Pediatric Hand Dressing: Technical Report

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A *compressive* or *conforming* dressing is an important aspect of hand surgery, particularly the role of uniform pressure to the entire hand. Pediatric hand patients require special considerations with respect to appropriate postoperative dressing to maintain equal limb compression and to maintain the dressing during the postoperative period. This article describes a specific upper-limb hand dressing that can be used in the infant and young child. (J Hand Surg 2005; 30A:1009–1013. Copyright © 2005 by the American Society for Surgery of the Hand.)

Key words: Pediatric, congenital hand, hand dressing.

Experience has taught us that there is nothing more important than a sound, comfortable, secure postoperative dressing. As stated by Green,[1] "In no other field of surgery does the postoperative management of the patient play so critical role as it does in hand surgery." It is axiomatic that the postoperative care of the hand is at least as important as the surgery itself. We agree with Green's[1] admonition, particularly as it relates to the importance of a well-applied comfortable dressing in a pediatric hand patient. Over the years we have had excellent success with the compressive hand dressing for pediatric reconstructive surgical cases.[2] We have found that frequent dressing changes are not necessary in the child when the initial dressing is well applied, and indeed repeated dressing changes are uncomfortable for the child, parent, and surgeon. The principles are a conforming or compressive dressing that extends from the fingertips to the axilla, reinforced by metallic or plaster splints and combined with wound closure using resorbable chromic sutures. If the dressing is applied properly it does not need to be changed for 3 to 4 weeks, providing a protective cocoon for the surgically treated limb. The postoperative management and the long-term results in treating pediatric hand conditions have improved greatly with this tenet. Today we no longer use suture stents over skin grafts and rarely use drains of any kind. We find it unnecessary to change the pediatric dressing 1 or 2 days after the surgical intervention as we do in adults. A well-applied pediatric hand dressing provides a safe environment for wound healing.[3,4]

Technique

The first important concept in the pediatric hand dressing is wet-to-dry wound wicking inside a large bulky dressing. With increased layers of dressing beginning with antibiotic gauze, wet cotton-mesh gauze, multiple aerated fluffs, soft roll, and supportive splints, a well-applied and moderately compressed upper-limb dressing is initiated. Contouring of the dressing is performed easily with bias-cut stockinette. The maintenance of the position of the dressing and body parts is performed easily with an overwrap of conforming bandage reinforced with metal and plaster splints to help control wrist, elbow, and shoulder motion. Today we rarely use an inclusive cast but use an appropriate plaster support

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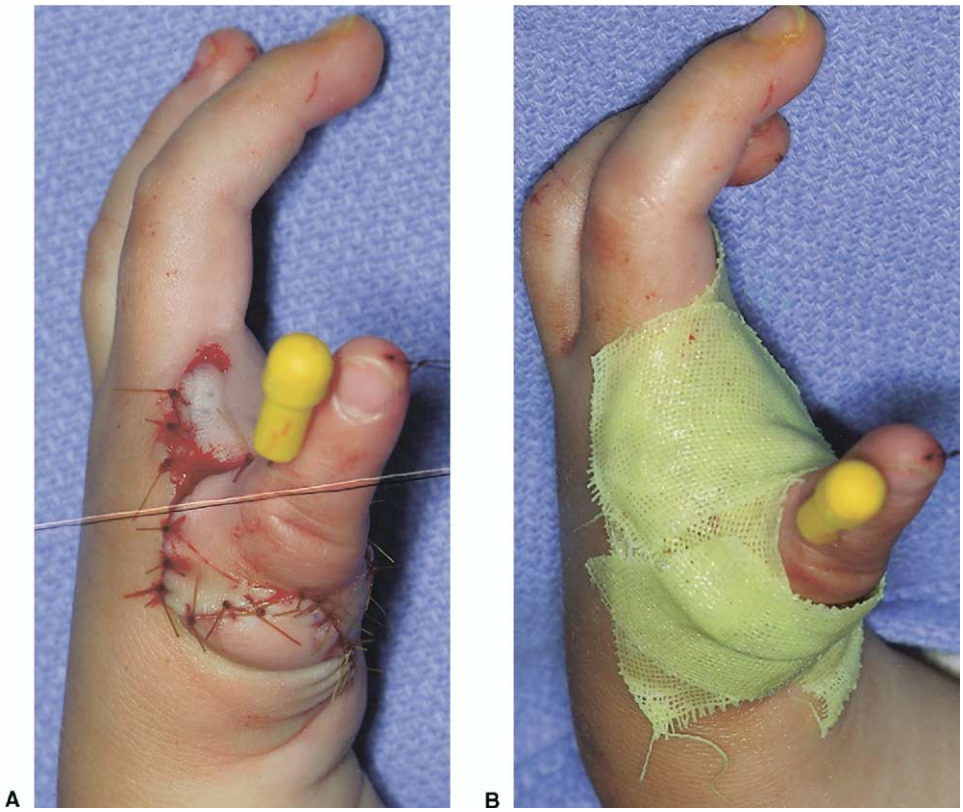

Figure 1. (A) Pollicization of the middle finger. K-wire stabilization. Chromic suture wound closure. (B) Xeroform gauze applied over the skin closure sites.

around the hand, wrist, and elbow to make the dressing secure. The pediatric hand dressing after pediatric hand reconstructive surgery (Fig. 1) consists of the following:

1. After skin graft and/or wound closure with resorbable chromic sutures and occasionally with Steri-Strips, Xeroform is placed over the wound (Fig. 1).
2. Moist gauze pads (fine mesh gauze covering both sides form a sandwich of cotton batten and fine mesh gauze) (Fig. 2) are fitted over the sutured wound. For example, for a syndactyly release strips of moist gauze are placed between the digits with gentle compression.
3. Moist dressings (consisting of fine mesh gauze, and cotton soaked in saline) then are placed over the hand and wrist in the area of the surgical procedure. The concept of wet-to-dry dressings considers capillary action as the main principle for wound drainage. After the application of the wet gauze we apply multiple fluffs (with air cell entrapment) (Fig. 3), a soft roll (Fig. 4), and then layers of plastic strips for limb support (Figs. 5, 6).
4. In all children less than 6 or 7 years of age and sometimes older the splint support extends above the elbow, which is placed in greater than 90° of flexion (Fig. 6). This prevents dressing slippage. The position is maintained further with stockinette (Fig. 7) cut to fit over the limb and then used to encircle the healing limb around the opposite shoulder and neck. There is nothing worse than a late-night call from the parents because the child has "slipped out of the dressing," sometimes completely. We have found quite suitable the 3- to 4-week interval before dressing changes over skin grafts for syndactyly, web-space deepening, and muscle transfers about the hand and wrist. When carefully applied, the dressing provides an excellent environment for wound healing.
5. Return-appointment dressing changes are performed with sedation but rarely general anesthesia. Parents are present. Further wound care is emphasized including the application of antibacterial ointment to the skin incision for wound softening and the use of cotton swabs (Q-tips; Cardinal Health, McGaw, IL) to help with resorbable chromic suture resorption.

Figure 2. Moist gauze pads (fine mesh gauze covering cotton gauze on both sides) applied in the webspace and over the surgical incision sites.

6. Splints of elastomer padding plus Orthoplast are made by a hand therapist while the patient is sedated and the position and application of the splint are reviewed with the parents. Parents play an important role in wound care (antibiotic ointment application), hand rehabilitation (assists with range-of-motion exercises), and splint application.

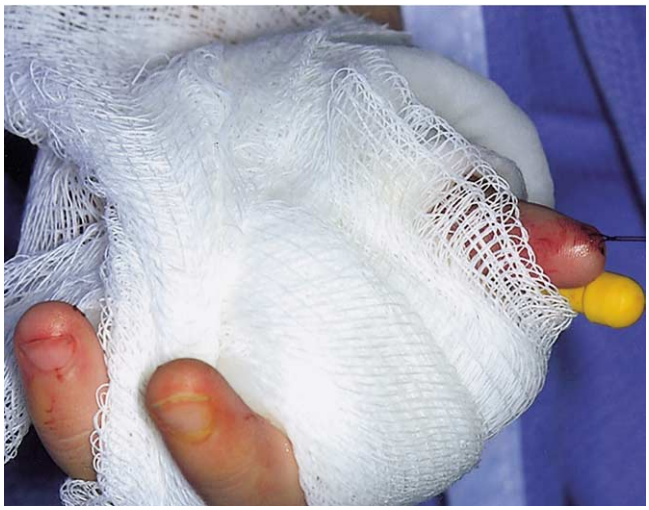

Figure 3. Cotton gauze fluffs are placed between the pollicized middle finger and the ring and small fingers. The fluffed gauze (air entrapment) creates equal compression of the hand (dorsal-palmar and radial-ulnar).

Figure 4. A soft roll is applied to compress the fluffed gauze and provide uniform pressure around the hand.

7. The hand surgeon (with the resident or fellow) should be present at the time of the dressing application. A neat and tidy dressing is important and sends a message to the family. If the hand looks neat and tidy on the outside then the presumption is that the surgical procedure performed is similarly neat and tidy on the inside.

Discussion

In the postoperative management of the pediatric patient population it is important that the dressing

Figure 5. The soft roll is extended above the elbow, which is flexed past 90° to prevent slippage. Plaster splints are applied in a sugar-tong fashion to maintain the wrist in neutral position, the forearm in midrotation, and the elbow in 90° or more of flexion.

be applied securely and does not require concern by the parents or surgeon.[5] It is important that the parents participate in understanding the dressing application and its role in postoperative care.[6] The importance of limb elevation also is stressed. The difference between the pediatric and the adult patient is the relative degree of decreased cooperation that occurs in children compared with adults. As Kleinman and Bowers[7] observed, "Young children have an enormous predisposition to either destroy or wiggle out of their immobilization. In the absence of internal fixation, standard casting techniques used in adults are often ineffective in children." In an article related to postoperative splinting in pediatric patients, Osterhout[8] stressed the importance of the pediatric hand dressing and personal experience with the use of thermoplastic material. Osterhout[8] also discussed the removal and reapplication of thermoplastic protective materials in the postoperative recovery period. Our preference is to eliminate the need for the removal of protective splints or casts until the postoperative healing period is well past and rehabilitation has started. We recommend plaster splints, recognizing that other surgeons use a circumferential cast without difficulties. We prefer to avoid the potential of the overcompressing effect of a cast and the disadvantage of requiring a cast saw for dressing (cast) removal.[9] We found that the use of an elevating sling or strap was helpful and in the postoperative care of children a circular stockinette appropriately cut can be tied to its other end behind the opposite shoulder. It can be untied and used for limb mobilization and substitutes well for slings, which often are not well tolerated or used properly in children.

Figure 6. Conforming dressing plus tape secures the plaster and dressing from fingertips to axilla. Coban and protective metal splints overwrap the conforming dressing.

Figure 7. Limb elevation can be achieved by splinting with the stockinette, which is slipped over the healing limb. One end of the stockinette can be tied around the opposite shoulder and neck (or to the bed frame of a crib) to maintain limb elevation.

We bring to the hand surgeon's attention a long-tested technique of a soft, air-containing compressive dressing combined with the wet-to-dry concept of molding the dressing to the hand. Our experience with this dressing has been very rewarding; however, we recognize that there are other equally successful methods of dressing the pediatric hand after reconstructive surgery. We present this technique as a suggested method that has worked well over time and have found that such a hand dressing has remarkably similar application in the adult hand.[2-5]

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