

# SURGICAL MANAGEMENT OF HALLUX ABDUCTO VALGUS WITH CONCOMITANT METATARSUS ADDUCTUS

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The surgical management of hallux abducto valgus in the patient with metatarsus adductus deformity is a particular challenge to the podiatric surgeon. Determination of the most appropriate surgical procedure will depend on the degree of symptomatology, age of the patient, severity of both the hallux abducto valgus (HAV) deformity, and the metatarsus adductus deformity. The adult and pediatric patients must be approached in a different light.

In dealing with the pediatric bunion deformity every effort must be made to identify the presence or absence of a metatarsus adductus deformity. Our experience has shown this to be a common entity. A comprehensive exam should be performed to determine the degree of compensation occurring in the rearfoot complex when metatarsus adductus is present. In the juvenile with a significant HAV deformity and significant metatarsus, correction of both components is highly recommended. In general this will consist of osteotomies of the first through the fifth metatarsals with either a transverse or oblique closing base wedge osteotomy of the first metatarsal just distal to the epiphyseal growth plate when one is present. By restoring structural alignment to the forefoot on the midfoot at the level of a Lisfranc's joint abduction of the hallux and digits will be decreased.

This allows a direct line pull of both the intrinsic and extrinsic musculature which governs the function and position of each of the metatarsophalangeal joints. The improved alignment of the flexor hallucis longus and the intrinsic musculature of the first metatarsophalangeal joint decreases the likelihood of recurrence of the deformity. In certain cases even following successful correction of both the HAV deformity, metatarsus primus adductus deformity, and metatarsus adductus deformity additional surgical procedures may be required to correct pes valgus deformity.

In a limited number of cases where severe pronatory signs exist and a significant pes valgus deformity is present preoperatively the rearfoot deformity may even become exaggerated following correction of the forefoot.

The most commonly employed procedures at our institution for correction of the pes valgus deformity in-

clude the Evans calcaneal osteotomy, with or without concomitant medial arch reconstruction, and a gastrocnemius recession or a tendo Achillis lengthening. Following structural realignment of the foot appropriate biomechanical control should be instituted.

The juvenile or adolescent bunion deformity with only mild to moderate metatarsus adductus which is asymptomatic and has only mild to moderate compensation may be satisfactorily corrected without addressing the metatarsus adductus deformity. In such cases aggressive surgical treatment is recommended to minimize the probability of recurrence of deformity.

It is recommended that the more proximally based osteotomy of the first metatarsal be used for correction of the metatarsus primus adductus in such patients. In radiographic evaluation of such feet the intermetatarsal angle must be considered two to three degrees greater than that determined by actual measurements. It is not uncommon to strive to obtain a reduction of the intermetatarsal angle in surgery to 0 to -2 or -3 degrees. In some cases an opening wedge osteotomy of the first metatarsal or medial cuneiform may be an appropriate procedure.

Our clinical experience has shown, based upon intraoperative radiographs that even when the intermetatarsal angle has been reduced to a slightly negative value an increased separation between the first and second metatarsals will be seen later when full weight-bearing function has returned to the foot. This ultimately results in an intermetatarsal angle of approximately 0 to 5 degrees postoperatively. If an open epiphyseal growth plate is present, particular care should be taken to ensure that damage does not occur intraoperatively. The growth plate should be identified and visualized at the time of surgery and the osteotomy executed just distal to it, but in as close proximity as possible, to obtain the full effects of the mechanical principles of the radius arm concept. This allows the most effective mechanical reduction of the intermetatarsal angle. A McBride type bunionectomy is performed. The critical aspects of the procedure include the mobilization and centralization of the sesamoid apparatus beneath the first metatarsal head.

The adductor tendon transfer is particularly helpful in accomplishing this goal. When the sesamoid apparatus is not centralized beneath the first metatarsal head, the lateral intrinsic musculature and the flexor hallucis longus tendon may cause a recurrence of the deformity in the ensuing years as these tendons gain in mechanical advantage over the more medial tendinous structures.

In patients with significant adaptation of the cartilage of the first metatarsal, a Reverdin type osteotomy is recommended along with the proximal metaphyseal osteotomy. Akin type osteotomies should be used with caution and reserved only for those cases where there is significant hallux abductus interphalangeus present. The indiscriminate use of the Akin procedure to straighten the great toe is likely to result in greater pathology, especially recurrence of deformity if the other structural abnormalities have not been precisely corrected. This is particularly true in individuals with symptomatic metatarsus adductus.

Although the Akin procedure may contribute greatly to restoring a straight medial border of the foot, it results in an obvious separation between the hallux and lesser digits which already are abducted relative to their adjacent metatarsals. This results in a physical incompatibility with normal shoes. In order to conform to the medial border of the shoe the great toe must deviate laterally resulting in loss of joint congruity at the metatarsophalangeal joint.

Clinical experience has shown that patients who undergo surgical correction of a hallux abducto valgus deformity in the presence of a structural metatarsus adductus frequently have a residual bunion deformity or a clinical hallux abducto valgus deformity without radiographic evidence of such deformity.

In many cases the surgeon may even identify full correction and normalcy of all radiographic parameters. The degree to which this clinical appearance of a residual bunion of hallux abducto valgus deformity occurs is proportional to the degree of metatarsus adductus deformity and the degree of compensation present. The greater the metatarsus adductus deformity the greater the abduction of the hallux and lesser digits on their adjacent metatarsal.

The hallux and digits generally remain parallel to the long axis of the calcaneus regardless of the degree of metatarsus adductus deformity present. The amount of abduction present between the digit and its adjacent metatarsal will increase as the degree of metatarsus adductus increases. This will be accentuated by pronation of the subtalar and midtarsal joints as compensation for the deformity. There is a temptation to decrease this

residual bunion appearance by excessive resection of the medial eminence. This is to be avoided at all costs.

Distal metaphyseal osteotomies of which the Austin bunionectomy and its modifications are most popular are reserved for those patients with mild to moderate HAV deformities and mild metatarsus adductus. One should remember that distal metaphyseal osteotomies do not provide a true structural reduction of the metatarsus primus adductus, but rather effective or relative reduction in the intermetatarsal angle only. Our staff has not found distal type osteotomies to be highly successful in those patients with significant metatarsus adductus deformity. We continue to prefer the more proximal base wedge osteotomies with or without simultaneous correction of the metatarsus adductus deformity.

Surgical management of HAV deformities in the adult with significant metatarsus adductus deformity is also an extremely challenging clinical entity. In general we recommend avoiding correction of the metatarsus adductus in the adult with such a deformity unless major clinical disability or symptomatology is present. This may be present in extreme cases of compensation in which the foot is in a severe pes valgus attitude or in cases where there is minimal compensation and the foot presents as a mild cavus deformity.

Major alterations of all the metatarsals on such a foot may have significant adverse effects on the remaining structure and function of the mature foot. We do however recommend an aggressive surgical approach to the correction of the HAV deformity, even with only a moderate increase in the intermetatarsal angle. Commonly employed procedures include proximally based wedge osteotomies of the first metatarsal with modified McBride bunionectomy at the metatarsophalangeal joint level. A Reverdin type osteotomy is preferred to correct significant alterations of the proximal articular cartilage (PASA) of the first metatarsal head.

## Summary

Correction of the hallux abducto valgus deformity in a patient with a metatarsus adductus deformity is a challenging clinical entity which requires a comprehensive clinical and radiographic assessment and evaluation to determine the most appropriate surgical procedures. Consideration must be given to the degree and severity of deformity and compensation present, presence or absence of clinical symptomatology, the age of the patient, and finally the expectations of the patient seeking corrections of such deformities. Clear cut guidelines and indications have yet to be established and remain a goal for the future.