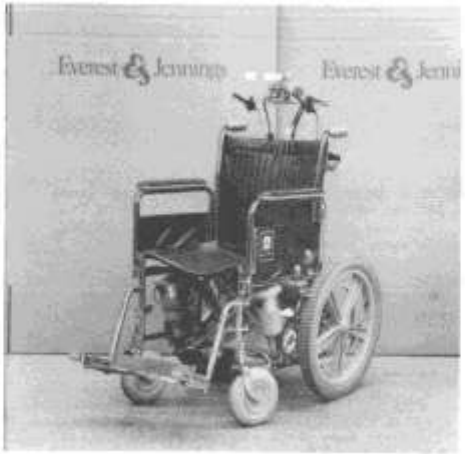
Everest & Jennings
RIM Head Control



R. I. M.

Head Control System

developed in cooperation with:

REHABILITATION INSTITUTE OF MONTREAL

equipment design and manufacture:

EVEREST & JENNINGS CANADIAN LTD.
111 Boldercroft Road Concord, Ontario, Canada

distribution and service in the United States:

INTERNATIONAL MEDICAL EQUIPMENT CORPORATION
11000 Rush St. #20 So. El Monte, California 91733

R.I.M. Head Control System

Description of Equipment

The basic wheelchair selected for this application is the Everest & Jennings Model 3P, 24-volt Power Drive Wheelchair. This unit offers a smoothly operating proportional control and a 'fail safe' design of its relays.

The Head Control Unit is designed with a Head Control Lever that moves through a low friction shaft and slide attachment to allow smooth application of power by a backward motion of the head. Side projections on the control transmit angular motion of the head into a signal to move the wheelchair in a lateral direction.

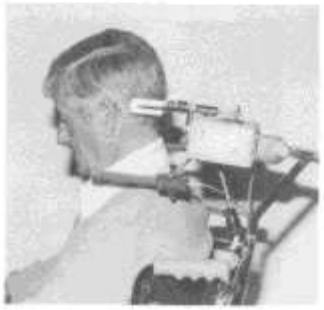
Two sensitive leaf switches may be positioned to be activated by shoulder or cheek deflection. The leaf switch on one side will turn all power on and off and may be used as an emergency "off" switch. The other leaf switch is used to provide a reverse mode of power operation. When this reverse switch is activated, the same head movements that control forward and lateral speed and direction will now operate to reverse the movement and direction of the power wheelchair.

The standard Model 3P Control Box is modified to reposition the off/on switch to a leaf switch operation by shoulder deflection of the patient. The Electronic Module of the Model 3P is also modified to accomodate the commands of the special control box and leaf switches. These special components (Control Box and Module) must both be used with the Head Control. They may be used to replace the standard Control Box and Electronic Module of any Model 3P Power Wheelchair. The holding frame for the Head Control will attach to the back uprights of the chair by use of the upholstery screws.

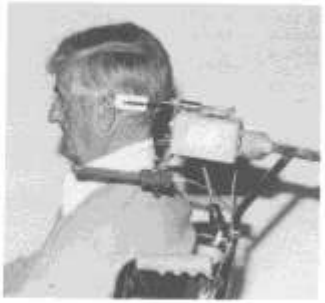
Description of Equipment

Description of Use

To use this device, the patient should be able to sit and (assisted by restraints, if necessary) be able to maintain his posture erect in the chair. In this position he is able, by use of head motion and shoulder deflection, to drive the chair in any direction at varying speeds. In general, a rear movement of approximately 1-1/2" covers the speed range from stop to full speed (approximately 3 miles per hour).



Power control is in neutral - no movement of wheelchair.



Head moved back, the control is activated to put chair in motion.

Description of Use

Description of Use - continued

An angular head rotation of about 15 degrees from center will result in a directional change of 90 degrees.

Head rotated to right for right turn.

Head rotated to left for left turn.

Description of Use - continued

Description of Use - continued

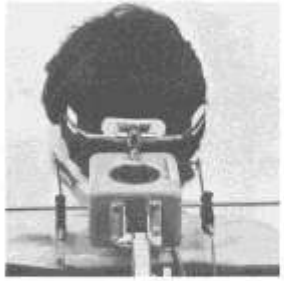
In use, one of the great advantages of this system is that the wheelchair goes in the direction in which the patient looks when his eyes are focused straight ahead. As he turns his head to the left, for example, the chair seems to follow the direction of his gaze. This leads to good coordination of intention and activity. Steering with the mechanism is very sensitive and experience at the Rehabilitation Institute of Montreal has indicated a patient with average capabilities would require practice of one to two hours per day for a week, to master coordination.

In addition to the motion of the head, two other actions are required. These relate to shoulder deflection and are patient motions to activate the leaf switches that control the reverse mode mechanism and operate the Off/On/Stop and Emergency Stop functions.

As stated previously, most high level quads retain scapula activity and a controlled shoulder deflection is well within their capability. However, the leaf switches may also be positioned to be activated by the patient's head or cheek when controlled deflection is not possible.

The Model 3P Power Drive Wheelchair can be operated entirely in the forward mode and a 180 degree turn can be accomplished in less than 4 feet; a 360 degree turn in approximately 7 feet.

Leaf switches positioned for cheek deflection.

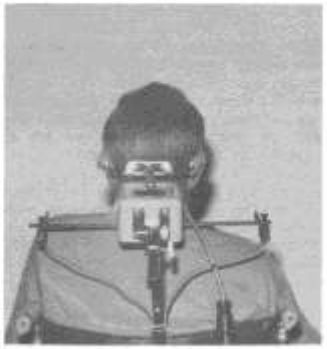


Angulation of the head to deflect leaf switch with the cheek.

Description of Use - continued

Description of Use - continued

To back up, it is necessary to activate a reversing switch by using scapula deflection as previously described. With slight pressure, the leaf switch electronically reverses the commands received from the control, so that rear motion of the head is now translated into rear direction of the chair. Left shoulder deflection is shown to activate the reverse leaf switch.



A safety control to prevent sudden changes from forward to reverse is incorporated, so that reverse switching is ineffective when the speed control is not in the neutral position. This prevents accidental shifting to reverse when the chair is operating in the forward mode.

Right shoulder deflection as shown, will activate the Off/On switch that also serves as an emergency stopping switch. In an emergency, this switch is activated to cut power to the motors and allow the chair to come to a stop.

When the chair is not in use, this switch should be in the Off mode.

Description of Use - continued