

INSERTION TECHNIQUE FOR THE GROMMET COMPRESSION STAPLE

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INTRODUCTION

The purpose of this article is to introduce the reader to a new form of staple fixation that is currently under development and will be marketed and distributed by Vilex. The system allows compression to be produced at the site of fixation by use of a specially designed stainless steel grommet and accompanying compression device. The set comes with a wide variety of staple widths (10-20mm) which allows the surgeon to place the staple precisely at the desired location of the staple legs. The sequence of insertion will be discussed and a case illustration presented.

TECHNIQUE FOR LESSER METATARSAL-CUNEIFORM JOINT ARTHRODESIS

The lesser metatarsal-cuneiform joints are generally exposed from a dorsal perspective. The cartilage and subchondral bone plates are then removed. After assuring the joint reduces satisfactorily, the desired entry points of the staple are chosen (Figure 1). At this point it is necessary to prepare to insert the first of two stainless steel grommets (Figure 2). (The standard grommet is 10mm in length and has a 0.062" inner diameter, and the outer diameter is 2.7mm). A parallel drill guide (Figure 3) is placed over the selected entry points of the staple (Figure 4) and two 0.045" K-wires are drilled into the bony surfaces through the chosen entry points for the staple (Figure 5). The parallel drill guide is removed and a 2.7mm cannulated drill bit is used to produce a channel 10mm in depth, which matches the length of the grommet (Figure 6). The drill bit has a marked graduation at a point 10mm from the tip so that the surgeon doesn't inadvertently drill the hole too deep. (The grommets are 10mm in length, therefore the 2.7 mm drill hole need not be deeper.) Distal to this point the staple engages the bone.

The K-wires are then removed (Figure 7) and the grommets are approximately 80% inserted (Figure 8). A grommet compression clamp (Figure 9) is then applied to the sides of the grommets and closed until good apposition and compression of the arthrodesis site is

attained (Figures 10-12). A significant amount of compression can be produced with this method. The distance between the grommets is measured (Figure 13); the appropriate width staple is inserted and finally tamped into place (Figures 14, 15).

There is also technique for insertion. After the first staple has been inserted, a second staple will often be added (such as in midtarsal joint fusions). The second staple can

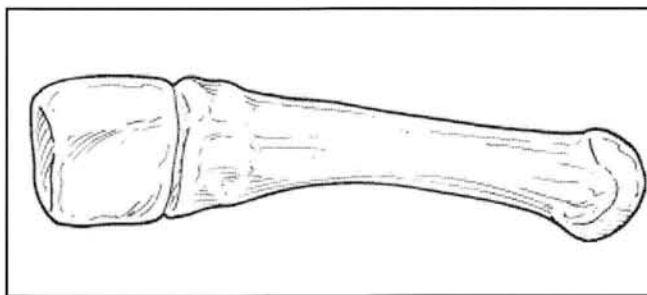


Figure 1.

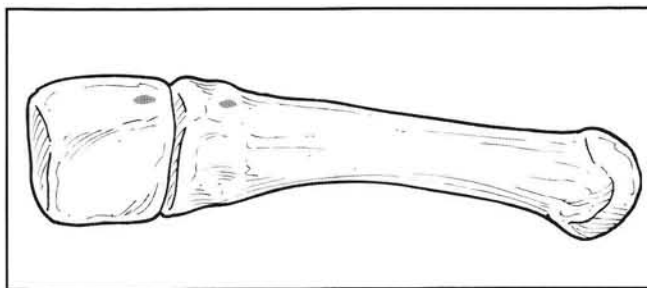


Figure 2.

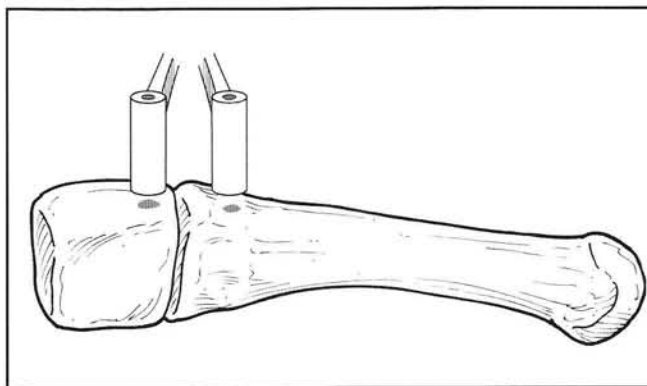


Figure 3.

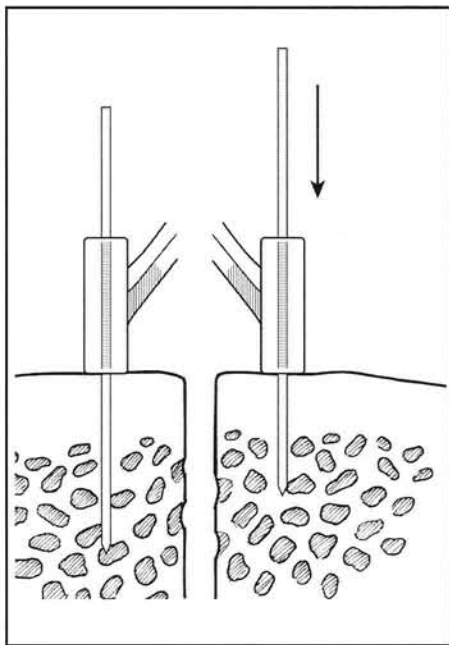


Figure 4.

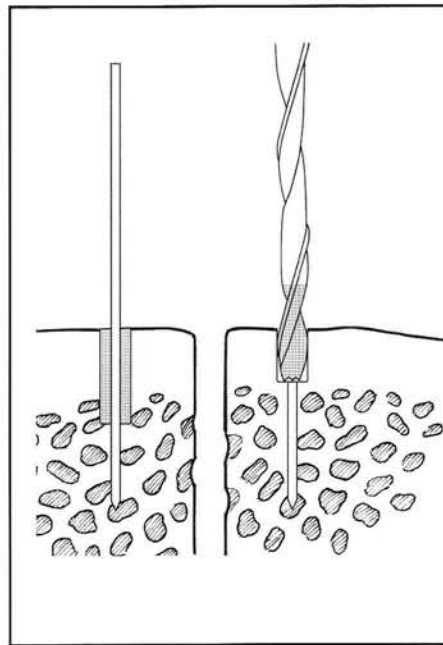


Figure 5.

be added using the standard technique or the alternative technique. With this method the ideal entry points for the staple are chosen, the K-wires are placed in a parallel fashion and the grommets are completely inserted. The distance between the grommet holes is determined, and a staple 1 mm shorter than measured is inserted.

COMPONENTS

The components of the Grommet Compression Staple set include:

- (1) Stainless steel staples ranging in widths from 10-20 mm, in sequential 1mm increments. The staple diameter is 1.6mm. This gauge staple is primarily intended for midfoot use. A larger gauge staple is also being produced for use in the rearfoot and ankle.
- (2) Stainless steel grommets (10mm length x 2.7mm outer diameter, with 1.6mm core diameter)
- (3) Parallel drill guide for .045" K-wires
- (4) Canulated 2.7 mm drill bit
- (5) Grommet compression clamp
- (6) Measuring device
- (7) Tamp
- (8) Staple/Grommet extractor

INDICATIONS

Indications for use are arthrodesis procedures (e.g., Lisfranc/midtarsal joint), osteotomy fixation (e.g., Dwyer calcaneal osteotomy), and adjunctive bone fragment fixation (e.g., 1st metatarsal base fracture).

DISCUSSION

The Grommet Compression Staple system allows a staple to be placed with compression across the fixation site. With a wide variety in staple widths available, the proper size is consistently available. Another positive aspect of the system is the ability to place the device exactly where it is intended to go. The grommets follow the K-wires, and the staple follows the grommets. Also, no aggressive force is necessary to hammer the implant in place. Consider the occasional situation where a surgeon places a Blount staple across an arthrodesis site. The device is forcefully hammered into place and an intra-operative x-ray is taken only to show one of the staple legs penetrating an adjacent joint. Using a standard Blount type of device, it is often difficult for the staple legs to follow the intended path. Furthermore, the more narrow the bone (such as the navicular) the less margin for error in placing the staple without violating an adjacent joint. Also, coupled with the limited sizes of staples available the task becomes more challenging.

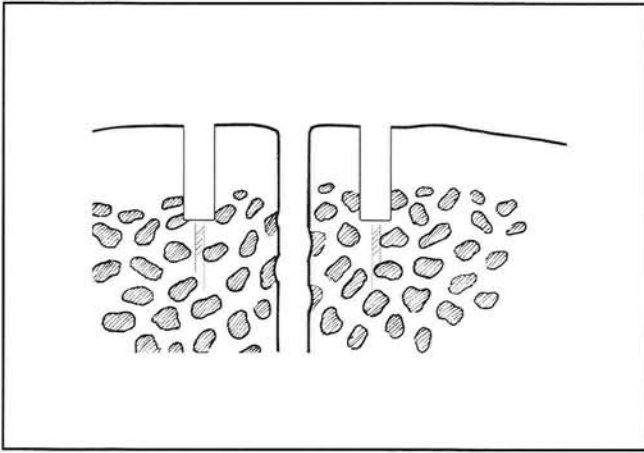


Figure 6.

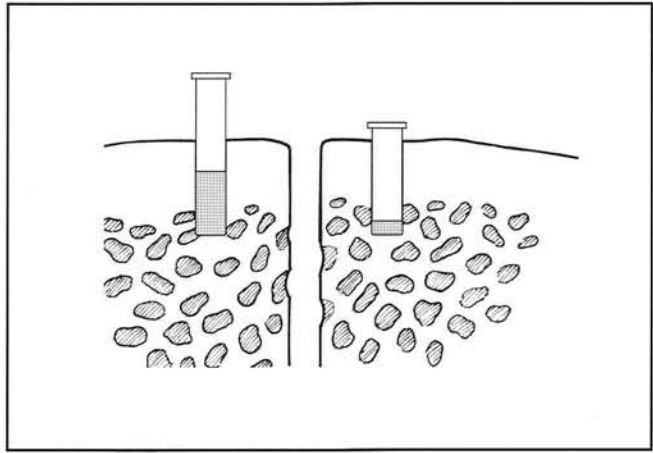


Figure 7.

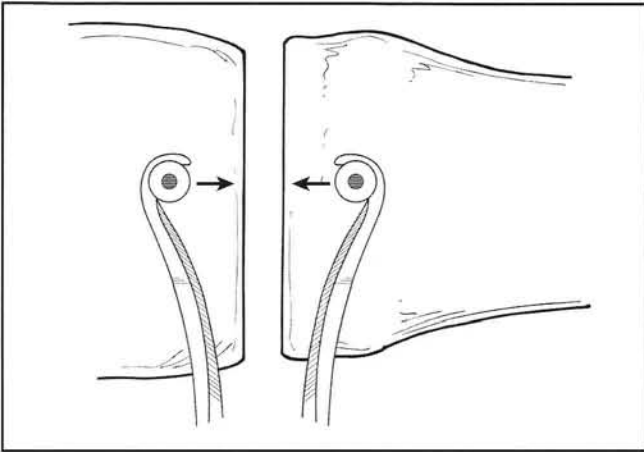


Figure 8.

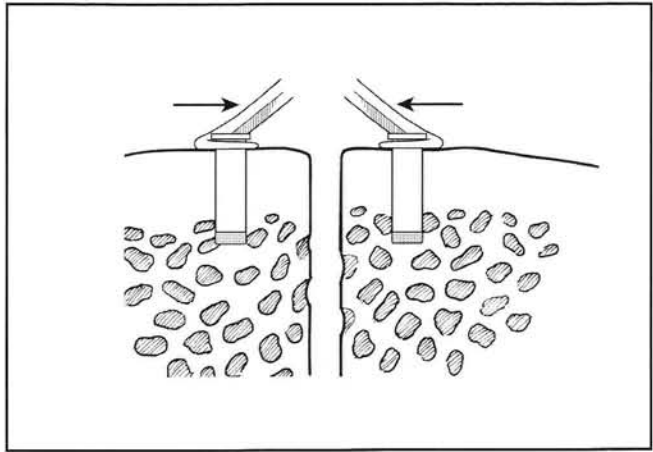


Figure 9.

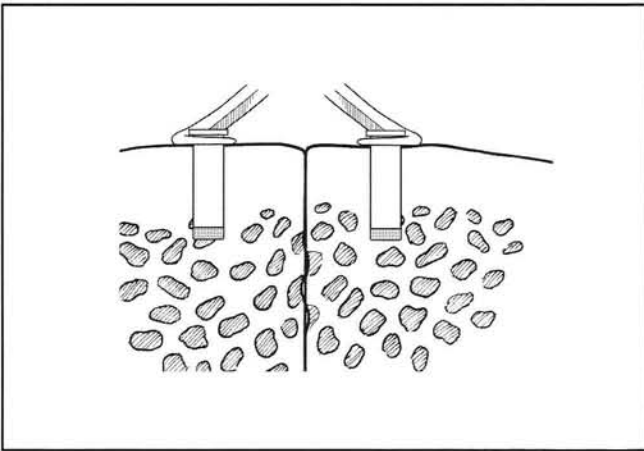


Figure 10.

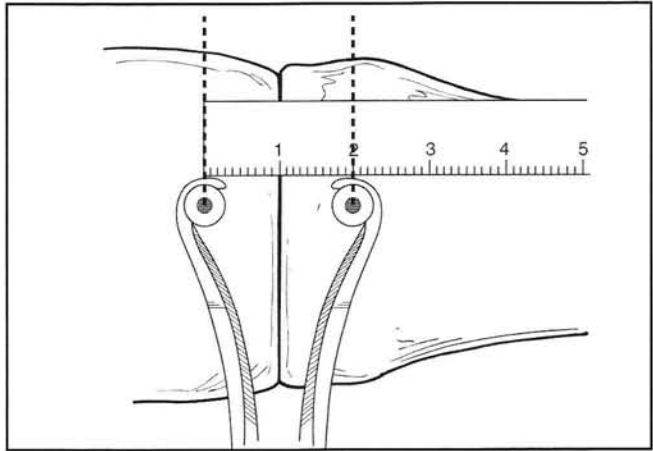


Figure 11.

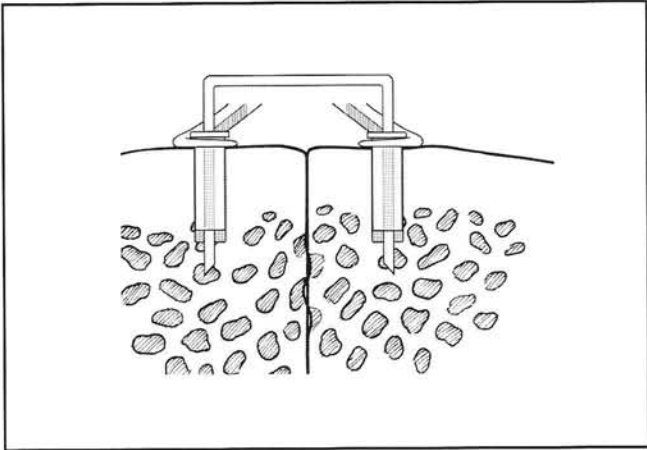


Figure 12.

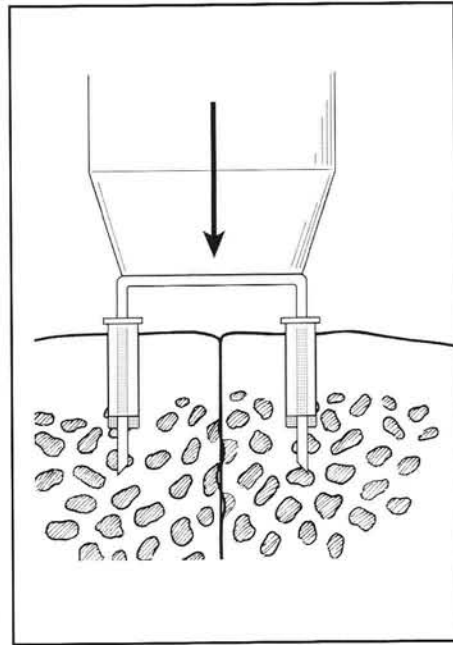


Figure 13.

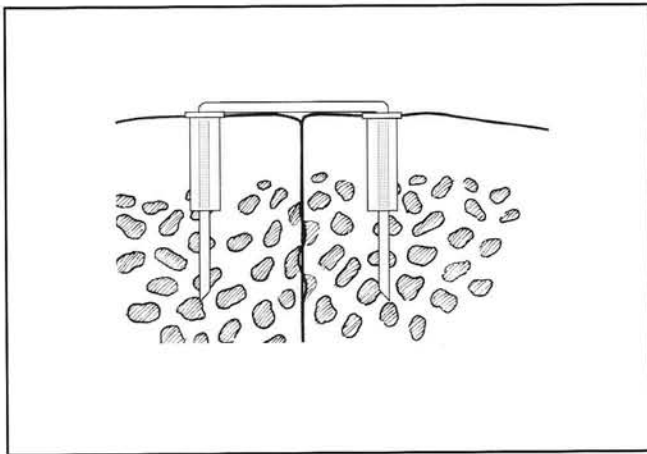


Figure 14.

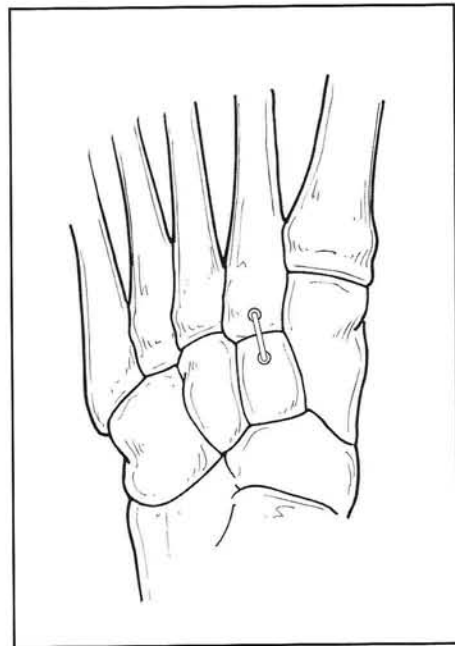


Figure 15.

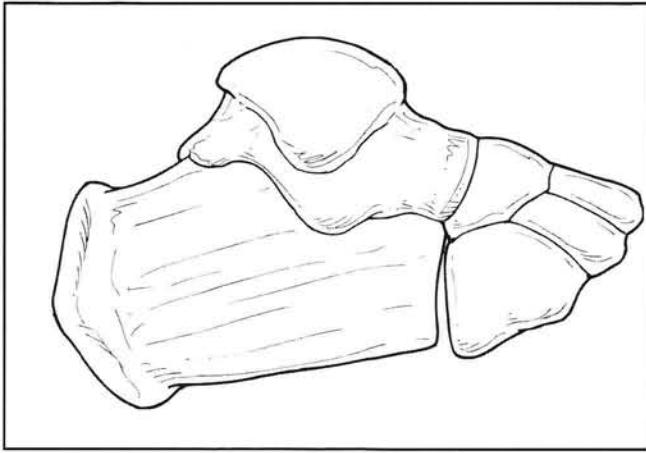


Figure 16.

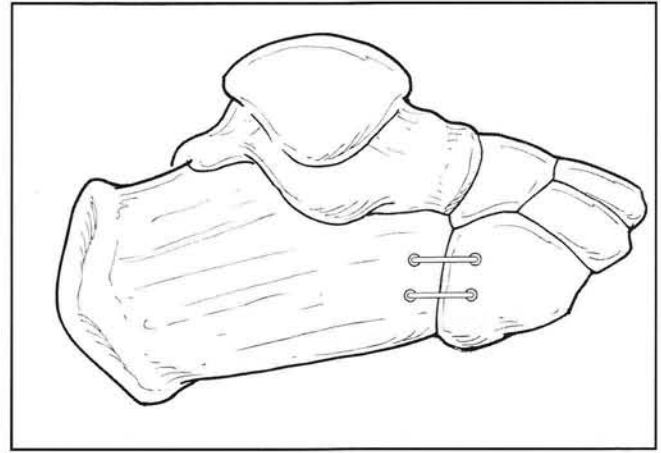


Figure 17.