

## Above knee fitting. Wood works out or in?

During the XXth century, the choice of materials for the fabrication of prostheses has been governed by several criteria:

- Density
- Resistance
- Plasticity
- Ease of application
- Price, in certain cases
- Mode, strongly influenced by dealers in materials.

Having regard to these criteria and the varieties of materials available, prosthetic practitioners have opted for aluminium, leather, wood, etc.

Wood has gradually lost ground on account of the obsession with the new materials, and because of the loss of know-how brought about by the plastics mode. Today the criteria governing choice are still the same but the range of available materials has increased appreciably and the possibilities for blending are infinite.

It is clear that the case for prosthesis consisting entirely of wood can no longer be argued in the light of the current criteria for cosmetics, mode and functionality.

It is the duty of the prosthetic practitioner to make optimum use of the properties of every material.

We no longer construct all-wood prostheses but a socket of acrylic laminated wood fitted on to a knee in composite equipped with a hydraulic system with a foot of carbon, the whole cushioned by various foam materials.

To make above knee sockets, whatever the material used, the prosthetic technician must not only be a worker good with his hands for carving and modelling but also have a very sound grasp of volumes and forms. A socket is defined in terms of its form and its volumes. Thus the construction material delimits the space created by the prosthetic technician. It is only the prosthetic technician's professional knowledge which determines the correctness of this space.

On the other hand, the properties of the material used may increase or diminish the "comfortable prosthesis" feeling in the amputee, e.g., by exacerbating or attenuating the variations in temperature. With us, wood always has a preponderant place in the fabrication of above knee sockets, for the following reasons in particular:

- We prefer to work on the actual object (the socket) rather than on its negative image (positive plaster of the stump).

- In the first fitting, corrections of depth, volume and form are easy to make while maintaining an acceptable aspect for a definitive socket.
- When it comes to performing the final adjustments to a finished socket, the thickness of the medial border enables modifications to be effected which are difficult to make on a plastic socket, just as are modifications of volume.



*Example of a socket deepened by the affixing of a washer, tightened by a saw kerf and corrected by the insertion of additional pieces of wood.*

The use of wood is incorporated in the fabrication process, not out of conservatism or any ecological preoccupations but because its mechanical qualities and application make it a material of choice on a par with titanium or composites.

While working with wood used to be physically fatiguing, took a long time to learn and involved a mastery of forms and volumes which was difficult to impart, today these drawbacks have been considerably diminished by the influence of advanced technologies.

To make optimum use of these technologies, we have incorporated in them the experience acquired over the years. Through the use of certain algorithms, computerisation assumes the form of knowledge engineering. Robotics enable us to automate the physically demanding work. Our CAD/CAM system mills ready-to-fit wood sockets. By means of digitisation of above knee sockets we are able to build up a data bank in which we can draw on past experience and combine it with today's. In these times of working groups our system makes it possible to share such experience.