Extension Block Splinting for the Proximal Interphalangeal Joint

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The proximal interphalangeal (PIP) joint is particularly susceptible to acute ligamentous injury, and such an injury can result in swelling without ligament laxity, collateral ligament laxity and disruption, or a partial or complete avulsion of the volar plate with or without bony involvement. Many articles have been written about methods for treatment of injuries to this joint (Bowers, 1983; London, 1971; Lopez & Hanley, 1985; McCue, Baugher, Kulund, & Giek, 1979; McElfresh, Dobyns, & O'Brien, 1972; Moberg, 1960; Strong, 1980). Conservative treatment is the treatment of choice for many hand injuries if the goal is to return the patient to normal activities as quickly as possible. Bowers, McCue et al., McElfresh et al., Moberg, and Strong have each described treatment protocols for various injuries to the PIP joint. McCue et al. and Moberg suggested a period of static splinting followed by dynamic and protective splinting (usually buddy taping). Bowers suggested early mobilization with some form of extension block splinting for sprains (Grade I and II), lateral ligament disruption (Grade III) with articular congruity, volar capsular injuries, certain intra articular fractures, and certain unstable unicondylar and bicondylar fractures. McElfresh et al. suggested early mobilization with extension block splinting for fracture dislocations with volar instability. Strong recommended his version of extension block splinting with volar plate avulsions not involving collateral ligament laxity.

McElfresh et al. (1972) used a plaster cast with an aluminum outrigger to block the PIP joint extension at an angle of about 10° to 15°. Although the splint provided for some lateral stability, primarily because of the size of the plaster cast, it was bulky and immobilized joints that were free of pathology. Strong (1980) recommended taping two pieces of modified aluminum splinting material to the proximal and middle phalanges to block full extension. His splint was small and acted only on the injured joint; however, it did not provide a lateral stabilizing force. The use of buddy taping, as pointed out by Bowers (1983), can be complicated by producing a rotational force to the injured digit, especially when the two digits do not match in length. The purpose of this paper is to discuss the fabrication of a splint that can be made easily, block PIP joint extension, and provide lateral stability protection. The splint was originally described by Hollis (1978) who reported its application with swan neck deformities associated with rheumatoid arthritis.

Method
This extension block splint is made of Aquaplast-T® ⅛ inch thick. Although other materials were tested

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for use, Aquaplast-T proved to be far superior for this type of splint because of its elasticity and forgiving "memory" qualities. Materials necessary for fabrication include scissors, a leather hole punch, and an electric fry pan to heat water (or any other method for heating water to about 150 °F). Cut the piece of Aquaplast-T to the size of approximately 4 cm x 2 cm (this size can vary depending on the length of the finger and the amount of swelling at the PIP joint). Round off the ends and make 2 holes \( \frac{1}{4} \) cm to \( \frac{1}{2} \) cm apart. While the patient is resting his or her elbow on the table, dampen the injured digit with water and apply the splinting material to the joint. The finger is pushed up through one hole and then down through the other (see Figure 1). Working quickly, slide the material over the PIP joint. The PIP joint is held at an angle of approximately 15° (or the desired degree of flexion) while the splinting material is allowed to harden. To speed the hardening process, you can use a cold spray (e.g., Dichloratetrafluorathane spray). The fabrication time is usually less than 5 minutes.

**Discussion**

During a 9-month period, 45 patients exhibiting various joint injuries were treated with this extension block splinting technique. Table 1 provides a list of presenting diagnoses. There were no complications while this splinting regimen was used, and the patients' compliance was excellent. The splint was applied within 72 hours of injury. Each patient was educated as to the purpose of the splinting program and the importance of compliance. All 45 patients were able to achieve full functional active range of motion after 2 to 5 weeks of wearing time (depending upon the injury). Weekly reevaluations were conducted when possible. Active motion at the involved PIP joint returned quickly. Because early mobilization improved the blood supply, decreased edema, and eased discomfort, the patients' symptoms resolved quickly. Edema often decreased so quickly that a second splint was required after 72 hours. The patients were not afraid to move the affected digit partly because of the partial protection the splint provided against lateral stresses. Furthermore, because of the small size and comfort of this very efficient splint, patients tolerated its continuous wear and adapted easily to its presence. It did not impede the normal use of the hand, for example, patients were able to place their hands in their pockets.

**This method** of extension block splinting is cost-effective and easily applied in a busy practice (total splint fabrication time is usually less than 5 minutes). The splint allows for full flexion and blocks extension of the PIP joint as well as provides for some lateral stability. A note of caution should be added: Not all injuries to the PIP joint can be treated exclusively by extension block splinting. This splinting program should be conducted in compliance with your referral source's treatment philosophy.

**References**


