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While a cadet at the United States Air Force Academy, Colorado Springs, Colorado, studying engineering in sciences, he sustained injury in a climbing accident. This left him with a spinal cord injury, T-10 paraplegia. After his rehabilitation at the Craig Rehabilitation Center in Colorado in December, 1975, he was honorably discharged from the military with disabled veteran status.

Today, his specific interests focus on the design and development of adaptive equipment for persons with varying abilities. His general interests focus on the interpersonal relationships necessary to facilitate successful design solutions for people.

Early in postinjury, Mr. Axelson pursued sports and recreation activities for paralyzed persons such as himself, which led him into the design and development of sports equipment to enable him to pursue some of these interests, such as skiing. This led to the design and manufacture of the ARROYO downhill skiing system. He has since become a champion skier.

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## Benefits of Physical Activity for People with Spinal Cord Injuries

by Peter W. Axelson, MSME

As a researcher and a developer of adaptive equipment for people with disabilities, and as a person with a disability, I feel that the benefits of physical activity for a person with a spinal cord injury are mostly quantifiable, yet, in many ways, extremely difficult to measure.

Besides the fact that there are now many objective studies that show that active people in wheelchairs have fewer kidney infections, fewer skin breakdowns, and other medical complications, as well as greater self-actualization and positive emotions (1), there are many other benefits to physical activity. In general, for people with and without disabilities, the benefits of physical activity are physical, intellectual, emotional, and spiritual. Physical fitness is improved and obesity and cardiac problems are reduced. A recent research study indicates that a sedentary lifestyle is the third leading contributing factor of death in North America (2), behind only smoking and obesity. Since most people with spinal cord injuries have mobility limitations, we typically have more sedentary lifestyles than our nondisabled peers, encouraging a high rate of health risk. Statistics show that heart disease, in particular, is catching up with many of us who have spinal cord injuries. Therefore, the need for, and benefits of, regular physical activity are even more important. However, aside from our physical well-being and function, the emotional and spiritual benefits of physical activity include greater confidence, more positive self-esteem, and increased feeling of "inner peace."

What interests me personally about physical activity is the ability to express myself through the freedom of movement that comes from exploring the space and environment around me. Let me try to explain.

The world is very two-dimensional for people who use a wheelchair for daily mobility.

Aside from when we transfer in and out of bed or the bathtub, eye level for most wheelchair users is almost always between 36 and 52 inches from the floor. Day in and day out, we exist solely in this horizontal plane. The invention of technologies, such as racing wheelchairs and handbikes, and adaptations to powered vehicles and all-terrain vehicles (ATV) have encouraged people to seek out the innumerable benefits of physical activity. Additionally, these technologies provide an opportunity to sit in a position different from our usual altitude in a wheelchair and allow us to move at a faster rate of speed over the ground. Many people who do not use a wheelchair for daily mobility take for granted their ability to change their body position both horizontally and vertically as they sit and stand over the course of the day. I miss this ability to move three-dimensionally in space, and I appreciate that alternative recreational activities offer the chance to move in this way again. I find water to be one of the most freeing environments because I have the ability to twist, turn, roll, and float. SCUBA diving adds an even greater sense of movement because it invites a diver into a completely different world. Sports that use gravity as the source of energy (e.g., snow skiing) encourage three-dimensional movement that is exhilarating. Flying through the air in a small aircraft, hang glider, ultra-light, or even bungee jumping allows a freedom of movement that cannot be experienced in the two-dimensional "ADA-accessible" world. Recently, I joined a dance troupe comprised of people with and without disabilities in which we have experimented with moving from wheelchair to floor using three-dimensions in a way I have never before experienced.

The possibilities for leisure and recreational activity are endless and the

benefits immeasurable. It is difficult to describe, let alone quantify, the pleasure that moving three-dimensionally provides, but I can say with certainty that activities that allow three-dimensional movement and expression give me back, as a wheelchair user, something very special and very lasting.

Quantifiable or not, recreation and leisure activity is important to all people with and without disabilities. Look for ways to help facilitate and adapt physical activity in whatever way you can for yourself and for others.

## REFERENCES

1. Sherrill C. Adapted physical activity recreation and sport: crossdisciplinary and lifespan. 4th ed. Madison, WI: Brown & Benchmark, 1993.
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This editorial was reprinted from the *Journal of Rehabilitation Research and Development*, Vol. 33 No. 1, 1996.