

THE MODERN JONES COMPRESSIVE DRESSING

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Until the surgeon's hands have acquired an automatic rhythm, being able to pass and mould the turns of bandages quickly, regularly, and subconsciously, his mind is not free to devote its entire concentration to the tissues of the fracture.

- Sir John Charnley

At Northlake Regional Medical Center, the standard protocol for immediate trauma or fracture treatment to the lower extremity is the use of either a posterior splint or hard Jones compressive dressing. In addition to trauma, the compressive dressing also plays an integral part in the postoperative management of many surgical procedures. As this topic has been discussed thoroughly in the past, the evolution of the dressing is still undergoing today. The modern cast today is a compilation from work done by the Dutch military surgeon Mathysen in 1854, Sir Robert Jones, as reported in the 1921 Oxford University Press and Dr. John Charnley during the 1950s.¹⁻³ Their contributions on the compression bandage helped shape the design for the modern Jones compression dressing, which is attributed to Ruch. Dr. Ruch's original compression dressing created in 1975, constructed in the form of an anterior splint, consisted of cotton batting, linen wraps, multiple layers of Specialist cast padding, ace bandages, and plaster splinted around the foot. The dressing used today has evolved into a full compression dressing utilizing Specialist padding, an Ace bandage, cast padding, and fiberglass cast material (Figure 1).

Lower extremity trauma seen in the emergency room often requiring immediate compression includes ankle sprains, pedal, and ankle fractures. Injuries warranting emergent surgery are typically placed in a posterior splint for the ease of taking off the dressing while at the same time committing some form of compression on the injury. All other injuries are commonly dressed with a hard shell until further evaluation in the office. Understanding that surgery is also a form of trauma, the hard Jones compression dressing is commonly applied after various midfoot and rearfoot fusions such as a triple arthrodesis,

Charcot reconstruction, and pes valgus reconstruction. In addition to these extensive surgeries, cases requiring additional stability and protection such as posterior Achilles tendon work are also augmented with postoperative cast immobilization. The cast is used not only to protect the surgical site and internal fixation from disruptive forces, its compressive nature helps reduce postoperative edema, facilitating a more expedient recovery. In addition, minimizing postoperative edema has also been associated with the added benefit of pain reduction.

Application of a uniform dressing and proper positioning the foot and ankle are two important aspects of the Jones compression dressing that are often overlooked. In regard to proper positioning, when applying the Jones compression dressing to patients who have sustained acute trauma such as a severe ankle sprain, the patient's ankle should be held in a position of comfort, not forced into a 90° degree position of agony. The ideal casting position for surgery involving the Achilles tendon is in 20° to 25° of plantarflexion, as described by Davis. Maintaining this position, which is easily accomplished with the patient in a prone position, effectively eliminates tension within the Achilles tendon (Figure 2).⁴ A common mistake when holding the extremity for a cast following surgery is the inability to maintain the position. With a 90° degree ankle position commonly desired, allowing



Figure 1.



Figure 2.

the foot to plantarflex or dorsiflex after the casting process has begun wrinkles the dressing material. This occurs over the anterior ankle, which can ultimately cause the dressing to bunch and can lead to skin irritation, blistering, and possible ulceration. Similarly, over padding at bony prominences can also lead to unevenness within the dressing and can lead to tissue necrosis. A common area requiring special attention includes covering the posterior aspect of the heel with adequate padding. This comes into play when padding in a figure-of-eight fashion around the ankle without progressing up or down the leg, potentially leaving the posterior heel exposed, and concentrating excessive padding at the trauma or surgical site.

To begin, three to four rolls of Specialist padding are applied to the foot either from a proximal to distal or a distal to proximal direction after the primary dressing is applied. The proximal border of the cast includes padding distal to the fibular head if palpable, avoiding compression on the common peroneal nerve as it courses around the lateral neck of the fibula. If the head of the fibula is not palpable, the dressing should cover a majority of the gastrocnemius muscles bellies. Distally, the cast should extend beyond the metatarsophalangeal joints to the level of the digital sulci. As previously discussed, care is deliberately taken to provide an even layer of padding around the extremity with uniform tension



Figure 3.

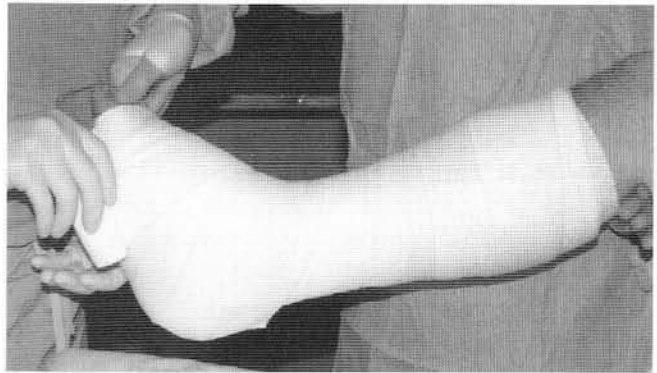


Figure 4.

applied to the padding (Figures 3, 4). With the Specialist intact, one Ace (all cotton elastic) bandage is applied from a distal to proximal direction, again with firm but even tension placed on the extremity. Starting the Ace bandage on the dorsum of the foot and in an oblique fashion allows the bandage to conform around the foot. Typically one Ace bandage is sufficient to cover the entire leg as it progresses proximally; however, at times the Ace will not reach the proximal dressing in its entirety. It is more important to achieve full coverage distally around the traumatized area then sacrifice compression for completeness of covering the entire specialist padding (Figures 5-7). A second Ace bandage can be utilized, but is not required to complete where the first ended. Excessive amounts of edema may warrant repeating this process, known as a Double Jones.

The next step involves covering the Ace bandage with a layer of cast padding, which prevents the fiberglass from sticking to the Ace

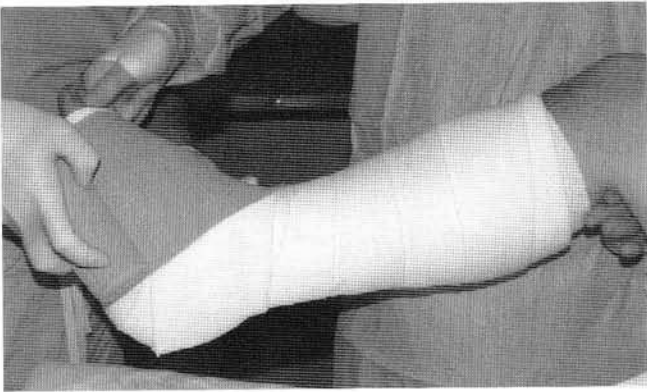


Figure 5.



Figure 6.

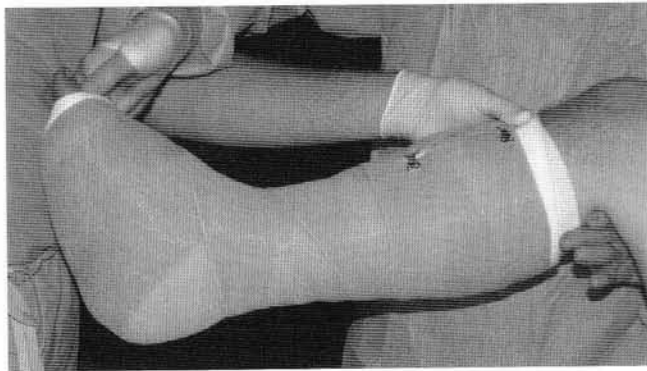


Figure 7.



Figure 8.

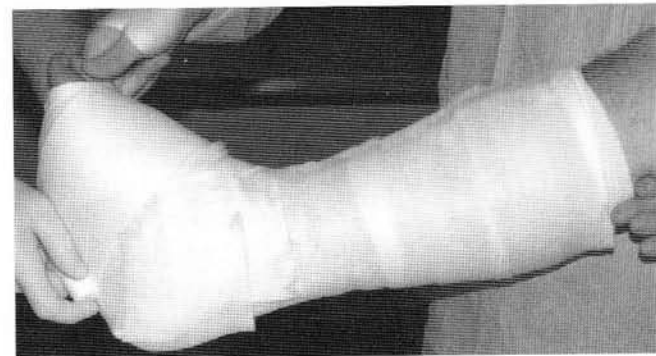


Figure 9.

bandage during cast removal, thus making it easier to remove (Figures 8, 9). The dressing application is finally completed with three layers of 3- or 4-inch fiberglass cast material. With focus on adequately covering the limb, the first layer is applied from proximal to distal with 30% overlap. The second layer is started distally around the digital sulcus and converges around the ankle joint in a series of figure-of-eights. The purpose of this layer focuses

on securing the ankle in a locked position, with care to again encompass the posterior heel in its entirety.

The final layer is started at the proximal leg again, this time proceeding with 50% overlap to ensure complete coverage of the entire lower leg (Figures 10-12). One final pearl that can add to the overall effectiveness of the cast is to compress the distal end of the cast. This prevents digital swelling as well as it reduces pressure off of the first and fifth metatarsal, a common area of unwanted pressure as the cast material courses around the foot (Figure 13). The hard Jones compression dressing described above differs from a traditional cast in that the combination of Ace bandage and Specialist cast padding are not used in the traditional cast. Thus, no circumferential compression is achieved while allowing for fluctuation in edema.

An alternative option for immediate splintage of the lower leg includes the application of a posterior or anterior splint. The anterior splint was originally described by Ruch in 1975 and is the foundation of the current Jones Compression

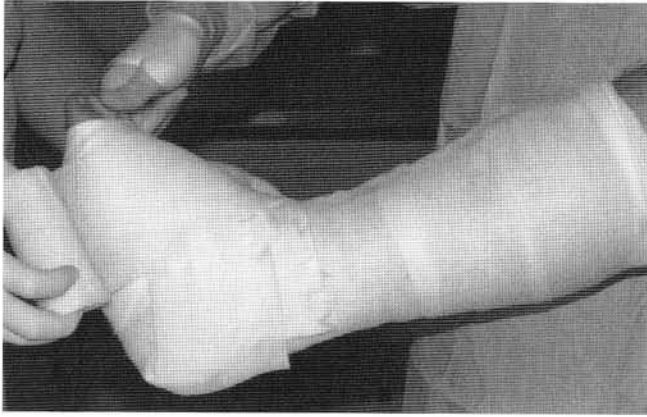


Figure 10.

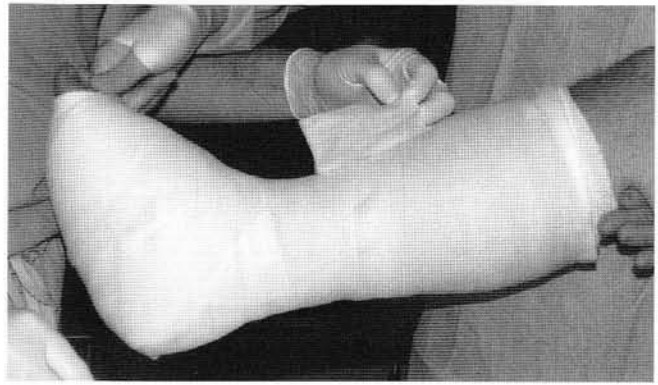


Figure 11.

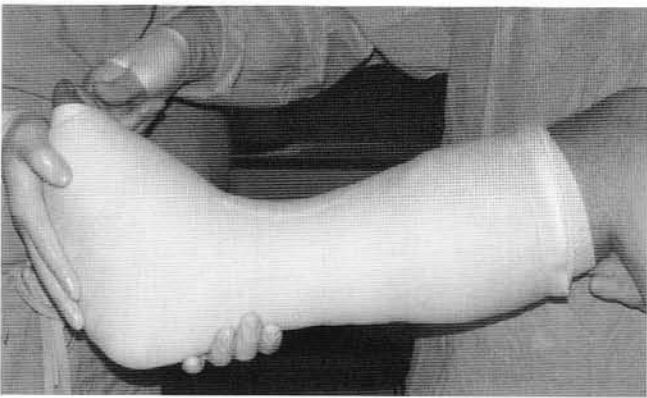


Figure 12.

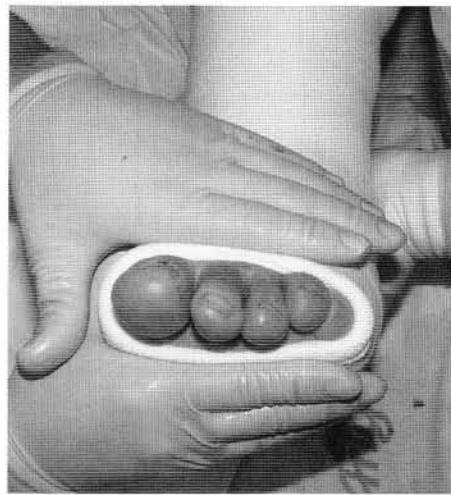


Figure 13.

Dressing that is used today. This splint was originally developed to provide compression to the extremity while at the same time maintaining ankle position. The anterior splint was also utilized because of its ability to lock the foot and ankle into position without the concern for splint failure, which can potentially happen with a posterior splint. One other advantage that both splints provide is the ability to facilitate bandage removal for convenient examination of an extremity. This is ideal in acute trauma such as an ankle fracture that is bound to the operating room within a few hours as well as for monitoring diabetic and decubitus ulcers that require daily dressing changes. Postoperatively the splint can also be utilized to maintain the ankle at 90° , such as in cases involving tendon transfers, ligament repairs or even a well stabilized Lapidus.

In the absence of a premade posterior splint, the physician can easily create a posterior splint using Specialist cast padding, a 3 inch roll of cast

material, and an Ace bandage. As described by Camasta, the length of the splint is measured from the posterior calf to the distal aspect of the foot (Figure 14). After the Specialist cast padding has been applied, the fiberglass casting material is then folded multiple times upon itself extending from the calf to the digital sulcus. As it is folded upon itself, each pass is shortened proximally a few inches creating a thinner splint along the posterior leg and a progressively thicker splint along the ankle and plantar aspect of the foot (Figures 15, 16). This prevents inadvertent failure of the splint as well as unwanted plantarflexion of the ankle. The splint is then secured with an additional roll of cast padding and an Ace bandage (Figures 17-20). The posterior splint allows for faster application while maintaining stability of the lower extremity, whether it is post-traumatic or post-surgical.



Figure 14.



Figure 15.



Figure 16.



Figure 17.



Figure 18.



Figure 19.

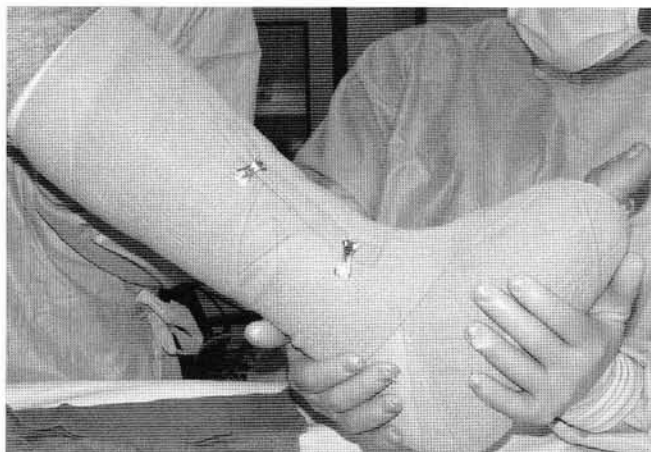


Figure 20.

Although the application of a cast appears to be effortless to the untrained eye, the principles behind the actual process are commonly misunderstood or unappreciated. The slightest errors in casting can have a tremendous effect on the outcome of the patient, regardless if it is following acute trauma or surgery. As the application of the modern Jones compression dressing continues to evolve today, it is important to remember the basic principles of the dressing during its application.

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