

Sequelae of Spinal Cord Injury, Physiology, and Complications

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Numerous physiological changes occur in almost every system of the body as a result of spinal cord injury. In addition, there are a host of complications that occur as a result of spinal cord injury. A comprehensive discussion of these factors and issues is beyond the scope of this reading assignment. However, an introduction to this topic is useful and necessary to understand the implications to life care planning.

Cardiovascular Complications

Normal physiological control of the arteriovenous system and the heart are lost in SCI from the level of the SCI down. The portion of the spinal cord that controls the heart directly begins at T1 through T7. Injuries at this level or above result in altered cardiovascular physiology, not only of the vasculature, but of the heart proper.

Loss of blood pressure control is a very common problem in SCI. Higher level SCIs result in orthostatic hypotension. The individual experiences a drop in blood pressure and an elevating heart rate in response to attempting to sit up. These episodes tend to improve with time. However, a select group of individuals may continue to have this throughout the remainder of their lives and require very aggressive management in order to tolerate a sitting posture. Orthostatic hypotension is most commonly seen in individuals with an SCI at T6 or above. It can be quite severe and result in a patient having a fainting episode or loss of consciousness. Numerous techniques to assist in the management of this are available including TED hose, abdominal binders, reclining chairs, and elevating leg rests. Physical therapists address the issue by utilizing a progressive elevation with a tilt table. Medications useful in the management of orthostatic hypotension include ephedrine, tyramine, steroids, and ergotamine.

High level SCIs can result in bradyarrhythmias, which can lead to cardiac arrest and standstill during tracheal suction. Patients at risk for this may require atropine and possibly placement of a pacemaker.

Deep Vein Thrombus (DVT)

In recent years, it has been recognized that DVT is a significant cause of morbidity and mortality in spinal cord injury. The incidence of DVT is likely to occur in well over 80% of cases (Waring, Karunas, 1991). The use of heparin has been demonstrated to be effective in reducing the incidence of DVT. Spasticity and its effects on the development of DVT have been studied. Though there are varying reports in the literature, however, overall, it is felt that increased spasticity results in a decreased incidence of DVT in the acute sitting (Bors et al., 1954). Daniel Chin has studied DVT and the use of Lovonox (a low molecular weight heparin) in the prevention of DVT and has documented that Lovonox is extremely

effective in reducing the acute incidence of DVT (Chin).

DVT can be a life threatening condition. Of those individuals who develop DVT, approximately one-third can develop pulmonary embolus. Pulmonary embolus can be a life threatening condition and result in death in a number of individuals.

Venous Doppler studies and/or venograms are necessary to follow the DVT as well as serial laboratory studies, such as Protimes. Once a DVT has developed, an individual will be treated for six months to one year, depending on his clinical response. A small minority of spinal cord injured people with DVT will develop a chronic DVT and require lifelong management with anticoagulation therapy. Some individuals with DVT and other comorbidities or injuries may require the placement of a vena cava filter in order to protect them from risk of pulmonary embolus.

Of those individuals who do not develop DVT during the acute hospital stay, there is approximately a 14% to 20% risk of developing DVT at some point during their lifetime. The period of greatest risk for development of DVT seems to occur within the first three months after SCI (Staas et al, 1993).

Autonomic Dysreflexia (AD)

AD is a life threatening complication that can occur as a result of spinal cord injury. It most commonly occurs in individuals that have a spinal cord injury at T6 or above. It is characterized by flushing or redness of the skin that develops above the level of the spinal cord injury, and a general malaise, a severe headache, elevated blood pressure, and increased heart rate. Occasionally, the heart rate may be slowed. While AD commonly occurs at T6 or above, it also occurs, with the right type of stimulus, at lower levels of spinal cord injury.

This condition is extremely uncomfortable. The patient may feel as if they are dying. It causes an extreme and diffuse malaise. The danger lies in the elevated blood pressure, which can result in stroke and death.

In incomplete spinal cord injuries, AD usually is not a significant problem. AD occurs as a result of some noxious stimuli, the most common being distended bowel or bladder. Other causes may be occult fractures, decubitus ulcers, infections, and abdominal lesions (ulcers or cholelithiasis). Improper positioning in the chair as well as tight clothing or wrinkles in the clothing have been reported to cause episodes of AD. In individuals who are experiencing an increasing autonomic dysreflexia, a complete and thorough medical workup is indicated to determine the etiology and cause of the AD.

AD is treated by identifying and relieving the noxious stimuli. In refractory cases of AD, medications such as Dibenzylamine may be required. In acute episodes of AD, calcium channel blockers such as Procardia are indicated to gain control of

the blood pressure while the underlying etiology is determined.

The spinal cord injured patient is at higher risk for developing peripheral vascular disease, both arterial and venous disease (Lee, 1991).

Pulmonary Complications

Individuals with SCIs below T12 have virtually no impairment of their pulmonary system. As the SCI levels rise from T12 to T5, there is a progressive loss of abdominal motor function and chest wall function that impairs expiration and cough. As the level rises further from T5 to T1, intercostal function is impaired and inspiratory function as well as expiratory function is impaired (Lanis, Lammertise, 1992). Jackson has reported that approximately 70% of newly injured SCIs experience respiratory complications, with one-third developing pneumonia (Jackson, Groomes, 1991).

The most critical level for pulmonary function is C3, C4, and C5—the neural segments that supply the phrenic nerve and the diaphragm. With injuries at this level and above, the individual is at high risk for relying upon a ventilator for pulmonary function, SCI at levels C3 and above will result in total dependency on ventilators. These individuals require a whole host of support to maintain them, including high level attendant care and frequent physician follow-up visits. In a select group of these individuals, phrenic pacers may be indicated which will result in a more physiological breathing mechanism. It can be expected that individuals with phrenic pacers will experience less respiratory complications, have an improved quality of life, and improved longevity. In high levels of SCI, careful monitoring of the pulmonary status is absolutely essential and problems must be reported immediately to the treating physicians.

Upper respiratory tract infections and pneumonias can be expected to occur at a higher frequency and require aggressive preventive care in order to limit the morbidity and mortality. Tetraplegics should receive annual influenza vaccinations and they should receive a pneumococcal vaccination. The winter months are likely to be the most troublesome and may require daily respiratory therapy treatments in order to prevent complications.

Sleep Disturbances

Braun and colleagues have reported an increased incidence of sleep apnea in spinal cord injured patients (Braun et al., 1982). Consideration of monitoring of this condition is required in patients with symptoms of sleep apnea or in patients who are overweight.

Individuals with high level SCI will require a host of equipment including ventilators, respiratory monitors, suctioning equipment, and pulse oxymetry. Additional emergency equipment will include a backup ventilator, a home

generator system in the event of prolonged power failure, and an Ambu bag.

Additional factors that can complicate respiratory status in SCI is a progressing scoliosis, increasing spasticity, and syringomyelia. High SCI in females who become pregnant may also experience a worsening pulmonary status and require additional support during pregnancy.

Gastrointestinal Complications

Individuals with SCI experience a number of physiological changes in the function of the GI tract. There is a slowing of transient time through the GI system and gastric acid secretion may increase. GI bleeding is a very common early complication in SCI with the incidence of ulcers being reported around 20%. The risk for GI bleeds and ulceration are higher in individuals with SCI at T6 and above. Prophylaxis use of H2 blockers is common and medically indicated. The GI bleeds frequently result in anemia after SCI.

Cholelithiasis is a common complication of SCI and may occur three times more often than in able bodied populations (Apstein, Dalecki-Chipperfield, 1987). Possible causes for this may include decreased GI tract motility, gallbladder motility and abnormal bowel secretion.

Individuals with UMN lesions may have an intact defecation reflex and respond to digital stimulation of the rectum with a reflex defecation. Individuals who do not have an intact anorectal reflex for defecation have a much more difficult time controlling bowel incontinence.

Dietary factors are utilized to assist in controlling the bowel incontinence by maintaining a proper consistency of the stool. In addition, rectal suppositories such as Dulcolax, Therevac Mini Enemas, and Magic Bullet may be necessary. Oral medications such as Metamucil, Colace, or Peri-Colace also may assist in the bowel management.

Individuals with SCIs experience a high rate of hemorrhoids and rectal fissures that will require the assistance of GI medicine physicians and/or colorectal surgeons. SCI people who have refractory diarrhea and difficulty controlling their incontinence may be candidates for a colostomy. Bowel incontinence poses serious social and recreational limitations for the SCI patient. Individuals with high level SCIs are dependent on others for assistance and management of their bowel incontinence. In addition, individuals with low level SCI or paraplegias will require the assistance of an attendant during times of illness for management of their bowel program and a PCA will be required during times of illness that result in GI upset or diarrhea. Management of the neurogenic bowel can be quite time consuming and require from 30 minutes to three hours or more per day.

Neurogenic Bladder

SCI results in urinary incontinence in most people. The management program required depends on the level of spinal cord injury and that individual's unique bladder function or dysfunction. UMN lesions may be managed with an external catheter if an intact reflex voiding mechanism is present. This technique is by far the most desirable if it is functional for the patient. It should be recognized that as a patient ages or changes set in with the SCI, the external condom catheter may not continue to be an effective method of urinary control.

Most SCI people will require intermittent catheterization, which will be performed four to six times daily. SCI males with low-level lesions are the best suited for intermittent catheterization. Intermittent catheterization becomes increasingly more difficult in females, obese individuals, and individuals with high-level lesions. Indwelling Foley catheters may be required or suprapubic catheters may be required to manage the neurogenic bladder.

Individuals with SCI experience an increased rate of urinary tract infections and urosepsis and will require UAs and urine C and S tests and intermittent antibiotics to assist in the control of this. Some individuals may require lifelong use of prophylactic antibiotics to reduce the incidence of urinary tract infections. Bladder calculi and renal calculi are a common complication of spinal cord injury that require the assistance of a urologist to manage and should be screened for on an annual basis. Urinary incontinence may lead to skin breakdown in the perineal area and result in decubitus ulcers that require surgery. High level SCI will mandate the assistance of a personal care attendant.

The goals of neurogenic bladder management are to preserve renal function and reduce morbidity and may require a change in the management of the system during the patient's lifetime (Cardenas, 1992).

The individual with SCI may require catheters, leg drainage bags, night drainage bags, gloves, tape, Betadine, and other supplies. Follow-up evaluations will require renal ultrasounds, IVPs, urinalysis, urine cultures and sensitivities, urology visit, and urodynamic studies.

Sexual Functioning

SCI has a significant impact on sexual functioning in both males and females with spinal cord injury. Sipiski (Sipiski, Alexander, 1992) has reported that in males with UMN injuries, reflex erections are present in 70% to 90%. Ejaculation occurs in only 4% of these patients. In males with LMN lesions, approximately 20% achieve an erection with 20% of these achieving ejaculation.

Females with SCI injury have reported higher levels of reflex lubrication and psychogenic lubrication with 50% to 75% reporting orgasm.

Fertility

Male fertility is impaired in SCI. Techniques such as vibratory stimulation and electroejaculation may be utilized to harvest sperm for artificial insemination. The success rate varies from center to center and may approach 50% in some cases. In general, it is felt that the earlier the sperm is harvested after spinal cord injury, the greater the likelihood of successful pregnancy. Repeated urinary tract infections and development of scar tissue in the male reproductive system reduces the viability of sperm as a function of time.

SCI males may require assistive techniques for erectile dysfunctions such as prostaglandin penile injections, vacuum tumescence pumps, or penile implants. In general, penile implants are discouraged in the SCI population since they can lead to erosion and skin breakdown in the perineum.

In SCI females, half will not miss a menstrual cycle. Of those who have a delayed menses, all will begin normal menstruation within a three to six month period. The SCI female has no change in her fertility. Birth control becomes a major problem since the SCI female is at high risk for development of DVT and birth control pills are known to increase the risk of DVT. It is generally recommended that birth control pills not be utilized. The Norplant implant is contraindicated if there has been a preexisting history of DVT. Condom may be the method of choice for prevention of pregnancy in the SCI female who is not in a monogamous relationship.

Women with SCIs who become pregnant have a higher incident of premature and small birth weight infants (Sipiski, Alexander, 1992). In addition, females during the last trimester of pregnancy may experience more difficulty with urinary tract infections, decubitus ulcers, edema, autonomic dysreflexia, transfers, and self care. Due to these complications, admission to the hospital during the thirty-second week of pregnancy may be required. Breast-feeding in the tetraplegic female may be difficult due to positioning or due to AD.

Individuals with SCI should receive counseling regarding their sexuality and relationships with others. The intent of the counseling is to provide sex education to assist the couple in resuming sexual activity and to teach alternate techniques for giving and receiving sexual pleasure with the presence of a SCI.

Musculoskeletal Complications

A host of physiological changes occur after SCI, including body composition, lipid metabolism, energy expenditure, nutritional parameters, glucose and calcium metabolism, thermoregulation, and soft tissue changes (Yarkony, 1996).

Heterotopic Ossification (HO)

This is a common complication of SCI where the body begins making ectopic

bone in an area where bone should not exist. Typically, this bone is formed in the soft tissues around a joint, most commonly in the hips, knees, shoulders, elbows, and ankles. The condition rarely occurs in small joints of the hands or the feet. It is reported to occur in as many as 20 to 30% of SCI patients and can result in limited range of motion of a joint. HO can lead to complications such as repeated skin breakdown, or interfere with positioning and ADL activities.

Triple phase bone scan is the earliest and most sensitive test to diagnose HO. Additional useful tests include serum alkaline phosphatase and x-rays.

HO must be treated by a physical therapist with range of motion to prevent ankylosing of a joint. Medications that are useful include Indocin and Didronel. Indocin therapy and Didronel therapy may be required from six months to one year depending on the individual's response to treatment. When active HO is present, frequent follow-ups with a physiatrist, serial bone scans and/or x-rays, and serum phosphorus levels are required.

After HO has matured and has no longer been active for at least one year, and if the HO is causing interference with ADL activities, positioning, or skin breakdown, it can be surgically resected. Refractory HO that is not responsive to medication may benefit from radiation treatment, although there are conflicting reports in the literature regarding the efficacy of radiation treatment.

Nutritional Requirements

SCI can result in altered nutritional requirements, hypercholesterolemia, and dyslipidemia. Changes in the diet may be required as well as nutritional counseling to assist the SCI person in learning how to manage these complications. Exercise has been demonstrated to be beneficial in assisting and restoring a desirable HDL to LDL ratio.

Glucose metabolism is altered in SCI people and there is an increased incidence of adult-onset diabetes mellitus. It appears that insulin resistance is a factor that contributes to the development of abnormal glucose metabolism (Duckworth et al., 1983).

Poikilothermia

SCI persons have a decreased ability to maintain their body temperature. In an able bodied person, body heat is generated through shivering and vasoconstriction and body heat is reduced through sweating and vasodilation. These mechanisms are impaired in the SCI person. The higher the SCI the more significant the poikilothermia. This loss of ability to regulate body temperature can be life threatening in SCI individuals. They require adequate safeguards to assist in maintaining their body temperature. These include central heating and air systems in their homes as well as good functioning air conditioning systems in

their vehicles. Cellular telephones are required so that in the event the transportation vehicle breaks down, the SCI person can summon help in inclement weather. SCI people are at risk for skin injury from exposure to extreme heat or cold and may, in fact, suffer life-threatening complications if exposed to the extremes of either temperature for longer than a brief period of time (Formal, 1992).

Osteoporosis

Osteoporosis is a common complication of SCI. As much as 50% of the bone mineralization may be lost within the first few months of SCI. This poses a SCI patient at greater risk of fractures below the level of the lesion. In addition, it has been reported that fractures below the level of the lesion are much slower to heal and may not heal at all.

Musculoskeletal complications such as overuse syndrome, chronic pain of the upper extremities, shoulders, elbows, and wrists are common sequelae of SCI and can result in a decreased functional status of the patient. Up to 75% of SCI people may experience the development of peripheral nerve development such as carpal tunnel syndrome and ulnar nerve entrapments at the wrists. Davidoff has reported the incidents to be as high as 86% (Davidoff et al., 1991).

Decreased shoulder functioning and increasing pain has been reported to increase with aging. Rotator cuff impairment and tendonitis of the shoulders are common problems associated with SCI.

Spasticity

Spasticity is an involuntary rhythmic contraction of a muscle. Spasticity can result in increased disability by interfering with transfers, ADL activities, interfering with positioning in the chair, interrupting sleep, and causing pain.

There are some beneficial effects of spasticity such as weight shifts, improving circulation helping to reduce skin breakdown and at times may be used for functional purposes, such as a transfer. Increasing spasticity can result from sitting on a foreign object, skin breakdown, infections or kidney stones, ingrown toenails, bony fractures, or other painful stimuli. Syringomyelia is a diagnosis that must be excluded when no other source of the increasing spasticity can be found.

Spasticity is treated by providing full range of motion to all involved joints at least twice a day with prolonged terminal stretches by the therapist. Standing in a standing frame or tilt table will help reduce spasticity. Avoiding extreme temperature changes, preventing bladder infections, preventing constipation and skin breakdown, will also help. Whirlpool treatments can also be effective in reducing spasticity.

Medications that are useful in the treatment of spasticity are Baclofen, Dantrium, and Valium. In severe cases, the patient may require an intrathecal Baclofen pump. Surgery such as a rhizotomy may be considered. The patient may require motor point blocks or nerve blocks utilizing phenol, alcohol, or Botox. Spasticity has been reported to increase with aging and SCI (Menter, 1995).

Musculoskeletal Pain

Fleming reported an incident of neck and shoulder pain at 80% for tetraplegics. Upper extremity pains are commonly reported to exist in 75% of SCI people. Females seem to have greater difficulty with the upper extremity and shoulder pain than males.

Contractures

Contractures are a well-known complication of spinal cord injury. They are the result of increased tone and decreased range of motion in a joint. They can require surgical intervention, treatment with physical therapists, range of motion, standing frames, whirlpool treatments, peripheral nerve or motor point blocks, and splinting.

Decubitus Ulcers

Decubitus ulcers are a common complication and perhaps the most costly complication of SCI. It is reported that most SCI people will experience at least one decubitus ulcer. Ulcers may be classified according to their level of involvement. Grade I is redness and induration of the skin. Grade II is superficial breakdown of the dermis. Grade III extends through the entire subcutaneous tissue but not into the muscle. Grade IV: Deep ulceration that extends into muscle, tissue and to underlying bone. Grade V: Widespread extension of the ulcer into adjacent body joints or cavities.

The best management for decubitus ulcer is prevention. Unfortunately, this is not always possible. Given the very best level of care. Individuals can still develop decubitus ulcers. It particularly becomes a problem as the individual with SCI ages. Adequate seating systems and positioning in the chair with proper cushions are crucial in maintaining skin integrity and reducing the incidence of decubitus ulcers. In addition, adequate personal care attendants for hygiene and to assist in transfers and positionings are also necessary. Nutritional support is beneficial at reducing the risk of decubitus ulcers and at helping decubitus ulcers to heal.

Once decubitus ulcers have developed, a variety of treatments are appropriate, including antibiotic ointments, debridement preparations, whirlpool treatments, and surgery. A scar is left in the area of a decubitus ulcer after healing and

predisposes this area to further breakdown in the future.

Factors From the Acute Hospital Stay to Consider in Life Care Planning

A thorough and comprehensive review of the medical records from the acute care hospital stay and the initial rehabilitation stay should be performed in order to obtain the most accurate information available regarding the complications the patient has experienced which can have an impact on his future medical needs. In addition, a thorough review of the most recent records from physical therapy and occupational therapy will provide valuable clues to the person's current functional status and equipment needs. When reviewing the medical records, there are key items that should be searched for in the records, since they can and do alter the future medical needs of the patient. Some of the items that are important are included in the following discussion. This is by no means intended to be a comprehensive list of all of the important things that could be in the records, but should serve as a guide.

Deep Vein Thrombus

Patients who have experienced DVT during acute hospital stay will require ongoing follow-up and care for the DVT after discharge from rehabilitation. Typically, six months to one year of follow-up care on a monthly basis will be required. However, there are cases of DVT that are permanent and will require a lifetime of care. If the person is one year out from the development of DVT and experiences increased swelling and temperature of the Coumadin is stopped. This likely represents a permanent condition and will require lifelong treatment.

Individuals who have experienced a DVT are twice as likely to develop a blood clot again in the same extremity at some point later in their life (Menter, 1995). Provisions for this must be included in the life care plan.

Fractures

40% of SCI people will have multiple fractures below the level of the injury. In addition, due to the extensive osteoporosis from the level of the lesion down, it can be anticipated that many SCI individuals will experience at least one long bone fracture during their lifetime. Long bone fractures below the level of the lesion are slow to heal and may not heal at all, resulting in a nonunion. Such fractures have to be evaluated carefully as they may require future surgical interventions or prolonged care and treatment. These fractures can be a source of ongoing pain and can produce autonomic dysreflexia symptoms in a patient. Fractures below the level of the SCI can result in the development of heterotopic ossification and require extended periods of treatment.

Fractures above the level of the lesion or in the upper extremities can interfere with rehabilitation care and make the patient more dependent for personal care

services until the fracture and the resulting sequelae have resolved.

Heterotopic Ossification

Once SCI individuals have experienced HO, throughout the remainder of their lifetime they have an approximately 50% chance of reactivating the HO. Factors that will result in reactivation of the HO are fractures, infection, kidney stones, decubitus ulcers, and surgeries. If the HO is reactivated, it requires an extensive course of treatment, generally a minimum of six months and perhaps as long as one year. Reactivated HO is treated the same as the original episode of HO requiring Indocin, Didronel, physical therapy, and possibly radiation treatment. It also requires physician follow-up, bone scans, x-rays, and frequent laboratory evaluation.

Infections

Review of the past medical records to determine the number of infections and the types of infections that the patient has suffered will serve as a useful guide for making projections about the future rates and types of infections the person is most likely to experience. In addition, the severity of the infections should be assessed to determine the level of care that will likely be required. For example, a patient who has had numerous infections with highly resistant organisms requiring hospitalizations and IV antibiotics is likely to continue to require that level of care.

Skin breakdown

Review of the records to determine the number of decubitus ulcers and the locations of decubitus ulcers is useful in making projections regarding future skin care needs. There are individuals, due to their body habitus and their state of health, who will experience a high rate of decubitus ulcers given the very best of care. When a patient has decubitus ulcers that have resulted in extensive scar tissue, due to the fact that scar has a very poor blood supply, they are at much higher risk of developing decubitus ulcers in that region again.

Orthostatic Hypotension

A select group of individuals will have a great deal of difficulty with orthostatic hypotension. The problem will be life long. A review of the records should ascertain whether the individual is continuing to have problems with orthostatic hypotension. The orthostasis will interfere with the number of hours a person can be in a wheelchair and will interfere with their ability to be out in the community for vocational or social activities.

Autonomic Dysreflexia

Individuals that have frequent and recurring autonomic dysreflexia or who tend to have alarmingly high blood pressures, i.e. diastolics over 120 or systolics over 200, require ongoing use of medications such as Dibenzyline and Procardia. In addition, they will require a fail proof emergency response system to ensure that they get the urgent care that may be required. The life care plan should be designed in such a fashion to make every effort to prevent such episodes by providing adequate supplies for frequent catheterization and bowel programs and ensuring that the personal care attendants have been trained to the proper level to assist in preventing the autonomic dysreflexia, recognizing and treating it.

Neurological Level

Careful review of the records should be performed to determine the exact neurological level and completeness of the spinal cord injury. If this cannot be determined from the records, then the life care planner must obtain an accurate neurological level from a knowledgeable physician. Knowing the neurological level of the patient is a crucial starting point to determine future medical needs. In addition, knowing and describing accurately the neurological level of the patient serves as a baseline in the event that there is a change in the person's neurological status so that it can easily be determined by the caregivers.

Comorbidities

Comorbidities and other medical complications and problems of the patients are extremely important and can impact upon the life care plan. Such complications as coronary artery disease, peripheral vascular disease, preexisting renal disease, COPD, or diabetes mellitus has a significant interplay with the effects of spinal cord injury.

Preexisting conditions such as these and others can become much worse when combined with spinal cord injury and dictate that a higher level of care be provided. Some conditions, although not related to the traumatic spinal cord injury, are seriously complicated by the traumatic spinal cord injury and therefore mandate that a higher level of care be provided in the plan as a result of the spinal cord injury. For example, the insulin-dependent diabetic who becomes tetraplegic: An increased level of attendant care is provided in part to monitor the blood sugar and give the insulin injections, even though the diabetes is not in this case related to the spinal cord injury.

Preexisting disabilities combined with SCI can have a synergistic effect and require higher levels of care than would be required by the presence of either disability alone. For example, the individual with blindness who becomes paraplegic. This individual will require a much higher level of attendant care than the average paraplegic would require, and correspondingly a higher level of care than an individual with blindness alone would require. It is easy to understand the problems that are posed by the existence of both disabilities together.

Functional Independence Measures (FIM)

FIM scores are used to communicate the level of independence of the patient in many areas. The scale ranges from a Level 7, fully independent, to a Level 1, which requires total assistance.

The rehabilitation record will reflect FIM scores in several areas, including dressing, bathing, grooming, transfers, medications, bowel and bladder, and mobility. If the FIM score is 5 or less in any category, then attendant care has to be provided to assist the patient in that area. While FIM scores are not the only way to determine what personal care services are needed by the individual, they are an excellent way to establish a baseline and provide objective documentation of the need.

Equipment

Review of the records should also determine in part what equipment needs the patient has and what equipment needs have been met at that point. It is not necessary to recommend the exact same type and style of equipment that was recommended by the hospital but it is important to review what has been provided to the patient and when it was provided prior to making any future recommendations.

Psychological and Social Adjustment

The rehabilitation and acute care record should provide information on family support and the patient's psychological adjustment to the disability. Patients who cope poorly or fail to complete the initial rehabilitation are at much higher risk for experiencing complications and problems and will require a more intensive level of service in the life care plan. In addition, identifying the social activities that were important to the patient prior to the SCI and establishing alternative ways to participate in these activities for the newly injured person is an important goal of a life care plan.

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