By Tina Roesler, MSPT

During the initial rehabilitation phase, the role of the interdisciplinary team is not only to maximize function, but also to educate the client about the psychological aspects of his or her disability and the prevention of secondary complications, such as pressure sores, that may develop as a result of the spinal cord injury. About 20 percent to 30 percent of clients with spinal cord injuries may develop pressure sores in the first one to five years post-injury, according to a 1995 article in SCI Nursing.

With trends in rehabilitation tending toward decreased lengths of stay and increased inflation-adjusted hospital charges, many clients may not receive adequate equipment assessment or be able to retain important information amid psychological adjustment to a severe disability. This may, in turn, lead to a higher risk for pressure sore formation, subsequent rehospitalization and prolonged bed rest, which may have detrimental physiological and psychological effects.

While many studies have been devoted to pointing out risk factors for pressure sore prevention, few quantitative data are available on methods to minimize risk or the effectiveness of pressure-relieving wheelchair cushions. This case study takes a retrospective look at one client with a new SCI who was followed through initial rehab to one year post-injury. It describes steps taken through systematic wheelchair cushion evaluation and post-discharge educational follow-up to minimize the effects of pressure sore formation.
Information was obtained through observation, client interview and review of physical therapy progress notes.

**Results**

Steve Richardson was an 18-year-old male admitted to SCI rehab 12 days after a T1 burst fracture sustained while snow-boarding. The client received permission from his insurance company, the chief of staff of the medical center, and the New England Paralyzed Veterans Association to attend rehab at the West Roxbury VA medical center, because there were few SCI centers in the New England area, and the facility was closest to his family home. Steve remained in acute rehab for 41 days, during which he participated in the standard physical and educational rehab program. This included daily physical and occupational therapy, family education, peer counseling and equipment assessment. His rehab stay was uncomplicated and Steve was discharged home to his parents at a functionally independent level as reported on a Functional Independence Measure (FIM).

It was anticipated that Steve, a very active B-year-old, would resume his previous lifestyle and social situation, so pressure sore prevention was a primary concern during rehabilitation. Education included group “Education Day,” when clients, caregivers and family members are presented with information regarding physical, psychological and social aspects of SCI. Areas covered include pressure relief, bed and wheelchair positioning, basic anatomy and physiology, medications, bowel and bladder care, nutrition, wheelchair and wheelchair cushion maintenance, and community resources. One-on-one sessions with members of the interdisciplinary team, peer counseling and assigned weekend readings were also integral parts of the educational process. In physical therapy, information from client-oriented publications is most often utilized. Main sources include *Options* by NSCIA, *Spinal Network* by Sam Maddox and the VA publication *Yes, You Can.*

A comprehensive wheelchair and wheelchair cushion assessment was also completed. The cushion assessment consisted of trials with Jay Active, High Profile ROHO, Flexseat by Flofit, Stimulite (contoured) Ultimate and the ROHO Nexus cushions. The evaluation of each product included:

- Postural evaluation seated in the wheelchair. Postural evaluation is primarily an observational technique that looks at whether the pelvis is even and whether there is any excessive abduction or internal or external rotation of the lower extremities. Sometimes, photos of the lateral and anterior views are taken to aid in the evaluation.
- Dynamic sitting balance in the wheelchair. Dynamic seating is a series of functional and reaching activities (e.g., throwing and catching, picking things up off the floor and pushing a wheelchair). During these activities, we looked at how often Steve repositioned himself after an activity or lateral movement; if he was sacral sitting to maintain balance; and if he supported himself more with his upper extremities. In addition, Steve reported on how he felt while performing the activities.
- Client input regarding ease of transfer, comfort, maintenance and cosmesis.
- Evening and morning skin checks with documentation of any impaired skin.
- Force Sensing Array (FSA) computerized pressure-mapping evaluation.

A mat evaluation, completed as part of a separate wheelchair evaluation, showed no range of motion limitations or the need for special precautions.

The selection of cushions may vary depending on the clients’ level of injury, type of transfers, cognition, and current medical conditions (impaired skin integrity, severe spasticity, etc.).

For Steve, a 16-by-16-inch Flexseat wheelchair cushion was chosen for use with an Invacare A4 rigid frame chair with standard sling back. With all factors considered, the Flexseat was chosen for Steve because of its positioning qualities, its aid in dynamic sitting balance, ease of maintenance and pressure-relieving qualities. The
client had no particular problems with the other cushions evaluated, and the choice was ultimately made based on his preference at the time. However, due to an eight-week lag between insurance approval, equipment procurement and discharge from acute rehab, Steve was issued loaner equipment that did not meet specifications of the prescription.

Eight weeks post-discharge, Steve was seen in physical therapy for final equipment check out. At this time, Steve indicated that he had recently noticed a small sacral sore lasting two to three weeks. He was issued the prescribed wheelchair and wheelchair cushion at that time. We also reviewed educational materials regarding pressure relief and skin care. He was instructed to follow up by phone in two weeks, at which time the sacral sore had healed.

Steve was seen again three months later, in SCI clinic, reporting with a 3-cm Stage 1 pressure sore. After repeat FSA evaluation, review of risk factors and client interview, the rehab team was able to determine the most probable cause of the sacral sore. Eight weeks before his appointment, Steve had resumed driving and was frequently in the car for up to two hours at a time. He did not sit on a protective seating surface and did not perform any means of pressure relief. A peer counselor also noted Steve executing poor transfer technique (transferring over the tire).

These issues were discussed with Steve and his mother. Suggested alternative habits included shorter driving periods, use of a gel pad in the car, performance of daily skin checks, and scooting farther forward before transfers. The physician recommended one week of bed rest side-lying or prone at home.

About four weeks later, Steve contacted physical therapy by phone and reported that the sore had healed. No further medical intervention was required. Six months later, Steve returned to school, and there has been no recurrence of impaired skin integrity. Steve has also done exploring on his own and alternates wheelchair cushions between the Flexseat and the Isch-Dish.

**Discussion**

Secondary complications of spinal cord injury, specifically impaired skin integrity, can greatly affect a client’s physiological and psychological well-being post-discharge. Therefore, it is the responsibility of the interdisciplinary rehab team to educate the client about his or her disability to minimize the incidence and effects of secondary complications. This case study demonstrates the effectiveness of a comprehensive wheelchair cushion evaluation and the importance of post-discharge equipment check-out and educational follow-up.

With continuing trends toward brief hospitalizations and relatively short rehab stays, it is difficult to monitor a client’s understanding of educational material presented during initial rehab. Clients are experiencing a stressful situation and may be in denial or shock. Many do not have the concentration needed to process complex information, while pain and medications may also interfere with acquisition and retention of educational materials. A comprehensive educational program should be established at each facility that should extend beyond discharge and include clients with new and old injuries alike. Peer counselors, printed and videotaped information, and community resources should be made available during all phases. The program must be the co-responsibility of an education committee and participants. Telephone follow-up may suffice if clients do not reside in the immediate area of the rehab facility.

When you consider that the cost of rehospitalization can amount to upwards of $10,000 for an average 11.9 day stay (according to a 1990 study in *Archives of Physical Medicine and Rehabilitation*), health care professionals must be aggressive in clinically testing new equipment and substantiating claims of superior performance and protection. Wheelchair cushion selection should be systematic and include FSA pressure mapping when available, posture and balance assessment in the wheelchair, and client feedback. The client should play an active role in cushion selection and be given the opportunity to complete trials on the various seating surfaces available.

Research must be done on the effectiveness of new and established equipment (specifically seating and mobility items), minimization of risk factors for secondary complications, and efficacy of established educational programs for individuals with spinal cord injuries.

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