Improving Good Ideas
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Over the years, hand therapists have refined the art of innovation, always finding ways to make the good even better. This issue’s Practice Forum submissions are perfect examples of this quest to improve and refine. The first article, by Judy Colditz and Anne Marie Schneider, offers one solution to the difficult task of improving proximal interphalangeal joint extension for the little finger. The second contribution also tackles the proximal interphalangeal joint, this time with a revision of a splint designed for early mobilization of the unstable intra-articular fracture.

MODIFICATION OF THE DIGITAL SERIAL PLASTER CASTING TECHNIQUE

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Serial plaster-of-Paris casting as described by Brand\(^1\) is recognized as an effective technique for regaining proximal interphalangeal joint extension. However, the inability of the serial cast to “purchase” the full length of the proximal phalanx decreases the length of the proximal lever arm available to extend the joint. Additionally, when the distal interphalangeal joint is hyperextensible, the length of the distal lever arm is limited to the length of the middle phalanx. Care must be taken to avoid hyperextension of the distal interphalangeal joint when the proximal interphalangeal joint is molded into extension. We have observed this mechanical inefficiency to be particularly marked in the little finger because of the naturally short lever arms available.

To address these problems, we have modified the technique. Our alternative technique increases the lengths of the lever arms available to extend the proximal interphalangeal joint by (1) lengthening the distal lever arm by creating one unit of the middle and distal phalanges and (2) lengthening the proximal lever arm by elongating the end of the cast proximally and volarly.

*FIGURE 1. The middle and distal phalanges are wrapped with a thin layer of plaster. The proximal interphalangeal joint crease must be clear.*

*FIGURE 2. Plaster is molded on the volar proximal phalanx from the proximal interphalangeal joint crease to the distal palmar crease.*

*FIGURE 3. Thermoplastic material is used to reinforce the plaster slab.*
FIGURE 4. The plaster cast is applied over the proximal and distal segments.

FIGURE 5. The finger is gently stretched into extension.

Technique

First, the middle and distal phalanges are encompassed in a thin layer of plaster of Paris that is wrapped circumferentially from the end of the digit to the proximal interphalangeal joint crease (Fig. 1). Next, eight layers of 1-in wide wet plaster of Paris are applied volarly on the digit from the proximal interphalangeal joint crease proximally to the distal palmar crease, positioning the metacarpophalangeal joint in zero degrees of extension (Fig. 2). The plaster is gently molded to the palmar contour of the digit. The distal circumferential cast and the proximal volar slab must meet exactly at the proximal interphalangeal joint crease (joint axis). The volar piece of plaster is then reinforced by adding a small piece of thin (1/16 in) thermoplastic material molded directly over the hardening plaster slab (Fig. 3). It is important that the edge of the plastic material does not touch the patient’s skin.

Once these segments are in place, a plaster cast is applied circumferentially over them using the technique described by Bell-Krotoski (Fig. 4). With the partially hardened components under the serial cast, the proximal interphalangeal joint can be gently positioned toward extension without risk of creating a pressure area over the proximal interphalangeal joint (Fig. 5). Excessive force must be avoided when molding the cast for proximal interphalangeal joint extension, as the dorsal proximal edge of the distal circumferential piece can be tilted, creating a pressure point on the dorsum of the proximal interphalangeal joint.

This modified technique is particularly useful for resistive joints where the uninjured metacarpophalangeal and distal interphalangeal joint are hypermobile. It is also effective for short digits where there is restricted length available to hold onto the proximal and middle phalanges adequately with circumferential plaster. This modified technique increases the mechanical efficiency of the cast application.

REFERENCES


A MODIFIED DYNAMIC TRACTION SPLINT FOR UNSTABLE INTRA-ARTICULAR FRACTURES OF THE PROXIMAL INTERPHALANGEAL JOINT

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Adopting the Dennys et al.\textsuperscript{1} and Schenck\textsuperscript{2} splinting concept in our facility has resulted in a modification of the Dennys splint (Fig. 6). The original de-