

## TECHNIQUE

# Finger Joint Fusion With the Aid of an Aluminum Template

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## ■ ABSTRACT

The author presents a simple technique of the finger joint fusion. The aluminum template is used to make the correct bone cutting and to facilitate the PIP joint fusion in a useful position.

**Keywords:** finger joint fusion, aluminum template, proximal interphalangeal joint

## ■ INTRODUCTION

There are several types of surgical procedures for the treatment of the severely damaged proximal interphalangeal joint (PIP) of the long fingers after trauma or diseases, for example, arthroplasty, joint prostheses, free joint transfer, and fusion.<sup>1–3</sup> If the patient works as a laborer, there will be a preference for a stiff but painless and strong finger. Therefore, in these cases, fusion of the PIP will be the procedure of choice. The ultimate indicator of surgical success and good functional outcome is to have the joint fused correctly in the most useful position possible. The recommended position for PIP is 40° to 55°, depending on the patient's particular needs, the type of finger, and subject to the surgeon's discretion.<sup>1</sup> It is very difficult to maintain this angle during the operation. We use an aluminum template to facilitate this step of the procedure.

## ■ TECHNIQUE

The operative technique is as follows. The anesthesia is a general or regional block of the brachial plexus. A C-shaped incision is made on the dorsal surface of the PIP, and the extensor tendon is divided longitudinally.

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Resection of the base of the middle phalanx is performed perpendicular to the phalanx shaft with the help of the oscillating saw. Resection of the distal part of the proximal phalanx is achieved with the aid of a template, which is prepared before surgery. The template is cut from an aluminum plate with scissors. The tip of the plate is cut according to the necessary angle (Fig. 1). For example, if the planned PIP fusion angle is 40°, then the cutting blade of the aluminum template should be at 40° as well. During surgery, the blade of the saw is directed along the template that is held firmly in place on the dorsal surface of the proximal phalanx by an assistant. The phalanges are then stabilized by tension-band wiring.<sup>2</sup> From 1995 to 2002, the indication for PIP fusion was given in 6 patients aged 18 to 52 years: the index finger, 1 patient; the middle finger, 1 patient; the ring finger, 2 patients; and the little finger, 2 patients. Templates with the appropriate angle were used in all cases. In 2 patients with significant finger shortening and deformation, the operations were performed in 2 stages to decrease the likelihood of damage to the nerves and vessels.<sup>4</sup> In a first step, slow distraction with the mini-Ilizarov apparatus was used, and, in a second step, the actually PIP arthrodesis was performed. After surgery, cast splinting was continued for 2 to 3 weeks. Skin sutures were removed at 2 to 3 weeks after surgery. Wound healing was uneventful. Fusion in the correct position was achieved in all cases.



**FIGURE 1.** The aluminum template on the bone model.



**FIGURE 2.** Case 1. A, Radiograph before surgery; (B) 2 months after surgery; and (C) function of the hand 1 year after surgery.



**FIGURE 3.** Case 2. A, Radiograph before surgery; (B) after 2 weeks' distraction; and (C) 2 years after surgery.

## ■ CASE REPORTS

### Case 1

A 32-year-old female presented with malunion and subluxation of the middle phalanx of the left ring finger after a fracture-dislocation 5 months previously (Fig. 2A). She worked as a cloakroom attendant and had a serious problem at her workplace because of the severe pain in the entire finger and no joint function. After several months of permanent pain, the patient was in need of a pain-free finger. She was operated on by implementation of the method described above. Before surgery, the necessary template with an angle of 40° was made. Wound healing was uneventful. The sutures were removed at 2 weeks after surgery. Finger splinting was continued for 3 weeks. The radiographs at 2 months after surgery revealed the PIP had fused in a good position (Fig. 2B). At

1 year after surgery, she had a good functional result and no pain (Fig. 2C).

### Case 2

A 52-year-old male presented with an “old” dislocation of the middle phalanx of the left ring finger after sustaining an injury 2 years previously (Fig. 3A). In a first step, slow distraction with the mini-Ilizarov apparatus was carried out for 3 weeks (Fig. 3B), and in a second step, the actual PIP arthrodesis was performed using the method described above (the cutting part of the aluminum template was set at 40°). Wound healing was uneventful. The sutures were removed at 2 weeks after surgery. Finger splinting was continued for 3 weeks. The radiographs at 2 years after surgery revealed that the PIP had fused in a good position—40° (Fig. 3C).

## ■ CONCLUSION

The simple aluminum template is a convenient aid to the surgeon who is trying to achieve finger fusion in the correct position.

## ■ REFERENCES

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