CHOPART'S AMPUTATION

The Advantages of a Modified Prosthesis

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Chopart's amputation has for many years been condemned as an unsatisfactory procedure, doomed to failure because of the alleged inevitability of plantar-flexion contracture with the development of painful callosities on the antero-inferior aspect of the calcaneum. To my surprise, however, I found in 1948 that one of the limb makers at the Artificial Limb Factory in Auckland, who was then twenty-seven years of age, had had a Chopart's amputation performed upon his left foot at the age of seven. He was wearing a blocked leather socket inside a clumsy surgical boot, and he was getting more and more pain because of increasing plantar-flexion at the ankle. He himself knew of the supposedly inevitable re-amputation in

FIG. 1

FIG. 2

Figure 1—The stump, twenty-six years old, in full dorsiflexion. Figure 2—Radiograph of the stump in full dorsiflexion and full plantar-flexion.

store for him. His foot at that time was held moderately plantar-flexed and could not be dorsiflexed as far as a right angle. He experimented with plastic sockets and endeavoured to make a new type of artificial foot. He found that the plastic socket let heat out better and was lighter and less bulky, but he also found something much more important. By moulding the plastic socket so that the back of the prosthesis was slightly narrower round its upper edge posteriorly than it was at its base, it was possible to get sufficient grip on the back of the calcaneum to hold it downwards and so modify the action of the calcaneal tendon. The plastic socket was inserted into an ordinary artificial foot so that it became part of it, and a leather ankle corset was attached. This allowed the patient to wear a pair of ordinary ready-made shoes. By 1950 dorsiflexion was well performed by the tibialis anterior, which had previously been inserted into or had gained attachment to the front of his talus, and it was obvious that re-amputation would not be required. Experiments were made with willow sockets as well as with plastic, but eventually it was found that the best socket of all was one made of stainless steel. It was much less bulky, it was cooler, it was hygienic, and it lasted.

Figure 1 shows the stump as it is now, twenty-six years after amputation, held in full dorsiflexion, and Figure 2 shows radiographs of it. The prosthesis (Fig. 3) is put on by inserting the bare stump heel first into the socket in order to get the wider lower part of the heel in

FIG. 3

FIG. 4

Figure 3--The prosthesis, showing the gentle incurving of the upper rim posteriorly. Figure 4--The prosthesis fitted to the stump and the patient standing on tip-toe with the other foot off the floor.

FIG. 5

Patient fully dressed with sock and ready-made shoe.

under the slightly overhanging sides. The fore part of the stump then fits snugly into the front of the socket and the ankle leather is laced up (Fig. 4). A sock is drawn over the artificial foot and over the ankle corset and the shoe put on (Fig. 5).

So good is this patient's control of the artificial foot that he can stand on tip-toe in it with his other foot off the floor, as shown in Figure 4, and he has an apparently normal gait.

In the last four years five other patients have been fitted with this prosthesis. Two have true Chopart's amputations. In one the stump was hopelessly fixed in plantar-flexion when first seen and will soon have to be re-amputated, but he feels that by wearing the appliance he can continue as he is for a time. The other is a Maori boy of seventeen years with multiple congenital deformities of hands and legs in whom the right leg had been amputated below the knee and the left foot amputated after the manner of Chopart. The remaining three patients had trans-tarsal amputations.

Construction of the prosthesis—The prosthesis is made by taking a plaster negative of the foot when weight bearing and making a cast-iron positive. On this the stainless steel is beaten to fit it and all of the seams except one are welded together. It then grips the contours of the concavo-convex surfaces of the iron cast, but can be removed from it in two pieces. These two pieces are then welded together and the whole is fitted and bolted into a standard willow footpiece. A leather ankle corset is attached, and a pick-up of elastic webbing can be added if desired.

One of its good features is that it can be worn inside a ready-made shoe. It makes the stump more or less part of the artificial foot and gives fairly normal control of it. The old surgical boot with a cork block in the toe never did this. It allows perspiration to evaporate freely, and is easily kept clean and bright.

Comment—This modified prosthesis has aroused my interest in the possibilities of reclaiming the Chopart amputation from the disrepute into which it has fallen. The opportunities for practising it must be rare, rarer even than for a Syme's amputation. Nevertheless here is a man who still walks on the plantar surface of his calcaneum, has a full normal range of dorsiflexion at the ankle, wears ready-made shop shoes, and can raise the heel of the affected side with the other foot off the ground. And the amputation was twenty-six years ago. It is probably necessary, for such success, to attach the tibialis anterior—and in fact all of the available dorsiflexor muscles—firmly to the front of the talus, and it seems necessary also to use a prosthesis such as this with its restraining action on plantar-flexion of the stump.

After all, if it were tried and were to fail, it would still be possible to substitute for it a Syme's amputation in the case of a man or a below-knee amputation in the case of a woman.