One criticism of IPOPs is that they require a trained prosthetist for removal and application. However, Smith found tissue heal fastest and with the least pain when they are undisturbed. A second critique of IPOPs comes from the surgeon’s inability to see and monitor the wound as it heals. Although it is believed that trauma can occur within a cast, there are no reports of trauma under these circumstances in published articles. One problem associated with early weight bearing is due to the lack of research. There is no set criteria regarding IPOP use time, which creates skewed results among studies. Smith et al. report that most of the current documentation of IPOPs is too inconsistent to make a definitive conclusion on the criteria for a particular dressing that will optimize a patient’s recovery. More research on IPOPs is needed to obtain consistent data.

RRD

A prosthetic team fits the RRD on the patient after the amputation surgery has taken place and the patient’s condition is stable. The patient dons several postoperative socks, and then a cast is taken. The practitioner wraps fiberglass around the cast to form the socket. The RRD cast is suspended by a stockinette and a cuff above the knee. This postoperative dressing method is beneficial in maintaining adequate fit and function and offers the ease of applying additional socks to control edema. RRDs are removable and allow nurses, physicians, and patients to view the wound. The removable nature of the RRD can be beneficial in a number of ways, but only with a properly trained and compliant rehabilitation staff and patient. It is imperative that the staff and patient are properly educated on how to don and doff the device as well as when to add and remove socks to provide a better fit. Proper education and compliance can often eliminate the need for a trained prosthetic team to be present for removal and application. Nawijn found RRDs are better for healing and volume measurements between the RRD group and the soft dressing group but did find significant results of an overall decrease in volume in the RRD group. A study by Taylor et al. also reported on the comparison of soft dressings versus RRDs. Using a 37-patient cohort, they found that patients using RRDs as a postoperative dressing received their first prosthetic cast sooner and spent less time in the hospital but had no difference in their rehabilitation time when compared to other dressing types.

There have been criticisms of both the claimed advantages of RRDs and the RRDs themselves. Wu et al. completed a case study of 28 patients that compared the healing rates of patients using RRDs versus traditional soft dressings. They found the residual limbs of the RRD group healed in half the time of the residual limbs of their counterparts who had soft dressings. However, Smith et al. noted in their review that this case report lacks statistical significance and a consistent outcome measure, both possible sources of bias. RRDs do not immobilize the knee, which can allow for flexion contractures to develop. According to Baker, if applied too loosely, the RRD will permit swelling; if it is too tight, it will lead to anterior tibial or patellar skin necrosis. And if left off for more than 15 minutes, the residual limb will swell and the RRD cannot be reapplied. There are many studies that look at RRDs and compare them to semi-rigid dressings or soft dressings. These studies all conclude that the RRD is the better option.

ZCast

In the research for this review, there was no available information on ZCasts in recent literature. Therefore, the authors contacted the distributor, who was unable to provide any updated objective outcomes data for the product. See photo on page 40 for description of ZCast usage.

Air Splint

Air splints were originally introduced as an emergency solution to stabilize fractures and have been successfully used as pressure bandages for trans-tibial and transfemoral amputees. They were first modified by J. M. Little, MD, MS, FRACS, for post-amputation use to overcome the previously discussed weaknesses of RRDs. An air splint consists of a plastic pneumatic bag and a rigid aluminum frame. A foot can be attached to allow for early ambulation. Some have a zipper for easier removal and wound access. A towel is wrapped around the thigh to absorb perspiration and prevent maceration of the skin. This device has also been used as both an immediate, and a temporary prosthesis. It is normally applied two to ten days after surgery although it can be put on immediately. Several studies and literature reviews have discussed the benefits of the air splint, including its lighter weight compared to other postoperative dressings. Palsule and Desai studied the air splint’s ability to be used as a rehabilitation tool following amputation. The reported effects were a decrease in the distal and mid-girth of the amputated limb, a decrease in edema, the ability to weight bear, a decrease in pain perception, no knee contractures or wound infection, and residual limb shrinkage. They found the air splint effective in creating compression and also in allowing for early ambulation when the splint had a foot attached. An increase in weight bearing using the air splint was also reported. These factors may be the reason edema was decreased if left off for more than 15 minutes, the residual limb will swell and the RRD cannot be reapplied. There are many studies that look at RRDs and compare them to semi-rigid dressings or soft dressings. These studies all conclude that the RRD is the better option.

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