

Technical Note:

The USMC Prosthetic Skin

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INTRODUCTION

Coverings and artificial limbs have enjoyed limited popularity for over twenty years. While early versions, made primarily of polyvinyl chloride were usually applied to exoskeletal below knee prostheses, it was not until introduction of endoskeletal prosthetic components with their soft foam covers that their utility became apparent.

The USMC prosthetic skin (Figure 1) was initially developed in 1974 as a protective

cover for soft foam endoskeletal below knee prostheses. Today it is available in both caucasian and negroid skin tones in a variety of sizes for all applications from below knee to hip disarticulation prostheses.

Characteristics of the USMC prosthetic skin are its toughness, thinness, elasticity—particularly in the longitudinal direction—and its slow rebound to stretch. Because of this, little additional limitation in knee flexion will result with the above knee exoskeletal prosthesis when the skin is

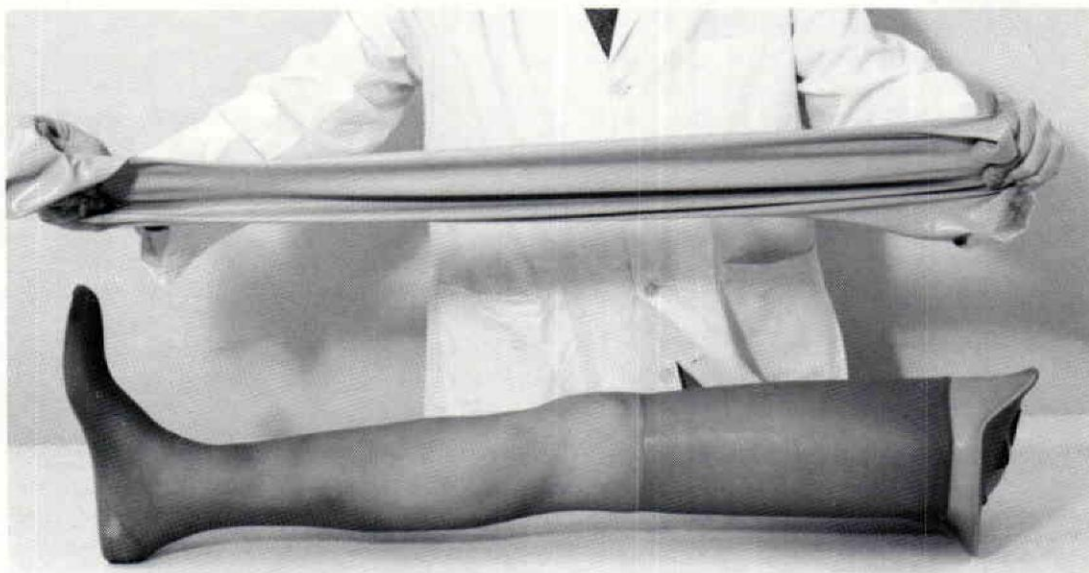


Fig. 1. The prosthetic skin is very elastic in the longitudinal direction to minimize interference with knee function.



Fig. 2. The skin is gathered and carefully pulled over the foot. The use of heat is not recommended.

used over the soft foam cover. Furthermore, if properly sized, the skin will not collapse or significantly distort the underlying foam.

As with any thin material designed to fulfill the above requirements, the USMC prosthetic skin is not completely impervious to tears and abrasions. Damage, if it does occur, is most likely during and through improper application procedures. However, when correctly installed, and with proper patient care, many months of service will be realized.

PREPARATION PROCEDURES

If the skin is to be used over an exoskeletal system all outer surfaces must be padded with at least $\frac{1}{16}$ " of soft foam such as Aliplast[™] or Plastazote[™] to prevent wear-through. All rivets, buckles or protruding components must also be carefully covered. The posterior aspect of the ankle where the counter of the shoe contacts the foot must be undershape to permit the addition of foam in this area (Figure 2).

With the endoskeletal prosthesis it is necessary to leave the foam cover somewhat oversized to compensate for the slight compression caused by the skin covering. Care must also be taken to accentuate the knee cap shape so that its lines will remain cosmetic during knee flexion.

For the hip disarticulation prosthesis, additional padding for cosmetic appearance should be considered through use of an oblong buttocks pad glued to the socket. When using the USMC prosthetic skin in this application it is suggested that a nylon hose (preferably a panty hose) be pulled over the entire limb. Protective padding is applied over all rough edges and exposed screw heads to prevent them from wearing through the skin. When proper padding is completed, the skin should be applied by using the following procedure.

APPLICATION OF THE PROSTHETIC SKIN

The USMC prosthetic skin is applied in a manner similar to donning a stocking. It should be gathered, however, rather than

rolled on starting with the foot. After carefully pulling the skin over the foot, it is stretched proximally using the pads of the fingers (Figure 2). Particular attention to preventing the fingernails from digging

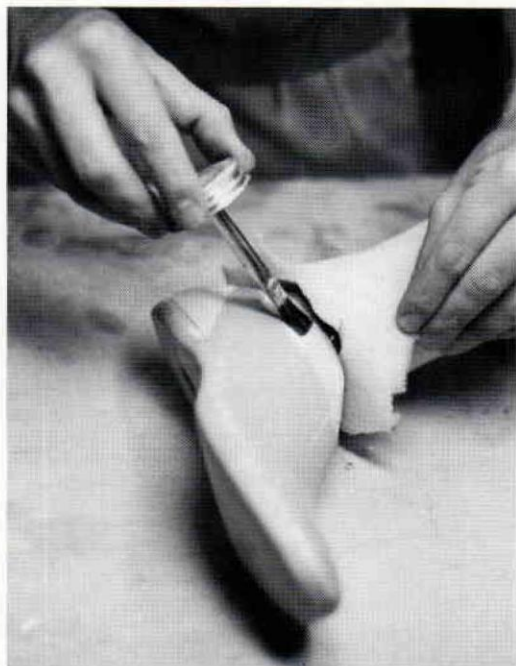


Fig. 3. When using the skin over a soft leg cover, it is cemented directly to the lower end of the cover.

into the elastic material is essential to prevent tearing. Once over the foot it is stretched longitudinally until all wrinkles are removed. The use of heat to soften the skin material to facilitate stretch is neither necessary nor recommended.

When installed over a below knee prosthesis the skin may be permanently glued to the proximal brim with Barge[™] and trimmed or, if desired, left long and used as an auxiliary suspension by attaching to a garter belt.

When using on an above knee prosthesis it may be necessary several times during the first few weeks to remove wrinkles that develop from creep in the skin material. Because of this characteristic, permanent attachment of the skin at the proximal aspect should be postponed until all evidence of creep has been resolved. The skin works exceptionally well over the Hydracadence foot and lower leg cover as well as over the Mark V Multiplex and OHC Four Bar Systems. With these components, the skin is cemented directly to the soft lower leg covers (Figure 3).

Hip disarticulations may require an extra length skin for an exceptionally long prosthesis; however, with shorter limbs a standard above knee length will suffice.