

TECHNICAL NOTE

AN IMPROVED CRUTCH GRIP

One of the recurrent complaints made by our patients who require additional support from the arm, or arms, is discomfort of the hands. When the lower limbs cannot support the body weight, the burden is placed on the upper limbs and is transmitted to the body through the hands. Canes provide a small, often non-anatomically positioned, grip for the hands that tends to blister because of the forces that are needed to avoid slippage for any significant length of time. With this in mind a handle has been designed and tested on patients with short-term disabilities and on patients with long-term disabilities. Some of the patients with long-term disabilities, especially the active ones, have benefitted greatly from the handle and continue to use it.

The handle (Fig. 1) is anatomically shaped to conform to the palm. The gripping fingers are provided with a supporting area which protrudes radially and extends obliquely to the gripping surface. The thenar and hypothenar eminences are provided with a weight-bearing surface. The handle offers a maximum area for distribution of the force between hand and handle so that unit pressure over the inner surface of the hand is relatively small.

The handles are designed for the left and right hand and may be made of materials that are easy to shape, such as wood or, preferably, plastic. The only tools needed in the production of the grip are a bandsaw and a "Trautman" router. The overall length of the grip should be about

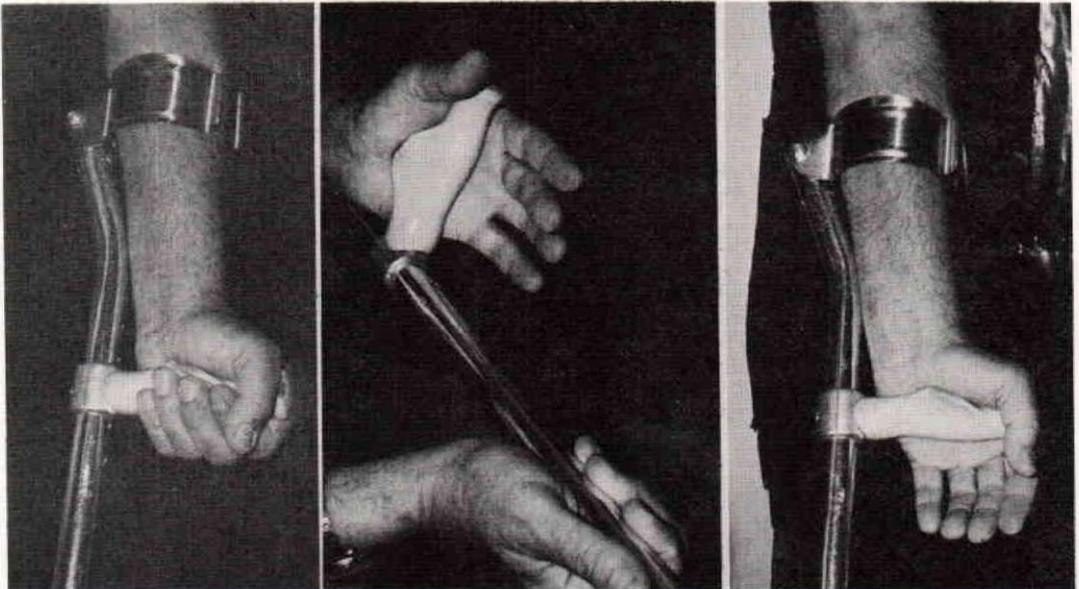
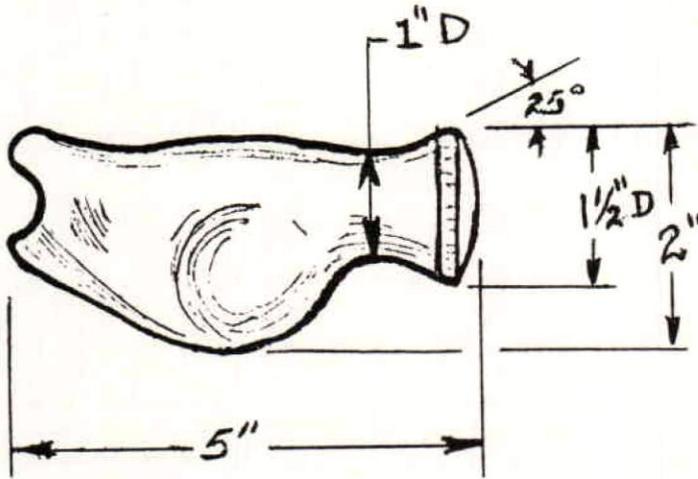


Fig. 1. Three views of the new crutch grip.



ALL DIMENSIONS
APPROXIMATE

Fig. 2. Top View, Left Handle. The outboard end of the handle has a knob-like thickening which, via a throating, extends into the handle with a large radius so that an adherent surface is formed for the inner thumb blank that extends from the root of the thumb to the outer thumb member, forming, at the same time, a supporting area for the index finger.

five inches. (Fig. 2). The maximum overall width is two inches. The knob end is $1\frac{1}{2}$ inches in diameter, with a throating angle of approximately 25 degrees to a cross-section of approximately 1 inch in diameter. The weight-bearing surface suggests a 45 degree angle downward. The overall depth should not be any more than any regular wooden crutch handle.

The benefits of this handle have been conclusive after having been tested clinically for approximately six months. Among the patients testing the handle on the Lofstrand-type crutch were six different long-term disabilities, three high lesion paraplegics, two lower-limb compound fractures, and one hip-disarticulation amputee. All of them, including two who had already used Lofstrand-type crutches for many years, found the newly designed handle superior as it lowered pressure in the palm area and the outer borders

of the hand. This, naturally, lowered the force necessary for gripping. Crutch motion and placement were improved, and the fingers could be stretched when tired while the palms were used for leaning on the handles with safety.

A hip-disarticulation amputee, a young, active patient, agreed to use the prototype handle on the left (prototypes were designed for both left and right) while continuing to use the conventional handle on the right. After four months of rigorous daily activity, including some mountain hiking, he asked for a right prototype. He had quickly grown accustomed to the left-hand prototype while his right hand had blistered and his right forearm continued to be sore. He has now been using both new handles contentedly for several months.

Rainer Schmid, C.P.