

# DELTA-CAST CONFORMABLE: A NEW CUSTOM SPLINT SYSTEM FOR THE FOOT AND ANKLE

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Foot and ankle immobilization and edema control with comfort is a primary management need for the podiatric physician in multiple clinical scenarios. Trauma, surgery, and various pedal inflammatory states require the consideration of various types of splints and compression modalities as a segment of the overall treatment scheme. With the Delta-Cast Conformable cast material, marketed by DePuy a division of Johnson and Johnson, a removable custom-molded foot and ankle splint can be fabricated. The devices are not only clinically effective but comfortable and cost effective. The versatility of this material in the hands of the podiatric physician makes the Delta-Cast Conformable splints for the foot and ankle a helpful adjunct in the management of multiple foot and ankle conditions.

### **MATERIALS AND SUPPLIES**

Delta-Cast Conformable is a synthetic cast material composed of a polyester resin with elastic fibers. It is supplied as rolls of 2, 3, and 4 inch widths and is packaged typical of most synthetic cast materials. This material does not contain fiberglass and is available in multiple colors. Due to the elastic nature of the product, a splint for the foot and ankle can be fabricated that is not only custom molded and removable but easily adaptable for size changes as occurs with increasing or reducing edema. The flexibility of the splints adds comfort for walking or running in the device. More rigidity can be designed into the splints to limit or control plantarflexion-dorsiflexion of the ankle in the sagittal plane or eversion and inversion of the subtalar joint in the frontal plane.

The Delta-Cast Conformable handles like most synthetic cast materials in terms of feel, application, and setting. The method of application of this cast material in the fabrication of foot and ankle splints varies from the application of a permanent synthetic cast. The material is applied to the foot and ankle

and permitted to set, then immediately removed. In this way a splint that conforms to the limb is constructed that can be dispensed to the patient for immediate use that is easily removable and contours well to the foot and ankle of the patient as a cast might.

The cast material is applied over Delta Stockinette, a special thicker and more padded type of liner for the splint to function against the skin of the patient. This stockinette adheres to the splint and provides a layer of comfort for the patient in wearing the device. No other cotton roll or padding is utilized with the splint as in a typical synthetic cast. If further padding is needed, the device can be worn over a thick type of padded sock. One to two inch strips of plastic x-ray film are placed beneath the stockinette over the anterior ankle and foot as a protective layer to aid removal of the splint due to the thin nature of the cast material and padding. Once the splint is removed, it can be modified and adjusted to meet the particular needs of the patient. The finished splint can be worn in accommodative shoes or within a removable cast system of physician choice. The activity level of the patient in the splint is a factor of comfort and physician recommendation and prescription. The splint is secured to the foot distally by the shoe and either a velcro strap or tapped closure proximally at the ankle.

The final splint in terms of design and position of the foot and ankle is up to the imagination and experience of the podiatric physician and the versatility of the material. A significant advantage is that physician control is maintained in terms of design and position of correction based on patient need. The cost of the device is much less than conventional custom fabricated ankle-foot orthoses. The splint is not intended as a permanent ankle-foot orthosis, but functions well in short term applications of up to several months. Adhesive felt type or glued-in pads found in most podiatric practices can be added to the splint. The height proximally of the final splint can vary from just

above the ankle to higher on the lower leg. The length distally of the final splint can vary from past the toes as a toe-plate to sulcus length as in a typical functional foot orthoses. Once fabricated,

the splint can be cut down to a shorter size as the needs of the patient change. As treatment schemes evolve, the device can be easily modified to meet the new clinical needs and progress of the patient.

### SPLINT FABRICATION



Figure 1A. Office set-up for application of Delta-Cast Conformable splint including: one roll of cast material, x-ray strips, padded stockinette, casting gloves, scissors, and velcro.



Figure 1B. Packaged cast material as supplied by the manufacturer.



Figure 2A. Placement of protective x-ray strips on the anterior foot and ankle.

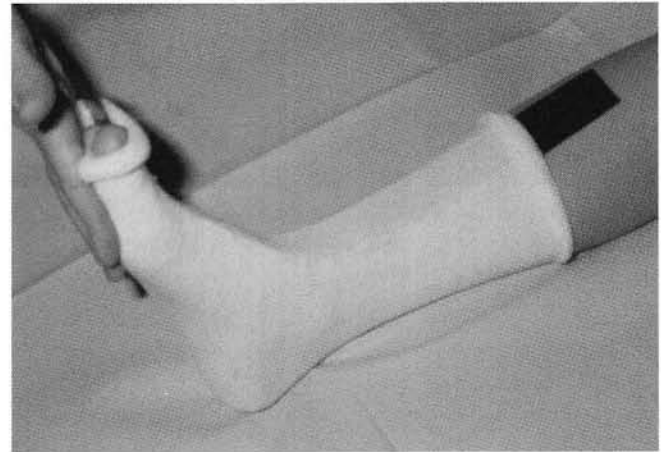


Figure 2B. Padded stockinette applied over the x-ray strips to just beyond the desired length distally and proximally.

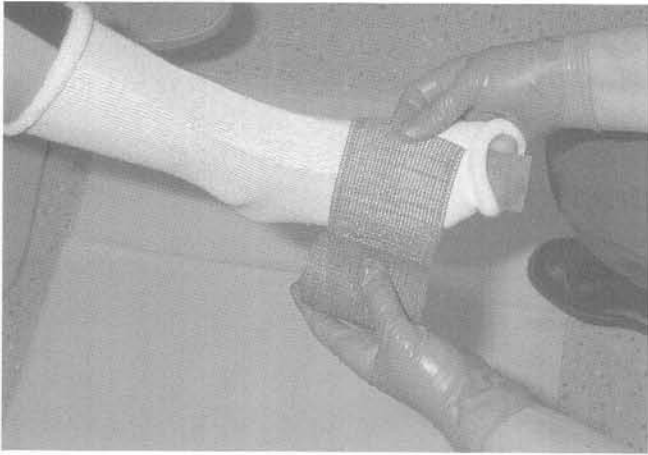


Figure 3A. Cast material from the roll that is not stretched.

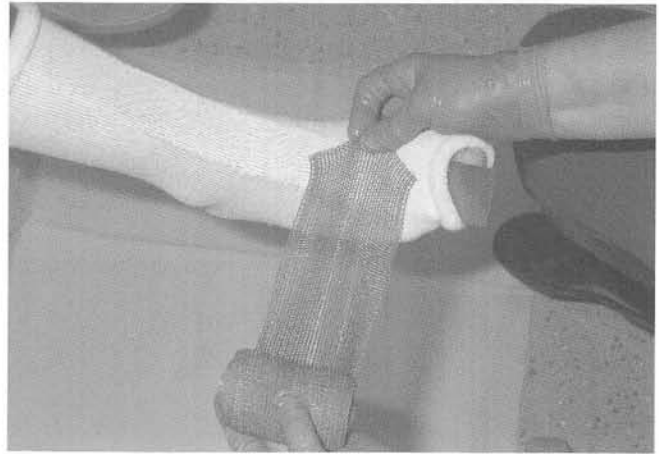


Figure 3B. Fully stretched position of the material. It is generally applied at about a 50% stretched length.



Figure 4A. Splints are measured and cut from the roll of material to the appropriate length and can be applied as posterior splints.



Figure 4B. Splints could also be applied as lateral stirrups. The splints are held in place and the rest of the material is rolled in place.

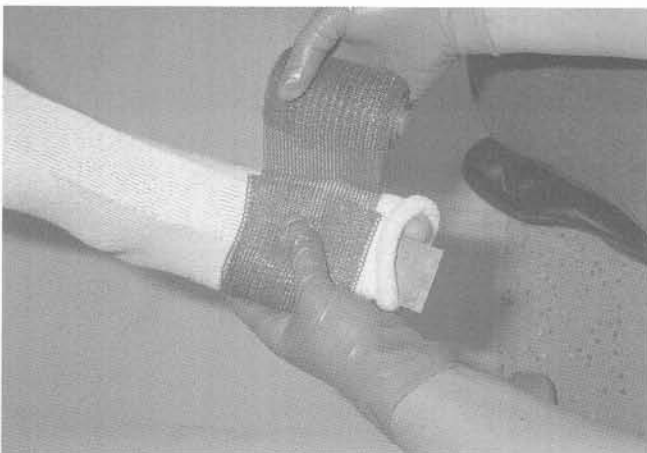


Figure 5A. The wrapping process begins distally and ends proximally as a double layer of material.



Figure 5B. The wraps are applied with an overlap of material of about 50%.



Figure 6A. The foot and ankle are held in the desired position in the sagittal plane until the material is set.



Figure 6B. The frontal plane can be manipulated as well for optimal position of correction.



Figure 7A. Once firm and set, the splint can be cut with a scissors.



Figure 7B. Removal can be facilitated with the careful use of a cast saw.



Figure 8A. The finished splint can be spread and easily removed.



Figure 8B. The splint can now be modified or adjusted to meet the particular patient needs.





Figure 9A. Foot and ankle modifications. Once removed, the splint can be reinforced with extra material for added stability.



Figure 9B. Cutting angular corrections with reinforcement as in progressive night splints.

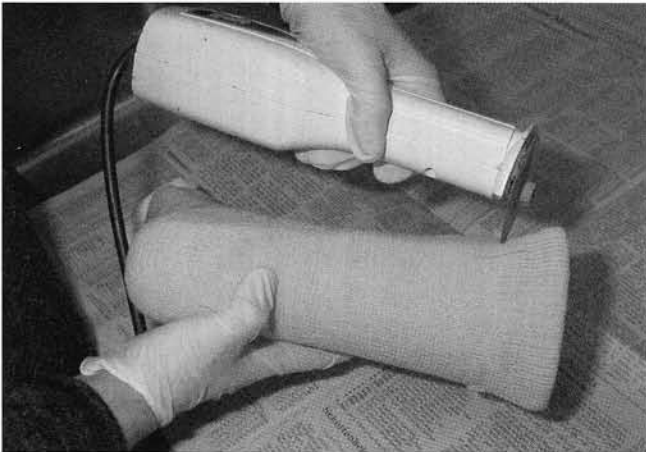


Figure 9C. Cut-down from low leg to above the ankle length.



Figure 9D. Cut-down from above the ankle to foot orthosis type device.

## CASE PRESENTATIONS



Figure 10A. Finished splint, sagittal view for a 78-year-old female with rheumatoid arthritis and nonoperable retrocalcaneal exostosis and Achilles tendonitis.

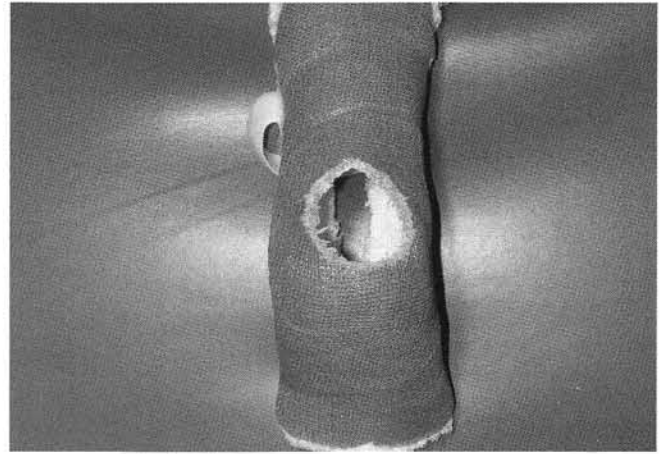


Figure 10B. Finished splint posterior view with accommodative aperture.



Figure 10C. Splint in place within an athletic shoe.



Figure 10D. Posterior view.



Figure 11A. A low leg height splint for a 56-year-old female with posterior tibial tendonitis.

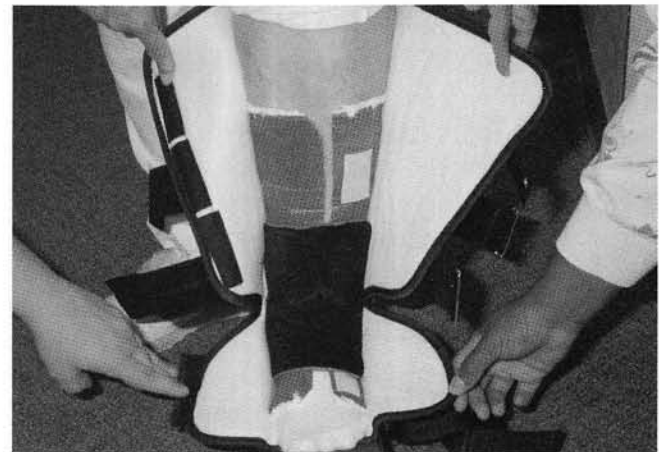


Figure 11B. Splint placed within a removable cast-brace system.

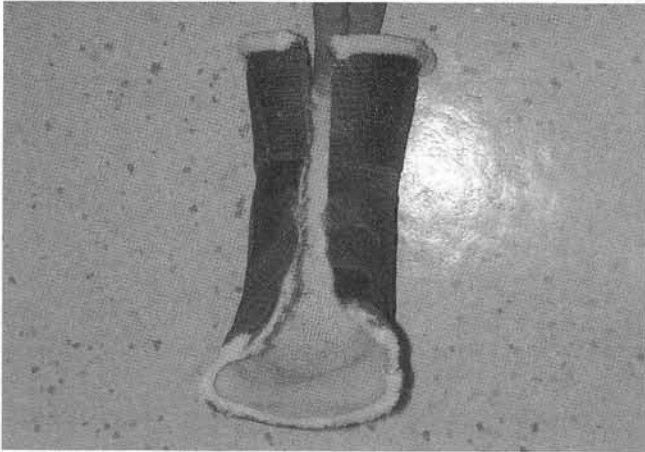


Figure 12A. Anterior view of splint for a 48-year-old female, 4 months after triple arthrodesis.



Figure 12B. Sagittal view with taping to secure proximally outside of the shoe.



Figure 12C. The brace in place within the shoe.



Figure 12D. Frontal plane appearance of the brace and shoe system.

## CONCLUSIONS

The Delta-Cast Conformable cast material is a versatile and well tolerated method of fabricating custom molded foot and ankle splints in the office or clinic setting. The splint possibilities have a wide variety of applications for the podiatric physician in multiple foot and ankle conditions. The imagination and ingenuity of the designer can be applied to meet the needs of a particular patient. The material is easily handled and familiar to most podiatrists who use synthetic casts in their practice. Most of the equipment, tools, and skills needed to work with the material are found in most podiatric practices and clinics. The cast material and splints are highly recommended for consideration.