

**Making Equipment Decisions  
after Spinal Cord Injury:**

**Teaching Cases for  
Rehabilitation Students**



Spinal Cord Injury  
Peer Information Library  
on Technology

<http://www.scipilot.com>

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## **A resource describing the assistive technology experiences of individuals with spinal cord injury told from their own perspective**



This set of teaching cases for rehabilitation students was developed as part of the Spinal Cord Injury Peer Information Library on Technology (SCI PILOT). The overall goal of SCI PILOT is to present assistive technology from the consumer perspective. Experienced consumers have a wealth of practical knowledge about assistive technology that is rarely tapped in a systematic way. SCI PILOT aims to fill that gap.

For the most up-to-date information on the project, please visit our website:  
<http://www.scipilot.com>.

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## Norman: Taking Action to Remain Active

### Background:

Norman is a 42-year-old man who sustained a C5-6 complete spinal cord injury seven years ago as a result of a motor vehicle accident. He lives in his own home with his wife and is currently unemployed. He has recently gained 25 pounds.

Three years ago, Norman received a new power chair. The chair does not have a power tilt and recline feature. He received a new seating system at that time which included a gel-filled cushion and modular back. He is able to drive the chair using a joystick located on his right side. He is able to access the kitchen table and his computer workstation using his chair. Most of what he needs during the day is located in one of these two areas.

Norman has come to the seating clinic because of discomfort due to 'bottoming out' of the cushion. He is concerned that he will develop a pressure ulcer if the cushion is no longer providing effective pressure relief.

### Person:

**Physical:** Norman has sensory and motor function consistent with a complete C5-6 spinal cord lesion. He has been susceptible to skin breakdown in the past although it has not caused major interference with his ability to function. He also sweats a great deal, which is another contributing factor to skin breakdown.

**Affective:** Norman does not want the spinal cord injury to be the focus of his life. Rather, he wants to get the most of out life that he can and advocate for the rights of himself and others. He is an active participant in his community, both as a volunteer and in social activities.

**Cognitive:** Norman has no cognitive issues.

### Occupation:

**Self-care:** Norman has a personal care attendant who comes in three times a day, in the morning to help him get out of bed and dress, at mid-day to help him with his noon meal, and in the evening to assist with personal care and getting into bed. The personal care attendant is shared with two other individuals with spinal cord injury who live in the same town. Norman is alone during the day when his wife is at work and when he is not attending his volunteer position. He has an emergency telephone service if needed.

Norman is able to feed himself using a universal cuff once his food is prepared. He uses a straw to drink. He and his wife purchased a refrigerator with a water dispenser in the door so that he can get a drink independently. His cup has handles

on two sides so that he is able to lift it. He uses the universal cuff with an electric shaver and a toothbrush for hygiene activities. His personal care attendant assists with dressing, bathing, toileting and some other grooming activities. A mechanical lift is used to assist with transfers. The personal care attendant places the things he needs during the day within reach before she leaves in the morning.

**Productivity:** Norman is a college graduate who worked in sales for a plumbing company prior to his accident. He is currently unemployed. However, he is very active as a volunteer with an advocacy group for people with disabilities where he helps develop resource material and position papers for presentation to the government. He volunteers with this group three times a week. His wife provides transportation to and from his volunteer work.

**Leisure:** Norman and his wife have an active leisure life. They enjoy going to restaurants and playing cards with friends. He has a computer with Internet access that he uses for both his volunteer work and leisure. He enjoys surfing the net. Norman also pursues painting.

**Transportation:** Currently, Norman does not drive. He and his wife have a modified van with a power ramp and power tie downs to secure his wheelchair. Norman would like to re-learn to drive in the future. However, since no funding is available to purchase and convert a new van, this goal has been delayed.

### **Environment:**

**Physical:** Norman and his wife live in a small town. There is no accessible public transportation available. They live in a single floor bungalow. All entrances into the home have a minimal grade change so ramps are not required. A sidewalk circles the perimeter of the house for easy access to the yard. Inside the home, the doors and halls have been widened to allow easy access with his power wheelchair. There is a roll-in shower and a combination shower and commode chair. The floors are either linoleum or hardwood for easy manoeuvrability. The counters in the kitchen are not lowered but a table has been placed so that it is accessible to Norman with his power chair. Norman uses a hospital bed with an overhead trapeze to assist with transfers.

**Social:** Norman has a good social network that includes his wife and extended family members. The couple does not have any children. Norman has many friends with whom he enjoys social and leisure activities. Further, Norman has friends through his volunteer activities.

**Institutional:** Norman's power chair and seating system are funded through a governmental agency. His personal care attendant is also funded through a public program. No public funding is available for the van conversion.

**Norman's Goal:**

Norman maintains a very active lifestyle and does not want to give up any of his activities because of a pressure ulcer. He is being proactive by replacing his current cushion. He wants to get a new cushion that would be the most effective in pressure management and most suitable to his needs.

**Case Related Questions:**

1. What are the typical sensory and motor functions associated with a complete C5-6 spinal cord lesion?
2. What functional activities would you expect Norman to be able to do independently? With the assistance of devices only?
3. What factors contribute to the development of skin breakdown or pressure ulcers in individuals with spinal cord injuries?
4. What types of cushions are most effective in reducing pressure for this group of clients? Use literature evidence to support your opinion.
5. What cushion would you recommend for Norman?
6. What potential effects would a change in cushion (e.g., one that is thicker than his current cushion) have on Norman's ability to complete daily activities or access his environment? Hint: See SCI PILOT stories about Joan, Paul and Mike.
7. What types of assistive technology would be useful to Norman for engaging in his desired leisure activities? Hint: See SCI PILOT stories about James, John, and Tony.

# Edward: Getting Older with a Spinal Cord Injury

## Introduction:

Edward is a 64-year-old man who sustained an incomplete C6-7 lesion when he was 21. Although he could manage short distances using crutches, his main means of mobility since his injury has been a manual wheelchair. He believes that using a power chair will make him look and feel like he is more disabled. However, over the past five years, he has experienced increasing pain in his shoulders and has been treated for repetitive strain injury in both of his shoulders. He has also experienced increasing fatigue over the past several years. He has returned to the spinal cord rehabilitation centre seeking a power chair and suitable seating. He is currently using a manual chair with semi-solid tires and an air-filled cushion.

Edward is married and lives in a single story condominium. His wife is 71. She has high blood pressure and rheumatoid arthritis, the latter managed primarily with ibuprofen.

## Person:

**Physical:** Edward has good trunk control, demonstrated by his ability to independently weight shift and to lean forward and retrieve objects from the floor. He has a weak grasp and is able to lift light objects such as a cup of water. He has almost full extension at his elbow. Shoulder movement is limited by pain. He has difficulty with movements above 90 degrees at the shoulder. He has some sensation below the level of the lesion and indicates discomfort when sitting for a long period of time. He is able to bear minimal weight such that his wife is able to assist him with some transfers with minimal assistance from devices. Edward experiences swelling in his legs. He reports that he is tired all of the time and feels that fatigue is limiting his ability to propel his wheelchair and perform activities of daily living. His perceived level of independence in each of these areas has decreased over the past five years.

**Affective:** Edward describes himself as strong-willed. He does not like to do things or use assistive technology that makes him look more disabled. He is very persistent in getting devices and support that he requires, believing that he is the expert on his own body. He is a strong advocate for rights and support for persons with disabilities. He indicates that he is satisfied with his life.

**Cognitive:** There are no cognitive issues in this case.

## Occupation:

**Self-care:** Edward and his wife recently purchased a powered portable lift system. They also have an elevating, recliner chair. An attendant assists Edward with transfers from bed to chair in the morning and for showering. A trapeze is installed

above the bed. He uses a commode chair for toileting and showering. His wife is able to assist him with transfers from the elevating chair to his wheelchair as the chair helps him come to a standing position. He is able to eat using utensils woven through his fingers and a cup with two handles. The couple has an ice water dispenser on the refrigerator door that Edward is able to access independently. The attendant assists Edward with dressing and hygiene activities in the morning.

**Productivity:** Prior to his retirement, Edward worked as a civil servant for the government. He took early retirement at the age of 55 because he felt he was not able to meet the physical demands of the job.

**Leisure:** Edward enjoys gardening, tending both flower and vegetable gardens on slightly raised beds. A tiled path provides access to the gardens. He likes to read and watch television. He and his wife enjoy playing card with their friends.

**Transportation:** Both Edward and his wife drive. Edward uses hand controls in a full-sized van with a lift. He is not able to transfer to the driver's seat of the van, so he drives from his manual chair.

### **Environment:**

**Physical:** Edward and his wife purchased their condominium from the builder so it was built to be accessible. They have a roll-in shower and wide hallways and doorways. The living and dining rooms and kitchen are an open-concept design. The couple does not have carpeting in the home, having opted for tile floors instead. There is a level access at both the front and the back of the home as well as from the garage. Furniture was chosen so that Edward has access to it with his manual wheelchair (e.g., tables and cabinets). Tiled paths have been laid in the yard for his access.

**Social:** Edward and his wife do not have any children. They have many friends, both those who live close-by in the condominium complex and more distant in their community. They have a small dog.

**Institutional:** Edward receives funding for wheelchairs, the lift system and the van conversion. He also has funding for his personal care attendant.

**Edward's Goals:** Edward wants to continue with all of his activities, particularly his gardening, when using a power wheelchair. He is seeking a chair that will be manoeuvrable both in his home and in his yard. He also wants a chair that will be comfortable and assist with pressure relief.

### **Case Related Questions:**

1. Edward sustained his injury in the early 1960's. At that time, attitudes toward persons with disabilities, rehabilitation, and accessibility were different from those

today. What are some of the shifts in attitudes, rehabilitation treatment and philosophy and accessibility for persons with disabilities from that time until the present? Hint: See the stories of Paul and John.

2. Edward has lived with a disability for many years. At the age of 64, he is experiencing changes in his abilities that are related not only to living with a disability but also to aging. His spouse is also aging. Discuss the issues related to aging with a disability, including issues related to support from a spouse or caregiver who is also aging. Hint: The stories of John, Sandra, and Paul describe some of the issues related to aging with a SCI.
3. The move from a manual to a power wheelchair is frequently a very difficult one. Many wheelchair users see it as a sign that they are less able or losing function. Discuss the concerns that many wheelchair users have when switching from a manual to a power wheelchair. How might the rehabilitation professional assist the individual address these concerns? Hint: most of the stories in SCI PILOT talk about attitudes toward manual and power chairs. These stories are a good source of information for discussing these ideas.
4. Edward has determined that he wants a power wheelchair. What features would you recommend on a chair for him, considering his functional abilities and activities? Hint: Look at the stories of Jeannie, Paul and Mike.
5. What accessibility and activity issues might be encountered when changing from a manual to a power wheelchair? Hint: Look at the stories of Joan, Alex and Paul.

## Gina: Making Changes to Stay Productive

### Introduction:

Gina is a 38-year-old woman who sustained a C4 incomplete spinal cord injury when she was 26. At the time of her injury, she worked as an office manager. Since then, she returned to school to complete a graduate degree in journalism and now works as an editor for a small publishing company. She lives in her own home that she shares with her personal care attendant, who has her own apartment in the basement of the home.

Gina is experiencing increasing fatigue and neck pain during the day and is no longer able to work a full day at her place of employment because of these symptoms. She wants to be able to work part-time at the office, then return home for lunch, have a rest in the afternoon and then work in a home office after she has rested. Her employer is very supportive and has agreed to this arrangement. Gina has returned as an outpatient to the local rehabilitation centre to identify environmental modifications for a home office, and to investigate a new computer system.

### Person:

*Physical:* Gina has full range of motion and strength in her neck muscles. She has little motor function below the level of her lesion, although she is able to elevate her shoulders. Her vital capacity is diminished, which causes fatigue during the day, sometimes requiring her to transfer to bed for a rest, and may influence her ability to use certain computer access devices. She has had pressure ulcers in the past and continues to have pressure relief issues. If there is a possibility that a pressure ulcer might develop, Gina will remain in bed as necessary.

Currently, Gina is experiencing considerable pain in her neck and upper trapezius muscles after completing an hour or so of computer work. The pain worsens as the day progresses and has become very distracting to her. She now finds that by lunch, she is not able to concentrate well because of the pain and is also very fatigued. She has tried to schedule meetings for the morning when she feels rested and alert.

*Affective:* Gina is a very persistent and independent woman. She is well aware of her needs concerning desired tasks at home, work, and for leisure. She does not make quick decisions about purchases, but instead does her own research and talks to others before making equipment choices. She is determined to be effective and competent in her job and expects the same of others she employs.

*Cognitive:* Gina is an intelligent woman who likes the challenge of her work. She relies on memory for keeping track of important points and decisions made during meetings. She is well organized and would like to have the technical support to be able to manage her time better since the demands for productivity in her job are high.

## Occupation:

*Self-care:* Gina employs two personal care attendants who assist with her hygiene activities, prepare her meals, assist her to eat, and do light housekeeping. One attendant lives with her while the second comes in during the day to assist when she arrives home from work. This second attendant prepares her lunch, assists her to transfer into bed, and sets up any equipment or materials that Gina needs during the afternoon prior to the other attendant's return later in the afternoon. She uses a power wheelchair with power tilt and recline controlled through a switch array in her headrest.

*Occupation:* Gina works as an editor for a small publishing company. She interacts with authors throughout the writing process. Most of her work involves review and editing of manuscripts for content, style, format and grammar. She also attends meetings and communicates with clients via phone, fax, and e-mail. She is able to complete most of her work using a computer. She uses the Internet for e-mail, research and document retrieval. As well, she completes reports of her work, which include statistical summaries. Finally, she keeps a record of appointments and other business activities on the computer.

She accesses the keyboard, including mouse keys and sticky keys, with a mouthstick, finding this technique more efficient than other access methods. The keyboard rests on a book to make it easier to reach. She has a ceramic pot near the keyboard into which she drops the mouthstick so that she can retrieve it easily when she needs it. The CPU tower is placed on the table so she can turn it on and off independently, however, the on/off switch is too high for her to reach. She tried speech recognition at work, in the past, but did not find this access method useful. The background office noise affected the reliability of this method. Further, speech recognition did not afford her privacy in completing her work.

The receiver for her telephone is mounted on a gooseneck support located on her left side so that she can access it easily. She prefers this set up to a headset or a speakerphone because she can be independent with it and have privacy. She has bookstands mounted on a turntable so she can access several manuscripts at once.

*Leisure:* Gina has a passion for basketball. She attends the games of her local team as frequently as possible. She wants to experiment with photography, thinking that advances in digital cameras and computer software will enable her to engage in this activity. She likes to listen to a wide variety of music. She enjoys going out on the weekends with friends to shop and chat in cafes.

## Environment:

*Physical:* Gina lives in a large city. Her home is a bungalow with a finished basement apartment. The home was modified to be accessible to her. There are two bedrooms on the main floor, one that Gina uses for sleeping and one that she wants to convert into a home office. The home is accessed through three entrances:

one from the garage into the kitchen, one at the front of the home and one at the back onto a patio.

*Social:* Gina has a wide circle of friends from university and work. They usually go out at least once a week, attending many of the activities mentioned in the leisure section above. Her parents and most siblings live in different cities. One sister and her family live in the same city that Gina does. Gina enjoys visits from her nieces and nephews.

Gina's primary personal care attendant is a university student. The student attends classes while Gina is at work. A second attendant comes in when Gina returns home from work. There are times when Gina is at home alone when the student has engagements in the evening or goes out of town to visit family and friends.

Gina's employer is very supportive of her needs at work. She works in a building and office that are accessible. Her employer supplies most of the technology that she needs in the workplace. She supervises an assistant editor and has access to secretarial support.

*Institutional:* Gina received partial government funding for the purchase of her wheelchair. Her employer purchased the necessary computing and other office equipment that she uses at work. She is investigating whether there is funding for the computer and other devices she might need in her home office.

*Transportation:* Gina does not own a vehicle. She relies on the local accessible transit, which is reasonably reliable for travel to and from work. For other trips, she will either use the transit or accessible taxis, although she finds both services inflexible for spontaneous trips.

### **Her Goals:**

Gina wants to continue to work at her current level of productivity, respecting her increasing fatigue and pain. She wants to be as independent as possible. She accepts the need for various technologies but wants them to be discrete and as simple as possible. She wants access to work and leisure activities in her own home. Gina is seeking recommendations on computer and access devices and software that will enable her to be productive in both her work and leisure activities, and that will reduce her fatigue and pain. She also wants to be able to do some of her work from bed when she must take some time for rest.

### **Case Related Questions:**

1. When selecting and trying assistive technology, it is important to identify devices that meet the client's needs, i.e., serve the purpose the client intends, provides a reasonable level of effectiveness in the client's actual environments, and be consistent with the client's personal preferences around assistive technology use.

What are some issues or factors that influence whether the consumer will ultimately use a device?

2. Considering both work and leisure activities and interests, what are some of the tasks that Gina wants to do in her home office? Think both broadly and then specifically to computer software that might be used and how it is accessed (e.g., keystrokes, mouse). What personal skills and abilities does Gina possess for assistive technology use?
3. What recommendations would you make for a computer and access devices for Gina's use at home? Hint: look at the following stories: Joan, Eric, Michael, Ken, Steven, Luther, Kevin and Alan. Discuss the pros and cons of each option.
4. What recommendations would you make to help Gina organize her home office? Hint: look at the following cases: Joan, Jack and Eric.

# Francesca: Homeward Bound

## Introduction:

Francesca is a 27-year-old woman who was injured in a backcountry skiing accident six months ago. She sustained an incomplete C4-5 spinal cord injury. Francesca enjoyed extreme sports and participated in marathons, triathlons, and adventure racing on a regular basis. She worked on an assembly line for an auto manufacturer so that she could have sufficient free time to train for her sports activities.

Francesca was living in her own apartment at the time of the injury. Living alone is not desirable for her at the moment as she adapts to her disability. When she is discharged from rehabilitation, she will move into an apartment in her sister's home. Her sister will provide care for Francesca as needed, although both anticipate that there will be times when Francesca will be alone in the home.

Francesca's sister and her family (husband, two school-aged children, and a dog) live in a back-split home. A living area that includes a bedroom, sitting room and bathroom will be renovated for Francesca on the lower floor at the back of the home (i.e., the side of the home with a level entrance to the back yard). Francesca and her sister are consulting with the occupational therapist for recommendations on the renovations as well as electronic aids to daily living (EADLs).

## Person:

*Physical:* Francesca has full range of motion in her neck. She is able to elevate her shoulders, protract and retract her scapulae. She has weak shoulder flexion and abduction, i.e., she is able to raise her arms to shoulder level and can lift very light objects to her mouth, e.g., utensils or cell phone. She has weak elbow flexion and a very weak grip. Her grip strength is not sufficient to allow her to hold an object when she lifts it. She uses a variety of cuffs to allow her to grasp objects. She is able to flex forward minimally to assist with bringing objects to her mouth. She is able to return to an upright position from this minimally flexed position only. Francesca has minimal sensation in her upper extremities and trunk. Spasticity is present in her lower extremities. Sensation is absent in her lower extremities.

Francesca uses a power wheelchair for mobility. She controls the chair using a joystick positioned on her right side. The chair has power tilt and recline that are controlled through the joystick. She uses a foam seat cushion, rigid back and contoured headrest.

*Affective:* Francesca has very quickly learned what many of her needs are, although she has yet to experience many activities outside of the rehabilitation centre. Prior to her injury, she enjoyed the challenges of intense physical activity. She had well-established priorities and arranged her life to fit her chosen lifestyle. She wants to return to some form of physical activity, as that is what gives meaning to her life. She is confused and anxious because she doesn't know how she will be able to

resume these important activities. She also wants to be independent and does not want to feel that she is a burden to her sister.

*Cognitive:* Francesca is a good problem solver and can identify many different ways of achieving a goal. She is very organized and has good judgment. Because she worked on an assembly line, she is very familiar and comfortable with technology.

### **Environment:**

*Physical:* Francesca and her sister live in a small town located about an hour's drive from the rehabilitation centre. There are limited services available for individuals with a disability in the community.

The sister's home is a back split. None of the entrances is accessible, i.e., each has at least a single step or doorsill to navigate. Currently, a small two-piece bathroom is located on the lower level. A large family room and a combination laundry/furnace room are located on the lower level. The upper levels are accessed by a series of two short staircases (four and three steps, respectively).

The home is located on a narrow lot. There is approximately three feet on either side of the home to the property line. Currently, sliding doors are the access from the lower level to the back yard. The back yard is reasonably flat.

*Social:* Francesca's family, particularly her sister, is very supportive. Her sister works part-time as a bank teller. For the moment, she wants to continue to work part-time, although she realizes that this arrangement may not be feasible depending on Francesca's needs. Her husband is an accountant with his own business working with local clients.

Their community is small and rural. Some buildings are accessible, according to current building requirements. There is no accessible transit available, either public or taxi. The family is not aware of any contractor with experience in constructing an accessible home.

*Institutional:* Francesca has good health-care benefits from her employer, an automotive manufacturer. She had a union position in the company and is currently on long-term disability.

The government, according to their criteria, provided funding for her wheelchair. She does not know what funding is available for any electronic aids to daily living or home modifications that she will require.

### **Occupation:**

*Self-care:* Because her sister's home is not accessible, Francesca has not had any opportunity to go into the community, except on day trips. Thus, her experience with self-care and other activities outside the rehabilitation centre is very limited. At the centre, she is able to complete self-care activities such as washing her face, brushing her teeth and hair, feeding herself using a universal cuff and with set-up. Either two people or a mechanical lift are required for transfers. She is not independent in dressing, although is able to assist through raising her arms and shifting her weight in a limited range. She is establishing a bowel and bladder routine. She is transferred onto a shower chair and uses the roll-in shower for bathing.

*Productivity:* Francesca knows that she will not be able to return to the same position she had with the company and does not know what her employment options are at this time.

*Leisure:* Prior to her injury, Francesca's leisure activities were the main focus of her life. She enjoyed very active and challenging physical activity. She does not know what will fill the void left by her present inability to engage in the same types of physical activities she enjoyed prior to her injury. Until she was injured, Francesca did not know anyone with a spinal cord injury so she is not aware of the options available to her for leisure activities.

### **Goals:**

Francesca wants challenge in her life again. She wants to experience the same sense of accomplishment that she felt when she was involved in sports prior to her accident. She does not want to be a burden to her family and wants to be as independent as possible. She wants to contribute to the family. She is willing to try new things and is eager to work with her sister and the rehabilitation professionals to identify necessary technology and home modifications to facilitate her return home.

### **Case Related Questions:**

1. Assistive technology is classified in different ways. What are some of the different classifications?
2. When selecting and trying assistive technology, it is important to identify devices that meet the clients' needs, i.e., serve the purpose the client intends and provides a reasonable level of effectiveness in the relevant environment(s). What are some issues or factors that influence whether the consumer will ultimately use a device?
3. Describe the difference between barrier-free and universal designs.

4. Describe the assessment process you would use to determine Francesca's EADL and home modification needs.
5. What recommendations would you make to Francesca and her sister for EADL and home modifications? See Joan, Eric, Simon and Rodger.

Supplemental Question:

This case is an excellent opportunity to discuss leisure activities for a person with a spinal cord injury. Often, leisure is one area that is not given much attention and not considered as important as self-care or productivity. In this situation, leisure activities helped defined how the client viewed herself so they are especially important to include in the rehabilitation process. Technology affords the opportunity for individuals with spinal cord injuries to engage in a wide variety of physical activities. The following SCI PILOT stories provide good illustrations of some possible active leisure activities: Jerry, Ken, Sandra, and Dan. Ken has less physical ability than Francesca, but has identified some very innovative ways to engage in leisure activities. Dan requires less support to engage in physical activities but this story illustrates many different sports that would be available to Francesca.

# Dave: Conserving Energy for the Things that Matter

## Introduction

Dave is a 22-year-old man who was injured 21 months ago in a car accident. He sustained an incomplete C6-7 level spinal cord lesion. He was an inpatient in a spinal cord rehabilitation centre for four months and was discharged home 15 months ago. A manual wheelchair was ordered for Dave while he was an inpatient. He received the wheelchair three weeks prior to his discharge. At the time of his injury, Dave was an undergraduate student at a university at a distance from his hometown. Dave did not know whether he would be able to return to the university and resume his studies at the time the wheelchair was ordered. His therapist told him he had sufficient muscle power to propel a manual wheelchair. Some of his friends were also adamant that anyone who could physically use a manual wheelchair should use one. Dave got the impression that using a power wheelchair showed that he was lazy. As well, he thought that a manual wheelchair would make him look “less disabled” and that it would provide some exercise to build up his arm muscles as much as possible. He currently uses a lightweight, manual chair with a foam seat cushion and back.

After discharge from the rehabilitation centre, Dave did return to university and moved into an accessible unit in student residence. Dave was injured during the summer following his first year of university. He returned into the second year of a science undergraduate program, has completed one term of studies and is now mid-way through the second. The university is of moderate size. Dave’s residence is located on the perimeter of the campus. He now questions the wisdom of choosing a manual wheelchair given his lifestyle as a student. He is actively involved in all aspects of student life. He finds that he uses up a great deal of energy propelling his chair from the residence to the main campus, around the campus as well as when going out with friends. He feels that he does not have enough energy for the other activities that he wants and needs to do. He thinks that a power wheelchair would be a better choice, as it would help him conserve energy for all his activities. He has explored power options on the Internet and has spoken with some friends he made while in rehab about a power chair as an option. He has booked an appointment with the outpatient seating clinic to pursue the purchase of a power wheelchair.

## The Wheelchair Selection Process

Once Dave was able to sit up for an extended period of time, he was assessed for a wheelchair. The therapist performed a mat assessment to determine the amount of support he required in sitting, including when performing arm actions. She also assessed strength and range of motion in upper and lower extremities, and head control. Body measurements were taken to determine the correct wheelchair size. She asked Dave questions about his family home such the presence of stairs and carpets and the layout of the bathroom. She asked about the kind of car his parents drove. She did not ask about other environments in which he intended to use the wheelchair.

Based on her assessment and clinical experience, the therapist recommended a lightweight, manual wheelchair with a foam cushion and firm back. She assured Dave that he had sufficient upper extremity strength to propel a manual wheelchair. When the chair arrived, Dave received instruction on how to propel the chair in the rehabilitation centre and on the grounds outside the centre, perform various transfers, and maintain the wheelchair. He had one weekend visit to his family home, using his wheelchair, prior to his discharge. On that visit, he propelled the wheelchair inside his home but opportunities for outdoor travel were limited. Dave instructed his father on folding the chair and placing it in the trunk of their car.

**Person:**

*Physical:* Dave has good strength and full range of motion in his shoulders. His grip strength is weak so that he can manage to lift light items such as a shaver or a telephone. He has difficulty isolating finger movements so that very fine motor actions are difficult. He does have sufficient finger coordination to push buttons on a telephone keypad or use a keyboard, for example. He is able to transfer independently using a sliding board. His trunk control is fair—he cannot sit unsupported, but he is can support his weight on his hands for short periods of time (up to a minute). He is able to shift his weight independently.

Dave uses his wheelchair for the duration of the day. He rarely transfers out of his chair to another chair or bed during the day. He has not had any difficulty with pressure ulcers since his injury and monitors his skin condition diligently so that ulcers don't occur.

*Affective:* Dave is very outgoing and enjoys the company of many friends. He was very active in high school, involved in student clubs and athletics. He maintains a confident attitude toward his ability to complete school and pursue an interesting career. He is becoming surer of what he wants and needs in order to pursue his goals and has some ability to advocate for himself. He is young, so he does sometimes need some support to voice his opinions when speaking with professionals, either in the rehabilitation or educational settings.

When he was newly injured, Dave did not know what he would be able to accomplish as a person living with a spinal cord injury. He did not know anyone who used a wheelchair prior to his injury so didn't know about issues of accessibility or assistive technology. Over the course of his rehabilitation, Dave realized that he was capable of returning to university and completing his degree given certain supports, such as barrier free housing, some academic accommodations (e.g., longer time to write exams or an alternate means to do so), and appropriate assistive technology. Since it has been a relatively short time since his injury and his discharge from the rehabilitation centre, Dave is still figuring out the best ways to accomplish everyday tasks.

*Cognitive:* Dave is a successful student who performs in the middle of his class. He has strong study skills and does work hard to maintain his grades. He has always

been a person who likes to ask questions and to explore new ideas. He seeks out information from a variety of sources including other people, print materials, and the Internet. He has particular skills in mathematics, which facilitate his ability to formulate arguments and problem solve.

**Environment:**

*Physical:* Dave attends a moderate sized university. His residence is located on the perimeter of the campus. Any shortcuts from the residence to the academic buildings are along unpaved paths that are not accessible. Most of his classes are in a single building. He has a weekly seminar that is in a separate building accessed by a path down a short hill. He has a twice weekly class in another building. Student services, including food, shops, and the bookstore, are in another building again. A cafeteria is located in the building in which most of his classes are held.

The campus is intended to be accessible. All of the buildings have ramps for at least one entrance. Some of these ramps are short and steep or have sharp turns in them. All of the buildings have accessible washrooms and elevators. However, these are not always convenient to Dave's classrooms. Sidewalks are wide and curb cuts are present. However, the surfaces are not all well maintained so there are a number of cracks and holes that Dave needs to navigate. Accessibility within the classrooms varies with the age of the building. Dave is always able to enter a classroom but his choice of sitting location within the room is limited. His sightlines to the front of the classroom are not always ideal. Further, he sometimes must position himself right at the middle front of the room, which makes him feel rather obvious.

Dave's residence room is new and works well for him. He has his own bedroom and accessible bathroom and shares a common area and kitchen with three other students. In this particular unit, the kitchen has been adapted so that he can access it for simple meals. Dave doesn't enjoy cooking so he usually only has breakfast in his unit. Otherwise, he takes advantage of the university meal plan or eats out with friends.

The bathroom has a wheel-in shower, grab bars appropriately placed at the toilet and shower and a lowered sink. The pipes for the sink have been insulated to avoid injury.

*Social:* Dave's parents are very supportive. They live at a distance from both the rehabilitation centre and his university. In the early days following his injury, Dave's mother moved to the city in which the rehabilitation centre was located so she could be close to him. Although it was difficult, as Dave recovered, she returned home and allowed him more independence. His parents wanted him to transfer to the university in their hometown so he could live with them. This university did not have a strong program in Dave's academic area so he did not consider this option satisfactory. Somewhat reluctantly, his parents supported his wish to return to his

former school and friends. As they see their son gaining confidence and being successful, his parents are relaxing. They have always been supportive of his goals and his desire to return to school. However, it has been difficult for them to step back and let him make his own way. They are learning to provide support when he requests it.

Dave has lots of friends at school. He sees friends that he made while he was in his first year of university who lived in the same residence. These individuals are in different academic programs and in upper years so their paths don't cross as much as they did during first year. He gets along well with the other three young men with whom he shares the residence unit. These four and a few others from the residence frequently meet for lunch and go out in the evenings. The university sports facilities are accessible, and the group goes to games together.

*Institutional:* The university has services for students with disabilities. This service works with students to identify academic accommodations required to engage in their studies. These accommodations include longer times to complete examinations, instructional accommodations and note taking, as examples. The service interacts with the student's professors to ensure that the accommodations are made.

Dave's manual chair was funded through a government program. This program funded the majority of the cost of the chair. His father's health benefits from work covered the remainder.

### **Occupation:**

*Self-care:* A personal care attendant comes in the morning to assist Dave with dressing and hygiene activities. He is able to conduct his bladder routine independently. Although Dave can complete many self-care activities independently, they take a significant amount of time and energy, which he would rather use for school and leisure activities. His parents visit twice a month. They do his laundry and help clean his unit at that time. His roommates are helpful but Dave does not want to rely on them for assistance. He wants them as friends rather than helpers.

*Productivity:* Dave carries a full courseload of five courses, including three science courses. Because he is in a science program, each of his science courses includes a lab component. He is in class 18 hours a week. He is able to get copies of classmates' notes to assist with note taking. His computer set-up is well organized. He accesses the keyboard either directly or using a pen woven through his fingers. He has a front loading printer.

Most of Dave's courses are in the same building. He has three classes a week that are not in the science building. Dave and his friends usually meet at the student union during the day for lunch. Much of his library work is done in the medical and science library, which is close to the science building. He also conducts much of his research and library searches via the Internet on his own computer. Because travel

between buildings takes considerable time for Dave, as he propels his manual char, he must choose his courses carefully. He cannot take courses with classes that are scheduled closely in time, as he cannot always travel the distance from one class to another in the allotted time. He is concerned that this limitation may restrict his course choices in his senior years.

*Leisure:* Dave and his friends like to attend the school football and hockey games, as well as the pre- or post-game parties that often accompany these events. They like to go out to movies or to socialize in the evenings. Dave was physically active prior to his injury and is interested in getting involved in sports again. At this time, he has not explored his options in this area.

*Transportation:* The city in which the university is located does have accessible public transit. Some buses are accessible to people who use wheelchairs. However, they are not used on consistent routes in the city. The local paratransit service is over-burdened. Dave is registered with this service but does not use it frequently. He must book a trip at least one week in advance in order to secure a reservation. Two of his roommates have a car. Dave is able to transfer into the front seat of a vehicle, using a sliding board, and has instructed his roommates on how to fold the chair to place it in the trunk. Unless weather or distance permit walking to a location, Dave and his friends usually travel together in a car.

### **Goals:**

Dave wants to complete an undergraduate degree and secure a job in his area of concentration. He has always been a person who needs to work fairly hard in order to get satisfactory marks. He does not want to waste time and energy, which could be directed to school work or going out with friends, propelling a wheelchair. He wants a power chair that is manoeuvrable in all the various environments in which he engages in activities. He must be able to use the chair both indoors and outdoors. Outdoors, the chair must be dependable in different weather conditions and over various terrains.

### **Case Related Questions:**

After using a manual wheelchair and returning to school, Dave finds that it does not meet his mobility needs as it takes too much time and energy to move about the campus.

1. Look at the SCI PILOT stories about Anna, Tony, Brenda, Jerry and Jennifer. What is the experience of these individuals in acquiring adaptive devices early in rehabilitation (i.e., prior to discharge from an inpatient setting)? What advice do they have for others regarding selection of adaptive devices at this stage?
2. What are some of the personal, social (or attitudinal), environmental and systemic factors that influence the selection of adaptive equipment during rehabilitation? Focus particularly on issues that might lead someone to make an equipment decision in rehab that they later come to regret after living in the community for a

while. Look at the following stories: Joan, Jerry, Alan, Luther, Helena, James, Anna, and Jack.

3. Power wheelchairs cost considerably more than manual wheelchairs. What is the therapist's responsibility in the device selection process? i.e., what is the professional responsibility (clinical knowledge and judgment), responsibility to the client, and responsibility to the funding agencies?
4. Consider the wheelchair assessment that occurred while Dave was an inpatient. How would you augment it to determine the most appropriate wheelchair to meet future needs? What questions would you ask that would help a client identify and articulate future goals and needs? What other actions or strategies would you use to ensure that the wheelchair recommended is the most appropriate?
5. What power wheelchair would you recommend for Dave? What are the pros and cons of a manual wheelchair for Dave? What are the pros and cons of a power wheelchair? What would you say to the funding groups to justify the purchase of this new wheelchair?

An additional discussion point:

In part, this case explores the issue of learning to live with a disability. Many of the SCI PILOT stories talk about a long learning curve around the possibilities that assistive technology might offer them (e.g., Anna: The Journey of Recovery). People describe not knowing what they are capable of doing in the period immediately following their injury but gradually coming to an awareness of how they can get back to accomplishing the things that matter to them, sometimes with the help of equipment, sometimes not.

The timing of the client's learning process may not be in sync with the rehab facility's schedule. In the early stages after injury, the world appears to have changed in fundamental ways. In all of this upheaval, people are being asked to make significant equipment purchase decisions. Many decisions must be made during initial inpatient rehab, an environment that is often far removed from the community to which they will be returning. Once made, these decisions are difficult to reverse. An interesting discussion can be centred around the responsibilities of a rehabilitation professional who is helping someone make these decisions. Obviously, a client-centred approach is critical. Here a client-centred approach means actively engaging the client to understand what they want to be able to do and to help them develop the skills they need to make informed choices. It is rarely good enough to simply present the client with their options in the accessible rehab centre and ask them to choose. Even though the client may be offered choices, he or she may not have the experience needed to make an informed choice. This is especially true of wheelchairs. Has the equipment in question been trialed in the client's actual environments for a substantial period of time? Has the client had enough experience to be able to assess the impact of the equipment on activities that matter to him or her? The client is the expert in identifying his or her own goals, but the therapist brings professional expertise to help the client make the most informed decisions possible. (See *Enabling Occupation* listed with the references below for a fuller discussion of the concepts of client-centred practice.) The

individual often relies on professionals at this stage to provide considerable input into decisions that will affect their lives on discharge. The discussion can also include ways in which rehabilitation professionals can help or hinder a client.

The following books provide additional insight into understanding how individuals learn to live with a disability:

1. Gwyneth Ferguson Matthews, *Voices from the Shadows*
2. Kenny Fries, *Staring Back: The Disability Experience from the Inside Out*
3. John Hockenberry, *Moving Violations*
4. Robert Murphy, *The Body Silent* (Robert Murphy was an anthropologist who developed a spinal cord tumour. Although he did not sustain a traumatic spinal cord injury but experienced a progressive disease, his book effectively describes the process of learning to live with a disability. His book discusses many of the attitudinal and systemic factors that hinder a person with a disability.)
5. Andrew Potok, *A Matter of Dignity: Changing the World of the Disabled*
6. Christopher Reeve, *Still Me*
7. Ed Smith, *From the Ashes of My Dreams* (<http://edsmith.net>)
8. Barbara Turnbull, *Looking in the Mirror*