

MIDDLE FACET COALITIONS AND THE IMPORTANCE OF REARFOOT POSITION

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Although many papers have been written addressing middle facet coalitions of the subtalar joint, few have addressed rearfoot position. Three cases are reviewed in which rearfoot position was felt to be an important part of the patients' recovery. In the first case, a middle facet coalition was resected, and rearfoot position was not addressed. In the second and third cases, the middle facet coalition was resected and the rearfoot position was dealt with at the time of surgery as deemed necessary.

TALOCALCANEAL COALITION, HISTORICAL PERSPECTIVE

The earliest description of tarsal coalition as an abnormal anatomical entity has been credited to Buffon in 1769,¹ while the first specific reference in the literature of talocalcaneal coalitions was by Zuckerandl in 1877.² The clinical significance of middle facet talocalcaneal coalitions as a cause of peroneal spastic flat foot was described by Harris and Beath in 1948,³ using axial calcaneal projections still employed today when screening for suspected talocalcaneal coalitions via plain radiographic examination.

ETIOLOGY AND INCIDENCE

Talocalcaneal coalitions may be either congenital or acquired, with the contemporary view that most coalitions are congenital in nature, with coalitions being reported in fetal feet.⁴ The familial nature of the condition arising from a genetic mutation of an autosomal dominant gene with variable penetrance, resulting in the failure of differentiation and segmentation of primitive mesenchyme with resultant lack of joint formation.^{5,6,7} Acquired coalitions may result from arthritis, infection, neoplasms or trauma,⁸ and with the exception of juvenile rheumatoid arthritis, are seen more frequently in adult patients.

The incidence of tarsal coalition in the general population is unclear, although it is thought to be less than 1%.^{3,9,10,11} Talocalcaneal and calcaneonavicular coalitions in particular, account for approximately 90%

of all tarsal coalitions.⁵ The condition has been reported as having no race predilection,⁸ with a high incidence of bilateral presentation.^{9,12} While a male:female gender ratio as high as 12:5 in the incidence of the condition has been claimed,¹¹ a relatively equal male/female ratio has also been reported in a larger study.¹²

CLINICAL FEATURES

In infancy and early childhood the condition is usually asymptomatic and seldom recognized clinically as the union in the young foot is cartilaginous prior to ossification, permitting some joint motion.¹⁴ Symptoms of deep pain and aching of the foot and ankle, often localized to the sustentaculum tali medially and the sinus tarsi laterally, and signs of spasm and limitation of joint motion in the 12-16 year old patient should raise the suspicion of talocalcaneal coalition.⁵ The onset of pain is often insidious in nature, made worse with exercise or walking over uneven terrain, but may be accompanied with a history of onset of symptoms following minor trauma.

The diagnosis of talocalcaneal coalition may often be confirmed with plain radiographs, however the exact nature and extent of the coalition is best determined via computed tomography or magnetic resonance imaging techniques.

SURGICAL MANAGEMENT OF TALOCALCANEAL COALITION

In patients where conservative treatment measures fail to relieve symptoms, surgical resection of the talocalcaneal coalition or fusion of the subtalar joint should be considered. Surgical resection, regardless of the nature of the tissue involvement, has been described as yielding good-excellent subjective results in 16 of 18 feet (16 patients) by Kumar et al,¹⁵ given a mean follow-up of four years (range four to eight years). Similar subjective medium-term results were reported by Kitaoka et al,¹⁶ in eleven patients following resection surgery, however, most subjects suffered reduced joint motion and altered gait parameters. In a longer retrospective study, satisfactory

symptomatic and clinical findings, including the absence of radiographic signs of developmental joint degeneration, were found following middle facet resection arthroplasty after a minimum of ten years post-operation in eight of nine cases.¹⁷

CASE 1, N.M.

History

The parents of N.M. first sought treatment when he was 7 years old. At the time, their chief concern was his flatfeet. N.M. was treated with orthotics and two years later, after persistent pain, CT's revealed a middle facet subtalar coalition (figure 1). N.M. was continued in orthotics and at the age of 13, the coalition was resected.

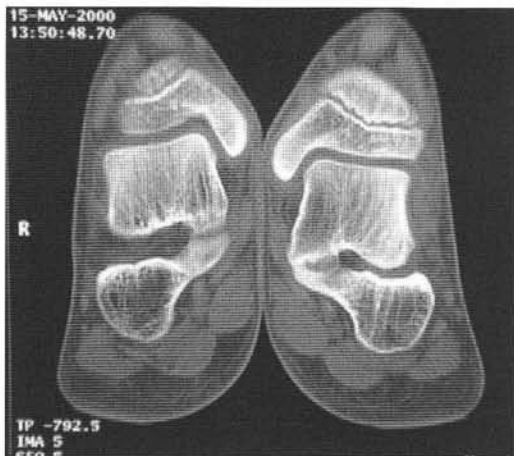


Figure 1.

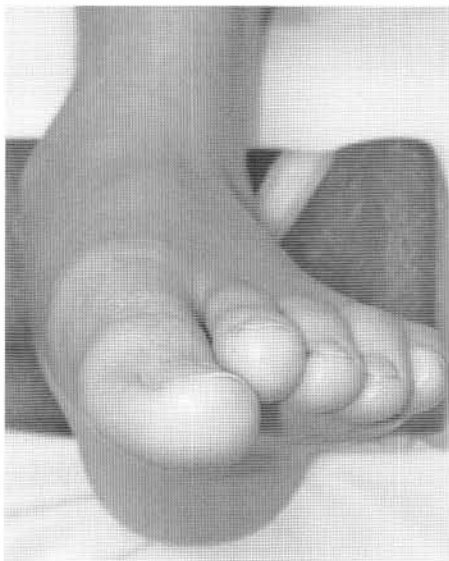


Figure 3.

Following the surgery, N.M.'s complaints of foot pain continued to worsen. Once active in sports, his participation continued to decrease as his foot became more painful. When he presented he was noted to be in a somewhat rigid valgus positioning (figure 2), and in peroneal spasm (figure 3). Follow-up CT's revealed absence of the coalition but increased lateral deviation of the calcaneus (figure 4).

SURGICAL APPROACH

The surgical plan was to fuse the subtalar joint to attempt to regain a rectus position and alleviate his symptoms. During the surgery, reduction of the valgus deformity was not satisfactory so an autogenous bone graft was used to augment the arthrodesis and bring the calcaneus more in line with the talus.



Figure 2.

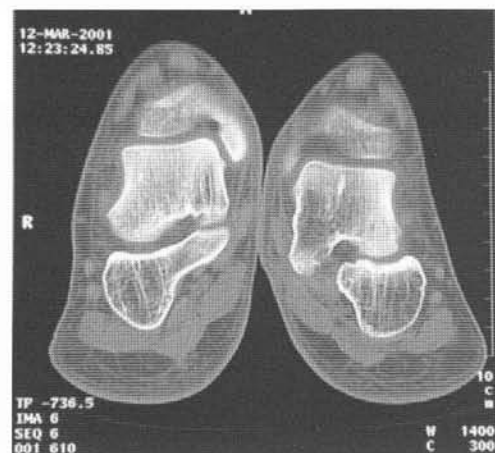


Figure 4.

Following surgery, N.M. was kept nonweightbearing for a period of two months and radiographic exam showed consolidation of the subtalar joint (figure 5). The screw was removed at that time due to some plantar symptoms and final weightbearing radiographs showed a foot to be in a more rectus position (figure 6).

At last exam, N.M. was seven months postop and was playing golf with minimal discomfort. His foot clinically is still in a valgus position although less than preoperative and he has difficulty without his orthotics.

CASE 2, S.C.

History

This 9-year-old female presented with a chief complaint of rearfoot and ankle pain. She attributed it to her sister landing on her foot some nine months prior. She had been treated conservatively with molded orthotics but failed to respond. She was referred for consultation.

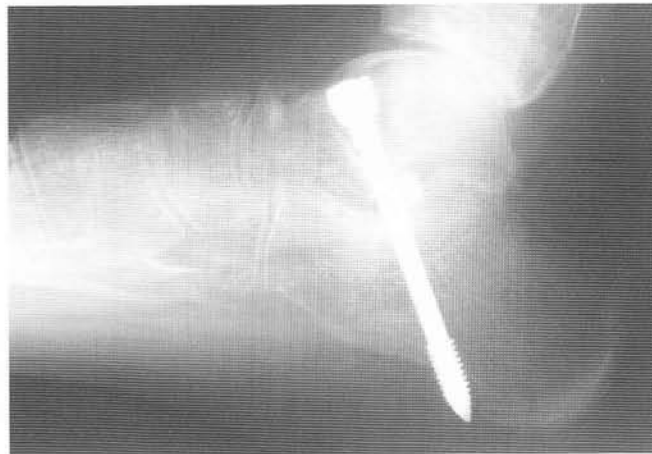


Figure 5.



Figure 6.



Figure 7.

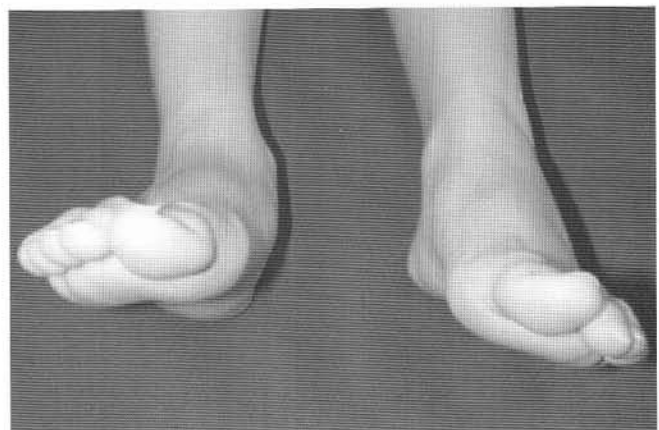


Figure 8.

At the time of presentation, S.C. complained of the same symptoms. Clinical examination revealed a planus foot deformity bilaterally on stance phase (figure 7). However, while not weightbearing, the right foot was in peroneal spasm (figure 8). A CT revealed a fibro-osseous coalition of the middle facet of the subtalar joint with the rearfoot in a valgus position (figure 9-10).

SURGICAL APPROACH

A medial incision was made over the sustentaculum tali retracting the flexor tendons plantarly and the middle facet coalition was easily approached. Using an osteotome and saw, the coalition was resected and improved motion was noted immediately. Since S.C. had a pes planus deformity with rearfoot valgus preoperatively, it was surmised that she would continue to have problems if not addressed, as in case N.M. To address the valgus deformity, a subtalar joint blocking arthroereisis was performed. This was noted to correct the deformity on the table.

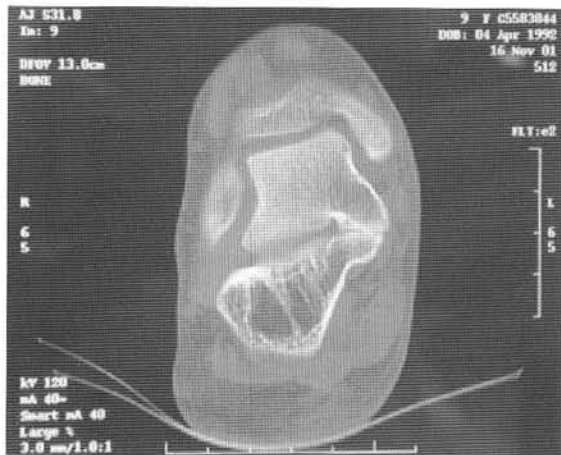


Figure 9.

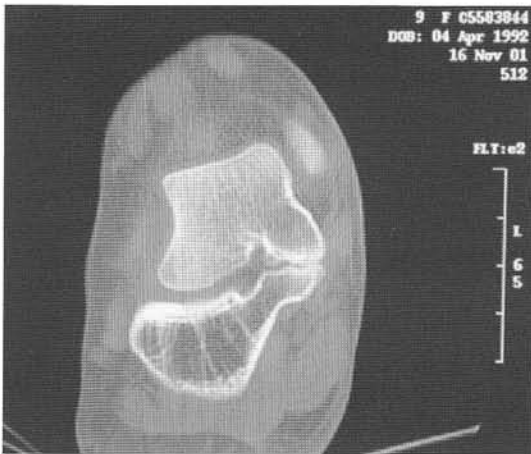


Figure 10.



Figure 11.



Figure 12.

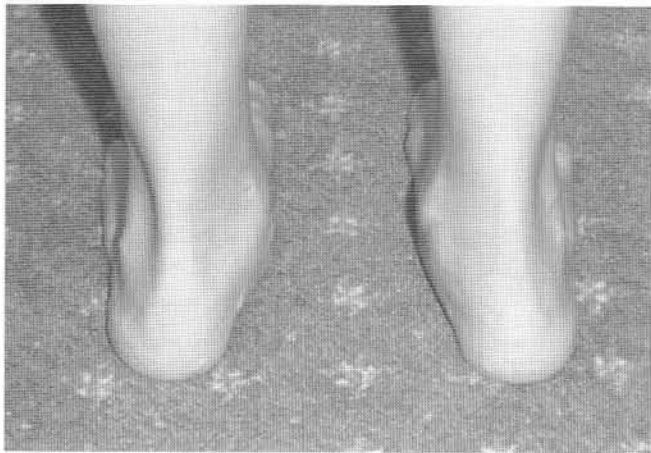


Figure 13.



Figure 14.

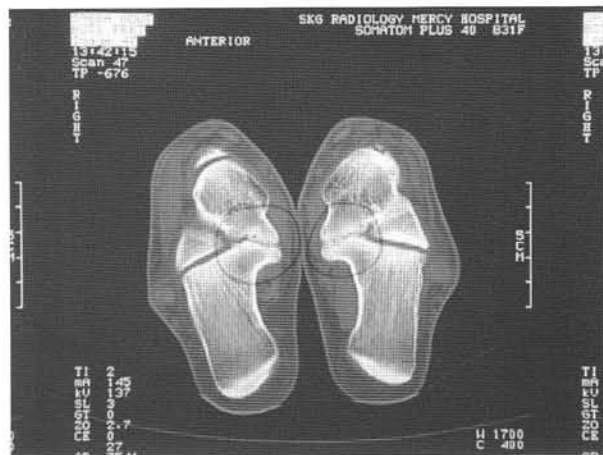


Figure 15.



Figure 16.

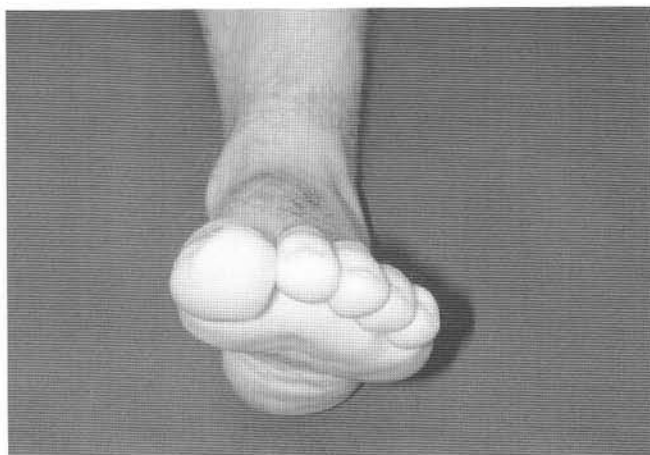


Figure 17.

Following the surgery, S.C. was treated with a one-month period of nonweightbearing followed by a progressive return to walking and activities. At last report, four months postoperatively, she was back to school sports and doing well. X-rays taken at the time showed her foot to be in a more rectus position (figure 11-12). Clinically, she was no longer in spasm but still retained a slight valgus position in her heel (figure 13-14).

CASE 3, S.G.

History

S.G. was a 22-year-old male who presented with long-standing foot and ankle discomfort bilaterally for the past eight or nine years. He related that his left foot was worse than his right and he had been treated conservatively with orthotic therapy. He did relate that these orthoses had partially helped.

Clinical examination of his feet did reveal some restricted subtalar joint range of motion bilaterally and CT's revealed a middle facet coalition bilaterally (figure 15). Radiographic examination revealed some arthritic changes through the subtalar joint consistent with middle facet coalition (figure 16). Unlike the previous cases, S.G. was noted to be in a more rectus position clinically. He was not in peroneal spasm and did not have an exaggerated rearfoot valgus position (figure 17).

SURGICAL APPROACH

At the time of surgery, the middle facet coalition was resected through a medial approach again retracting the flexor tendons plantarally and using an osteotome and sagittal saw to recreate a middle facet space. Following the resection of the coalition, it was noted that his joint range of motion did improve on the operating table and on loading of the forefoot the rearfoot did remain in a more rectus position. A decision was made at that time to not do anything further to address his position since his position seemed to be adequate in terms of its relation to the forefoot.

S.G. was treated following surgery with nonweight-bearing for two to three weeks with progressive return to activities following that. He was last seen at three months postoperatively continuing to make steady progress. His range of motion was still mildly restricted although improved as compared to preoperatively. He continues in orthotics and appears to be progressing well.

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