

## The Importance of Finding a Cure for Spinal Cord Injury

As of June of 2004 there were an estimated two hundred thousand Americans who suffer from spinal cord injuries, and eleven thousand more people are added to the list each year. (Landers) Due to these significant injuries their lives have changed drastically, not only for them but also for the people around them. Injuries to the spinal cord give no warning or any signs, it's normally a fluke injury. "The spinal cord is central nervous system tissue that carries messages between the brain and the rest of the body. The spine (or spinal column) refers to the vertebrae, the bones that protect the spinal cord. Spinal cord injury occurs when the nerves of the spinal cord are damaged." (About) One moment a person could be so called normal, and the next in a hospital bed. This actually happened to me, on the night of June 28, 2003, my life changed drastically. I flew home from California that evening and drove to my friend's house to catch up. Since the weather was very warm we decided to go swimming. Shortly after we got into the pool I decided to get out and do a belly flop off the side. In the few brief seconds in the air I figured a belly flop would hurt. I quickly changed positions, tucked my head and upper body slightly and entered the water. I found myself underwater holding my breath, tingling all over, fighting to move any part of my body I could. A minute or two later my friend helped me to the surface, the paramedics came and put me into the ambulance using a stretcher. The next two days were blurry and vague. When I came to and my mind was fairly clear, I realized my neck was broken and I was paralyzed from my shoulders down. There is not a day that passes that I do not miss walking, standing, running, playing sports, or any of the things I could do six months ago. Everyday I wonder when someone will find a treatment or cure for me and many others in the same situation all the time.

This ordeal has sparked my interest in the research of spinal cord injury. I think it is imperative to find a cure or treatment. There are so many people in the world whose severe disabilities have possibly held them back. Imagine what they could have done if their body functioned normally. However, it is not hopeless there is some research being done. The main treatment ideas for healing the cord are: using drugs to rejuvenate the damaged area, using drugs to fight the response of the body that stop natural re-growth, using the axon nerve to connect the spinal cord above and below the injury, thus bypassing the bad area and allowing the body to function again, and transplanting stem cells to heal the damaged area of the spinal cord. This process is difficult to do and politically difficult also, but this treatment also has the most room to grow. (Lewis)

In an accident dealing with the spinal cord “the spinal cord is rarely severed, the connections in the cord are present but are not working.” (Lewis) The problem is the insulation for the cord has been lost. There are three main drugs to correct this problem, IN-1, 4-AP, and NT-4 (Lewis). In the case of the body regenerating the cord naturally there are five drugs that can help with this, NT-3, IN-1, NT-1, L-1, and GM-1. After an injury, the body tries to heal itself, but is stopped by something the body produces. “The idea is to keep the process which prevents regeneration at bay and to let nature take it from there. It is a simple idea but the human central nervous system is very complex.” (Lewis) The conflicting problem with these treatments is scar tissue. Scar tissue from the injury and surgery acts as a barrier for growth. Stem cells have the ability to fix this. The scar tissue can be removed, then injecting stem cells, the harmed area will heal. (Vandersaar) “Stem cells can be used to generate cells and tissue that can be used for cell therapies. They are simply cells in their developing stage, the cells are found in human embryos, umbilical cords and placentas.” (Connelly) In previous years when transplanting stem

cells, the cells generally died quickly, that is if it could be done. (Lewis) Tests have now been done with rats that have been successful. Paralyzed rats given stem cell injections regained the ability to stand on four legs and walk, within 2 weeks. (Seppa) Stem cell treatments can re-grow the damaged area of the spinal cord up to two centimeters. Two centimeters is a large distance considering many injuries are much less. (Vandersaar) There have been advances in these areas since Connelly's article was written but the ideas and uses are still the same. A company named Ability Biomedical has come up with a drug that has the potential to "neutralize IP-10, a protein that attracts harmful T-cells to the spinal cord, damaging the central nervous system." The company has tested this on mice by injecting them with the drug, and it has restored movement in many of the paralyzed mice. (Robbins)

Another recovery technique is to use a muscle stimulator. There are a few different types of machines that are used, the common one used by rehab hospitals is the TENS (Transcutaneous Electrical Nerve Stimulator) unit. The problem with using this is that it won't help develop new muscles, using the machine will only strengthen a muscle that already works. I am currently using a muscle stimulator at home, made by Neurocare. The main treatment uses three leads or pads. One is placed on each leg just outside the shinbone. This placement is necessary because there is a main nerve that runs in the curve of the shinbone that connects to the spinal cord. The third pad is connected to the neck above the level of injury. This muscle stimulator is intended to disperse the fluid and edema in the spinal cord, allowing improvement to happen.

Many of my doctors are confident that during my lifetime a cure for spinal cord injury will be found. This good news is promising, but in my lifetime is fairly ambiguous; I could be on my deathbed when a cure is found. For this reason I believe the government should allow and support any reasonable tests or studies, especially those involving stem cell research.

In the United States there are many colleges doing research to find a cure, but the resources are limited with little support by the government. President George W. Bush said on August 9, 2001, that taxpayer dollars could not be spent to create new stem cell lines. (Connelly) Specifically, he was referring to surgical procedures that are not supported. A substantial amount of the research being done in the world is not being done in the United States. Instead, more research is being done in Italy, China, and Israel, “research in the United States is far behind that of Europe and Asia.” (Connelly) “The federal government limits the number of previously created stem cell lines to be used for government funded research. A number some doctors say is fewer than a dozen viable stem cell lines. The Bush administration prohibits federal money from being spent on creating new stem cell lines and restricts federally funded research to already created lines.” (Connelly) Stem cell research is responsible research that could potentially better the lives of millions. “The way scientists are thinking about treatment, it may not be one treatment that fixes everything. More likely, it may be easier to target specific issues, like bringing back your bladder functions, then bringing back walking, slowly bringing function back one step at a time.” (Connelly)

The reason behind the government not funding stem cell operations is because of how many people oppose it. “Opponents to stem cell research, including religious groups who condemn cloning and abortion, have argued that to create stem cells, embryos must be destroyed.” (Connelly) **This argument is backed up because a few years ago the developing spinal cords of aborted fetuses were used to replace and heal the divot in the spinal cord of a person suffering from a rare case where the spinal cord attacks itself.** (Vandersaar and about) Even with such a loss, stem cells can help many different problems such as Alzheimer's, Parkinson's diseases, spinal cord injury, stroke, burns, heart disease, diabetes and arthritis.

(Connelly) “In fact, all two hundred ten kinds of human cells can be grown from stem cells.”

(Beaulieu) This is how Stem cells have the ability to help these diseases because stem cells can change into any type of cell, from kidney to bone to skin or even brain cells. (Lemonick)

Knowing this, stem cell research should be promoted, not held up by technicalities. For something that has so much potential why would it be so limited?

From my personal experience I believe that knowledge is another problem spinal cord injury victims fight. The general population typically knows very little of what a person with such an injury goes through on a daily basis. This is the same for many people in the general medical field also; although knowledge is higher at a rehab hospital. People need to become aware of this in order to make progress with a cure.

Since my injury I have sometimes thought “perhaps there is a reason for this,” but what if there is a reason for me and many other people like me to be cured. Cures or at least treatments to help problems such as cancer, HIV and/or burns have been found but not spinal cord injury. I believe that a focus should be made on spinal cord injury as well. The injuries cannot be stopped, but if they can be fixed the lives of so many individuals would be changed for the better. The good news is that new steps are being taken. “Scientists are now thinking that because pluripotent and multipotent stem cells (which are cells in two specific developmental stages) have the ability to renew themselves and form many types of specialized cells, scientists suspect they could possibly serve as a renewable source of cells. As the process becomes known, neuroscientists suspect that they could duplicate the process in laboratory dishes and create a supply of nervous system cells to test in transplantation studies.” (About) This would eliminate the problem with anti abortion groups and politics, and push testing further. On the 5th of January 2004, New Jersey became the second state to allow stem cell research when Governor

James McGreevey passed the law. (Larson) If the United States took a more active part in research and applied it to those in dire need of this support, there would be more success in the field of spinal cord recovery. These are the hopes, and the first steps to a better future.