

REHAB *T e c h*

Monash Rehabilitation Technology Research Unit

Trans Tibial Manufacture Using Silicone Cups

Work Experience
Kylie Stitt



REHAB Tech- Monash Rehabilitation Technology Research Unit assume no liability for any claim of adverse effects resulting from misapplication of the information presented here in. While every effort is made to ensure the accuracy of the guide no responsibility or liability will be taken for any inaccuracies.

REHABTech is finance and supported by



In collaboration with



© Copyright 1998

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording or any information storage and retrieval system, without permission in writing from the publisher.

Requests for permission to make copies of any part of the work should be addressed to:

REHAB Tech- Monash Rehabilitation Technology Research Unit

C/- C.G.M.C.

260 - 294 Kooyong Road

CAULFIELD VIC 3162

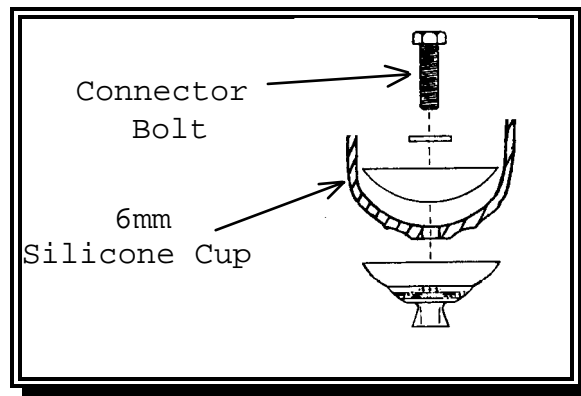
AUSTRALIA

Email rehab.tech@eng.monash.edu.au

Interim Prostheses for below knee amputees can be fabricated in a variety of ways. A relatively new interim fabrication technique was developed by the Monash University Rehabilitation Technical Research Unit (MRTRU). The interim prosthesis has developed considerably in the past few years. There has been a range of socket types used, from materials such as plaster, scotchcast and resin. It is important that the interim be able to undergo dynamic alignment, be practical and effective. The undertaking of research of new materials and methods through experimentation made it possible to achieve the use of duplicating plastic.

The MRTRU have their own way of making interims using Otto Bock componentry, and USMC (as shown in the video). Their method involves the use of duplicating plastic. The duplicating plastic simplifies the fabrication process, by forming a cap which rests on the end of a socket before laminating or making a check socket. It remains on the inner of the socket, under the liner. The modified cast, with or without a liner, placed in the vertical jig with approximately 5 degrees of both flexion and adduction. A pyramid placed on the base of the vertical jig represents the ankle, onto the pyramid a socket attachment adaptor kit is put into position.

DIAGRAM 1 Socket attachment kit



The socket attachment kit includes a silicone cup, socket attachment plates (an inner and an outer), and a connector bolt. These socket attachment plates are available in three sizes; large, medium and small. For protection the distal end of the cast is covered with a rubber sleeve such as a rubber glove or another latex material. This is to act as protection and separation barrier to the duplicating plastic from the pelite liner. A non-stick silicone spray applied to the rubber glove and the metal inner socket attachment plate for easy removal of the plastic cap from the cast. The silicone cup is rolled down to the level of the inner socket attachment plate, this enables ease of pouring of the duplicating plastic.

A minimal distance between the inner socket attachment plate and the cast is advisable, so as not to make the completed leg unnecessarily heavy. The socket attachment plate shouldn't touch the cast as this could create problems later on when the amputee weight bearing.

The amount of duplicating plastic (Otto Bock Pedilen 617H37) and hardener (Otto Bock Pedilen 617P21) required varies from leg to leg. A duplicating plastic to hardener ratio of 60gm :24 gm is quite adequate. Once the duplicating plastic mixture is poured in to the silicone cup, the cast is lowered into the cup. With the cup rolled up the side of the cast, it is held in position to ensure contouring of the stump. It also helps if the duplicating plastic sets in such a way that it isn't bulky or has air pockets in it.

DIAGRAM 2 Pouring of the duplicating plastic

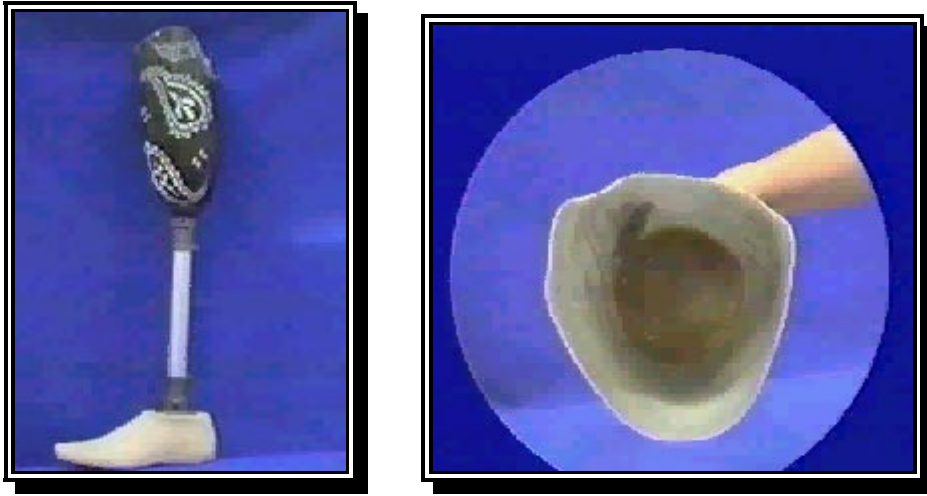


Once the duplicating plastic has set, its position is marked on to the cast and removed. Sometimes it is necessary to grind some of the plastic down to enable greater contour to the cast. Also this can reduce weight if that is a problem.

The plastic cap is attached to the cast, either by glue if using a liner or with a stocking drawn tightly over the cast for a plastic socket. Small plastic lugs or plasticine placed inside the screw holes enable easy positioning of the drill holes to connect the outer socket attachment plate to the inner attachment plate.

The cast is then ready to be either laminated or vacuum formed. The socket is removed from the cast in the conventional way. Holes are drilled in the end of the socket where the plastic lugs were placed. The outer attachment plate, pyramid, and the inner attachment plate are bolted together. A pylon of correct length connects the foot to form the interim prosthesis. A knee cuff is riveted to the socket if the socket is a PTB, although not shown in the video. The leg is ready for dynamic alignment.

DIAGRAM 3 The completed leg



This method of fabricating an interim is quick and relatively easy. This interim enables early ambulation and increase morale. Also ambulation tends to decrease oedema and brings the amputee closer to both stabilisation of stump fluctuation and the definitive prosthesis.

The interim with the duplicating plastic cap, in my opinion, is more cosmetic than the scotchcast interim. Also socket adjustments would be easier with the interim containing the duplicating plastic cap. With these considerations in mind, I believe that this method will most likely be the new trend in the future.