Modern Techniques in Hallux Abducto Valgus Surgery

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KEYWORDS

• Lapidus • Locked plate • Opening wedge plate
• TightRope • Bunion • Akin • Staple

OPENING BASE WEDGE

The opening base wedge (OBW) osteotomy for correction of hallux abducto valgus (HAV) and hallux primus varus (HPV) was introduced by Trethowan in 1923.[1] His technique described a hinged osteotomy with interposition of a wedge-shaped graft. He did not recommend fixation. This lack of fixation and perhaps the lack of quality fixation over the years provided the OBW few supporters throughout history. The osteotomy is vulnerable to hinge fracture and subsequent elevation of the capital arm, as well as delayed union or nonunion. Jamming of the first metatarsal phalangeal joint is also a recognized concern. Other, more reliable procedures were preferred for moderate to severe HAV correction. The scarf, crescentic, closing base wedge, and Lapidus are more frequently used because they are more stable and thus predictable.

Medical device innovation has brought the OBW into focus for HAV surgery. The procedure-specific OBW plate is the focus of this section. To effectively open the medial base of the wedge on the first metatarsal, the lateral hinge has to be made sufficiently thin; if the hinge is too thick, it will likely fracture as the wedge is pried opened (**Fig. 1**). The ability of the plate to offload the ground reactive forces, caused by weight bearing, on the intact hinge allows the bone to incorporate into the gap, with diminished risk of fracture or disruption during the postoperative course. An "efficient" osteotomy should be performed at 90° to the medial border of the metatarsal; at this angle, screw fixation is difficult. Landing a screw across a narrow bone at such an acute angle offers less than ideal fixation strength and compression according to arbeitsgemeinschaft osteosynthesefragen (AO) principles.

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Fig. 1. Medial to lateral osteotomy, perpendicular to the metatarsal shaft.

Recent literature has supported the use of a low-profile plate and screw system (Arthrex Inc, Naples, FL, USA) designed specifically for a basilar opening wedge procedure (**Fig. 2**).[2–6] The plate has many desirable features. The first is its low profile design. The medial cortex of the first metatarsal has minimal soft tissue buffering from local nerves and the skin. Any prominence in this area often leads to painful hardware and neurologic symptoms. The design of the plate to adhere closely to the bone and of the screws to seat down into the plate minimizes protrusion risks. The plate also features a solid wedge that is offset from the wall of the plate. The wedge allows seating of the plate into a reproducible location and holds the osteotomy at a predictable gap distance.

In 2009 several articles related to the Arthrex plate were published, whose authors' excitement was palpable. Cooper and colleagues,[7] Wukich and colleagues,[8] and Hardy and Grove[2] all described the OBW technique and described plate features. The technique is technical but reproducible. Of critical importance is maintaining a lateral cortical hinge without fracture as well as avoidance of first met base medial cuneiform joint violation with the osteotomy and the screws. Techniques vary regarding the orientation of the cut; some choose to remain perpendicular to the

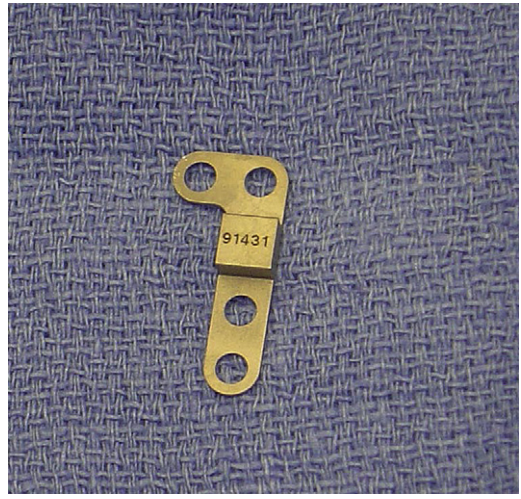

Fig. 2. Arthrex low-profile plate for opening base wedge.