Covers for a Powered Wheelchair Head-Array System

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Technological advances in powered wheelchairs and in augmentative and alternative communication devices often result in improved mobility and communication (Mollica, Perschl, Demasco, Phalangas, & Lytton, 1996). Thus, occupational therapists and speech therapists increasingly are attempting to meet the specific needs of clients by obtaining funds for such expensive equipment (Brown-Herman, Peterson, Taylor, & Stoecklin, 1996). This article describes an efficient and inexpensive way to protect one type of costly equipment from rainwater damage. It was developed for a 54-year-old woman with cerebral palsy, athetoid quadriplegia type, who uses a 4-year-old Action Arrow powered wheelchair. It has a three-piece head-array and head-support system, which allows the client to control the direction of movement of the power wheelchair with her head as described below. It also provides head support. She spends almost the entire day in this wheelchair.

The client originated the idea of placing a flat green button switch on the distal upright support pole of the right armrest. She activates the switch by hitting it with the ulnar side of her fisted right hand. Hitting the green switch allows her to adjust the wheelchair speed and to power the chair either forward or backward. An Invacare power control box with lights allows the client to see whether the power is on or off; on high or low; and engaged in Drive A or Drive B, the faster of the two drives.

The middle, midline component of the three-piece head-array system allows the client to move the chair forward or backward, depending on which direction has been engaged by hitting the green switch. In either the forward or backward direction, making contact with the right side of the head array moves the chair to the right, and contacting the left side moves it to the left. When her head is out of contact with the system for more than 10 sec, the wheelchair power goes off and must be reactivated by hitting the green switch again.

The head array is covered with black vinyl, with seams on the tops and bottoms of all three modules. The client, who lives in Seattle where it frequently rains, was experiencing water leakage into the seams of the head array, causing it to short out. She is active in the community and frequently goes outdoors when it can rain unexpectedly, but she stated that it is not always practical to take a raincoat or plastic cover with her. Thus, she requested head-array covers that could be applied for pro-

1 Manufactured by Invacare®, 899 Cleveland Street, Elyria, Ohio 44036.
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tection from rain, or threat of rain, but that would not interfere with her sensitive head control of the wheelchair.

A set of covers was devised to protect the head-array system from water damage. Materials used included two rubber Speedo®3 swimcaps, which were purchased at a discount store in a navy-blue color to blend with the black vinyl of the head-array system.

Fabrication time was 30 min. One of the two swimcaps was cut in half, with each half covering a right or left module of the head-array system (see Figure 1). Each half piece measured approximately 7 1/2 in. at the base and 4 1/8 in. on the medial side. The rounded portions of each piece cover the lateral sides of the right and left modules.

Both ends of the second cap were cut off to create a larger rubber cover for the center module of the head-array system (see shaded areas in Figure 2). The resulting cover measured 6 1/2 in. at the base and 5 1/2 in. on the two sides. A small strip was cut out of the center of one flap surface to accommodate the post supporting the head-array system. The second, uncut flap surface rested against the side of the array where client's head rests.

Self-adhering Velcro® hook and loop fasteners were used to attach the covers snugly at the undersides of the three modules. The loop pieces were attached directly to the covers, and the hook straps were made with sets of self-adhering Velcro attached together for easy use. The rather small hook and loop fastener pieces had to fit one another exactly so that the client's hair would not become entangled in the hook pieces.

The client has used these covers for more than a year without difficulty (see Figures 3 and 4), and continues to express complete satisfaction with them. They do not reduce the contact sensitivity between the array system and her head. She instructs caregivers on how to apply them, or their application can be learned simply by observing them in place.

Queries to an information clearinghouse on adaptive equipment and to three additional companies specializing in producing powered wheelchair electronics indicated that such covers are not produced as standard items. One of the companies questioned offered to custom make a set of covers at an estimated cost of $20 or more. This price is about five times higher than the cost of our materials. Thus, we conclude that our head-array covers are an easy and inexpensive way to prevent water damage to a costly piece of powered wheelchair equipment.

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3Manufactured by Speedo®, 6040 Bandini Boulevard, Los Angeles, California 90040.
Figure 2. Measurements for cover of central module of the head-array system.

Figure 3. Covers for three modules of head-array system.

Figure 4. Covers in place, back view.

References
