IV. Summary

Cavo varus increases likelihood of recurrent sprains, peroneal disorders, 5th met stress fractures and ankle arthritis.
Has increased plantar flexion of first ray, abnormal morphology of tarsals, reduced motion of subtalar joint.
Results in adduction thrust, short stride, weaker push off compared with neutral foot.

References


Aminian, Sangeorzan The Anatomy of Cavus Foot Deformity
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Treatment of asymmetric osteoarthritis of the ankle joint.
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Introduction
Supramalleolar osteotomies for the treatment of varus and valgus type arthritis of the ankle joint (asymmetric arthritis) have been shown to reduce pain, and improve function and radiological signs of arthritis as well as postpone fusion or replacement surgery. However, recent studies indicate that asymmetric arthritis of the ankle joint in a majority of cases is not a single plane deformity but may include a complex instability pattern involving not only the ankle but also the neighbouring joints and the stabilizing surrounding soft tissues. Therefore, these patients may not only require a correction of the angle of the distal tibial articular joint surface angle but also include additional procedures to the adjacent joints, ligaments and tendons. The purpose of this lecture is to provide a treatment algorithm and to discuss risk factors for failure of supramalleolar osteotomies.

Preoperative considerations
Prior to surgery the correction is planned on the anteroposterior and lateral view radiographs. The angle of distal tibial joint surface (TAS; normal value 91 to 93 degrees) and the tibiotalar angle (TTA; normal value 91.5 ± 1.2 degrees) is assessed. The degree of talar tilt in the ankle mortise can be calculated as the difference between TAS and TTA. Clinically relevant tilting has been determined to be >4 degrees. Lateral view radiographs are used to distinguish between patients who present with a centred joint and those with an anterior extrusion of the talus out of the mortise.

Surgical technique
In case of ankle impingement, advanced stages of arthritis (Takakura stage 3) and ankle joint instability the procedure is initiated with an arthroscopy. Grade four lesions, according to the Outerbridge classification, are microfractured.

Next, the axis of the distal tibia is corrected with a supramalleolar osteotomy. Varus feet are addressed with a medial opening wedge osteotomy or a lateral closing wedge osteotomy. The decision between the lateral or medial approach is based on the amount of correction needed. In an extensive medial opening wedge osteotomy, the fibula may restrict the amount of correction possible, therefore deformities greater than ten
degrees are corrected through a lateral approach (including an osteotomy of the fibula). Valgus feet are corrected with a medial closing wedge. If the talus is extruded anteriorly out of the mortise, the correction is conducted in a biplanar fashion, e. g. anterior opening or posterior closing wedge, to improve the talar coverage in the anteroposterior direction. In all osteotomies, the aim is an overcorrection of the angle of the distal tibial joint surface of three to five degrees.

After completion of the tibial osteotomy, the ankle mortise is checked under image intensification. In case of joint incongruence due to an inadequate length of the fibula, or if the talus did not follow the medial malleolus, the fibula is osteotomized and the position and length of the fibula adjusted.

After the supramalleolar correction, the alignment of the heel is reassessed clinically. The aim is to achieve a heel with one to five degrees valgus. Remaining deformity is addressed with a (z-) osteotomy of the calcaneus for varus malalignment and a medial displacement osteotomy for valgus malalignment. In tilted ankles the indication for an additional calcaneal osteotomy is set more aggressively.

Ankle instability is addressed using ligament reconstruction. Reconstruction consists of ligament suture and augmentation with the extensor retinaculum. In cases with a flattened longitudinal arch, corrective fusions (naviculo-cuneiform joints) or plantarflexion osteotomies (Cuneiform I or 1st metatarsal) are performed (valgus feet).

**Postoperative Treatment**

The patients are permitted to partially bear weight for eight weeks following surgery. During this time, the ankle is protected in a splint at night and a walker boot during the day. Thereafter, full weight bearing is allowed and physiotherapy initiated.

**Risk factors for failure**

Ankle varus with the talus additionally tilted within the mortise and degenerative changes located in the medial gutter has been defined as a riskfactor for an inferior outcome. Recently, a plafond plasty, e.g. an intraarticular osteotomy, has been recommended to restore the joint geometry in these cases. We observed the highest failure rate in valgus group where the talus remained lateralized, in tight contact with the fibula, after correction of the distal tibia. We believe these failures are due to the intraoperative misjudgement of the surgeon and that the results could have been improved by an additional fibular osteotomy in order to balance the joint. We therefore believe that the main risk factors for failure in supramalleolar osteotomy are osseous imbalance (e. g. not corrected fibula), ligamentous insufficiency and ankles with intraarticular varus arthritis (type III).

**References**


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