

Should You Resect The Medial Eminence During Hallux Abducto Valgus Surgery?

Point



Yes. As these authors argue, surgeons may resect the medial eminence to facilitate other bunion procedures, prevent potential complications and enhance patient satisfaction.

By David Yeager, DPM, FASPS, FAFAS, and Katherine Hagmann, DPM

Authors have proposed many different theories for the etiology of hallux abducto valgus, including restrictive shoe gear, trauma, heredity, pes planus, first ray hypermobility and ligamentous laxity.¹ In light of the complexity of the hallux abducto valgus deformity, planning the appropriate procedure is necessary to facilitate optimal outcome and decrease the risk of recurrence and other complications.

Currently, there are over 100 different bunionectomy procedures for the correction of bunion deformity.^{2,3} Many of these procedures involve removal of the medial eminence of the first metatarsal head, also described as a Silver procedure or simple bunionectomy. While surgeons do not usually perform resection of the medial eminence as a stand-alone procedure, removal of the medial eminence as an adjunct to other bunionectomy procedures is common. This is not surprising as patients with symptomatic hallux abducto valgus often cite the medial eminence as the focus of pain.^{1,4}

However, emerging literature has focused on the correction of the frontal plane component of bunion deformity, often without including resection of the medial eminence of the first metatarsal head as part of the procedure.^{5,6} The argument for leaving the medial eminence intact is to reduce the risk of complications associated with the procedure. These complications include avascular necrosis of the first metatarsal head, hallux varus, capsular adhesions and decreased range of

motion of the first metatarsophalangeal joint (MPJ). Opponents of resection also argue that the prominent metatarsal head is a result of rotation of the first metatarsal rather than a bony proliferation so soft tissue remodeling over time would ultimately yield results in terms of decreasing the prominence of the medial eminence when one performs adequate frontal plane correction.

As podiatric surgeons, are we left to believe that resection of the medial eminence is a thing of the past? We argue that resection of the medial eminence is still a viable adjunct procedure to other soft tissue and bony procedures to correct hallux valgus deformity. We believe this adjunct procedure may help prevent complications and improve patient satisfaction postoperatively.

Understanding The Pathology Of Hallux Abducto Valgus Deformity

Medial subluxation of the first metatarsal head is influenced by extrinsic forces, which may include restrictive shoe gear, and occurs as a result of instability due to the lack of muscle attachments to the first metatarsal head.¹ Subsequent subluxation perpetuates the instability of the first ray due to the deforming forces of intrinsic musculature and loss of the windlass mechanism. Subluxation also leads to contracture of lateral soft tissue structures and attenuation of medial soft tissue structures.

As the deformity progresses, the medial portion of the capsule deteriorates, allowing the abductor hallucis muscle to slip

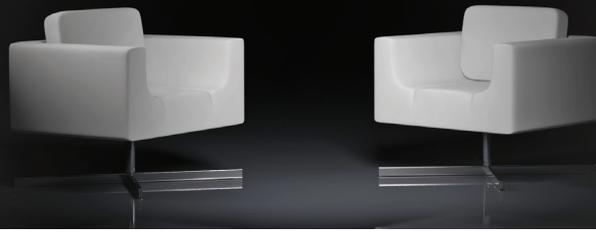
across the inferior aspect of the metatarsal head, leading to exposure of the sesamoids and pronation of the proximal phalanx. As this slipping of the sesamoid apparatus occurs, the crista wears, leading to pronation of the hallux. Further deviation of the metatarsal head leads to exposure of the medial eminence. Pain often results at the medial eminence as pressure from conventional shoe gear impinges on the nerve or bursitis occurs.

In severe deformity, the extensor hallucis longus tendon contracts and the abductor hallucis is no longer able to abduct the first metatarsal. As a result of the deformity, weight transfers laterally across the forefoot as the first MPJ and hallux are not able to function properly.¹ The rounded shape of the first metatarsal head, lateral deviation of the distal metatarsal articular surface and deformity of the proximal phalanx resulting in hallux valgus interphalangeus deformity have also been associated with hallux valgus deformity.¹

A Closer Look At Complications Of Resecting The Medial Eminence

One of the most compelling arguments for preserving the medial eminence is to reduce the risk of complications such as avascular necrosis of the first metatarsal head and hallux varus.⁶ While one must consider these complications for all distal metatarsal head procedures, arguably, both of these complications are rare.^{7,8} According to the literature, the incidence ranges from 0 to 76 percent for avascular necrosis of the first metatarsal head and from 2

(Continued on page 54)



Counterpoint



No. Sharing insights from their experience as well as the literature, these authors have found that by performing reduction in all three planes with the Lapidus bunionectomy, there is no need to resect the medial eminence.

By Danielle N. Butto, DPM, and Lawrence A. DiDomenico, DPM, FACFAS

With hallux valgus deformities, typically, the first metatarsal is a normal bone (straight) presenting with an angular deformity and malalignment. Hallux valgus is an angular deformity in all three planes stemming from metatarsal cuneiform joint instability. The progressive development of a hallux valgus deformity increases with instability in the transverse, sagittal and frontal plane, leading to an increase in deformity.

The first metatarsal head does not have a large medial eminence. Clinically, it appears to have a large medial eminence because of chronic soft tissue changes (bursa and adaptive changes). The soft tissue changes are a result of chronic pressure from malalignment and irritations of the first metatarsal head. With a hallux valgus deformity, the radiograph of a first metatarsal may provide an appearance of a large medial eminence but it is a radiographic projection of the first metatarsal malaligned in a valgus rotation as DiDomenico and colleagues have demonstrated.¹ The slow, gradual development of the deformity allows the first metatarsal to pronate. This pronated position of the first metatarsal head in turn provides a static “snapshot” radiographic projection that suggests there is a large medial eminence.

A Closer Look At The Authors’ Surgical Experience

It has been our experience (since 2001)

not to address the first metatarsophalangeal joint (MPJ) while correcting a hallux valgus deformity. We accomplish this through correcting the underlying pathology at the first tarsometatarsal joint (Lapidus). The most prominent goals of the Lapidus bunionectomy promote the establishment of a congruous first MPJ with a reduction of the intermetatarsal angle and realignment of the sesamoids in the frontal plane.

Furthermore, the Lapidus bunionectomy restores the weightbearing function of the first ray and maintains first MPJ range of motion while repositioning the hallux in a rectus alignment. The goal is to correct the factors that led to the development of deformity.

When I (the senior author) perform a Lapidus bunionectomy, I do not resect the medial eminence. I have found that when I perform the appropriate reduction in all three planes (frontal, sagittal and transverse), the medial eminence is no longer proud. Therefore, it does not need resection. Furthermore, with an excellent intermetatarsal reduction in the transverse, sagittal and frontal plane, I have found that a lateral release and a fibular sesamoid release are not needed. By reducing the intermetatarsal angle anatomically (congruent first MPJ), this essentially lengthens the adductor tendon and the first metatarsal rotates back over the sesamoids. This will help alleviate any potential for a postoperatively stiff first MPJ, hallux varus or nerve entrapment.²

What The Research Reveals About The Medial Eminence

In hallux valgus deformity, the medial eminence is usually the most visible component. Researchers often attribute this to the main complaints with bunions, including painful or ill-fitting shoe gear, inflamed bursa and irritation of the dorsal cutaneous nerve.³ Coughlin and colleagues reported that 70 to 75 percent of patients report a chief complaint of pain over the medial eminence.³

We traditionally think of the bunion deformity as consisting of a lateral deviation of the proximal phalanx with medial deviation of the first metatarsal. Recent studies argue that the deformity is multiplanar with abduction in the transverse plane, eversion in the frontal plane and a possible sagittal plane component.^{1,4-5} Regardless, in the deviated position, there is an imbalance of the intrinsic musculature along with a lateral pull of the extensor and flexor tendons, causing an abductory force to the hallux and further medial deviation of the metatarsal.⁶

There is debate in the literature whether it is hypertrophic bone causing the medial eminence or a rotational component of the first metatarsal causing protrusion medially.⁶⁻¹²

In 1887, Lane considered the medial eminence not to be a new growth but rather part of the original metatarsal.⁷ He states the prominent medial aspect once articulated with the proximal phalanx but became exposed once the

(Continued on page 58)



to 15.4 percent for hallux varus.^{6,7} Haas points out that one can avoid both of these complications through careful dissection, utilizing medial or dorsal capsulotomies to preserve blood supply to the metatarsal head, paying attention to structures in close proximity to the first metatarsal neck, and avoiding overly aggressive resection of the medial eminence that could disrupt the sesamoid apparatus.⁹

Other potential complications of resection of the medial eminence are the formation of capsular adhesions and joint stiffness. Fortunately, surgeons can counter these complications through range of motion exercises and joint manipulation to decrease pain and increase range of motion.¹⁰

Furthermore, it is important to point out that the literature has shown no statistical difference in the rate of revision surgery after Lapidus arthrodesis, closing base wedge osteotomy and chevron-Austin osteotomy.¹¹ This clearly illustrates that all surgery carries inherent risk. Currently, no literature to date shows a statistically significant correlation between resection of the medial eminence and increased rates of postoperative complication.

Recognizing The Adjunctive Benefits Of Resecting The Medial Eminence

Additionally, researchers have dispelled the idea that the medial eminence is hypertrophied or is a bony proliferation.^{1,3,6,12} While not considering the medial eminence to be pathological in and of itself may be reason to leave the medial eminence intact, it is important to recognize that resection of the medial eminence can be an adjunct to other procedures. One can better facilitate soft tissue procedures such as capsulorrhaphy by resecting the medial eminence to allow easier manipulation of the soft tissue structures.¹²

Furthermore, most bunionectomies, including the Lapidus procedure, shorten the first ray. Shortening of the first ray can lead to complications such as metatarsalgia and transfer lesions to the lesser metatarsals.¹³ As a novel solution to this problem, surgeons have used the resection

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of the medial eminence in conjunction with the Lapidus procedure to provide a suitable autograft to reduce the complications associated with shortening of the first ray.¹³ Clearly, the versatility of the resection of the medial eminence extends beyond the realm of the “bumpectomy” that surgeons perform simply to remove the bump.

Why Patient Perception Of Bunionectomy Outcomes Is Important

Finally, removal of the medial eminence also provides for the most immediate results in terms of cosmetic appearance and fit into conventional shoegear. Many people with symptomatic bunions have pain as a result of nerve impingement or bursitis that wearing conventional shoegear exacerbates.¹

While soft tissue structures remodel over time, it is important to keep in mind that patients may relate successful surgical outcomes to multiple subjective parameters including pain relief, cosmetic appearance and the ability to wear conventional shoegear.^{6,14} Patients may not be happy with their surgical outcome, even when radiographs show correction of the structural deformity, because their perception of the cosmetic outcome of their surgery does not meet their expecta-

tations or because they are still unable to wear conventional shoes without pain after their expected postoperative recovery period ends.

Radl and colleagues point out that the ability for surgical outcomes to appeal aesthetically to patients is a unique challenge to physicians who perform orthopedic procedures.¹⁴ Podiatrists must not only accept but embrace this challenge in order to remain competitive in our evolving profession.

In Conclusion

It is important for podiatric surgeons to choose the procedure that will lead to the best outcome for their patients. When deciding whether to resect the medial eminence, it is important to keep in mind that research has not shown an increased rate of complications associated with resection of the medial eminence in comparison to the rate of complications of other bunion procedures.¹¹ One can address many complications through careful preoperative and intraoperative planning, or postoperative intervention like range of motion and joint manipulation.

In addition, the surgeon may consider how the bunionectomy can facilitate other soft tissue and bony procedures in order to avoid complications. Finally, one must consider the opinion of the patient



Point

and it is important to appreciate aesthetic outcome and the ability for patients to be comfortable in conventional shoes. Clearly, the resection of the medial eminence must not be discredited as a viable surgical procedure we can utilize in the correction of hallux valgus deformity. ■

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toe moved laterally. In 1891, Anderson found no new bone formation in the region of the prominence.⁸ Payr in 1894 and Heubach in 1897 further supported Lane's theory with their studies.^{6,11,12}

In their cadaveric study, Grode and McCarthy observed that the position of the medial eminence actually represents the dorsomedial surface of the head of the first metatarsal.⁹ They stated that portion of the metatarsal comes into prominence by eversion of the metatarsal.^{1,4,9} In 2002, Thordarson and Krewer evaluated radiographs of patients with and without hallux abducto valgus deformity.¹⁰ They found no significant difference in the size of the medial eminence. They noted the head was more exposed medially but not enlarged, and concluded hypertrophy of the medial eminence is not a component of bunion pathology.

Greater than 200,000 hallux valgus surgeries occur every year in the United States alone.¹³ In the past century, authors have described more than 100 bunion procedures and variations of procedures.^{3,4,10} A great majority of these procedures include resection of the medial eminence of the first metatarsal along with soft tissue intervention at the first MPJ, including capsulotomy, lateral soft tissue release and/or medial capsulorrhaphy.¹³

DiDomenico and colleagues suggest that no medial eminence resection is required if it is the rotation of the metatarsal rather than hypertrophic bone attributed to the prominence medially.¹ In addition, if one can relocate the sesamoids through manipulation, this eliminates the need for soft tissue procedures at the first MPJ. This inherently eliminates an iatrogenic hallux varus associated with over-resection of the medial eminence. With no interspace dissection and lateral release, the potential for avascular necrosis to the first metatarsal head and first interspace scar formation decreases as do the vascular or nerve concerns for the first MPJ.¹

The goals of hallux valgus surgery are to re-establish a normal weightbearing status at the first MPJ and congruency of the first metatarsophalangeal complex and the relationship of the metatarsal head/sesamoid joint. Authors have proven that surgeons can meet these goals without medial eminence resection.

Dayton and colleagues in 2013 questioned whether medial eminence resection was necessary.⁵ They felt the described enlargement medially might be accentuated on anterior-posterior radiographs due to an abnormal profile created by the valgus positioning of the metatarsal. Reviewing their own cases, they found once they derotated the metatarsal and fixated it with a first metatarsal-medial cuneiform arthrodesis, there was no need for a distal eminence resection. They also noted that when the appearance of a medial eminence was still present, it was thickening of the soft tissue medial capsule rather than bone causing the persistent bump.

Klemola and coworkers reported their technique for flexible hallux valgus correction without touching the first metatarsophalangeal joint in 2014.¹³ They performed a first metatarsal-medial cuneiform arthrodesis using a single screw technique on 66 patients with 84 flexible hallux valgus deformities. The authors were able to reduce the hallux valgus angle, the intermetatarsal angle and Meary's angle. In addition, the surgeons attained relocation of the sesamoids under the first metatarsal without distal metatarsal intervention.

In Summary

With the review of earlier studies in combination with new literature, we should clarify the definition of the medial eminence. In addition, we certainly question the need for a medial eminence resection. The goals of hallux valgus surgery are to re-establish a normal weightbearing status at the first MPJ and congruency of the first metatarsophalangeal complex and the relationship of the metatarsal head/sesamoid joint. Authors have proven that surgeons can meet these goals without medial eminence resection.^{1,5,11} Not resecting eliminates the postoperative risk of hallux varus. In addition, there is no disruption of the first MPJ complex when one performs a Lapidus procedure.

The times we have not been satisfied with our postoperative results are when we did not achieve full reduction of the intermetatarsal angle or did not come as close as possible to parallel to the second metatarsal, leaving a small remnant of the bunion in appearance. One needs to ensure adequate reduction in order to remove the appearance of the clinical deformity. ■

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Counterpoint

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