EXPERIENCES WITH THREE TEMPORARY ABOVE-KNEE SOCKETS

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The fitting of prosthetic limbs is facilitated by a fully formed and shrunken stump, normal strength in the remaining limbs, and high motivation. The above factors are present to a larger degree shortly after the amputation, with the exception of a shrunken stump.

Rapid changes in the configuration of the stump make it costly to fashion a wooden or plastic socket for each change in stump dimensions. Thus, attempts have been made to utilize a rapid, inexpensive means of making a temporary socket which would permit ready disposal at low cost (1).

Three temporary sockets were evaluated to determine the most efficacious model. All three were fitted to a temporary above-knee walking leg with a SACH foot (Fig. 1).

Fifty-five patients were fitted with a simple plaster temporary socket. This socket was found to be wanting in the following respects:

1. It was difficult to achieve good ischial weight bearing on the posterior wall even when fashioned by experienced personnel. (Sockets were made by Corrective Therapists from the VA Hospital, Martinez, California.)

2. As a result of poor ischial weight bearing, the leg tended to go into a "plug fit." This changed the stump shape and occasionally produced a "choked stump."

3. The gait pattern was affected by the absence of ischial weight bearing. (A temporary socket must provide optimum ischial
4. Conversion to a permanent socket required 8 to 10 more training sessions to assure an acceptable gait. Each patient used the plaster socket 4 to 6 weeks before conversion was attempted.
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In search of an equally inexpensive, but more efficient temporary socket, two new devices were evaluated:

1. A light quadrilateral plastic socket
2. A combination plastic and plaster socket

The light quadrilateral plastic socket was made by the University of California Prosthetic Shop (Fig. 2). The device is shaped like a truncated cone with walls 0.8 to 1.0 cm. thick; it is available in three sizes with superior circumferences of 54, 48, and 40 cm. The lateral wall is split permitting modifications of this circumference up to 5 cm. by means of three adjustable screws. The device has the configuration of the usual wooden or plastic quadrilateral socket.

Ten above-knee amputees were fitted with the device and trained for a period of 4 to 6 weeks. The following results were noted:

1. Good ischial weight bearing was achieved.
2. Too much stump movement developed in five patients causing each of them to have a painful stump.
3. Five patients never developed a satisfactory gait while using the temporary socket.
4. Five patients required only 3 additional training sessions for independent ambulation with a permanent prosthesis; however, five required 6 to 8 training sessions to achieve the same end result.

A combination plastic and plaster socket was evaluated after training fifteen patients on this device (2). As shown in Figure 3, the plastic shell has a lateral wall 14 cm. high with a 20 to 30 cm. medial wall extending from the usual quadrilateral shape. The entire lower portion of this device is covered with plaster to fit snugly around the stump (Fig. 4). The plastic shell is adjustable and fabricated in three different sizes. The upper portion of the device is shaped as a quadrilateral socket with ischial weight bearing; the lower portion of the device provides a well contoured total contact plaster socket. As stump shrinkage occurs, the upper portion is retained for use in the fabrication of another socket. The sockets were made by Corrective Therapists from the VA Hospital, Martinez, California.

The following results were obtained:

1. Good ischial weight bearing and a quadrilateral shape were achieved.
2. The stump shaping, seasoning, and shrinking were satisfactory.
3. Stump movement within the socket was negligible.
4. The gait pattern development was good.
5. Conversion to a permanent socket was good in all 10 patients, and only 2 additional training sessions were necessary to master the permanent socket.
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FIGURE 4.—The finished combination of plastic and plaster-of-Paris socket (AP and superior view).

SUMMARY

Two major problems developed in the use of temporary prosthetic sockets. The patients did not achieve good ischial weight bearing when using plaster sockets alone. When using a plastic socket, good total contact was not maintained in half of the patients during the training periods.

Both problems were resolved by using a combination of a plastic quadrilateral foundation upon which plaster was wrapped. This device permitted changes in the socket to be made frequently, yet assured a snug socket with an ischial weight bearing posterior wall. Patients required only two training sessions with their permanent prostheses to become proficient in their use.

REFERENCES