

AN ORTHOSIS FOR THE FLAIL ELBOW

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With the availability of thermoplastics it is now possible for the imaginative orthotist to apply with advantage prosthetic principles to the design and fabrication of orthotic devices. Thermosetting plastics recently have been used extensively in lower-limb orthotics in the formation of quadrilateral and PTB sockets to unweight the lower limb. Plastics have been used in upper-limb orthotics, but the application has been confined primarily to orthoses used about the hand and wrist.

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The Flail Elbow Orthosis described here, made by vacuum forming sheet polypropylene, was designed to control rotation, flexion and extension, adduction and abduction, and any combination of these motions in an abnormal elbow. The patient, a seventy-year-old female, had undergone several operations involving reconstruction of her elbow. No articulating surface was left, and thus there was no possibility of either further reconstruction or total elbow replacement.

The orthosis (Fig. 1) was designed to hold the hand in a neutral position while allowing flexion of the elbow joint but no other motions.

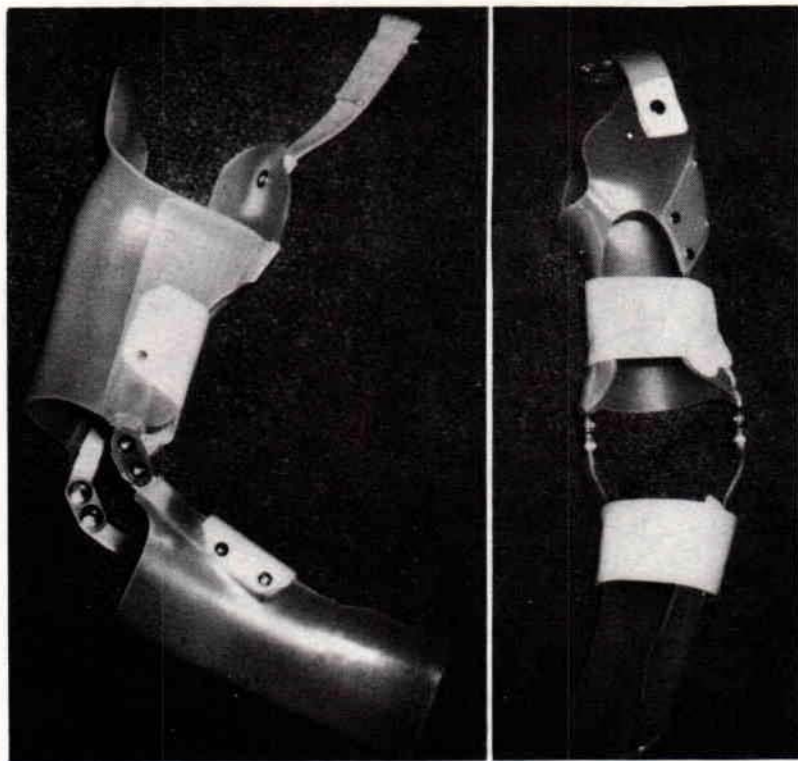


Fig. 1. Medial and anterior views of the flail elbow orthosis.

The wrist is held in position by incorporating the "screw driver" principle to prevent rotation of the radius, ulna, and humerus. Prosthetic polycentric elbow joints were incorporated to follow closely the flexion-extension motion of

the normal elbow. The proximal section was fabricated using the open shoulder, above-elbow principle (1), which allows for control of rotation of the ulna, radius, and humerus in the extended position (Fig. 2).

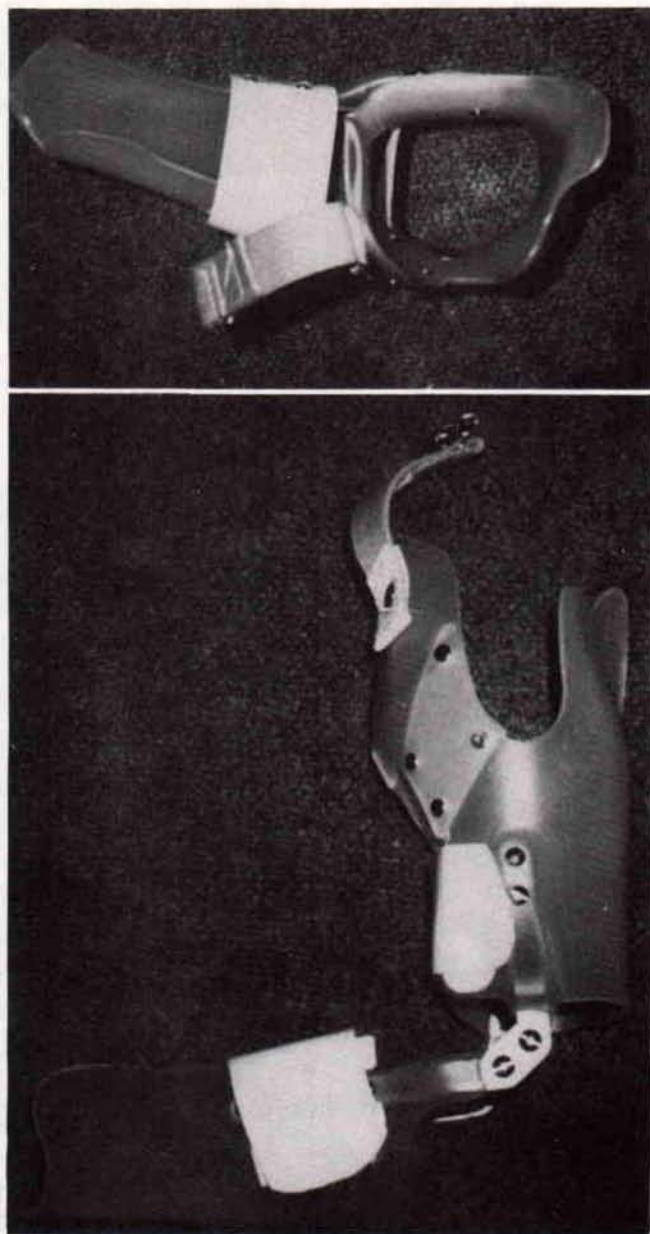


Fig. 2. Top and lateral views of the flail elbow orthosis.

A figure-nine harness was used for suspension (Fig. 3). The patient was able to perform activities such as washing dishes and cooking, which, prior to use of the orthosis, had been impossible.

Thermoplastics have allowed more latitude to the orthotist in fulfilling the needs of the patient. Application of prosthetic principles can result in simplicity, function, and improved patient activity.

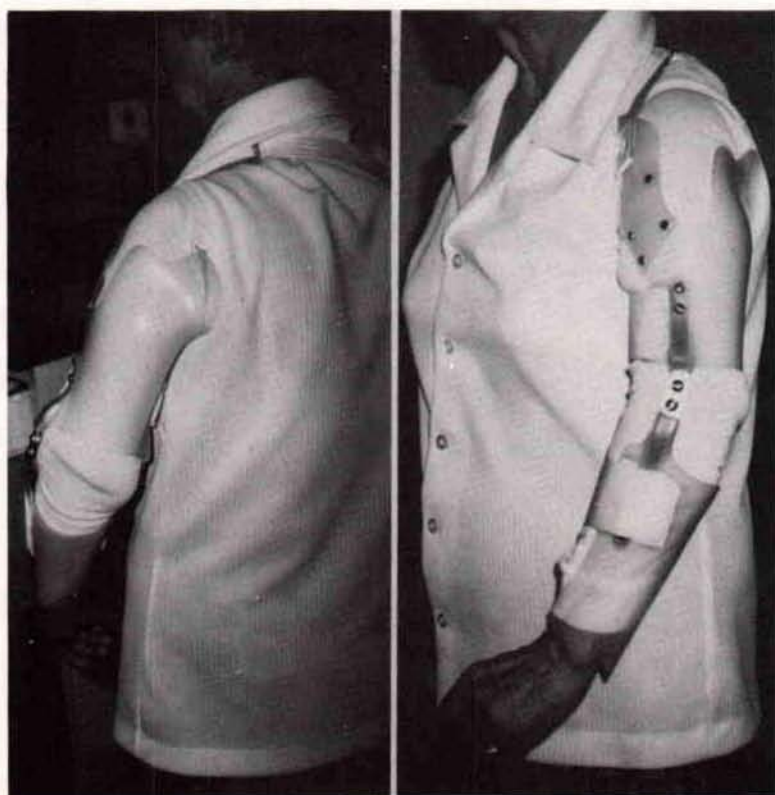


Fig. 3. Two views of the flail elbow orthosis applied to the patient.

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LITERATURE CITED

1. McLaurin, C. A., et al, *Fabrication procedures for the open-shoulder, above-elbow socket*, *Artificial Limbs*, Vol. 13, No. 2, pp. 46-54, Autumn 1969.