

CLINICAL NOTES

I N N O V A T I V E H E A L T H C A R E S O L U T I O N S

The sliding client: Solutions to a common concern

By Linda Norton, OT Reg (Ont).

Sliding is a common problem for clients who use wheelchairs and is a concern as it may cause skin breakdown and cause a client to be at risk for falls and other injuries. Preventing this phenomenon will reduce the incidence of these secondary complications. Clinicians can use a number of strategies to reduce sliding; however, each clinician must first determine its cause before he or she can identify the most effective solution.

Observation is the single most valuable tool available to the clinician.

down the ramp to the garden) where the sliding is most problematic.

Observation is the single most valuable tool available to the clinician. Although assessment time may be limited, it is important to observe the client as she sits waiting, talking, and engaging in other activities. During this observation, the clinician can ask the following questions:

■ **When does the sliding seem**

to occur? Is it after a certain length of time in the chair, at a certain time of the day, or during or after a certain activity?

■ **Where does the sliding initiate?** Does the client seem to flex his knees which results in sliding? Does he pull himself forward in the chair as he is foot propelling? Does he appear to just “scoot” his bottom forward?

■ **Does tone/spasticity appear to be an issue?** Clients with lower extremity flexor tone or hip extension tone are more likely to slide.

■ **What clothes does the client choose to wear?** Some clients prefer to wear pants made of nylon, which can greatly increase sliding.

■ **Does the client recognize that he is sliding?** Is he able to reposition himself? Some clients may recognize that they are sliding, but their attempts at repositioning only cause increased sliding.

■ **Does the sliding appear to be a choice?** For example, does the client slide to change his posture because of discomfort? Is he sliding to gain the caregiver’s attention? Is he sliding because of the biomechanical forces exerted on and in his body, over which he has little control?

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Clues to the cause

Simply asking a client why she thinks she is sliding may provide some initial insight. The client will often have an opinion that opens up other areas for the clinician to investigate. For example, the client may be able to identify a specific activity or place (for example, going

Helping relationships: Understanding older mother– adult daughter dynamics

By Tanya Martini, PhD, Joan E. Grusec, PhD, and Silvia Bernardini, PhD.

Similar to more intensive informal caregiving, supportive helping relationships may prove stressful for adult children. However, helping relationships can potentially be difficult for the older parent as well. One possible cause of problems is that help from others may be viewed with ambivalence: although assistance is seen to demonstrate the donor’s care and concern, it also

threatens the recipient’s feelings of independence and causes concern about the potential negative evaluations of others.

Examining supportive helping relationships is worthwhile because their study might shed light on more intensive helping relationships. In our particular project, we examined the help that

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Canes, crutches and home care: The interplay of human and technological assistance

By Susan M. Allen, PhD, Andrew Foster, PhD, and Katherine Berg, PhD.

Research has shown that family is the mainstay of people who require supportive assistance to remain at home. Formal home care services are called on in the absence of family or as a supplement to family care when needs exceed the helping capacity of the informal system. However, we are only beginning to examine how assistive technology may modify the role of formal and informal care systems.

Our research, discussed as follows, investigates the use of mobility equipment as a third helping resource to adults with chronic mobility and personal care impairment. Specifically, we examine whether use of mobility equipment can reduce the amount of human assistance received in the performance of daily activities, and whether use results in cost savings associated with use of formal home care services.

Since mobility equipment is generally an infrequent expense, substituting such aids for home care services may substantially increase the efficiency of home care delivery. Furthermore, dependence on assistive technology may be viewed as a lesser form of “dependence” than dependence on human assistance, in that the former increases the autonomy of adults with disabilities and facilitates chronic condition self-management.

Equipment substitutability

To explore the substitutability of mobility equipment for human help, we collected data from Phase II of the Disability Supplement to

the 1994 and 1995 National Health Interview Survey (NHIS), an ongoing survey of the non-institutionalized population. As selection into the survey was based on a wide variety of disability indicators, we thought it best to work with a relatively homogenous sample, preferably one in which use of technological equipment is fairly well understood. We therefore selected our sample on the basis of mobility limitations. Specifically, three indicators of mobility limitations were used as eligibility criteria for sample selection: difficulty walking a quarter mile, difficulty walking up 10 steps, and difficulty standing for two hours.

A total of 12,814 respondents met at least one of these criteria, and nearly half of those eligible (47 per cent) met all three. The analytic sample was further limited to respondents who reported difficulty with at least one activity of daily living (ADL) or one instrumental activity of daily living (IADL). Application of these additional criteria resulted in a final analytic sample of 9,230 respondents.

Insightful findings

The average age of sample members is 62 years old. The sample is predominantly female (63.7 per cent) and white (74.2 per cent). Nearly half the sample reports less than a high school education (43.4 per cent), while 24 per cent report education beyond high school.

Regarding access to human help, approximately one quarter (27.2 per cent) of sample

members live alone, half (51.5 per cent) are married, and a small minority (4.8 per cent) live in housing for the elderly. Measures of illness severity indicate that sample members have substantial health problems, with more than half (54.3 per cent) reporting three or more medical conditions, and approximately one quarter (25.2 per cent) report being hospitalized in the past year. Average levels of impairment severity reported by sample members are more than two mobility impairments, two ADL limitations, and two IADL limitations.

Two-thirds of the sample report receiving human help in the two weeks preceding the survey. More than half the sample receives informal help only, while relatively few sample members receive paid help only or paid help in conjunction with informal help. The majority of respondents who receive help have one helper.

Table 1 presents findings on current use of mobility equipment (i.e., use in the two weeks preceding the survey). Only slightly more than one-third of the sample report using mobility equipment. Not surprisingly, sample members who do not use such equipment appear to be the least limited in daily living activities. Canes are the most prevalent type of equipment in use, and crutches the least. Nearly equivalent proportions of the sample (approximately 10 per cent) report using wheelchairs and walkers, and users of these equipment types report the most severe level of activities limitations in the sample.

Substitution is possible

Our research results are encouraging and support previous research on the more general area of “special equipment” in ADL performance. Results suggest that “complete” substitution of mobility equipment for human help is unlikely overall, although it is possible that there may still be unobserved severity masking such an effect. However, study findings indicate that substitution is quite possible at the level of individual ADL tasks through use of canes or crutches. Similarly, use of canes and crutches is associated with overall reduced levels (hours) of both formal and informal care.

Table 1

Mobility equipment use in past two weeks (n=9,230)

Percentage who used mobility equipment in past two weeks

| | |
|------------------------|------|
| Any mobility equipment | 35.0 |
| Wheelchair | 9.4 |
| Walker | 10.8 |
| Crutches | 2.9 |
| Cane | 24.4 |

Percentage who used the number indicated of types of mobility equipment

| | |
|-------|------|
| None | 65.0 |
| One | 24.6 |
| Two | 8.5 |
| Three | 1.8 |
| Four | 0.2 |

In contrast, there is no evidence of a substitution effect involving use of walkers and wheelchairs. Use of these types of equipment appears to be indicative of a level of need for human assistance (impairment severity) that is unlikely to be offset by mobility equipment alone. Thus, walkers, and particularly wheelchairs, may be necessary but not sufficient interventions to enable mobility and task performance without human assistance.

In any case, canes and crutches are clearly more “optional” resources in that it is relatively common for people to choose to do without them until absolutely necessary, for reasons of stigma, access, or other factors. Such people are likely to depend on friends and relatives instead, or formal helpers in the absence of informal support, and may not realize the unnecessary loss of autonomy associated with this “choice.” Nor, judging from past research, may they realize the greater effectiveness of equipment over

human help as an intervention to close the gap between capability and environmental demand.

Our findings support other research indicating that equipment use is most effective in assisting with ADLs than with IADLs. This is intuitive, since canes and crutches may be all that are needed to achieve the balance necessary to perform simple daily living tasks. On the other hand, it is hard to imagine how a cane or crutch could be a sufficient intervention to reduce environmental demand to the point that performance of more complex activities, such as housework or cooking, could be accomplished without human help or substantial modification to the home environment.

Lower costs of care

Illness or disability severity, social support availability, and mobility aids are not the only factors affecting receipt of human assistance. Older age consistently predicts both having

any care as well as the amount of care received. This finding may reflect greater frailty among older people with disability as well as greater availability of helping resources. However, it may also reflect the desire for greater autonomy among younger people and perceptions by family members and people with disability that dependency is appropriate for older people but not younger people.

Interventions to destigmatize assistive technology use may promote greater autonomy and quality of life for people with disability while reducing costs of care.

Adapted with permission from “Receiving help at home: The interplay of human and technological assistance.” Journal of Gerontology: Social Sciences. 56B(6):S374-S382.

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Linda’s corner

Linda Norton, Rehabilitation Education Co-ordinator at Shoppers Home Health Care, answers your seating and mobility-related questions.

Q My client has diabetic neuropathy and has blurry vision, which is expected to deteriorate, and arthritis in her hands, which makes pushing a manual wheelchair difficult. I’m concerned about her trying power mobility. Any thoughts?

A I have had clients with very poor vision (including some who were legally blind) successfully drive power mobility devices. Some clients are able to use environmental contrasts (light and shadow) to avoid obstacles. Others engage in self-limiting behaviours (for example, avoiding crowds, staying in familiar environments, etc.) to maintain their safety.

My approach for similar clients to yours is to try the power chair with appropriate training and supervision, and then determine their capability from there. Often, these clients, with practise, can develop strategies to become safe power mobility users, even as their vision deteriorates.

If your client is unsafe with power mobility, manual wheelchair set-up becomes critical. For example, the chair’s centre of gravity and wheel placement should be optimized to facilitate propulsion. Other options to consider may be a plastic-coated hand rim or power-assist wheels.

Q I have a number of clients who tend to slide in their wheelchairs, even though they are not foot propellers. What do you suggest?

A Several factors impact sliding in a wheelchair, any number of which may be issues for your clients. Identifying and addressing the underlying cause may help to reduce the sliding. Issues may include

Hip range: If the seat to back angle is more acute than what the client will tolerate, or more acute than the hip angle, the client will tend to slide to get some relief. Try increasing the seat to back angle of the chair.

Hamstring range: If a client has decreased knee range of motion, his or her feet may need to be tucked in closer to the front of the chair, decreasing the seat to footrest angle. If your goal is to “stretch” the client’s knees, consider using a splint, as using the wheelchair to stretch the hamstrings will result in sliding.

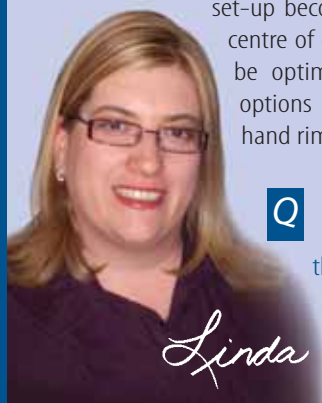
Seat depth: Seats that are too long will encourage sliding to decrease pressure at the back of the knee. Consider shortening the seat depth.

Preferred posture: Clients who prefer a posterior pelvic tilt when sitting will slide into this posture.

Stability: Sliding forward to create a posterior pelvic tilt may increase trunk stability, resulting in increased upper extremity function.

Comfort: A client may slide forward to relieve pressure. Consider using a different cushion or using tilt.

Tone/spasticity: Check the knee range of motion (see “Hamstring range” above). Consider the use of a four-point padded belt.



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Understanding insomnia: A complex yet treatable condition

By Joseph Barbera, MD, FRCP(C), DABSM.

Insomnia is a common and debilitating complaint that is associated with a number of medical and psychiatric disorders but that sometimes takes the form of a disorder in its own right. The costs of insomnia to both individuals and society can be enormous. Fortunately, effective treatments do exist for this complex condition, allowing for health care providers to significantly improve the quality of life and overall health of patients who live with this condition.

Scope of the problem

Approximately 30 per cent of the general population experience sleep deprivation at any one

time, while 10 per cent have associated daytime symptoms and impairment consistent with a diagnosis of insomnia. Insomnia is more common in women (particularly those who are menopausal), the elderly, and in patients with medical or psychiatric disorders.

In keeping with its daytime sequelae, insomnia has been associated with increased psychological stress, decreased ability to cope with stress, higher rates of work absenteeism, decreased productivity, higher rates of accidents, increased general medical services utilization, and decreased overall quality of life. Insomnia has been shown to be a risk factor for a number of psychiatric conditions, including depression, anxiety and substance use disorders, and can exacerbate concurrent medical conditions.

Diagnostic issues

Insomnia is defined as a persistent sleep disruption, despite adequate opportunity and circumstances for sleep. This sleep disruption can take the form of difficulties initiating sleep, difficulties maintaining sleep, or early morning awakenings. A subset of patients may also be capable of obtaining adequate sleep duration but experience such sleep as non-restorative or poor quality. Critical to the definition of insomnia is that such disruption in sleep results in significant residual daytime symptoms. Such symptoms include fatigue, decreased energy, poor concentration, memory impairment, reduced efficiency in performing complex tasks, and mood disturbance such as irritability and depression. As alluded to above, such symptoms can lead to significant psychosocial, occupational, health and economic morbidity.

On the one hand, insomnia can be considered a symptom produced by a number of underlying conditions including medical and psychiatric illnesses, medication and substance use, and other sleep disorders (see Table 1). In some cases, however, no such underlying cause is present, and the insomnia can be considered as a disorder in its own right: a “primary” or “intrinsic” insomnia. Idiopathic insomnia applies to patients with persistent, life-long insomnia that begins in childhood without any obvious cause. It is pre-

sumed to be secondary to dysfunction neurobiological mechanisms that lead to a persistent state of hyperarousal. More commonly cognitive, behavioural and mood disturbances predominate, encompassed in the diagnosis of psychophysiological insomnia.

Pathophysiology

An examination of the mechanisms underlying psychophysiological insomnia provide the means of understanding not only this common disorder but also the complexity of factors underlying all insomnias. The development and course of psychophysiological insomnia can be characterized by the presence of predisposing, precipitating and perpetuating factors.

Predisposing factors for developing significant insomnia may take the form of the same neurobiological mechanisms underlying idiopathic insomnia as well as personality factors such as a tendency to be “worrisome,” anxiety prone or otherwise respond poorly to stress. Patients describe having never been good sleepers but for the most part being able to manage.

Precipitating factors exacerbate this baseline level of disturbed sleep into a full blown insomnia. These can include an acute psychosocial stress (job loss, loss of a loved one), onset of a depressive or medical illness, the initiation of a new medication, or something as simple as a shift change or other unwarranted disruption in one’s usual sleep routine.

Precipitating factors that can be cognitive, affective or behavioural in nature. Patients can find themselves focusing excessively on their daytime worries (“I can’t shut my brain off”). In addition, they will focus unduly on their inability to sleep (looking at the clock, thinking about the impact of their sleepless night on their ability to function the next day, etc.). They become anxious and frustrated at their inability to sleep. Since sleep is a passive phenomenon and cannot be forced or willed, such undue focusing on sleep only leads to further sleep disruption. This leads to further frustrated attempts to sleep the next night, and soon a vicious cycle is entered into.

Table 1

Common causes of insomnia

Medical

- Respiratory disorders
- Cardiac disorders
- Rheumatologic disorders
- Parkinson’s disease
- Head injury
- Dementia
- Virtually any condition affecting the central nervous system or causing pain or discomfort

Psychiatric

- Depression
- Anxiety disorders
- Substance abuse/Dependence

Medication/Substance induced

- Antidepressants
- Antihypertensives
- Bronchodilators
- Corticosteroids
- Caffeine
- Alcohol
- Nicotine

Other sleep disorders

- Sleep apnea
- Restless leg syndrome
- Periodic limb movement disorder
- Circadian rhythm disorders

Primary insomnias

- Idiopathic insomnia
- Psychophysiological insomnia

Sleep itself, or rather a lack of it, has now become a major stressor in the patient's life. Some try to compensate by going to bed earlier, sleeping in, or napping; all are useful short-term strategies for dealing with the effects of sleep deprivation, but in the long term, these strategies only make things worse. As the individual spends more and more time in bed, he or she loses the normal conditioned associations one has between the bedroom and sleep. The bedroom no longer becomes a cue or signal to the person to sleep but a source of frustration, anxiety and dread. Such perpetuating factors can extend the life of insomnia to months or even years.

Assessment

The mainstay of assessing insomnia is a good clinical history. This begins with a medical, psychiatric, medication and substance use history (including caffeine and alcohol). A sleep history also focuses on an assessment of the patient's sleep-wake pattern and the identification of the predisposing, precipitating and perpetuating factors cited above. Sleep diaries, completed over a period of several weeks, may also help elucidate sleeping patterns. In some cases, an overnight sleep study, carried out in a specialized sleep disorder centre, may be helpful if sleep apnea or periodic limb movement disorder is suspected.

Treatment

Non-pharmacologic interventions: Non-pharmacologic techniques for dealing with insomnia fall under the category of "cognitive behavioural therapy." First and foremost is attendance to the principles of good "sleep hygiene" (see Table 2). Such principles amount to getting into a regular routine, maximizing one's chance of falling asleep and avoiding spending prolonged periods of time awake in bed. Sleep hygiene is sometimes called "stimulus control" as it works to retrain oneself to once again associate the bedroom with sleep.

For some, sleep hygiene is not enough. "Bed restriction" is a powerful technique for breaking the vicious cycle that characterizes psychophysiological insomnia. This technique amounts to spending less time in bed by setting the maximum time in bed from four to six hours, depending on the degree of insomnia. Dealing with a lack of sleep by spending less time in bed may seem paradoxical. In fact, the patient should expect to feel worse at first, as he or she does indeed get less sleep. Eventually, however, the accumulating

sleep deprivation works in the patient's favour as it allows the patient to eventually fall asleep quicker and for longer periods of time. Once reasonably efficient sleep has been achieved, the patient can gradually expand the amount of time in bed.

Cognitive therapy involves identifying and challenging dysfunctional beliefs that lead to insomnia (for example, one will be completely impaired without a good night's sleep when the reality is that such impairment is usually manageable). Relaxation techniques may also be helpful in dealing with nighttime anxiety.

Cognitive behavioural techniques require a great deal of effort on the part of both patients and treatment providers. Studies, however, have shown that such techniques are as effective as medications in treating insomnia and may have longer lasting effects.

Pharmacologic interventions: Medications are often helpful in treating both short-term and chronic insomnia and for some patients are a necessity. Herbal medications for sleep such as Valerian or 5-HTP are available but studies are lacking as to both their efficacy and safety. Most over-the-counter sleep aids contain an antihistamine as their active ingredient and similarly have not been proven to be any more effective or even safer than prescribed medications (the elderly in particular may be susceptible to the side effects of such products). Unfortunately, one of the most common forms of self-medication employed by patients is alcohol, which does help with sleep initiation but at the cost of more disrupted sleep later in the night.

The mainstay of pharmacologic treatment for insomnia over the last 30 years has been the benzodiazepines (those medications ending in "pam": lorazepam, temazepam,

oxazepam). These medications were a significant advance over the hypnotics that preceded them, specifically the barbiturates and chloral hydrate. While effective in treating sleep disorders, the benzodiazepines have been associated with a number of adverse effects, including tolerance, abuse and dependence, withdrawal, daytime sedation, cognitive/psychomotor impairment, and an increased risk of falls in the elderly.

In the last decade, the treatment of insomnia has been advanced by the development of the "non-benzodiazepine" hypnotics, specifically zolpidem, zaleplon, zopiclone and eszopiclone. These medications generally possess similar side-effect profiles to the benzodiazepines but to a significantly less degree.

While it is often stated that hypnotics should be given only for a short period of time (less than two weeks), the reality is that some patients do require their use on a sustained basis and are able to do so safely with minimal risk of abuse (in particular, the non-benzodiazepine hypnotics). In patients with chronic insomnia, the most effective strategy is often a combination of medication and cognitive behavioural techniques.

In summary, insomnia is a prevalent, heterogeneous condition with marked impact on daily functioning and overall health. Effective treatments do exist for insomnia, making its identification, assessment and management an imperative to health care providers.

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Table 2

Rules of good sleep hygiene

1. Set an appropriate bedtime. Do not go to bed before this time or until you are sleepy.
2. If you are unable to fall asleep within 10 to 20 minutes, leave the bedroom and return only when you are sleepy. This also applies to awakenings in the middle of the night.
3. Maintain a regular rising time.
4. Use the bedroom only for sleep and sex.
5. Keep the bedroom quiet, dark, and at a comfortable temperature.
6. Turn the alarm clock around.
7. Do not nap during the day.
8. Do not drink caffeinated beverages after mid-afternoon.

Walking after brain injury: Assessing children's early recovery

By Stephen M. Haley, PhD, PT; Helene M. Dumas, MS, PT, PCS; Jeffrey P. Rabin, DO; and Pengsheng Ni, MD, MPH.

Recovery of pre-injury walking is a primary goal for children with traumatic brain injury admitted to an inpatient rehabilitation program. Given the importance of ambulation as a critical outcome for community functioning at the point of hospital discharge and return to the community, surprisingly limited data are available for children after traumatic brain injury. For example, Emanuelson et al. (1996), in a series of 25 patients, found that about 64 per cent of children and adolescents with traumatic brain injury achieved a safe level of community ambulation after an inpatient rehabilitation program. Longer-term follow-up studies suggest that independent ambulation outcome in children with severe brain injuries ranges from 25 to 75 per cent, depending on injury severity, age, and time since injury.

Although children might be “independent” of assistance from another person, walking status in children after traumatic brain injury might be associated with the presence of significant gait deviations or limited weight-bearing due to lower-extremity injuries, often requiring the use of ambulatory devices. Several studies have examined the characteristics of children with cerebral palsy and myelodysplasia who attain independent and device-assisted ambulation. We are unaware of any reports that have examined the associated characteristics of children with traumatic brain injury who achieve independent and device-assisted ambulation at an early recovery stage, such as at inpatient rehabilitation discharge.

The aim of our research was to determine the percentages of children with traumatic brain injury who attained independent walking and device-assisted walking at hospital discharge and to identify characteristics that distinguished independent walkers from non-walkers and device-assisted walkers.

Measuring brain injury effects

Participants: The study included children and adolescents with neurological and motor sequelae resulting from traumatic brain injury, admitted to Franciscan Children's Hospital Inpatient Physical Rehabilitation Program in Boston, Massachusetts, between 1994 and 2001.

Children were excluded if they were not independent walkers before the recent injury (owing to age or previous injury) or if current extracranial injury (e.g., spinal cord injury, lower-extremity fracture with full non-weight-bearing status) limited the expectation of achieving ambulation during inpatient rehabilitation. One child was excluded because of missing data. The resulting 106 children and adolescents were included in the final analyses (96 per cent of all eligible discharges).

The age range of the sample at discharge was 2.1 to 18.9 years. About two-thirds (68 per cent) were male. The etiology of traumatic brain injury was as follows: motor-vehicle accident—pedestrian/bicycle, 49 per cent; motor-vehicle accident—passenger, 36 per cent; and falls or other head trauma, 15 per cent.

Clinical variables: Clinical data were extracted from medical record reviews by an author (HMD) and a research assistant. Eleven of the medical records (about 10 per cent) were identified for reliability checks. Medical records were stratified into groups of 10, and one chart was randomly selected from each group for review by a second rater. Coding of the clinical variables between two raters was more than 95 per cent accurate. Clinical variables were selected on the basis of availability in the medical records, clinical experience, and previous research examining factors in reported outcomes for children and adolescents after traumatic brain injury. Injury severity

(severe/not severe), responsiveness (alert/unresponsive), spasticity (present/absent), and lower-extremity injury (present/absent) were converted to dichotomous variables. A severe injury was defined as the loss of consciousness for more than 24 hours immediately after the injury. Children were classified as alert if they could respond to verbal or physical commands of the clinician at the time of admission to the inpatient rehabilitation program. The presence of spasticity was noted if the physical therapist's notes identified any level of increased muscle tone (hypertonicity). The presence of unilateral or bilateral fractures or dislocations of the lower extremities and/or pelvis at the time of injury was considered as evidence of the presence of a lower-extremity injury. We also included sex and discharge status (pre-injury home/other discharge location) as two additional variables of interest for across-group comparisons.

Standardized functional assessment scores:

The Pediatric Evaluation Disability Inventory (PEDI) is routinely administered during each child's physical therapy admission and discharge examinations. The Functional Skills Mobility Scale has 59 items and is used to measure a child's capability with basic functional mobility skills (such as transfers, bed/mobility, locomotion, and use of stairs). To provide an estimate of applied cognitive and social functioning, the speech-language pathologists routinely administer the Social Function Skills Scale, which consists of 65 dichotomous items with content covering word and sentence comprehension, expressive communication, problem resolution, social and object play, self-knowledge, and safety.

Walking outcomes: Walking status at discharge was extracted from each child's medical record. For our research, “independent walking” was defined as walking (with or without deviations in gait pattern) without assistance (caregiver, device, or surroundings), close guarding, or supervision for balance on level surfaces indoors for at least 15 metres. Supervision for behavioural considerations or other potential medical conditions was not



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considered as assistance by a person to ambulate. Orthotics could be used. The ability to ascend or descend stairs was not considered.

Device-assisted walking was defined as the ability to ambulate without a caregiver's help on level surfaces indoors for at least 15m, but typically using an assistive device (such as cane, crutches, or walker). Children classified as non-walkers were unable to ambulate for 15m without an assistive device or help from a caregiver. The 15m distance was marked off in the physical therapy gym and hallway and was a common distance that was used to assess walking ability before discharge.

Assessing return to function

Of the 106 children and adolescents in this study, 64 (60.4 per cent) walked independently, 13 (12.3 per cent) required a device, and 29 (27.3 per cent) were non-walkers at discharge.

Independent walkers versus non-walkers:

PEDI mobility (mean difference 51.9) and social function (mean difference 23.6) scores were significantly higher in independent walkers than in non-walkers. Children and adolescents who were discharged as non-walkers stayed for an average of 83 days longer than children who returned home as independent walkers.

Injury severity, responsiveness, and presence of lower-extremity injury and spasticity were significantly related to ambulatory discharge status. More than 85 per cent of children who were non-walkers (compared with 19 per cent who were walkers) had lower-extremity spasticity. About half of the children who were non-walkers were unresponsive at admission to inpatient rehabilitation (55 per cent), had a severe injury (55 per cent), and had a lower-extremity injury (48 per cent), whereas children who were independent walkers at discharge had much lower percentages of these clinical characteristics.

Independent walkers versus device-assisted walkers:

Children and adolescents who walked with devices were almost four years older on average than children who were independent walkers. Those who used a walking device at discharge had a much higher percentage of lower-extremity injury (77 per cent) than independent walkers (27 per cent). PEDI mobility or social function scores at discharge were not significantly greater for independent walkers than for device-assisted walkers, nor were injury severity or responsiveness variables related to use of a device.

Evaluating walking recovery

We believe there is value in describing walking outcomes when children are returning to their home and community environment from inpatient rehabilitation programs, because mobility is an important element in a safe transition home. However, we recognize that situations beyond medical or clinical needs (funding, home support, or other factors) can alter the length of stay or amount of care provided, resulting in not every child achieving full potential at hospital discharge. Nevertheless, safe ambulation was an explicit goal of this inpatient rehabilitation program, and every effort was made to discharge children at a minimal level of safe ambulation.

In this sample, all children were unable to walk independently on admission to the hospital owing to the recent traumatic brain injury and had severe enough injuries to need additional hospital-level care after an episode of acute care in hospital. The rate of walking recovery (70 per cent) in this sample is on the high end of the reported range of ambulation recovery; however, our definition of walking recovery is at a basic level. We do not know whether additional children in this cohort achieved walking ability once they returned home or whether some of the children continued to gain ambulation ability for outdoor or community needs.

Independent walkers versus non-walkers:

Four admission variables (injury severity, responsiveness, presence of lower-extremity spasticity, and presence of lower-extremity injury) might help to form the basis of more informed prognosis for walking recovery at discharge.

We note that the presence of lower-extremity spasticity is particularly high (86 per cent) in non-walkers and spasticity seems to be an important single marker for non-ambulation discharge. As expected, the mobility scores on the PEDI differ substantially between independent walkers and non-walkers at discharge. We also found a difference in social function scores at discharge between the groups: the walkers had over a 20-point advantage (on a 100-point scale) over non-walkers in PEDI social function scores.

Non-walkers have a much longer average length of stay (over 80 days) than walkers. This might suggest that once children are able to walk safely indoors, discharge to the community is initiated. However, because of the increased level of overall injury severity in those who do not walk at discharge, many other medical and rehabilitation factors are also likely to be responsible for the added resource needs and

length of hospital stay for non-walkers.

Independent walkers versus device-assisted walkers:

Associated lower-extremity injury was present in over 75 per cent of children who used devices, which might be a major determinant of device use at discharge. We excluded any child in this series who was expected to be discharged as full non-weight-bearing on both lower extremities because independent ambulation at discharge was not an achievable goal. However, partial weight-bearing and limited strength after lower-extremity fractures were associated with most of the cases in which a device was used. Almost all (92 per cent) of the device users were male and tended to be older than the average patients in this study. This might indicate that older males with sufficient upper-extremity strength are the most likely candidates for device use in indoor walking. However, as part of our data collection procedures, we did not have a separate test for upper-extremity strength, control, or associated upper-extremity injury.

Achieving ambulation

More than 70 per cent of the children and adolescents who were admitted to an acute rehabilitation hospital with traumatic brain injury achieved basic indoor ambulation with or without a walking device at discharge. Non-walkers differed from independent walkers in greater severity of injury, less admission responsiveness, and greater presence of lower-extremity spasticity. At discharge, non-walkers had poorer overall mobility and social function test scores, had longer hospital stays, and were more likely not to return home than independent walkers. Device-assisted walkers were most likely to be older, to be male, and to have an associated lower-extremity injury. An increasing number of risk variables at admission was related to a small probability of independent walking.

Continued investigation is warranted to identify clusters of clinical and demographic variables associated with recovery of ambulation to improve prognosis and resource planning for children and adolescents with traumatic brain injury during inpatient rehabilitation care.

References are available upon request. E-mail smhaley@bu.edu.

Adapted with permission from "Early recovery of walking in children with traumatic brain injury." Developmental Medicine and Child Neurology. 2003;45:671-675. Cambridge University Press.

Creative rehabilitation: Art therapy for the elderly

By Audrey R. Miller, MSW, RSW, CCRC

When visiting clients in the community, I am always pleased to see beautiful art, created by my clients, hanging on their walls. There is often a story behind the work; sometimes, the person can verbalize this story, while other times, the work itself is the story. These “stories” are being shared in many homes and long-term-care facilities thanks to art therapy.

Healing and life-enhancing

Art therapy is based on the belief that creating art is healing and life-enhancing. The therapy, which began as treatment for severely emotionally disturbed children and adults, provides a safe and structured setting to help participants express their thoughts or feelings in a verbal or non-verbal way. Drawing, painting, or discussing art are a few examples of the therapeutic interventions. And the individual is free to choose from a variety of media to express repressed thoughts and feelings related to conflicts, traumatic experiences, fantasies, dreams, self-image, and patterns of relationships with others.

Creating and accomplishing

In a long-term-care setting, an art therapy program strives to improve the quality of life

for residents by

- promoting individuality and a sense of being valued as a person
- building self-esteem through the accomplishment of doing and achieving
- elevating mood through the stimulation of creating
- promoting active involvement in programs
- decreasing agitation through the enjoyment of creating
- rehabilitating physical upper-body weakness by manipulating art media
- stimulating cognition and memory by incorporating visual, tactile and olfactory cues
- enhancing communication by allowing for verbal and non-verbal expression
- reducing restlessness through the captivating nature of creativity

Art therapy is often used to treat people with dementia, a growing population that needs on-going, creative programming to address their changing needs. The primary focus behind creative therapy programs for this population is to reduce anxiety and increase attention. Oftentimes, persons with

dementia will begin to feel isolated because of their condition. This experience can cause a great deal of anxiety and often leads to

depression, particularly in the early stages of the disease when a person recognizes her or his own confusion. Communication can also be difficult for someone with dementia, adding to their feeling of isolation. Art therapy can encourage communication as well as socialization and

expression, particularly for those clients in the later stages of dementia.

Experts in creativity

This unique therapy is delivered by art therapists, professionals who usually hold a master's degree in art therapy or a related field. They work with children, adolescents and adults and provide services to individuals, couples, families or groups. Therapists often work as part of clinical teams in settings that include rehabilitation facilities, community outreach programs, wellness centres, schools, nursing homes, art studios, and independent practices. They are skilled in the application of a variety of art modalities (ink, paint, clay, and other mediums) for treatment and assessment.

A source of stimulation

For many clients, art therapy provides an important source of stimulation to promote activity and encourage self-expression. Through creating and talking about art, a person can increase self-awareness, manage symptoms of a condition, alleviate stress, enhance cognitive abilities, and enjoy the life-affirming pleasures of creativity. Thoughts, feelings and experiences can be expressed through visual expression and through the therapeutic relationship of art and therapy.

References are available from the author upon request.
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A visual key

By Esther Zeller, BA, DTATI, TWS

Art therapy finds a visual key to unlock each person's door. The art therapist becomes a guide and creates a nurturing, non-judgemental and safe environment where both therapist and client can navigate a unique and personal journey together. In this environment, every contribution, whether visual or verbal is positive, has meaning and is important.

Unlike studio art, where technique and the end product is the focus, art therapy focuses on the relationship that is established between the therapist and the client that makes the process of creating more important than the end result.

The meaning and interpretation of a client's art belongs to the client. The images that are created may not always be pretty pictures; often, they are simple or even childlike, but that doesn't mean the artists are childish. The elderly should always be treated as adults, not as children.

The images created in art therapy may be used to encourage and share experiences and discussions with others, including groups, care providers, and family members.

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is given and received in older mother–adult daughter relationships. We interviewed 43 mothers (aged 60 to 89 years) and their adult daughters (aged 29 to 67 years) about two aspects of supportive help: the way that help is initiated and the type of help given.

Levels of comfort

Our results indicated that daughters felt their mothers would be more comfortable with offered than requested help, and more comfortable with requested than imposed help. Mothers indicated they would be more comfortable with offered help than either requested or imposed help (with which they said they would be equally comfortable). Mothers also indicated that they were more comfortable with their daughters offering and imposing help than the daughters felt their mothers would be.

Both groups also offered their thoughts about why mothers might feel as they did. Three main reasons were offered to explain mothers' discomfort: concerns about burdening the daughter, feeling that help eroded the mother's independence, and concerns that the daughter had different standards when completing the job. Prominent reasons given to explain mothers' feelings of comfort with the ways of initiating help included feeling that helping was the daughters' responsibility, feeling that help indicated the daughters' care and concern, mothers' beliefs that the help would be given sensitively, and the idea that it was difficult for the mother to do the task on her own.

We observed that daughters appeared to have a good understanding of their mothers' reasons for feeling comfortable or uncomfortable with the ways of initiating help. As to why mothers would feel comfortable, mothers and daughters' most commonly offered reasons were similar: for offered and requested help, both groups of women most often indicated that mothers would feel comfortable when they felt that the help would be given in a sensitive way. For imposed help, mothers indicated that they would be comfortable if they felt the help indicated the daughters' care and concern. In contrast, daughters most often indicated that mothers were comfortable with imposed help when they felt that the help would be given sensitively.

With respect to feelings of discomfort, both groups were most likely to indicate that

the mother would be uncomfortable with offered or requested help when they worried about burdening their daughters, and with imposed help when it was seen to erode the mother's independence.

The type of help given

Both groups felt mothers would be least comfortable with additional instrumental help and most comfortable with additional emotional support, with advice falling in between. The reasons given to explain discomfort in these three areas included concerns about burdening the daughter; feeling that help eroded the mother's independence or made her feel inadequate; concerns that the daughter had different standards when completing the job for the mother; mother's feelings that it was important to stay active, that she enjoyed doing the job herself, that the help was either intrusive or unnecessary; and mothers feeling suspicious of daughters' motives.

Reasons to explain mothers' comfort included their confidence that the help indicated the daughters' care and concern, mothers' belief that the help would be given sensitively, feelings that helping was the daughters' responsibility, indications that the mother appreciated assistance or that her daughter had particular skills that were well suited to the job, and suggestions that the job was difficult for the mother to do on her own.

Again, daughters seemed to have a good understanding of why their mothers felt as they did about physical help, advice and emotional support. In terms of comfort, there was complete agreement: both generations felt that mothers would be happy to receive more instrumental help when they had problems doing the task by themselves, when advice being given was appreciated (e.g., the mother appreciated alternative viewpoints), and when emotional support showed the daughters' care and concern.

With respect to mothers' discomfort, both groups agreed that discomfort would most likely stem from advice and emotional support seen as unnecessary. However, mothers indicated that the most likely reason for their discomfort with physical help would be that it eroded their independence. On the other hand, daughters suggested that physical help that was viewed as unnecessary would be most

likely to promote their mothers' discomfort.

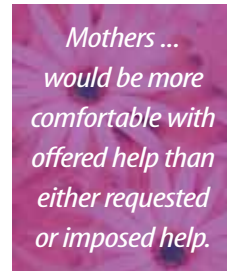
Needs to be met

Our research underscores a few points that should be considered when working with older adults and informal caregivers. First, mothers reported being more comfortable with offered and imposed help than daughters believed. This finding suggests the possibility that daughters may avoid doing tasks for their mothers (i.e., imposing help) even though such efforts are appreciated.

Second, though mothers appeared comfortable with offers of help, greater diversity was seen with respect to requested and imposed help. For example, 10 per cent of the mothers in this sample indicated that they were not at all comfortable asking for help, and a separate 10 per cent of the mothers indicated great discomfort with having help imposed upon them. These findings should alert us to instances when a mother's needs are not met because of her reluctance to ask for help or, alternatively, when mothers react angrily to unasked-for help, which elicits a similarly negative response from their daughters.

Although our results suggest that daughters are, on average, good at discerning why mothers feel as they do, such an understanding may not be present in particular relationships. In practice, accurate perceptions may be quite important to the way helping relationship unfolds, as people typically behave in accordance with their beliefs. A daughter who mistakenly believes that her mother's seeming discomfort with help stems from a desire to remain independent may react quite differently from one who accurately judges that her mother is uncomfortable because she is afraid of being a burden. It may be important, then, to encourage an open discussion relating to the reasons behind older adults' reasoning about help, so that informal caregivers may be more sensitive and responsive to the older adults' feelings.

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*Mothers ...
would be more
comfortable with
offered help than
either requested
or imposed help.*

The sliding client ... continued from cover

A mat or physical evaluation will help the clinician identify other physical contributing factors:

- **Does the client have a limitation in lower extremity range of motion?** It is particularly important to check the range of motion of the hamstring muscles, as this muscle group has the most impact on sliding as it crosses the hip and knee joints. Make sure that the client can flex her hip to 90 degrees and then extend her foot to the angle of the footrest without creating tension on the hamstring muscles.

- **Does the client have any fixed spinal deformities?** Spinal deformities need to be accommodated so that the client does not need to “move her bottom forward” to accommodate for her back structure.

Inspecting the client’s seating and mobility system may also identify other factors:

- **Is the seat upholstery taught?** Upholstery may stretch, creating a sling effect, and may potentially be lower at the front than at the back, thus promoting sliding.

- **What is the angle of the seat relative to the floor?** For chairs where the casters and wheels can be adjusted, it is possible to accidentally create a chair with a forward sloping seat.

- **Is the cushion positioned correctly?** Sometimes cushions slip or are put in backwards.

- **Are incontinence pads, lifting sheets, or other items placed between the client and the cushion?** Items placed between the client and cushion will often cause discomfort as well as sliding.

- **Are the client’s feet supported?** If the client’s feet are not supported, the client will move to seek support. Sliding forward in the seat is one way to gain this support.

- **Does the size of the chair match the client?** Having a seat depth in the wheelchair that is equal to or longer than the seat measurement of the client will likely cause sliding.

One other aspect to investigate is the client’s typical posture before her injury or disability progression. Clients with habitual postures (e.g., sacral sitting or one leg crossed over the other) tend to maintain a preference, either stated or unstated, for that posture. These clients will often migrate back into these postures when possible.

“Curing” the cause

It is tempting to restrain clients who are sliding in an attempt to prevent the phenomenon;
continued on page 11

Table 1

| Likely cause(s) | Possible solutions |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> → Lower extremity range of motion limitations → Lower extremity flexor spasticity | <ul style="list-style-type: none"> → Decrease the angle between the seat and footrests (e.g., move the footplates closer in to the chair, use 90 degree footrest hangers, etc.) → Use footrests rather than elevating leg rests. → Consider a foot box/padded calf pad to allow the legs and feet to move under the seat, without catching on the wheelchair hardware. → Consider the use of a padded seat belt. → Consider using either static or dynamic tilt. → Consider a referral to a physician for potential medical management. |
| <ul style="list-style-type: none"> → Decreased hip range of motion (cannot achieve 90 degrees at the hip) → Client has a fixed kyphotic posture → Client’s pelvis is fixed in a posterior pelvic tilt | <ul style="list-style-type: none"> → Open the seat to back angle of the chair to match the client’s hip range. → If the limitation is unilateral, consider tapering or carving the cushion on that side to make it thinner at the front. This wedge shape will allow the knee to drop down lower than the hip, thereby increasing the seat to back angle on that side. → Consider using static or dynamic tilt. |
| <ul style="list-style-type: none"> → Client is uncomfortable or experiencing pressure | <ul style="list-style-type: none"> → Ensure cushions, back supports, etc., are set-up and used as intended (e.g., check to make sure that the cushion is positioned the right way). → Change the seating to improve the pressure management properties. → Encourage regular repositioning. → Investigate positioning alternatives which may be more comfortable for a client. (For example, for a client who has always sat in a posterior pelvic tilt, changing to a more neutral position may not be tolerated.) → Check that the footrests are at an appropriate height and support the client’s feet. → Check that the seat depth is appropriate for the client. |
| <ul style="list-style-type: none"> → Client slides when propelling the chair (foot propeller) | <ul style="list-style-type: none"> → Check the seat to floor height of the chair to ensure that it is optimal for self propulsion. → Consider a four-point padded seat belt. → Consider increasing the contour in the seat cushion. → Consider the use of a one-way slide. → Consider wedging the seat or increasing the dump of the chair. |
| <ul style="list-style-type: none"> → Wheelchair set-up (sling seating, forward sloping seat, cushion placement, use of incontinence pads, lack of removal of the sling, etc.) | <ul style="list-style-type: none"> → If possible, remove transfer slings, incontinence pads and other items from the chair. → Ensure the chair is set-up appropriately for the client. → Consider adding some fixed tilt in the chair or a wedged seat. → Consider increasing the contour of the cushion. → Ensure that devices such as a one-way slide are positioned and used correctly. |
| <ul style="list-style-type: none"> → Client chooses to slide forward but this does not appear to be related to pressure or discomfort | <ul style="list-style-type: none"> → Consider the use of a one-way slide. → Consider increasing the contour of the seat cushion. → Consider wedging the seat or increasing the dump of the chair. |
| <ul style="list-style-type: none"> → Poor initial positioning in the chair | <ul style="list-style-type: none"> → Re-evaluate the transfer method. → Consider using a one-way slide. → Consider the use of a four-point belt. |
| <ul style="list-style-type: none"> → Fatigue | <ul style="list-style-type: none"> → Consider shortening the length of time in the wheelchair. → Consider adding tilt or recline or both to allow the client to rest in the chair. |



Figure 1



Figure 2

Photos: Bodypoint Inc.

Case study: Mary is still sliding

Mary is a 52-year-old woman who was diagnosed with multiple sclerosis almost 10 years ago. She is still able to propel a manual wheelchair over short distances and would like to maintain her independence with mobility as much as possible. She does not want “too much” support, as she is concerned it will interfere with her upper extremity function. Despite trying numerous seating systems and devices, she continues to slide, which is putting her at risk for falls, and she is developing skin redness over her buttocks.

Upon assessment, the clinician noticed that Mary has shortened hamstrings and high tone in her lower extremities. This tone tended to pull her forward in her wheelchair. Mary notices when she slides, and she attempts to reposition herself yet she is not successful. The effort of repositioning increases her tone and causes further knee flexion, making her repositioning efforts ineffective.

The clinician discussed a referral to Mary’s physician for tone management as one possible solution; however, Mary did not want to pursue this possibility related to her previous experiences with medical management of tone.

Instead, Mary’s wheelchair was adapted with a soft foot box that protected her feet from the front casters and wheelchair frame, and allowed her feet to tuck back slightly under the seat. Mary also agreed to use a four-point padded seat belt to help control her posture during lower extremity spasms. Once these changes had been implemented, Mary was able to maintain a functional posture most of the day.

however, depending on the cause of the sliding, restraint may not be the best solution and may cause further frustration. A better approach is to invest the time determining and addressing the most likely cause. Some possible solutions are outlined in Table 1.

If the client is sliding occasionally but is able to independently reposition and is not experiencing any skin breakdown, intervention may not be needed.

If your chosen intervention includes the use of a seat belt, four-point belt or other positioning strap, ensure that it is installed in the correct position. Generally, seat and lap belts should be positioned initially at approxi-

mately a 45 degree angle over the hip or at a 90 degree position over the proximal thighs depending on the client and type of belt (see Figure 1 and Figure 2). This angle may need to be changed when the client is reassessed depending on her posture.

If the client is still sliding after implementing all the appropriate recommendations, take a moment and re-evaluate. Has the client changed? Has another problem or issue been inadvertently created? Has the client’s frustration increased and is he sliding to avoid a particular posture? Have all the interventions been implemented as instructed? Often, this course of inquiry will identify other

issues which need to be addressed. If the interventions have truly been exhausted, the reality may be that that client will continue to slide to some degree. As long as this sliding is not putting the client at risk, it may become less of a priority.

Sliding is a common yet often preventable problem for clients who use wheelchairs. Through careful observation and assessment, therapists can determine the cause of the sliding and initiate appropriate interventions.

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Computers and power chairs: New technologies benefit clients

By Michael Babinec, OTR/L, ABDA, ATP.

Computer-based technologies have been slowly finding their way into the world of power wheelchair electronics. Technicians, clinicians, and rehabilitation technology suppliers are finding new ways to take advantage of these technologies to benefit power wheelchair users who rely on teams of professionals to set-up, troubleshoot, or fine-tune their systems. As a result of this integration, these technologies are quickly becoming part of our industry's rapidly changing environment.

The evolution of technology

Power wheelchair electronics have come a long way since the first controllers, motors and a joystick were added to a wheelchair more than 50 years ago. Since then, technology advancements have enabled those with very limited function and controlled movement to have not only independent mobility in a variety of driving environments but also control of additional enabling functions, allowing independent use of environmental controls, powered seating functions, personal computers, and even communication devices all through the same driver control that is used to operate a wheelchair.

In the late 1980s, the first microprocessor-based, software-controlled power wheelchair electronics appeared. Adjustment menus became more advanced to allow what was considered then to be "fine-tuned" programming of performance. Digital programmers replaced original potentiometers.

In the 1990s, the ability to use computer technology became available with the introduction of Invacare's Action Virtual Service™. This technology allowed technicians and suppliers to remotely connect, via a modem, a personal computer to a power wheelchair for troubleshooting as well as programming. This too has since

become easier and better integrated to facilitate easier programming, improved diagnostics, and easier updating of the controller's software on a power wheelchair.

Programming power chairs

The latest computer technology available for use with power chairs is a software program called Laptop IVS, which is available from Invacare by downloading it from the Internet (www.invacare.com). Laptop IVS essentially consists of two programs. The first is Laptop IVS, a Windows-based software program compatible with both the Invacare MKIV™ and MK5™ versions of wheelchair electronics.

With Laptop IVS, performance profiles for each drive mode of a power chair can be viewed simultaneously with all others, as well as all calibration settings. This makes for quick comparisons of levels and settings of the different drive modes. Changes can be made in any performance adjustment in any drive mode while still viewing the settings in each of the other drives. This quick comparison allows for easy fine-tuning of a chair's performance.

Troubleshooting tools

As power chairs continue to offer more features, effective troubleshooting skill is a valuable tool to have. Many power chair manufacturers have diagnostics in their electronics that allow a fault log to be viewed that displays a list of errors or faults that have occurred either back to a point in time or back to the codes intentionally occurring in the manufacturing process. The chronological order of these codes allows the supplier or technician to view not only the most recent fault or error code but also previous faults, enabling diagnosis of intermittent problems. A feature in Laptop IVS allows either the most

recent code or all of the codes to be erased, thereby setting a clean slate. This feature makes it for easier future diagnostics, as technicians will know that any faults listed have occurred after the date of the most recent service.

Another useful feature is being able to download and upload entire programming profiles of the controller on a power chair directly to a PC or from the PC to the chair. This has two benefits for those actively involved in power chair programming. The first involves changes in programming. Before trying out new performance adjustments to improve a chair's performance or trying out new driver controls (which often involves significant programming changes), the original controller settings can be downloaded to a file on the PC. Various changes can then be made to the controller settings of the power chair for trying new settings or driving methods. Once new settings have been tried (if needed), uploading the file back to the wheelchair can easily restore the original controller settings. The second benefit is that entire libraries of pre-set profiles for specific driver controls and driving environments can be created. These profiles are useful as a starting point for a new wheelchair or for in-services and training.

The future of care

Where the technology of power wheelchair electronics goes next is unknown. However, what can be anticipated with relative certainty are continued advancements that will improve the quality of life for those who rely on these products.

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