

COSMETIC COVERS FOR LOWER-LIMB PROSTHESES

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Cosmesis refers to four factors involved in the appearance and the feel of a lower-limb prosthesis in comparison with similar characteristics on the opposite limb. These factors include:

1. **Shape:** A general term including the matching of length, circumference, and cross section at various levels and the approximation of three-dimensional contours in such a way that the prosthesis appears similar to the opposite limb. In practice the actual circumferential dimensions must often be smaller in order to achieve the desired appearance.
2. **Surface Feel:** The degree of surface softness. A match with the characteristics of normal skin and soft tissue seems to be a desirable objective, if it can be achieved without a significant weight penalty. A close match with the feel of normal tissue is perhaps more important to the female amputee, but the sound-deadening characteristics of any soft cover is advantageous for all amputees.
3. **Surface Texture:** The appearance of the surface and its feel with a light touch should approximate that of normal skin.
4. **Joint Continuity:** The cosmetic cover should provide continuity of contour over the moving joints in such a way that gaps and bulges are minimized.

The ideal cosmetic cover for a lower-limb prosthesis has never been achieved because of conflicts between some of the above requirements. A lifelike soft feel is difficult to achieve without either loss of durability or excessive weight. A custom shape to match individual contours is possible at the expense of having to reestablish the skin-like characteristics after reshaping or by complicated custom-molding procedures.

An individual match of skin color leads to difficulties in providing good antistain and color stability properties. Easily applied color may not be sun and ozone resistant. A continuous cover over both ankle and knee joint requires special flexible materials which may lack durability.

A single solution to the problem is probably not possible because of differences between patients and the opinions and prejudices of both patient and prosthetist. Modern lower-limb prostheses should provide for a variety of types of cosmetic covers and cosmetic restoration systems

to allow for these differences. In all cases, however, the objective should be to approximate as closely as possible: 1. the shape of the opposite limb, 2. a soft and skinlike surface texture, 3. smooth continuous contours over joint surfaces, and 4. all of the above in an inexpensive, easily replaceable, durable, and lightweight system.

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