Stride Length Control for Hip Disarticulation Prostheses

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Prostheses for disarticulation of the hip and amputations through the neck of the femur have for many years routinely used a positive hip lock joint to facilitate functional control. In early 1954 the Prosthetics Service Center of Toronto, Canada, reported the development of a new type of prosthesis for hip disarticulation amputees. This prosthesis was designed to provide adequate stability by clever alignment; stride length control was provided by a properly-located elastic strap. After several fittings at the VAPC it was noted that the stability and control provided were inadequate for unrestricted use, i.e., over rough terrain. An additional or different means of controlling hip stability was required.

In 1955, we developed a spring-loaded stride length control mechanism which permitted a desired amount of motion of the hip joint and prevented over-flexion of the hip (excessive stride length), substituting for the simpler but less effective elastic strap. This aluminum control mechanism can be utilized on types of hip-disarticulation prostheses other than the Canadian.

The characteristics that distinguish this device are:

a. Free motion of hip to desired stride length;

b. May be used on *all* types of hip disarticulation prostheses;

c. Bulk in lateral socket area, as in conventional types, reduced due to location of control;

d. Increase in security with no loss of good gait pattern.

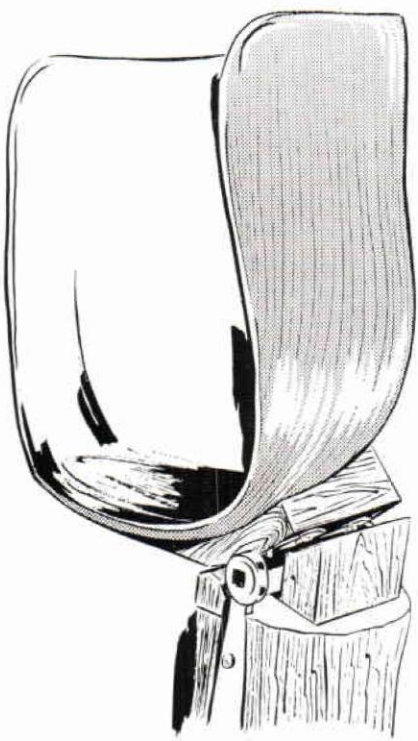

Figure 1. Set-up of socket on thigh piece for dynamic alignment prior to installation of Stride Length Control.

To summarize, the purpose of the control is to provide the required amount of hip flexion for a desired stride length without loss of stability under any circumstances. Its application is universal for hip-disarticulation amputees and, in some cases, for amputees with very short above-knee amputations.

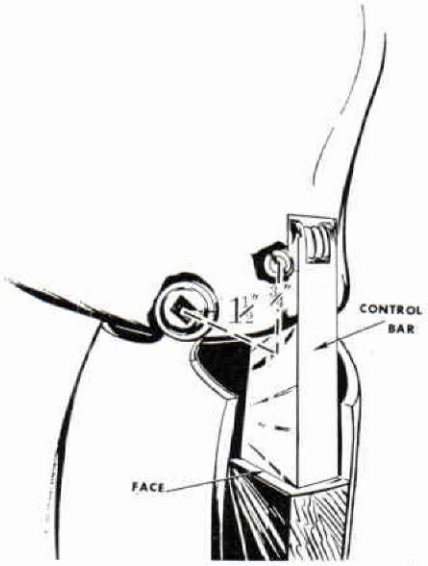

Figure 2. Position of Stride Length Control in prosthesis.

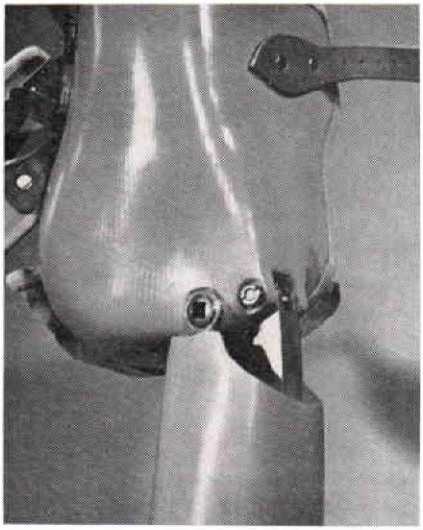

Figure 3. Stride Length Control as installed in finished prosthesis.

Installation of the device is fairly easy. The hip joint is attached to the socket in the usual manner. Placement of the joint is made as far posterior as possible so that, in sitting, the socket, rather than the thigh piece, rests on the chair.

When the prosthesis is prepared for fitting and alignment, a piece of wood is attached to the thigh piece as a temporary stride length control (See Fig. 1). A space is left between the wood block and the socket to permit hip motion. After the fitting is accomplished, a mounting for the stride length control is prepared on the socket. This mounting is located so that the axis of the stride length control is parallel to the axis of the hip bolt joint and approximately 1½" forward of and ¾" above the hip bolt joint (See Fig. 2). Suitable clearance is provided for the control bar so that when it is pushed back or released for sitting, the thigh piece may be flexed upon the socket without interference. The socket is finished in the usual manner but with extra reinforcement in the area of the joint and the stride length control (See Fig. 3). Range of hip motion is controlled by increasing or decreasing the space between the face of the control bar and the thigh piece. Detail drawings and an assembly drawing are shown in Fig. 4.

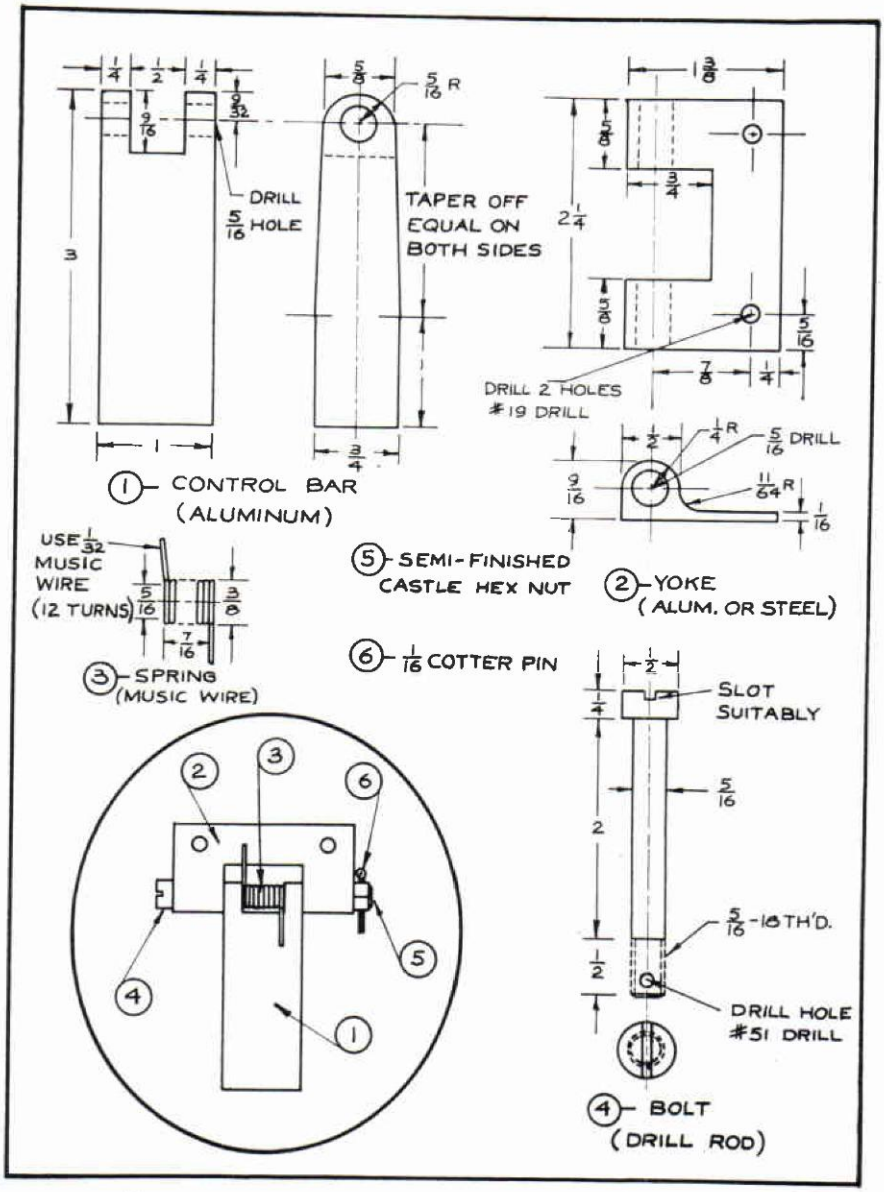

Figure 4. Details and Assembly drawings of Stride Length Control.