FAT GRAFT INTERPOSITION: AN ADJUNCT TO RESECTION OF CALCANEANOAVICULAR BAR: A CASE REPORT

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ABSTRACT: A case of bilateral calcaneonavicular coalition is presented. Treatment included post-resectional interposition of fat. Technique and results are discussed.

Introduction

Calcaneonavicular bar is one of the most frequently encountered forms of symptomatic tarsal coalition and is a common cause of peroneal spastic flatfoot. The condition appears to represent a failure in division of a cartilaginous anlage in the primitive mesenchymal tissue so that a fibrous, cartilaginous or bony coalition persists. This frequently becomes recognized during childhood as the tarsal bones begin to ossify. The condition usually becomes evident during adolescence with a complaint of a painful, stiff, flatfoot. Clinical features associated with a favorable prognosis include the absence of secondary joint changes, clinical presentation under the age of fourteen years, and the absence of a complete bony block. The treatment of a symptomatic calcaneonavicular bar remains controversial. Conservative measures such as the use of T straps, Whitman plates, or temporary casting is recommended by some authors. Triple arthrodesis is advised for the treatment of advanced cases with marked alteration of the articular surfaces. Local resection is reserved for symptomatic feet without extensive articular change.

Surgical resection had been described by several authors. However, except in the review by Mitchell, the rates of failure and recurrence have not been presented. After resection of the bar with simple cauterization of exposed bone, Mitchell observed a recurrence of osseous fusion after operation in one third of the feet treated. This high failure rate was documented even with vigorous selection of patients who did not show evidence of secondary articular deterioration. Kendrick reported unsuccessful results after the resection of calcaneonavicular bars followed by the use of interpositional grafts of fat. The failures occurred in patients who had multiple osseous bars or secondary degenerative changes. This high failure rate has stimulated others to interpose soft tissues such as the extensor brevis muscle, after resection of the bar. However, adequate filling of the post-resectional gap and stabilization of the muscle frequently have proven difficult. The interposition of fat, as illustrated in the following case, in carefully selected patients who show an isolated calcaneonavicular bar and no evidence of secondary degenerative changes, is a useful adjunct to surgical resection.

Case Report

L.B., a healthy, active 11-year-old girl, had the insidious onset of mechanical foot pain localized to the area of the sinus tarsi on the right foot. It was present when active and absent at rest. The pain was especially pronounced when she walked on the "outside" or lateral border of her foot. Her mother said that the child had always had flatfeet, but they had been asymptomatic.

On initial physical examination there was restricted bilateral subtalar motion (0°) and a diminution of the longitudinal arch. Roentgenograms (Fig. 1) showed bilateral calcaneonavicular synchondrosis without secondary joint changes. A short leg walking plaster cast was applied to the symptomatic lower extremity for four weeks. After removal of the cast the pain rapidly returned. Two months after the initial visit the patient was hospitalized, and resection of the calcaneonavicular bar was performed. Intraoperative findings confirmed synchondrosis without evidence of other abnormal coalitions. A generous amount (2x3x3cm) of subcutaneous fat was removed from the ipsilateral buttock and sutured carefully into the defect. A short leg walking cast was employed for three weeks. Following the removal of the cast, the foot remained completely asymptomatic. A normal longitudinal arch reconstituted itself and subtalar motion was restored to a normal range. After the initial problem, the patient complained of similar symptoms in her contralateral foot. Clinical
Fig. 1: Preoperative roentgenograms, showing bilateral calcaneonavicular synchondrosis in the absence of secondary joint changes.

Fig. 2: Interim roentgenograms, two years postoperative, showing resected right calcaneonavicular bar in comparison with the unsected left side. Note that there is no evidence of bony regrowth.

Fig. 3: Immediate postoperative roentgenograms following resection of the left calcaneonavicular bar. Compare with the right side resected two years earlier.
and roentgenographic assessments (Fig. 2) confirmed the presence of an isolated calcaneonavicular bar. Subsequent surgical resection of the bar with interposition of a free fat graft was performed. The postoperative roentgenograms are shown in Fig. 3.

Discussion

This case demonstrates the excellent results obtained by early resection of a calcaneonavicular bar in the absence of secondary joint changes when combined with fatty interposition to prevent postoperative bone overgrowth.

Previously, autogenous free fat grafts have been used by plastic surgeons to restore soft-tissue contours. Otolaryngologists have used fat grafts in tympanoplasty. Earlier, orthopedic surgeons and neurosurgeons employed free fat grafts after laminectomies to reduce early postoperative hemorrhage and late scar formation.10,11 The technique of free fat grafting, however, has been neglected in recent orthopedic literature.

The technique includes the harvesting of an adequate amount of fat to fill the defect completely without the liability of subsequent closure under tension. The fat should be excised by incision through intercellular planes without cutting through large fat cells. Prior to insertion of the graft, the recipient site should be dry.

When properly applied, the technique has been shown both experimentally12 and clinically13 to prevent bony regrowth in partial premature closure of epiphyseal plates. Not only is fat readily available and easily employed, but the graft is stabilized rapidly by fibrous attachment to surrounding bone. Although a few grafts have been observed to increase in size, most grafts undergo minor reductions in size. To prevent the recurrence of isolated bony bars, the use of interpositional autogenous free fat grafts merits further scrutiny.

References