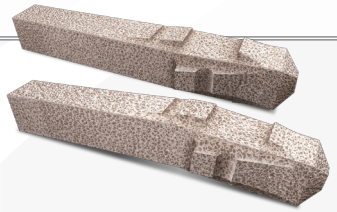
Hammertoe Deformity Correction

Using the Sterile AlloAid® PIP Allograft Implant



Straight and 10° Angled AlloAid® PIP Implants

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A case study using the Sterile AlloAid® PIP Allograft Implant

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INTRODUCTION: Hammertoe deformity is one of the most common ailments that is seen in the physician's office. It is primarily a sagittal plane deformity, however it can also have components of transverse plane and frontal plane abnormality. Typically, the patient presents with discomfort from either their shoe rubbing on the toe, or from the thick and inflamed corn which is a secondary effect of the tight shoe.

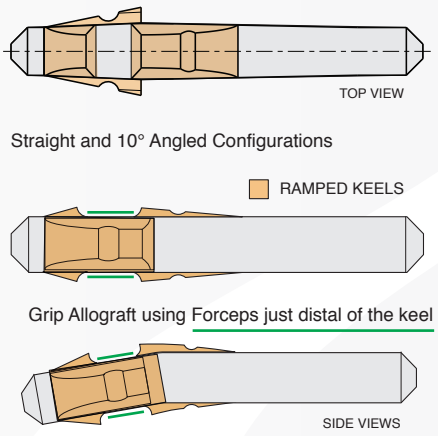
It is the rigid hammertoe which usually requires surgical intervention. In the majority of these cases, either an arthroplasty, or an arthrodesis is performed. It is a belief which has evolved over the past 25 years, that the fusion of the toe provides a more predictable and reproducible result. In addition, when multiple toes are involved, the arthrodesis provides a more stable walking platform, as well as a more aesthetically appealing foot.

CASE HISTORY: This patient presented to the office with a complaint of pain at the bunion site and discomfort from a long 2nd toe which had become a chronic problem. Most of her shoes which used to be comfortable, were no longer fitting well and had become very uncomfortable. In addition, her daily exercise routine was affected as well since her sneakers were now problematic. **(Figure 1**)

FIGURE 1

Initially, non-operative care was provided including padding, shoe style change recommendations, anti-inflammatory medications, and offer of an injection into the bunion in an attempt to reduce the inflammation and discomfort. After some thought, the patient decided to schedule surgery to correct the bunion and the 2nd toe hammertoe.

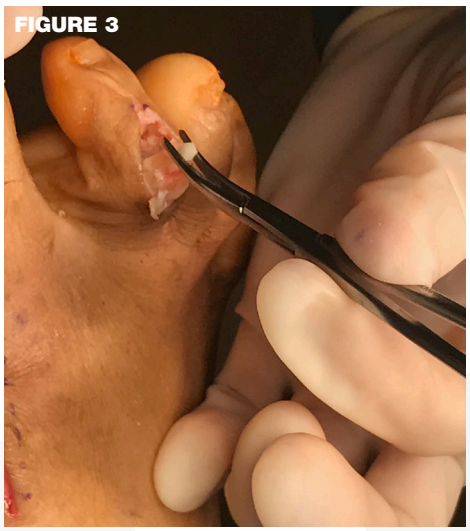
FIGURE 2



THE PROCEDURe: For purposes of this discussion, we will focus our attention to the hammertoe surgery.

A 1.5cm midline dorsal incision was made on the 2nd toe. The dissection was carried down to the level of the subcutaneous tissue and the EDL tendon. At the PIPJ level, the tendon was transected and reflected proximally to the neck of the proximal phalanx. The next step was to sever

FIGURE 3



the collateral ligaments on the medial and lateral sides of the head of the phalanx, and deliver the phalanx into the operative site. Utilizing a sagittal saw (sagittal or oscillating work well), the head was resected at exactly the point of the flair on the bone where it meets with the head. The head was dissected free and removed from the wound.

The next step was to remove the articular cartilage on the base of the middle phalanx. The same saw was used to accomplish that. The appropriate size drill bit was used to create a channel for the bone allograft to slide into. There are proximal and distal depth lines etched onto the drill bit. Once the drill holes are created, the AlloAid PIP allograft was removed from its sterile packaging. The allograft comes packaged sterile in a small vial with saline therefore no hydration is required. The AlloAid PIP Allograft is offered in 2.5mm and 2.9mm diameters and both straight and 10 degree angled options. (**Figure 2**).

In this patient, a 2.9mm x 19mm angled implant was used.

In the majority of cases, the implant is inserted into the proximal phalanx first. The implant is held by the forceps at the transition point between the proximal and distal keels which prevents to implant from being placed too deeply into the drill holes. (**Figure 3**). Once the implant is positioned proximally, the distal portion of the toe is placed onto the allograft which is protruding from the proximal phalanx. It is positioned directly onto the implant and compressed until the two cut surfaces of bone (proximal and middle phalanx) are opposed. Once the two bones are positioned correctly, the wound is irrigated and the tendon is re-approximated in any fashion desired by the surgeon. (**Figure 4**).

DISCUSSION: Biomechanically, the fusion of the toe provides a rigid lever arm for propulsion as well as a mechanism whereby the flexors stabilize the MTPJ. With the sterile AlloAid PIP bone allograft, there are several advantages over metallic implants, and K-wires.

1. This allograft implant provides an environment for both osteoconduction and osteoinduction.
2. The cancellous nature of the bone, with it's porosity provides "scaffolding" for the new bone to be laid down into by the osteogenic precursor cells.
3. Regarding osteoinduction, the undifferentiated mesenchymal stem cells become "active and awakened" to create the pathway for new bone to develop.
4. This implant provides excellent fixation and fully resorbs into the bone over time resulting in successful surgical outcomes.

FIGURE 4

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