

A Cosmetic Duplication Method

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For some time, I have wanted to write about my method of duplicating missing or deformed parts of the body, legs or arms to achieve a nearly perfect form and copy for any type of prostheses. Particularly in view of the increasing use of plastic material in the orthopedic field my method should be of great help to my fellow colleagues, because, after first taking a mould of the normal part of the body, and then by turning the shell inside out, we obtain a perfectly matched form to cover the deformed part and make both sides look alike.

It is much simpler than it sounds and one does not need a sculptor or expensive apparatus and materials to make a nearly perfect duplication. At the end of this article, I will list all the necessary tools and materials which are found in almost all of our orthopedic shops.

For simplicity let us assume we have a B.K. lady amputee whom we have to fit with a plastic cosmetic prosthesis that will match the normal leg, calf and ankle. The following process will do that and also applies to any deformity of the body which can be covered and reproduced by this method.

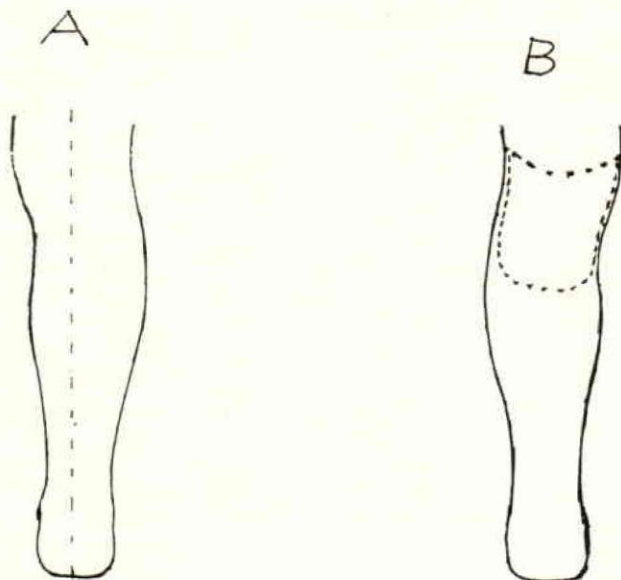
The first step is to secure all necessary measurements and castings in the usual routine manner. However, I advise right here to use only elastic plaster of paris bandages which will stretch and conform to the contours of the object without leaving wrinkles, and so produce a faultless negative.

Before applying the plaster of paris bandages, the stump (or other body parts) must be covered generously with a good separator like vaseline, silicone, wax, soap, paraffin or other chemicals to avoid the cast sticking to the object of duplication. Under no circumstances should a stockinette or other fabric be used as a separator.

In the case of the B.K. leg, the patient should stand on a podium, box or table supported by hand rails or crutches to be secure and comfortable, and must face in the opposite direction from the prosthetist. Next, a separator will be applied to the bare normal limb and a strip of brass, aluminum or plastic, approximately $\frac{3}{4}$ " wide and the full length of the leg, should be placed posterior running down from above the knee over the calf and heel into the arch and wrapped up with the plaster of paris bandages. This underlaid strip is used to cut the negative safely after the cast is hardened. It should be noted that the negative shell must be made with great care, without wrinkles, and of a fairly thin wall to allow easy removal from the leg.

After the negative has been removed, the cutting edges should be brought together, wrinkles smoothed over and the inside shell generously covered with the separator before the cut and foot opening are closed with plaster of paris bandage or tape. When this is done, a piece of water or gas pipe about 6" to 10" longer than the shell should be inserted, which later will be used to clamp the cast in a vice, and then filled with a well mixed good brand of plaster of paris that has no lumps or air bubbles in it. After allowing about one hour time for setting and hardening, the plaster negative

should be removed with great care to avoid nicks and damage to the positive form. Its surface must be smoothed over and any rough spots or air holes filled in. Then we proceed without drying the cast to cut out a paper pattern like sketch C over the positive and use it to cut a piece of celastic about 1/16" thick from a roll or sheet, making sure the cutting edges are posterior. While the celastic piece is soaking in a pan of softener, we cover the positive with a separator. Aceton should not be used, because it dries too fast and takes the elasticity out of the celastic.



Sketch A shows tracing of normal leg.

Sketch B shows contour of artificial leg.

The positive is clamped into a vice with the posterior side up. Next, the soaking wet celastic sheet is removed from the pan and quickly draped and moulded around the cast from top to bottom, bringing the cutting edges together. Any overlap must be cut away and only a straight and close cutting line should remain.

To protect the hands against the chemicals, rubber gloves should be used which also serve to smooth the surface after the moulding is completed. If necessary, some softener fluid should be rubbed into the celastic during the procedure to keep it soft and pliable.

When the outside of the celastic shell begins to dry in the air, it should be removed very gently from the cast by inserting a flexible thin strip of pliable round-cornered plastic about 10" long, 1½" wide and 1/16" thick between the celastic and cast. As soon as the shell is off it must be turned inside out until the cutting edges meet and the reversion process is completed. This is only possible because the moist plaster cast keeps the inner side of the shell soft and pliable while the outside already has started drying in the air and retains its shape. All that has to be done now is to straighten out dents, bring the cutting edges together and make sure the reversed shell matches the positive.

The whole trick in this reversion process centers in the fact that the plaster cast must be moist to prevent the celastic inside wall from drying

out too soon so it will not stick to the plaster. Therefore, everything must be done in an almost continuous motion to guarantee success.

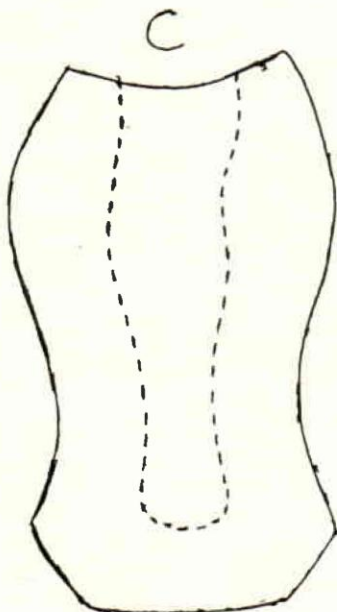
Following is a list of materials and tools:

Elastic plaster of paris bandages—plaster of paris (good grade)—knife and scissor—rubber gloves—water bucket—glass or metal pan for softening celastic—sheet or roll of celastic about $2/16$ " thick—celastic softener—separators like vaseline, soap, silicone, wax, paraffin or other chemicals—wrapping paper—gas or water pipe—a strip of aluminum, brass or plastic approximately 1" wide and $1/16$ " thick for cutting the cast lengthwise, and a strip of plastic or soft metal with round corners about 10" long, $1\frac{1}{2}$ " wide and $1/16$ " thick to help remove the shell from the cast.

Sketch A shows tracing of normal leg.

Sketch B shows contour of artificial leg.

Sketch C shows cutting pattern for celastic shell.



Sketch C shows cutting pattern for celastic shell.

