Tarsal Coalition

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A tarsal coalition is an abnormal connection between two bones in the midfoot and/or rearfoot. The term tarsal refers to the name used for the group of bones in the mid and rear portions of the foot. The term coalition refers to the abnormal connection, union, or bridge between two of the bones.

The most common tarsal bones affected are the heel bone (calcaneus) and the bones near the ankle (talus and navicular). The two most common coalitions are the talocalcaneal (between the talus and calcaneus) and the calcaneonavicular (between the calcaneus and navicular). Although tarsal coalitions can occur between any two or more bones, all are far rarer than the talocalcaneal and calcaneonavicular coalitions.

Coalitions may involve an abnormal connection that is bony (synostosis), cartilaginous (synchondrosis), fibrous (syndesmosis), or combinations of these types. The extent of the abnormal the abnormal connection can be minimal to extensive, and can even replace the usual location of a joint.

Tarsal coalitions occur congenitally (present since birth) in about 1% of all people and may effect only one foot or both feet. However, the pain from a tarsal coalition may not arise until adolescence or later. Some individuals with tarsal coalition do not experience any pain.

The abnormal connection between two bones in a tarsal coalition prevents what would otherwise be normal movement between the two bones. As consequence, the hindfoot and/or midfoot usually are stiff and immobile in a foot affected by a tarsal coalition. As a person ages, the abnormal connection becomes more bony and stiffer, which is why the pain from a tarsal coalition usually arises in adolescence (when the bones of the foot complete their bone formation) or later. Because of the restricted movement between two bones affected by a tarsal coalition, the joints around the coalition are functionally impaired and can develop painful degenerative arthritis as the person ages. In some cases, an injury can disrupt and aggravate a previously non-painful tarsal coalition.

A person affected by a tarsal coalition is often flat-footed on the foot in which the tarsal coalition exists. Pain is usually present just below the ankle area and made worse with weight bearing activities. In some cases, the muscles on the outside of the leg will spasm.

Tarsal coalitions can often be diagnosed simply with an examination and standard radiographs (x-rays). However, special imaging techniques (CT scan or MRI) are also used to confirm the diagnosis and determine both, the extent of the coalition (abnormal connection) and whether degenerative joint disease is present in the nearby joints.

Non-surgical treatment is directed at allowing the person affected by a tarsal coalition to live a painfree life, but does not correct existing malalignment of the foot. Surgery to remove the abnormal connection can be performed, but its success depends on a number of factors, including the person's age, the extent of the abnormal connection, and whether there is degenerative arthritis in the nearby joints. When the predicted outcome of removal of the abnormal connection (resection of the coalition) is poor, then surgical fusion of the two involved bones is performed.

Non-Surgical Treatement Options;

- Appropriate footwear: the shoes must be supportive – high top shoes and boots are best. Avoid sandals and barefoot.
- Orthoses: Orthoses are often necessary to reduce the stress and movement placed on the coalition with everyday activities. Options include:

  □ **Custom-made foot orthoses**. Custom foot orthoses are not a covered benefit of the Kaiser Health Plan. However, custom foot orthoses are available through the Department of Foot and Ankle Surgery on a fee for service basis.

  □ **Custom-made foot and ankle brace** (AFO). These braces are more restrictive than foot orthoses, and usually more effective. They are also more bulky than foot orthoses. The brace is made for the affected side. Kaiser usually pays for 80% of the cost for AFOs.
- Cast immobilization. Applying a cast to the limb can allow an aggravated coalition site to become painfree. After becoming painfree, the person is usually then treated with orthoses to further limit stress and movement placed on the coalition site with everyday activities. The cast is applied from below the knee to the toes typically for 2 or more weeks.
- Modify your activities. Decrease the time that you stand, walk, or engage in exercise that put a load your feet. Convert impact exercise to non-impact exercise – stationary cycling, swimming, and pool running are acceptable alternatives.
- Weight loss. Reducing weight can reduce the stress on the coalition site.
- Perform calf stretching exercises for 30-60 seconds on each leg at least two times per day. Sometimes, a tight calf can be present, and if so, it will place abnormal stresses on the coalition site. Stand an arm's length away from the wall, facing the wall. Lean into the wall, stepping forward with one leg, leaving the other leg planted back. The leg remaining back is the one being stretched. The leg being stretched should have the knee straight (locked) and the toes pointed straight at the wall. Stretch forward until tightness is felt in the calf. Hold this position without bouncing for a count of 30-60 seconds. Repeat the stretch for the opposite leg.
- Your doctor may inject the coalition area with cortisone. Injection of cortisone is a potent way to reduce inflammation and pain associated with the coalition. In some instances, the doctor may combine an injection with cast immobilization. The risks of cortisone injections for tarsal coalition include, but are not limited to: increased pain for 24-72 hours following the injection, depigmentation over the area of the injection, weakening of joint cartilage and progression of degeneration, and infection. Systemic side effects of this type of injection are extremely rare.
- Use an oral anti-inflammatory medication. We recommend over-the-counter ibuprofen. Take three 200mg tablets, three times per day with food – breakfast, lunch, and dinner. To obtain the proper anti-inflammatory effect, you must maintain this dosing pattern for at least 10 days. Discontinue the medication if any side effects are noted, including, but not limited to: stomach upset, rash, swelling, or change in stool color. IF YOU TAKE ANY OF THE FOLLOWING MEDICATIONS, DO NOT TAKE IBUPROFEN: COUMADIN, PLAVIX, OR OTHER PRESCRIPTION OR OVER-THE-COUNTER ORAL ANTI-INFLAMMATORY MEDIACTIONS. IF YOU HAVE ANY OF THE FOLLOWING HEALTH CONDITIONS, DO NOT TAKE IBUPROFEN: KIDNEY DISEASE OR IMPAIRMENT, STOMACH OR DUODENAL ULCER, DIABETES MELLITUS, BLEEDING DISORDER.
- Use ice on the painful area for 15-20 minutes, at least 2-3 times per day. Option A - Fill a styrofoam or paper cup with water and freeze it. Peel back the leading edge of the cup before application. Massage the affected area for 15-20 minutes. Option B –Apply an ice pack for 15-20 minutes. CAUTION: AVOID USING ICE WITH CIRCULATION OR SENSATION PROBLEMS.
- Physical therapy. (Ultrasound and interferential electric current therapy can be useful methods of reducing pain and inflammation.)

Surgical Treatment Options:

- Surgery for tarsal coalitions can be broken into to categories: resection of the coalition (removal of the abnormal connection) or fusion (arthrodesis). The decision to perform resection versus fusion is quite individual, but is often based upon a number of factors, including the person's age, the extent of the connection between the tarsal bones, and whether there is degenerative arthritis in the nearby joints. Younger age, smaller extent of the coalition, and relative lack of degenerative arthritis in nearby joints might favor a decision to resect the coalition. Both approaches might be combined with procedures to improve the alignment of the foot and/or improve the long-term outcome of the surgery. Both approaches require general or spinal anesthesia. Both approaches may require a hospital stay of 1-3 days following the surgery.
- Resection surgery attempts to alleviate pain by removing the abnormal connection between the two tarsal bones and restoring mobility between the bones. This procedure may or may not require using a cast after surgery. The recovery time may take 6-12 months. The success of the resection procedure cannot be guaranteed and is dependent upon a number of factors, including the person's age, the extent of the connection between the tarsal bones, and whether there is degenerative arthritis in the nearby joints. Risks include, but are not limited to: infection, nerve injury or entrapment, prolonged healing/recovery, wound or scar problems, incomplete relief of pain, no relief of pain, worsened pain, recurrent pain, calf atrophy, recurrence of the coalition, stiffness, arthritis, limping, incomplete arch restoration, continued reliance on orthoses, and need for future fusion procedure if the procedure fails.
- Hindfoot and/or midfoot fusion (arthrodesis) attempts to alleviate pain by completely fusing the associated painful joints. The fusion does not typically involve the ankle joint, so the normal up and down movement of the ankle is not eliminated. A below-knee cast is used for 3 months. The first two months requires absolutely no weight-bearing, while in the 3rd month, weight-bearing is allowed. Recovery takes 6-12 months. The success rate is about 80%. About 15% are better, but still have some problems. About 5% are no better or worse. Risks include, but are not limited to: delayed or non-healing of the fusion site, infection, nerve injury or entrapment, tendon injury, wound healing or scar problems, prolonged recovery, incomplete relief of pain, no relief of pain, worsened pain, limp, chronic swelling, and transfer of pain, callus, or arthritis to other area of the foot or ankle.