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Disability Research Report

Spinal Cord Injuries

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Disabilities that stem from spinal cord injuries are tragic and inconvenient, no matter who is going through it. In an article by the Mayo Clinic staff, it says “If you’ve recently experienced a spinal cord injury, it might seem like every aspect of your life has been affected. You might feel the effects of your injury mentally, emotionally and socially”(Mayo Clinic, 2017). This is very real in the world we live in today because the ages that are mostly impacted by this injury range from late teens to around thirty years of age. The Spinal cord is the core connection of what allows us as humans to move and interact with the people and things around us. Without our spinal cord there is no nerve connection let alone life, but when trauma is applied to it connections can be cut off to certain extremities. Your ability to move your arms and legs following a spinal cord injury depend upon the severity of injury and the location of the injury along your spinal cord.

Completeness is the extent of the injury and there are two types. If all sensory and movement control is lost beneath where the spinal cord injury happened, this is considered a complete injury. If partial motor control or feeling is being experienced below the injured area, the injury is now considered incomplete. Every incomplete injury will differ based on extent of damage. Tetraplegia or quadriplegia means everything from the neck down and pelvic organs are all impacted by your spinal cord injury. Paraplegia is paralysis that affects most or some of the trunk, legs and pelvic organs (Mayo Clinic, 2017). After these injuries these people are left to adapt to a new life with new obstacles. But with a little assistance and good rehab these people, who are disabled from a spinal cord injury, are able to live a normal life like the rest of us.

Former Olympian high jumper Jamie Nieto experienced this scary injury in a freak accident on one what seemed to be normal afternoon. Jamie went to do a back flip but instead of doing a full flip he slipped landing on his head. Immediately being paralyzed he was rushed to

the hospital where he spent the next twelve days in ICU. Doctors were very unsure if he'd ever walk again but Jamie being the hard working athlete he was decided to believe that he was going to walk again. Not only was he able to reach the point in his rehab where he was able to walk again but he was also able to walk to the alter to marry his now wife. Jamie said "his faith is big because when he is having a bad day he cries and talks to God then is able to fight through adversity"(Wise, Brown, 2017). This story gives a lot of people with this disability hope.

The Mayo Clinic says "a spinal cord injury, damage to any part of the spinal cord or nerves at the end of the spinal canal (cauda equina), often causes permanent changes in strength, sensation and other body functions below the site of the injury" (Mayo Clinic, 2017). There can be many causes of this type of injury, from vehicle accidents, falls, violence, alcohol, and diseases. In many cases these real life causes will bring upon a type of permanent paralysis. Most shocking out of all of these causes is by a disease or tumor of some sort. In general, unless an individual is sick or having back pain, an MRI and sometimes x-rays will show that a tumor is present on or dangerously near, on or in the spinal cord which is dangerous for a few reasons. One being if it grows fast then it will compress and possibly cut off spinal cord connection. If the tumor is on or in the persons spinal cord then surgery is most likely required but is very risky due to the doctors not wanting to cut or get too close to the spinal cord. There are two types of tumors that grow near the spinal cord; an intramedullary tumor and an extramedullary tumor. The intramedullary tumor will begin to grow in the cells within the spinal cord and an extramedullary tumor will grow in membrane around the spinal cord. These tumors can and will cause spinal cord disfunction and even neurological problems (Mayo Clinic, 2017). These individuals that have these type of tumors will most likely become disabled in some way from the damage done from the tumor growth or aftermath from the surgery.

Most of the time you think about immediate affects from a spinal cord injury but studies show that a decrease in cognitive function can occur after a spinal cord injury. A study was done where about 2,500 examinations were screened and a sum of 70 were incorporated into this study, 21 of which revealing skewed cognitive performance after a spinal cord injury contrasted with a physically fit control gathering and 49 with no healthy controls . Studies were broke down for the rate of debilitation and the collaborations with associative traumatic brain injury, mental, decentralized cardiovascular control, sleep apnea, neurologic level of damage, and age. There is a lot of proof detailing a significant decrease in cognitive performance in people with spinal cord injury (Sachdeva, Gao, Chan, Krassiokov, 2018). This shows us that many disabled citizens who have had a spinal cord injury are having cognitive function problems on top of physical function problems. Such as increased anxiety, depression and ability to re-learn fine motor skills.

After an injury has occurred, no matter what the extent, there is a rehabilitation program that is put in place to try and counteract the effects of a spinal cord injury. Even though rehab is done to improve someone's life post injury it doesn't change the fact that the person will have to adapt to a new way of life. The physical therapists will incorporate emotional support, while elevating physical, mental strength. Most people with this type of disability will be in a wheelchair or some type of so it is very important that these doctors utilize fine motor skill exercises that work there extremities that can move. Some of these exercises are as simple as squeezing a ball, or as extreme as assisted pullups for those who have upper extremity control and movement. The professionals at the Spinal Cord Injury Rehabilitation Program at the Mayo Clinic campus in Rochester, Minnesota offer a top notch program that utilizes technology and specialty services including spasticity management, upper extremity functional restoration, wheelchair and seating clinic, locomotor training, diaphragm pacing system, assistive

technology, functional electrical stimulation, sexuality and fertility management, neurogenic bladder and bowel management, community re-entry and recreation therapy, patient and family support and peer mentoring, comprehensive patient and family education (Mayo Clinic, 2018). The sooner these individuals are able to rehab and to manage most parts of their life with little assistance they are re-entered into the community through interactive and incorporating ways. This is where we as citizens come into play because we must be aware of those who have this type of disability so we can meet their needs. Such as building wheelchair ramps at every public establishment or business, or just having wheelchair accessible areas so that life is easier on individuals with spinal cord injuries and are disabled. All modifications and improvements done in a public or business setting, for those who are disabled, must be approved through the ADA.

The importance of psychological rehabilitation is crucial for individuals who have a spinal cord injury and are now in a wheelchair because of it, due to the anxiety and depression that the disability can bring. Many individuals with a spinal cord injury that are in wheelchairs can end up gaining weight to the point of obesity. In a study doctors were able to see what correlation individuals were having depression, anxiety, and weight gain problems. They say “individuals with SCI are at heightened odds of overweight/obesity alongside anxiety and/or depressive disorders” (Graupensperger, Sweet, Evans, 2018).

An alternate rehab approach that allows your own body to heal itself can be done through Neuroprostheses. Neuroprostheses is a method that uses small electrical currents to activate peripheral motor nerves, resulting in a controlled contraction of the paralyzed muscles. This method has shown promising progress in hand and arm function for people with a cervical spinal cord injury. The doctors that did this study used myoelectrical controlled Neuroprostheses on fifteen arms on individuals who have a spinal cord injury. This controlled stimulation allows

considerable increased response in hand and arm function. Improved ROM, grip strength, and fine motor skills with the hands were all improved. For individuals with a cervical spinal cord injury, an implanted Neuroprosthesis provides a great rehab solution for those who need to gain arm and hand mobility. This rehab approach has been shown to give increased function and freedom to those with cervical level spinal cord injuries (Kilgore et al, 2018). Human neural stem cell transplantation has been looked at closely to be another alternate form of rehab or central nervous system tissue restoration some would say. The immature human neural cells have shown that they can survive when transplanted and form synaptic contacts to improve functional use of limbs. The doctors doing this research are saying that around one year after transplantation, there was no evidence of further spinal cord damage, new lesions, or syrinx formation on MR imaging (Levi et al, 2018)

Another study was done to compare the participation of adults with chronic spinal cord injuries in sports and employment. Employment was related with more youthful age and a larger amount of education, though weight diminished the probability of work. Interest in organized athletics moved toward being significant. Gender, length of injury, use of a wheelchair, and participating in exercise that was planned were not essentially connected with employment (Blauwet et al, 2013). This is a good result to hear because it means little to no discrimination has happened against individuals with disabilities due to a spinal injury in sports or while trying to get a job.

When dealing with an individual with a spinal cord injury there are certain coaching techniques that come into play to provide the most beneficial exercise for the person based off of the severity. The coaches that are aiding in the rehab process are going to focus in on aerobic exercises, muscle strength and endurance, and stretching/flexibility. The coaches are very

important because they provide the positive feedback and assistance that these individuals with a spinal cord injury need while also knowing medical hinderances that can arise. For aerobic exercises an individual with a SCI might be doing seated aerobics, rowing, or boxing. But for strength those individuals might be lifting free weight dumbbells, or using resistance bands. Then for flexibility those individuals can be doing neck lifts, or anterior and posterior shoulder stretches. These exercises done based off of severity so types of exercises, weight and reps will vary depending on whether the injury is mild, moderate, or severe. There are wheelchair basketball leagues that get individuals with a less severe SCI back to participating in a competitive sport. If an individual with a SCI also has autonomic dysreflexia the coach will sit the person up, take any tight clothing off, or just allow them to just go pee because a signal is not getting past that damaged spot in the spinal cord to the brain. This happens because autonomic dysreflexia is a condition where your autonomic nervous system which controls breathing which you can do without thinking overexaggerates to something below the damaged area of the spinal cord. So if a coach notices that the individual with the SCI is feeling drained or has a bad headache while doing exercises it very well might be because of autonomic dysreflexia and they will act accordingly.

All in all, there are many ways that individuals get spinal cord injuries. Even though this injury permanently disables many people and it seems like every aspect of their life has been affected but there is still hope and independence for them. Through hard work and determination, the different types of rehab opportunities can help make life as close to normal as possible for these individuals. We also have a responsibility as non-disabled citizens to make sure we follow ADA guidelines so that those who are disabled can have access to the things we have access to.

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