicular bones (44%). Roughly 50% will have the same coalitions in both feet. Boys seem to be more affected than girls. Estimates vary, but about 1% of the population has a tarsal coalition. One study looked at first degree relatives of patients with tarsal coalitions and found that 76% had radiographic evidence of an asymptomatic tarsal coalition. Another name for this disorder is peroneal spastic flatfoot.

SIGNS AND SYMPTOMS
Patients with this congenital condition usually present during late childhood or adolescence. The condition usually presents as recurrent sprains, pain in the hindfoot, or loss of motion in the hindfoot. As the coalition matures it starts to interfere with the normal motion of the subtalar joint, which involves both rotation and gliding. This can irritate the joint, the supporting ligaments, or the adjacent peroneal tendons.

The pain associated with a tarsal coalition may be attributed to a sprain, peroneal muscle spasm or tendonitis, sinus tarsi irritation, subtler joint irritation or arthritic changes. The variability of the symptoms in different patients may be due to the variability of motion restriction of the different collations. Complaints usually include mild pain deep in the subtalar joint and motion limitation in the hindfoot.

The patient usually presents after some traumatic event like an ankle sprain. Symptoms are relieved by rest and aggravated by prolonged or heavy activity. The onset of symptoms depends on the bones involved. Talonavicular coalitions ossify at age 3-5 years, calcaneonavicular coalitions ossify age 8-12 years, and talocalcaneal coalitions ossify at age 12-16 years.
DIAGNOSIS
Plain xrays of the foot can be diagnostic if the coalition is bony and can be well oriented to the plane of the xray. There are also secondary signs include talar beaking, broadening of the lateral talar process, and narrowing of the posterior facet. Oblique views demonstrate calcaneonavicular coalition 90% of the times, but only 10% have a frank osseous coalition, with the rest demonstrating decreased space between the bones or indistinct cortical edges.
A talonavicular coalition is difficult to see on xrays because the orientation of the joint. CT scans with coronal cuts are best means to visualize the talocalcaneal articulation. MRI recently has been advanced as another tool to evaluate cases of fibrous or cartilaginous coalitions. Although MRI has been found to be very good at detecting tarsal coalition, CT scanning is still considered the standard and more cost effective than MRI. Other diagnoses to consider include recurrent sprains, tendonitis, osteochondrosis of the calcaneus (Severs Disease), or navicula (Kohlers Disease), osteochondritis dessicans of the talus, rheumatologic processes, fractures, or an inflammatory tumor.

TREATMENT
Initial conservative treatment may include shoe inserts, ankle supports, or a trial of walking cast immobilization. Symptoms can often be managed with activity modification and symptomatic management with anti-inflammatory medications, ice, heat, or warm soaks. Decreasing activity is probably the best means of controlling symptoms. However, if symptoms are well tolerated, then gym and sports are okay. If symptoms cannot be managed with these methods, often an injection of cortisone into the joint space can provide temporary relief for 2-3 months. Usually, symptoms will resolve over a period of 1-2 years as the bones in the foot complete their growth and development.

Patients and their parents are the best judge of appropriate activity restrictions. While it may be possible to figure out exactly how much time can be spent playing soccer or bike riding without becoming symptomatic, this may be difficult determine and even more difficult to enforce. Broad guidelines for activity modifications are to adjust activity by broad levels at no more or less than every 2 weeks. Activity levels can be set however the parents choose, but my recommendation is to consider four broad levels. Level one is full activity including gym and sports. Level two is no gym or sports, but running and jumping are allowed in play around the house. Level three is no running or jumping. Level four is immobilization in a cast or walking boot. Decisions for setting the activity level are based on the family assessment of frequency of pain complaints, presence of a limp, and cooperation with chores and schoolwork. If symptoms worsen, activity is decreased one level. If symptoms are acceptable or improve, then activity is maintained or increased one level. Schools are required by federal law to make appropriate accommodations for children with
medical conditions. You will need to notify school personnel of the child’s medical condition and work out a system for keeping them informed regarding activity restrictions.

Surgical treatment of tarsal coalitions is indicated in cases in which conservative treatment has failed and symptoms persist. Coalition resection is recommended if the coalition is isolated to one joint and involves less than 50% of the joint space. The joint is exposed surgically and the coalition removed with interposition of muscle or fatty tissue in the defect. Resection is not recommended when the coalition is large or when significant degenerative changes are present in the joints adjacent to the coalition. Fusion (arthrodesis) is preferable in such cases. Several long term studies have shown excellent or good results in 77-100% of patients. Post-operative treatment includes immobilization for 3 weeks in a walking cast, followed by 3 week of partial mobilization with range of motion exercises and a walking boot. This is followed by a gradual return to full activities. Bilateral procedures are staged to allow full recovery of the first foot prior to surgery of the second foot.

COMPLICATIONS
Most tarsal coalitions become asymptomatic once the bones in the feet mature. Usually the peroneal muscle spasm resolves and motion improves. Long term studies do not seem to show increased arthritis, so presumably the joints function well in the long run. If symptomatic treatment does not provide lasting relief, surgery is recommended. With surgical treatment, there are risks of infection and wound complications. If resection of a coalition is not successful in providing relief, then additional surgery for fusion across the painful joints is recommended.

EXPECTED OUTCOMES
Non-operative treatment of patients with symptomatic tarsal coalitions can usually provide relief, but has not been uniformly successful. Patients with extensive or multiple coalitions typically undergo fusion procedures, and those with less extensive or isolated coalitions undergo resection and soft tissue interposition of their coalitions. The vast majority of coalitions can be treated symptomatically or surgically with the expectation of successful long-term results.

QUESTIONS
Further information can be obtained on the internet. One good source for expert and peer-reviewed information is the Academy of Orthopedic Surgery at www.aaos.org. Another site which is well reviewed, but somewhat technical is www.emedicine.com.

FEEDBACK
If you have questions or comments, please contact the office or submit them to the web site at www.pedortho.com.