

# Below Knee Alignment Duplication — Recommended Modifications

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## INTRODUCTION

The usual procedure for alignment duplication of below-knee prostheses is outlined on pages 151 to 157 of the manual entitled "The Patellar-Tendon Bearing Below-Knee Prosthesis," by C. W. Radcliffe and J. Foort. In this shop guide, a simpler and more accurate technique is described which is substituted for the recommended system, and which is now being taught in our courses for prosthetists at New York University.

The earlier method relied primarily on the prosthetist's visual judgment in final determination of toe out. This often led to inaccuracies. The new procedure, if properly followed, will assure accurate retention of the established toe out relationship between the socket and the foot.

### A. MODIFICATIONS OF EQUIPMENT

It is necessary to make two modifications in the existing equipment before making use of the new procedure.

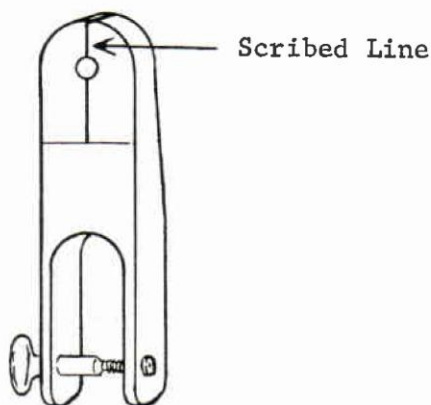


FIGURE 1

#### 1. Ankle Bracket Modification

Scribe a line on the ankle bracket parallel to its edges. The line must bisect the attachment hole and extend to and across the top of the bracket as in *Figure 1*.

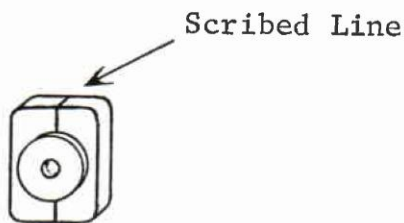


FIGURE 2

#### 2. Foot Attachment Plug Modification

Scribe a line on the long axis of the foot attachment plug. The line must bisect the bolt hole and be parallel to the edges of the plug. Extend the line over both ends of the plug as in *Figure 2*.

## B. PROCEDURE DURING BENCH ALIGNMENT

When the equipment is ready, the first two steps must be initiated during bench alignment.

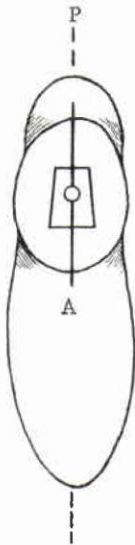


FIGURE 3

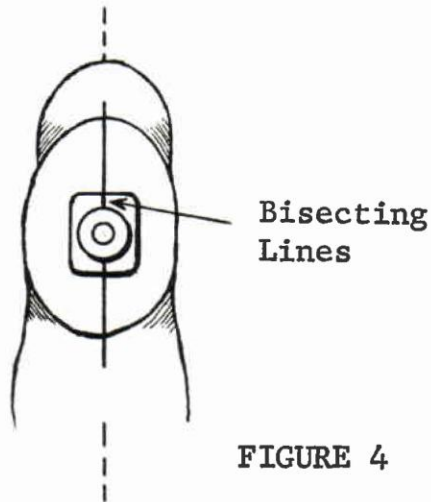


FIGURE 4

1. As illustrated in *Figure 3* draw line A-P which will serve as a reference line. Line A-P must bisect the wood keel bolt hole on the SACH foot and be perpendicular to the anterior edge of the top of the keel.
2. Attach the ankle plug to the SACH foot. The bisecting line scribed on the ankle plug during the modification procedure must coincide with the reference line of the foot. See *Figure 4*. Be sure that these lines coincide throughout the dynamic alignment procedure.

## C. PROCEDURE AFTER DYNAMIC ALIGNMENT

Bench alignment, static alignment, and dynamic alignment are carried out in a routine manner. When dynamic alignment is completed, the procedure continues as follows:

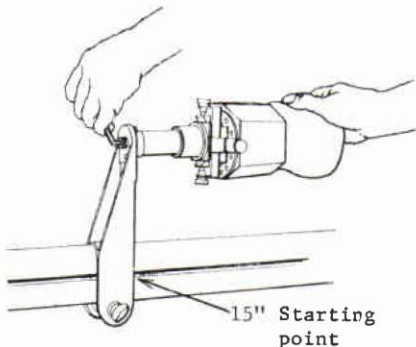


FIGURE 5

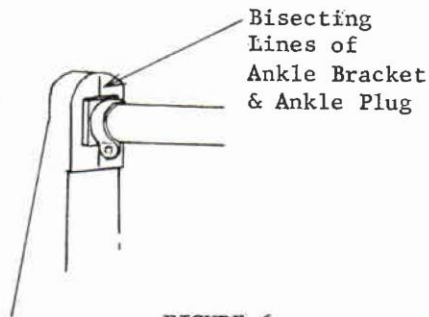


FIGURE 6

1. Remove SACH foot from adjustable shank by unscrewing the bolt through the bottom of the foot.
2. Using the base tube tape measure for reference, lock the ankle bracket at position 15", reading from the right side of bracket. See Figure 5.
3. Attach the adjustable shank and socket to the ankle bracket with bisecting scribe line of the ankle plug coinciding with the bisecting scribe line on the ankle bracket. See Figure 6.
4. Slide socket clamps into position and lock on base tubes. Then secure socket with post clamps. See Figure 7.
5. Remove the adjustable shank by unfastening from the ankle bracket and removing screws in socket extension block.
6. Set saw guide on jig without moving the socket assembly and make a cut with the saw on the socket extension block. The cut should be about  $\frac{1}{4}$ " from the end of the socket. CAUTION: *The saw guide should not be moved on the base tubes at any time during duplication.*
7. Slide socket assembly out of the way by moving it to the right.
8. Bring ankle bracket back to position 15". Attach shin block to ankle bracket. Correction for wood removed in saw kerfs may be made by setting the ankle bracket at position  $14\frac{7}{8}$ ".
9. Make vertical cut on shin block.
10. Remove saw guide.
11. Bring components into firm contact and index for gluing.

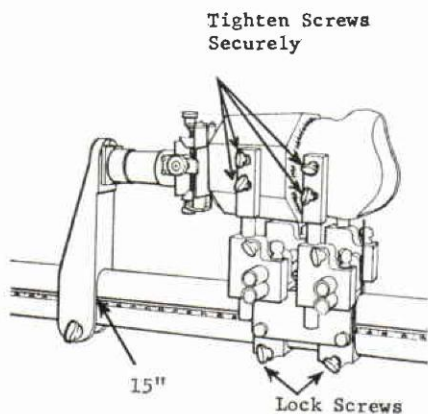


FIGURE 7

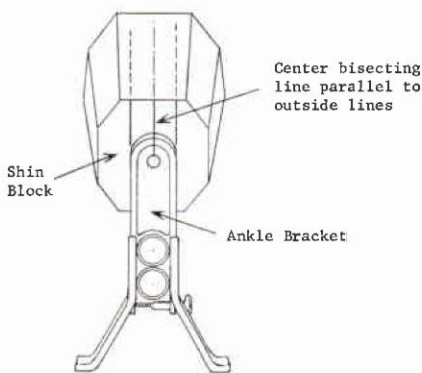


FIGURE 8

12. Index the distal end of the shin block with three lines. Two lines must be parallel to the lateral sides of the ankle bracket. The center line must correspond to the bisecting line scribed on the ankle bracket and also be parallel to the two lateral lines. See Figure 8.
13. Remove components from the jig and glue together. When the glue is set attach the foot to the shin block so that the center line at the end of the shin block corresponds with the reference line of the foot. The leg is now ready for shaping and finishing.