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Factors Influencing Participation in Wheelchair Athletics for Individuals with Spinal Cord Injury

A Master's Level Paper for OTH 669
Presented to the Faculty of Sage Colleges
Division of Health and Rehabilitation Sciences

In Partial Fulfillment
of the Requirements for the Degree of
Master of Science in Occupational Therapy

Maureen T. Fitzpatrick
April 1998

Approved:

[redacted]
Professor Howard J. Hickling, PsyD.
Committee Chair, OTH 669

[redacted]
Professor Brian P. Foster, B.S., OTR
Faculty Advisor

[redacted]
Professor Martha M. Frank, M.S., OTR
Director, Occupational Therapy Program

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Maureen T. Fitzpatrick
The Sage Colleges
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Abstract

The relationship of sports involvement and physical and mental benefits was studied in five individuals with spinal cord injury. The acquisition of information for sports involvement, the subjects' perception of its usefulness, and limiting factors in athletic participation were also examined. The results of this survey revealed that all subjects perceived athletics as contributing to their physical and psychological well-being and helped improve their ability to manage activities of daily living. Subjects reported the desire for additional, more thorough information regarding wheelchair athletics.

Factors influencing participation in wheelchair athletics for individuals with spinal cord injury

In 1982 it was estimated that more than 4,000 individuals with spinal cord injuries participated in organized wheelchair athletics (Stotts and Warren, 1982). The number of participants has increased in the recent years. The awareness of the physical and psychological benefits of wheelchair sports has also grown. (Shephard, 1988)

Early medical statistics (Burrell, 1905) have shown a generally unfavorable prognosis for persons with spinal cord injury. Historically, a one year mortality rate of 72 to 80% was demonstrated (Burrell, 1905). Today, the life span of individuals with physical disabilities has increase dramatically. Modern advances in medicine and science have resulted in this increase (Rimmer, 1994). However, Guttmann (1954) stated that the vast drop in the early mortality rate has been associated with the adoption of vigorous physical activity, including competition. The decrease in sedentary living is believed to decrease one's susceptibility to morbidity and mortality from cardiovascular or respiratory diseases , two of the greatest factors in the reduced life expectancy of individuals with spinal cord injury (Wells and Hooker, 1990).

History

In 1966 Sir Ludwig Guttmann was knighted for his contributions to the treatment of paraplegia which included the use of athletics, therapeutically (Jackson, 1987). In reference to sports for the physically disabled, Guttmann stated, "These games rebuild lives." (Jackson and Fredrickson, 1979) The improvement of stamina, strength, and skill may be achieved by means of sports during the rehabilitation process (Jackson, 1987). Commonly used therapeutic interventions are wheelchair racing, table-tennis, and archery. Upper body strength and overall physical fitness may be regained by swimming. To increase skill, snooker, bowling, rifle and pistol

shooting may be done at a competitive or leisurely level. The skill sports mentioned may offer competition for individuals who are no longer able to take part in sports involving much strength. (Jackson, 1987)

Recently, however, more attention is being placed on sports for disabled individuals as recreational activities, not only a therapeutic modality. Jackson (1987) stated that sports used during rehabilitation may be continued for the individuals own pleasure, throughout his/her life. Significant events in recent history have shaped the evolution of wheelchair sporting events and have helped to increase its world wide popularity.

The governing body for wheelchair sports is the International Stoke Mandeville Games Federation (I.S.M.G.F.) (Jackson, 1987). In 1952, the first international sporting event for paraplegics took place at Stoke Mandeville Hospital, their original site in England (Jackson and Fredrickson, 1979). In 1960, approximately 400 competitors world wide participated in the International Stoke Mandeville Games. This competition was relocated from its traditional location in England to Rome, at the place of the Olympic Games. In 1964, the Games took place the week before the regular Olympics, in Tokyo. The Japanese called these Games, which involved 4450 athletes from 25 countries, the "Paralympics". (Jackson and Fredrickson, 1979)

The Games grew to involve 750 sport participants from 29 countries, in 1968, and were held in Israel. Mexico was originally supposed to host these Games but was unable to complete their plans since the government did not support the organizers of disabled sports in that country. (Jackson and Fredrickson, 1979) Countries from all over the world were organizing into regional conferences to achieve further experience in international competition. The Pan American Paraplegic Games, established in 1967, was the predecessor for the development of European, Far Eastern and South Pacific Games. (Jackson and Fredrickson, 1979)

According to Jackson and Fredrickson (1979), in 1972, just a couple of weeks before the regular Olympics, Heidelberg, Germany hosted the International Stoke Mandeville Games. Forty-four countries were represented by the 1,000 athletes who participated in the Games. (Jackson and Fredrickson, 1979)

In 1976, more than 1,500 athletes from 38 countries took part in the first Olympiad for the Physically disabled, held in Toronto, Canada. (Jackson and Fredrickson, 1979) These games included blind, paralyzed, and amputee athletes. The success of the amputee and blind athletes during the 1972 German Games paved the road for their involvement in future Games. (Jackson and Fredrickson, 1979)

Jackson and Fredrickson (1979) stated that the turning point in the development for sports for the disabled was the Toronto Games. At this time, sporting events for the disabled became considered a true event of its own rather than viewing the sports solely from rehabilitational measures. (Jackson and Fredrickson, 1979)

Jackson and Fredrickson (1979) emphasized the importance of medical classification to allow fair and equal competition by ensuring that all of the competitors have an equal degree of disability. Six categories have been established for the wheelchair games, with the level of spinal cord involvement determining the division in which one participates. Listed below are the classes of athletes ranked from lowest functional level to the highest functional level with quadriplegia and paraplegia each being divided into three categories. Athletes with quadriplegia are divided into the first three divisions with the last three divisions belonging to individuals with paraplegia. The classes are: (1) individuals with triceps, (2) individuals without triceps, (3) individuals with some function in the hands as a result from a lesion at the level of the first thoracic vertebra and sparing of the intrinsic muscles of the hand or from a central cord lesion, (4) those without any trunk

muscles, (5) those with some abdominal musculature, and (6) those with some hip extension or flexion. (Jackson and Fredrickson, 1979)

Jackson and Fredrickson (1979) state that these classifications are ever changing. Medical records determine the classification and may be reviewed by the team to make sure the participant was correctly classified, as athletes may try to be placed in a division comprised of athletes with more involved disabilities than themselves to create an advantage. (Jackson and Fredrickson, 1979)

Benefits of Sports

Support for involvement in athletics for spinal cord injured persons has been justified by research on the physical and psychological benefits of sports and exercise. Goldberg and Shephard (1982) state that involvement in sports may serve to increase the actual range of physical abilities. Exercise has been known to be particularly beneficial for individual's with paralysis (Bharadwaja, Boker, and Gail, 1978). Physical activity may help to make activities of daily living easier by assisting in regaining maximum use of their remaining physical capacity. (Bharadwaja, et al., 1978)

It has been indicated that fitness, for individuals with spinal cord injury, as in able-bodied individuals, is related to one's level of activity (Hoffman, 1986). Studies have confirmed that spinal cord injured persons, who are sedentary, are not as fit as their peers who are active (Zwires and Bar-Or, 1975).

Hoffman (1986) described the dehabilitative cycle in individual's with spinal cord injury as the loss of motor function which may result in a sedentary lifestyle. Therefore, the individual may develop a decreased physical work capacity, leading to a decreased incentive to exercise. A reduced capacity for physical work and deconditioning, as a result in low activity level, may cause even more limitations on one's level of physical exertion. Engel and Hildebrandt (1973) state that significant

reductions in cardiovascular capacity may result from even brief periods of decreased activity in individuals with spinal cord injury.

Disabled athletes have generally demonstrated better health, as a result of the physical benefits that sports offer. The advantages offered by participation in athletics include increased mobility, greater ease in transfers, improved balance, and the development of greater endurance. (Bharadwaja, et al., 1978)

A study regarding health maintenance in paraplegia by Stotts (1985) demonstrated that paraplegic athletes, on average, reported significantly fewer numbers of hospitalizations, since injury, than nonathletes. The reported hospitalization for athletes was approximately once every four years, while the number of hospitalizations for nonathletes was approximately every 1.4 years. The nonathletic group not only had more hospitalizations, but also had more expensive ones that resulted from skin breakdown. As Stotts has pointed out, skin breakdown is not only one of the most common complications of spinal cord injury, it is also one of the most expensive (1985).

Stotts (1985) found that only 12.5%, of the forty-two athletes surveyed, reported hospitalizations due to skin breakdown while 45% of nonathletes reported hospitalization, for that reason. Interestingly, ten percent of the nonathletes reported skin breakdown from trauma, that resulted in hospitalization, yet none of the athletes reported skin breakdowns, requiring hospitalization, due to external trauma. There was also a significant difference in the number of urinary tract complications, with in the last year of the study, that occurred between the two groups. Athletes had significantly fewer urinary tract complications than the nonathletes. (Stotts, 1985)

A study by Curtis, McClanahan, Hall, Dillon, and Brown (1986) also demonstrated that spinal cord injured athletes sought medical attention less frequently than nonathletes. This was attributed, potentially to a greater level of self-reliance and responsibility for health management (Curtis et al., 1986). As Bharadwaja, et al.,

(1978) stated, participation is sports may generate a feeling of responsibility and independence, therefore, individuals who participate in sports develop a high level of autonomy with regards personal health care.

Exercise has also been suggested to help decrease the occurrence of cardiovascular disease and respiratory infections that may be attributed to the poorer prognosis of spinal cord injured persons, as compared to nondisabled individuals (Geissler, Jousse, and Wynne-Jones, 1977). As the life expectancy of spinal cord injured individuals grows, the proportion of persons affected by cardiovascular disease grows as well (Geissler et al., 1977). Cowell, Squires, and Raven (1986) have reported that spinal cord injured persons are at a greater risk to the effects of artherosclerosis, which is thought to be one of the greatest risk factors in decreasing the life expectancy of the individual. The degenerative nature of a restrictive sedentary lifestyle has been thought to be the reason for the greatest risk of mortality from coronary artery disease (Cowell, et al., 1986). Additionally, Blocker, Merril, Krebs, Cardus, and Ostermann (1983) state that physical inactivity, obesity, artherosclerosis, hypertension, and excessive emotional distress are likely to be major components in the development of cardiovascular disease.

Hjeltnes and Vokac (1979) conducted a study in which heart rates of five rehabilitated paraplegics were monitored, at home, during a two day period. Just as in nondisabled persons, it was found that the subjects did not reach heart rates within the desired range, to attain a training effect, solely during everyday activities. Contributions to the maintenance of circulatory fitness may be reached in paraplegics during workloads equivalent to 50 to 60% of their heart rate reserve. (Jochheim and Strohkendl, 1973) However, in Hjeltnes' and Vocak's (1979) study, the subjects only used on average only 15 to 24% heart rate reserve throughout their day.

The smaller muscle mass in the upper extremity exercise causes fatigue to occur sooner. Subsequently, only 50 to 60% of the maximal workload, that is

accomplished by the lower extremities, is attainable (Vovak, Bell, Bautz-Holter, and Rodahl, 1975). Additionally, wheelchair propulsion induces high levels of circulatory stress upon the individual in a wheelchair. Preexisting cardiovascular conditions have the potential to be exacerbated by wheelchair propulsion. It has, however, been reported that training for improvement in the cardiovascular system's function, with exercise and sports involvement, is not always addressed properly in rehabilitation. (Hoffman, 1986)

As Cowell, et al. (1986) concluded, it is apparent that a training program is required to improve aerobic capacity, increase muscle strength, and maintain and improve cardiovascular fitness. Moreover, individuals who participate in wheelchair sports have demonstrated greater cardiac reserves which may be advantageous for the demands of every day life including activities such as transfers, mobility, and performance of activities of daily living (Cowell, et al, 1986). Wheelchair sports have been shown to increase one's maximal aerobic power, work capacity, and mechanical efficiency, by increasing the area of slow twitch fibers within the muscles that are working (Taylor, 1979)

A well conditioned athlete may only use 18 % of their peak oxygen intake during normal use of a wheelchair. This may make it possible for the individual in a wheelchair to put forth less exertion during daily ambulation, than for a person who is less physically active. (Miles, Sawka, Wilde, Gotshall, et al, 1982) This increase in mechanical efficiency possibly makes participation in activities of daily living easier for the fit individual, due to functional stability. This stability enables the individual to maintain the levels of functional activities of the bodily system's, for an extended period of time, for effective and efficient performances, by avoiding interruptions in the system's function. (Viru and Smirnova, 1995)

A problem that may be faced by paralyzed individuals is weight gain. Claus-Walker and Halstead (1981) reported that following spinal cord injury, the

degenerative processes that occur lead to physiological changes. These include decreases in lean body mass and increases in the body fat percentage. Muscle atrophy, secondary to loss of muscle use, was viewed as responsible for the decrease in lean body mass (Claus-Walker and Halstead, 1981).

Participation in sports may help prevent weight gain, purely from the physical activity. Additionally, weight gain may be prevented as the individual makes more of an effort to remain healthy to increase their capabilities and performance when competing. (Bharadwaja, et al., 1978)

Regular physical activity may assist in counteracting the development of osteoporosis, as a generalized form is immediately seen following spinal trauma (Cowell, et el., 1986). Spontaneous stress fractures, most likely due to muscle spasms, routine transfers, therapy stretches, and minor movements, may occur as a result of the weak bone structure (Comarr, Hutchinson, and Bors, 1962). Rehabilitation and physical independence may be limited due to fractures and ectopic bone formation that restricts joint range of motion, both resulting from bone demineralization. According to Cowell, Squires, and Raven (1986) calcium loss may be repaired and the process of osteoporosis slowed down as the individual becomes more physically active.

Jackson (1987) reported increased strength, stamina, fitness, and mobility as benefits of sport for the individual. Previous studies, as reviewed by Jackson (1987) have demonstrated that physical adaptation to life in a wheelchair may be increased by participation in wheelchair athletics as evidenced by wheelchair athletes demonstrating greater levels of adaptation than their non-athletic peers. This may be demonstrated by repetition and drills that are performed in practice for the athletic event targeted at improving skill level for the game.

The advantages of skill acquisition for the sporting event do not have to stop once the individual leaves practice. The skill developed may benefit the person in

daily activities such as maneuvering around tight corners at home, or moving around obstacles at work or in the community. Arm strength, developed by physical exercise, is essential for mobility in the community. Good strength is required to overcome environmental obstacles in a wheelchair, such as mounting curbs and ramps (Shephard, 1988). Paraplegics who are active two or more times a week have been shown to demonstrate better physical condition than their peers in wheelchairs who live sedentary lifestyles. (Nakamura, 1973)

Roberts (1974) formed a hypothesis that demonstrated subjects who had a high level of activity reported fewer disturbances in psychological functioning than those who are inactive. Goldberg and Shephard (1982) surveyed 17 paraplegic, all of whom participated in sports at some level. In this study, they found that the more active individuals also reported to be more confident and display a more sociable personality and willingness to try new things. In contrast the less active individuals tended to be more cautious, withdrawn and demonstrated feelings of inferiority. Additionally, the more active persons were associated with an increased ability to confront tough emotional situations.

Individuals who pursue a physical lifestyle have been shown to surpass their inactive counterparts with regards to attaining a better mental outlook and a better acceptance of their disability (Jackson, 1987). Psychological testing has revealed that when compared to nonathletes, wheelchair athletes demonstrate much higher levels of self-satisfaction, greater self-image, fewer inclinations for suicide, and more independent attitudes (Jackson and Davis, 1983).

Glick (1953) has stated that individuals with physical limitations may have difficulty adjusting to their disability. However, more recent research shows that vigorous exercise may reverse these difficulties by increasing self-image, and by enhancing the individuals actual physical abilities. Both serve to increase adjustment and enhance quality of life. (Glick, 1953)

Disabled athletes have also reported psychological benefits associated with athletics. Reports of increased self-confidence and self-respect resulted from overcoming the obstacles and difficulties in learning a sport (i.e. skiing) not only in terms of the sport itself, but also in everyday life. (Bharadwaja, et al., 1978)

Social alienation has been a recognized problem for individuals with disabilities (Adedoja, 1987). Isolation may lead to feelings of rejection and depression, retarded emotional development and self-pity, which can be compensated for by passive hostility and egocentricity (Adedoja, 1987; Briuninks, 1978; and Harper and Richmond, 1980).

Paulsen, French, & Sherrill (1990) ,using the Profile of Mood States, found that wheelchair athletes scored lower in categories of tension, depression, anger, fatigue and confusion, in addition to scoring higher in vigor in comparison to their non-athletic peers. The success sports involvement offers may be related to successful social-leisure functioning, as it is through enjoyment of social-leisure activities that people receive most of their personal rewards and happiness (Paulsen, et al., 1990).

A spinal cord injury may interfere with many social and leisure activities the individual participated in before his/her injury. Therefore, the individual may be deprived of the rewards and satisfactions he/she received before the injury and that were considered important to his/her life roles. This deprivation may further complicate the long and frustrating task of having a disability. (Stotts, 1985)

Involvement in sports enables the individual to become athletically and socially involved with nondisabled peers and family. Through involvement in sports, such as tennis or skiing, the disabled individual no longer has to stay home while friends or family go on a ski trip, for s/he is able to participate with nondisabled individuals in social engagements. According to (Bharadwaja, et al., 1978) this helps to increase one's enjoyment in his/her life and has a strong psychological impact on

the individual's well-being. Social alienation is decreased while helping the individuals see that they do not need to be settle for a life void of physical activity (Owens, 1968).

For wheelchair athletes who play sports on a competitive level, additional benefits may be obtained. Pride in one's self is one benefit that may result from success of competition (Jackson, 1987). Jackson (1987) uses the example of the psychological uplift that one may experience as an individual is chosen to represent his/her country in an international event. The increased pride and morale achieved from success plays a strong role in developing a greater self-concept (Jackson, 1987) and may help further increase one's quality of life.

As Jackson (1987) mentions, athletics may also provide reasons and a means for an individual to travel and visit other countries. These opportunities assist in increasing one's psychological well-being, as they provide the chance to form networks with one's peers. Jackson (1987) suggested that this gives the individual an opportunity to meet other people with similar problems and issues. The networks formed provide peer support and a chance for individuals to discuss various ways of dealing with their problems and to possibly find new ways to handle a problem. Jackson (1987) adds an important piece of information pertaining to the presentation of these opportunities. He goes on to state that although cultural exchanges (i.e. music, science, and literature) may possess the potential to provide such opportunities, in actuality, apart from sports, these exchanges are uncommon.

Participation is sports may generate a feeling of responsibility and independence. Individuals who participate in sports often develop a high level of autonomy with regards personal health care. Athletes have been shown to be extraordinarily conscious of their health and greatly tolerant of side effects, including spasticity and pain. The high levels of independence and consciousness concerning

one's health may lead to developing a better ability to cope with associated problems. (Bharadwaja, et al., 1978)

Psychological benefits may arise as barriers are broken, secondary to the publics increasing awareness of sports involvement. Health care professionals tend to be overprotective and conservative when looking at disabled person's potentials, partially due to a sense of worry about possible risks of injury. (Bharadwaja, et al., 1978)

However, motor vehicle injuries and accidents in sports such as football, diving, wrestling, and gymnastics account for many of the younger spinal cord injured patients injury (Bruce, Schutt, and Sutton, 1984). Furthermore, these patients are often attracted to the excitement and thrills of fast-paced competition (Shephard, 1988). Involvement of the disabled person in sports may help bring to light the physical potential of the individual. Thus, stereotypes about the capabilities of such persons may be decreased and more doors may be opened for opportunities to experience enjoyment throughout one's life.

Jackson and Fredrickson (1979) have stated that sports may be used to promote integration to the community and provide a means to reenter the main stream life for individuals with a disability. However, the lack of opportunity due to unavailable facilities in the community and support in terms of coaches and funding to participate in sports is a problem facing disabled athletes. (Jackson and Fredrickson, 1979)

Bharadwaja, et al., (1978) found that many individuals still find it difficult to gain access to facilities for indoor and outdoor recreational activity, despite the growth in the public interest of physical fitness. One factor, they believe, is a result of the lack of education the disabled individual received about his/her disability. Some persons are unaware that they may become more physically active, despite their disability. Another reason is a possible lack of education regarding the benefits, thus

perhaps leading to a lack of motivation to do so. Others may be motivated to become involved in athletics but do not have the means to become involved. (Bharadwaja, et al., 1978)

The involvement in sports for individuals with disabilities has benefits for society as well (Jackson and Fredrickson, 1979). The increased knowledge of athletic involvement of individuals with disabilities may assist the community in becoming more aware of the potential of the disabled athlete. By observing his/her success in an activity, one may have not deemed possible for the disabled individual, the social stigmas and economic barriers are further removed. To illustrate their point, Jackson and Fredrickson (1979 pp. 296) suggest that when a possible employer of a disabled athlete hears that s/he "raced a mile in just over 5 minutes or lifted almost 600 pounds" the employer may begin to view the disabled individual more favorably, as the public is generally interested when a wheelchair athlete does something extraordinary (Jackson, 1987).

Often individuals associate disability with sickness. Sports have played a large role in bringing to light the capabilities of disabled individuals and aiding in the elimination of stigmas as the attitudes of the public are more easily adjusted and an individual in a wheelchair is no longer viewed as "sick". (Jackson, 1987) A potential employer may think the disabled individual will need to take more time off from work than a nondisabled employee. However, the athletes' dedication and participation in the sport, as well as the physical and psychological benefits help to bring to light the knowledge that disability and sickness are not synonymous. Therefore, the activity may have a significant positive impact on employability. (Bharadwaja, et al., 1978)

Jackson and Fredrickson (1979) state that the increasing awareness of the potential of disabled athletes benefit non-athletic disabled individuals. As disabled individuals gained acceptance in society, structures which have been barriers to

wheelchair users moving freely in the community have been modified, to increase accessibility. Sports, to a significant degree, have promoted public awareness and increased advocation for such adjustments (i.e. increased building accessibility, wider supermarket check-out counters) to assist in easing community integration. Jackson (1987) adds that many technological advances have been pioneered through wheelchair sports. This has lead to the availability of better wheelchairs for athletes and non-athletes alike.

Competitors are working at great levels to create advances in wheelchair designs that will, in time, be made available to the average user (Bharadwaja, et al., 1978). For example, in 1987, Jackson, stated that Rick Hansen, a Canadian athlete who participated in the wheelchair odessy (25,000 miles around the world) evaluated a four-wheel drive wheelchair, as he crossed snow-covered ground during the odessy, to be available for the average wheelchair user. The evaluation of clothing for use in very cold temperatures was also evaluated as a result of Hansen's voyage. Another advancement contributed by sports for the average disable individuals are electronic sensor device that measures the skin temperature of insensitive areas and regulate electronic heating coils to prevent the occurrence of frostbite. (Jackson, 1987)

Participation in sports has been shown to be important. It is not solely a recreational event, as it contributes to the individual's entire quality of living. Literature has shown that although everyone is not interested in sports and physical activity and others may derive their enjoyment through many other activities, it is recommended that everyone should make physical activity a part of their daily life to acquire the advantages of exercise. (Bharadwaja, et al., 1978)

The physical and psychological benefits of sports for persons with spinal cord injury have been successfully summarized (Noreau and Shephard, 1995). However, research has shown that little consideration of sports activities has been given to individuals with spinal cord injuries by clinicians and rehabilitation researchers

(Stotts, 1985). A survey by Rucker (1980) demonstrated that only eight percent of those questioned reported their family doctor as a prime source for incentive to exercise. Furthermore, Hart, Rintala, and Fuhrer (1996) found that education, in the area of exercise, was a major concern among spinal cord injured persons. They surveyed six hundred and sixty-one persons with spinal cord injury and found that a majority would have liked to receive more information about exercise participation.

However, while the benefits of athletics for individuals with disabilities has been generally agreed upon, Jackson and Fredrickson (1979) reported two main problems that often face disabled athletes: (a) lack of recognition, and (b) lack of opportunity. The performance of the disabled athlete was typically not viewed as highly, for there was a tendency to compare the disabled athletes performance to that of an able-bodied individual. This created difficulty in convincing the general public, the press, and non-disabled athletes that disabled athletes were serious competitors. (Jackson and Fredrickson, 1979)

Jackson and Fredrickson (1979) continued to state that the press, governing bodies of athletic programs, coaches, and trainers must recognize that athletic performances of disabled athletes may be as worthy and "commendable" as that of an able bodied competitor and represent the hard work and dedication the athlete put forth to make such accomplishments. To make their point clear, Jackson and Fredrickson (1979) quote the following:

> As no one expects a featherweight lifter to lift as much as a heavyweight lifter, the featherweight's performance in his own class can be as exciting for the spectator and as rewarding for the individual as the heavyweight'sperformance in his class. In a similar was, the performance of some disabled athletes are truly remarkable. A paralyzed athlete, David Kiley, from the United States has raced the metric mile (1,500 m), in a wheelchair, in minutes and 14 seconds. (pp. 295-296)

Jackson and Fredrickson's second point was that there are fewer opportunities for the disabled athlete to train and compete than for the able-bodied athlete to do so (1979). A lack of awareness of community resources highly impact the health professional's neglect of sports in rehabilitation programs. This greatly decreases the opportunity for sports involvement (Bharadwaja, et al., 1978).

However, rehabilitation may be an ideal time to introduce wheelchair sports. As Bharadwaja et al., (1978) have stated, spinal cord injury centers should be the principal facility for presenting the individual with information on sports. Thorough, early education is necessary to ensure that the individual is aware of all of his/her opportunities. Curtis (1986) found in a study that even nonathletes demonstrated an interest in sports and in the accessibility to athletics as a leisure activity.

Nevertheless, it is not only common for communities to lack facilities for athletic competition, but often the facilities in the community are not wheelchair accessible. Limiting factors in exercise participation have been reported to be the great distances required to get to a training facility (Shephard, 1988). Jackson and Fredrickson (1979) state that in addition to facility availability, more support is needed from coaches and from funding to support the athletes.

Support from coaches and trained health professionals is needed as initially, individual instruction is important. Certain sports may be complex and require adaptations and demanding physical skills, calling for individual training programs to develop specific skills tailored for the individual's needs. New sports for disabled individuals are tried each year and have been shown to be safe, as long as proper training and skill development take place (Bharadwaja, et al., 1978), just as it would be for a nondisabled individual beginning a new sport program. Both coaches and trained health professionals may play a role in carrying this out to ensure safety. As one can see, a shortage in persons to provide adequate training may place the athlete at a disadvantage and may even risk his/her safety. (Bharadwaja, et al., 1978)

However, Rimmer (1994) reports that there has been dramatic increases in the area of exercise testing and prescription for individuals with disabilities, in the last decade. Individuals with disabilities have been empowered with more rights with the passage of antidiscrimination laws including the Individuals with Disabilities Education Act, the Rehabilitation Act of 1973, and the Americans with Disabilities Act. These laws, in addition to receiving greater visibility in society today, by appearing more frequently in television programs, movies, and commercials, and greater research by health professionals, have fostered integration in the community, including areas of fitness and sports. (Rimmer, 1994)

Despite the growing awareness of the benefits that arise from physical activity for persons with disabilities and the growth in community integration, exercise does not often play a role in the lives of the tens of thousands of people in the United States who are spinal cord injured, as a result of accidents or diseases (Rimmer, 1994.) The purpose of this research was to investigate the factors that influence persons with spinal cord injury to initially become involved in athletics and to continue involvement in the sport. This survey was also designed to determine if and how involvement in wheelchair athletics provides physical and psychological benefits for the participants.

METHODS

Subjects

The subjects surveyed were five individuals, above the age of eighteen, with spinal cord injury. Their ages ranged from 35 to 53 years with a mean age of 43.3 years. All subjects were located within a two hour radius from Albany, New York. Complete demographic data can be found in table 1.

The questionnaire used is shown is Appendix A. The data will be tabulated and the results then will be described. The subjects were recruited by: (a) referrals

from persons in the community who organize wheelchair athletics; and (b) referrals from wheelchair athletes.

Examples of the scope of wheelchair sports usually include track and field, swimming, road racing, archery, weight lifting, table tennis, tennis, basketball, winter sports, bowling, billiards, boating, and many others (Curtis and Dillon, 1985) In this study, the definition of sport and athlete was based on the subject's perception of the activity in which s/he participates. Table 2 is a description of the subjects involvement in athletics before and subsequent to their injury.

Mat*erials/Measurements*

Subjects were provided with a self report questionnaire that was given in person. The questionnaire included the following:

(a) *Demographic data section.* Designed to specifically request sex, age, marital status, employment (full or part time), date of injury, level of injury, and primary diagnosis.

(b) *Pre-injury athletic involvement.* Tailored to specifically request information of the sports the individual participated in, prior to injury, and the frequency in which s/he was involved in the sport.

(c) *Post-injury involvement.* This was designed specifically to request data pertaining to the type of sports the individual is involved in and the frequency in which s/he participated. Factors that may limit involvement were also included.

(d) *Acquisition on information.* This was tailored to request material on primary providers of information, and the type of information acquired including: organizations for wheelchair sports, wheelchair design, adjustment, increasing biomechanical efficiency, injury prevention and the subject's perceived usefulness of the information.

(e) *Perceived benefits.* Designed to request information on physical, social, and psychological benefits from the individual's perspective and its relation to daily activities.

A copy of the survey can be found in Appendix A.

RESULTS

The results was based on the responses from the five participants. This survey was comprised of four males and one female. The employment status was as followed: full time (1), part time (1), and not currently employed (3). The group's average number of years since the occurrence of injury was 16 years. The diagnosis for the subject's were as followed: one subject with multiple sclerosis, one subject with polio, two subjects with paraplegia (T-7 complete and T-4, T-5 incomplete), and one subject with quadriplegia (C-8, T-1 incomplete). Three subjects were single, one married, and one divorced. (see Table 1)

The pre-injury athletic history revealed that involvement in competitive or recreational sports activities ranged from 1 to 39 hours per week. Five out of the five subjects reported participation in sports at least once a week (see Table 2). The sports participation history within the previous year demonstrated that involvement in competitive or recreational sports activities ranged from 5 to 24 hours per week. The total group consisted of five out of five individuals currently involved in competitive wheelchair sports. Three out of five subjects also reported current involvement in recreational wheelchair sports.

The data revealed that the primary factors that limit the number of sports or the amount of time subject's play were reported to be practicality, enjoyment, disability, time, and finances. Four out of five subjects reported that inaccessibility and limited availability of sport programs in the community negatively impact sports participation. One subject reported driving two hours from home to reach the nearest

accessible sports program. Four out of five reported that they perceived most public sports facilities as not being "truly" wheelchair accessible.

The subjects reported that primary sources of information about wheelchair sports participation were a wheelchair representative (1), verbal information (3), and the media, newspaper, magazine (3) (see Table 3).

Two out of the five subjects reported receiving information regarding sports participation while in rehabilitation (see Table 4). Of these two subjects, both reported receiving the information from a recreation therapist. None reported receiving information from an occupational therapist, physical therapist, or physician. Reportedly, the information received was very broad. Subjects reported receiving general encouragement to participate, but no specific referrals to groups or organizations were received.

Four out of five subjects reported they would have liked to receive more information about sports participation and felt that they should have received information sooner. Responses included the desire for more information regarding programs themselves and more for assisting with becoming involved. One out of five subjects reported that he would not have liked to receive additional information at the time of initial rehabilitation secondary to not being emotionally ready to re-enter athletics. (see Table 4)

Three out of five subjects reported receiving information on wheelchair design for sports (see Table 5). All three of these subjects reported receiving the information from a friend (via networking with other wheelchair athletes). The two subjects who did not receive such information, thought this would have been beneficial.

The data reveals that zero of the five subjects reported receiving information to increase biomechanical efficiency during athletics. All five subjects responded that they would have benefited from this information. (see Table 6)

Two of the five subjects reported receiving information pertaining to the prevention of injuries during sports participation. Three out of five did not receive such information and reported it would be beneficial. (see Table 7)

Data was collected on the subjects' initial perceptions about playing wheelchair sports and their changes over time. Five out of the five subjects revealed that playing the sport was difficult, at first. Responses included feeling frustrated, embarrassed, nervous, highly self-conscious, and uncomfortable with his/her body. Additionally, two subjects added that despite the difficulty, it was very exciting.

Five out of five subjects reported significant changes that occurred from the beginning of play to the present time. Subject reports indicate that the initial feelings stated above subsided as subjects played more and became more comfortable with their bodies and wheelchairs. Reports included that sports helped the subject feel better about him/herself, which overrode the initial feelings and helped him/her play better.

Data was also collected on the benefits that the subject's believed sports participation offered him/herself (see Table 8). Responses to each statement include either strongly agree, agree, disagree, or strongly disagree. In response to the statement that sports has offered social connections, three out of five strongly agreed and two out of five agreed. The response for the statement that sports offered a support group, one of the five strongly agreed, three out of five agreed, and one subject disagreed.

Three out of five subjects strongly agreed that sports has offered friendships, while two out of five agreed. All five respondents responded they met with these friends, outside of participating in sports.

Three out of five subjects strongly agreed that sports has increased assertiveness, while two out of three agreed. All five subjects strongly agreed that participating in sports has helped to relieve tension.

In response to the statement that sports has helped give an internal feeling of control, two subjects strongly agreed and three subjects agreed. Further responses to this statement include control has been increased by sports participation helping to increase patience with one's self, providing a certain feeling of freedom gained from playing, by controlling actions while playing that have a positive outcome, and by winning.

Three out of five subjects strongly agree and two out of five subjects agree that sports has helped increase satisfaction with self. Three out of five subjects strongly agree and two out of five agree that sports has helped increase self-image. In response to the statement, "I participate for the social experience/benefits", three out of five strongly agreed, one of five agreed, and one of five disagreed. In response to the statement, I participate for the health/fitness benefits, two of five strongly agreed, two of five agreed, and one of five disagreed.

Three out of five subjects strongly agreed and two out of five agreed that sports has helped increase strength. One of five subjects strongly agree and four of five subjects agree that sports has helped increase coordination. One of five subjects strongly, and three out of five subjects agree and one out of five subjects disagree that sports has helped increase balance. Three out of five subjects strongly agree and two out of five subjects agree that sports has helped increase endurance. All five subjects reported that the benefits has carried over to help in every day activities. Subjects reported that transfers, bathing, dressing, and mobility became easier. Additional responses were that the psychological benefits of the physical activity helped subjects to become mentally better able to handle every day situations and frustrations of having a disability.

DISCUSSION

The results support the hypothesis that spinal cord injured persons who participate in sports perceived the sport as helping to increase their physical and psychological well-being. Subjects generally agreed that they would have benefited from receiving more information, than they had, in rehabilitative or clinical settings.

These results supported the previous research (Jackson 1987 and Noreau and Shephard, 1995) that revealed participation in athletics has high positive psychological and physical benefits for individuals with spinal cord injury (e.g. decreased tension and increased self-satisfaction, control, assertiveness, self-image, strength, coordination, balance, and endurance). This research attempted to identify why athletes report more positive well-being than their counterparts who do not participate in sports. In response to the question 'why?' subjects reported participation was exciting, a way to get out of the house, "it makes me feel alive/like a person again", and provided a means to get re-involved in activities that were enjoyable to him/her before the injury.

A response from one subject revealed that participating in athletics enabled him to temporarily forget about disability and help put focus on to other aspects of his life. All subjects strongly agreed that athletics helped to reduce tension. Subjects reported that this helped them mentally, throughout every day activities. The study by Paulsen, French, and Sherrill (1990) found wheelchair athletes reported significantly less tension than nonwheelchair athletes. Thus, the link of sports participation to decreasing tension in individuals with spinal cord injury is supported by this study.

The reported decrease in tension may also have been related to the subjects' general agreement that sports has helped to increase assertiveness, internal sense of control, and self-image. Increased assertiveness may in part be related to the nature of competition. The competition offered by sports may require one to take a more active role to effect the outcome. This may help to reduce passivity or learned helplessness

by requiring one to take charge of the event and become a leader, instead of a passive bystander.

Previous studies have demonstrated that tension and depression may be related to social alienation that often encompasses disability (Adedoja, 1987) and the discontinuance of activities that one perceived as enjoyable before injury (Stotts, 1985). As revealed in this survey, social alienation was decreased by participation is athletics, by the formation of friendships and support networks. Social alienation may be further decreased as sports also provides for social engagements with nondisabled peers and family (Bharadwaja, et al., 1978). Sports, such as tennis, are often easily adapted. For example, the individual in a wheelchair is allowed two bounces before returning the ball, while the participant, not in a wheelchair, is allowed one.

In this survey, all subjects participated in sports before their injury. Therefore, their injury was a potential blockade for continued pursuit of those activities that were of value to him/her and a potential source of tension or depression. Becoming involved again in athletics, after their injury, reportedly aided in reviving the rewards and satisfactions they received before the injury and that were considered important to their life roles. These factors, according to Stotts (1985) are important in reducing complications of the long and frustrating task of having a disability.

Subjects all reported that athletics increased his/her self-image. Important factors included athletic involvement helping to increase body image and comfort level (physical and mental) in a wheelchair. Reports of the increased self-image may be related to the increased self-confidence and self-respect that previous research has shown to be linked to sports participation for individuals with a disability. (Bharadwaja, et al., 1978) Subjects reported that pride resulted from positive events, such as wins. This is supported by Jackson (1987) who stated that pride in one's self is a great benefit that may result form successful competition.

It was generally agreed upon that sports help provide an internal sense of control. Reports included feeling a certain freedom from disability, feeling in control over play, feeling in control over positive situations, and helping to develop self-control by increasing patience. The information and availability of athletic programs for disabled individuals provides options. Options regarding whether to play or not to play, what sport(s) to participate in, creating schedules, and organizing meetings, all help place the individual in control of the event. Schulz and Decker (1985) found in a study of life satisfaction and individuals with disabilities, that perceived control had the strongest association with such satisfaction.

In the same study, by Schulz and Decker (1985) it was found that there was a positive correlation between life satisfaction and social support. However, Schulz and Decker (1985) continue to state that it remains undetermined whether the several kinds of social support (i.e. tangible, emotional, and informational) differ in their association with life satisfaction and individuals with spinal cord injury.

This survey demonstrated that emotional support is often provided secondary to sports participation. All subjects agreed that athletics has fostered friendships. These friendships were reportedly not limited to meeting only during sports participation. All subjects reported arranging meetings with the friends outside of structured playing time. Additionally, four of the five subjects reported that support networks were formed through sports participation.

These results are supported by previous research. Jackson (1987) stated that sports involvement provides opportunities to network with one's peers, to meet other people with similar problems and issues, and provide peer support to discuss various ways of dealing with their problems and possibly find new ways to handle them.

This study also revealed that informational support plays a role in life satisfaction, as evidenced by the responses regarding the provision of information for wheelchair sports. Three out of five subjects reported that not receiving any

information regarding athletics, early on their disability, was both frustrating and dissatisfying. Subjects reported feeling that information should have been provided years before it was, so one could have begun participation earlier. The lack of information hindered one's ability to become involved in an activity that had high levels of value for him/her.

A goal of rehabilitation is to recognize personal values and goals of the individual. From the results of this study, it appears that more attention needs to be given to goals and values relating to athletic participation, to help ensure all aspects that influence ones life and self-satisfaction are met.

In an article by Bharadwaja, et al., (1978) it was stated that physicians have been conservative in developing the potentials of disabled persons. Children in wheelchairs were used, as an example. Physicians have often been overprotective of these individuals. This influences other personnel, who work with the individuals, and are concerned about possible risks of injury. Concerns of potential malpractice suits may also make health professionals more cautious when discussing and providing material on sports to an individual with a disability. (Bharadwaja, et al., 1978)

Suggestions for the provision of information regarding athletics include supplying education to inform the client about its physical and psychological benefits, increase awareness of community resources, and assisting the individual in networking to find a suitable athletic program in his/her area. Regardless of whether the health professional involved with the individual is an athlete him/herself, the personnel can act as a networker and resource to assist in enabling the individual to start a program.

However, one of the five subjects in this survey reported that during the time of initial rehabilitation, he was not ready, emotionally, to receive more information than the general encouragement to participate, that was offered. The individual's

acceptance of disability and emotional, not only physical readiness are highly important factors to consider when discussing this topic. Suggestions in this situation include the following: (a) providing a general overview of available information, (b) suggesting the possibility of organizing an informal one-on-one meeting with another spinal cord injured individual, who is involved in athletics to create a network, and (c) informing the client that when s/he is ready to become involved in sports, s/he is welcome to contact the health professional for further information.

The results of the survey demonstrate a general agreement that sports help to increase strength, coordination, balance, and endurance. Reportedly, the increases in all of these areas have carried over to help make every day activities easier. Some of these activities include transfers, bathing, dressing, and moving around at home and outdoors in the wheelchair.

A study by Fuhrer, Rintala, Hart, Clearman, and Young (1992) found that self-assessed health had a moderately strong impact on life satisfaction. A possible link to this study is that all subjects reported that participating in athletics has helped them to feel better, mentally and physically. The reported agreement from subjects about the physical benefits of sports leads to question if the benefits listed above qualify to be considered perceived quality of health. It appears acceptable to qualify psychological and physical well-being as health, thus concluding that the positive impact of sports on health assists in raising life satisfaction. Additionally, subjects reported that their perceived increases in physical skills that were provided by sports helped not only for physical components of their daily life, but also for the mental tasks of living with a disability.

The results of this survey demonstrate that more information about sports participation and the availability of programs would have been beneficial to enhance one's opportunities to play and help increase performance. Subjects agreed that information provided in rehabilitation was very general. Bharadwaja, et al., (1978)

state that a lack of or knowledge of community resources highly impact the health professional's neglect of sports in rehabilitation programs and greatly decreases the opportunity for sports involvement.

This has also been revealed in this survey by the reported provision of general encouragement to play, but no reported provision of information about a specific group or organization. Zero subjects reported receiving information from their occupational and physical therapists and physician. Two subject's reported receiving information from their recreational therapist. Only two subjects reportedly received information while in rehabilitation.

The results reveal that only three of the five subjects received information on wheelchair design for athletics. Additionally, all three subjects reported receiving information through networks formed, to other wheelchair athletes, by participating in sporting events. Again, these results support the importance of peer relations and social contact for problem-solving through shared difficulties and experiences.

A majority of the subject's questioned reported that they did not receive information about working to increase their biomechanical efficiency during athletics (i.e. through seating and positioning, chair adjustments, adaptive equipment, etc.). However, the subjects reported that if this information was received it would have been beneficial. Shephard (1988) states that the importance of biomechanics, in wheelchair sports, is growing so improvements in the individual's mechanical efficiency are increased and the risk of injury is minimized.

The results of this survey revealed that subjects still found accessibility to be a limiting factor in participating in sports and recreation. Wheelchair accessibility of community facilities was reported to be a major problem facing the subjects. In 1978, Bharadwaja, et al., stated that many individuals found it difficult to gain access to facilities for indoor and outdoor recreational activity, despite the growth in the public interest of physical fitness. Today, in 1998, even with the additional research

supporting the benefits of athletics, limited access to facilities still appears to restrict participation.

This survey revealed that there are limited opportunities for the disabled athlete to train and compete, as evidenced by subjects traveling up to two hours to participate in a wheelchair athletic program. Previous research by (Shephard, 1988) has also found a limiting factor in exercise participation has been reported to be the great distance required to get to a training facility. This travel time may not be possible, on a regular basis, due to practicality and time constraints placed by other responsibilities, such as a family or job.

Subjects reported initial feelings on playing wheelchair sports were those of embarrassment and nervousness. Attitudes on playing changed over time as subject's reported feeling more comfortable with their bodies and chairs, which in turn, reportedly helped to make one's self "feel better". Goldberg and Shephard (1982) found, in their study of spinal cord injured persons and activity level, that the high activity group of individuals demonstrated having a better body image than less active persons. This survey is supported by the study, as subjects reported athletic involvement helped increase comfort level with their bodies. In turn, this increase, reportedly, led to an increased ability to play the sport, which further increased self-image.

In conclusion, although everyone has different preferences and not everyone desires to be an athlete, research has demonstrated that sports and recreation are almost more important for disabled individuals than for non-disabled individuals (Jackson and Fredrickson, 1979). This survey demonstrated the advantages that athletics offer, from the participant's perspective. Given the rate of occurrence of secondary complications of spinal cord injury, it appears the physical and psychological benefits offered from athletics are important for overall well-being.

Jackson and Fredrickson (1979) state that sports are important to provide a means for community integration and reentering the main stream of life for disabled individuals. However, despite the research stating the benefits of athletics, it appears that more action needs to be taken to provide appropriate information on athletic programs for disabled individuals.

From the results of the survey, it appears that health professionals need to take a greater role in the provision of such information and acknowledging the value of sports to their client. Rehabilitation may be an ideal time to introduce wheelchair sports. As Bharadwaja et al., (1978) state, spinal cord injury centers should be the principal facility for presenting the individual with information on sports.

Early, thorough education is pertinent to ensure the individual is aware of all of his/her opportunities. It is important to provide such information to athletes and nonathletes alike. This is supported by Curtis (1986) who found that even nonathletes demonstrated an interest in sports and in the accessibility to athletics as a leisure activity.

This survey contained a small sample size of five individuals. All subjects were located with in a two hour radius of one another. It would be useful to survey a larger, more diverse sample of individual to further validate the results.

Additionally, all of the subjects in this survey were involved in athletics prior to their injury. It would be interesting to compare the results of this survey with that of a survey consisting of individuals who were not involved in athletics prior to their injury. It would be beneficial to compare the athletes and nonathletes (prior to injury) perceptions on becoming involved in a wheelchair athletic program and their perceived benefits.

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Table 1: Demographic data

Sex	
male	4
female	1
Age(range)	35 to 53 years
Marital Status	
single	3
married	1
divorced	1
Employment Status	
full time	1
part time	1
not	3
Years since injury	
(avg #)	16
Type of injury	
multiple sclerosis	1
polio	1
paraplegia	2
quadriplegia	1

Table 2: Athletic participation: Pre- and postinjury

Sport participation Sport		Subject # (reported average number of hours per week) Preinjury and Postinjury									
		1		2		3		4		5	
		pre	post	pre	post	pre	post	pre	post	pre	post
tennis				2	14		6			2	4
golf										3	
skiing						6					
volleyball				5		2					
softball						3					
racquetball					14		6				
running								2			
swimming								1			
bowling				3							
football				15							
soccor		1						3			
basketball				12		2					1
water ski				2							
wheelchair - cycling			10								
weightlift									4		

Table 3: Information received about sports

Primary Sources of Information	# of subjects who received information from source
magazines	2
newspaper	1
verbal	3
wheelchair company representative	1

Table 4. Information Given about Sports in Rehabilitation / from Health Professionals

FROM WHOM DID YOU RECEIVE INFORMATION:	**# of SUBJECT RESPONSES**
Occupational Therapist	0
Physical Therapist	0
Recreation Therapist	2
Physician	0
Rehabilitation	2
Outpatient Therapy	0
WERE YOU SATISFIED WITH INFORMATION?	
Yes	0
No	4
Somewhat	1
WOULD YOU HAVE LIKED TO RECEIVE MORE INFORMATION?	
Yes	4
No	1

Table 5. Information Provided on Wheelchair Provisions for Sports

DID YOU RECEIVE INFORMATION ON WHEELCHAIR DESIGN FOR SPORTS?

a. **YES 3**

if yes: FROM WHOM / WHERE DID YOURECEIVE INFORMATION?
FRIENDS = 3 (personal networking with other players)

b. **NO 2**

if no: WOULD THIS INFORMATION HAVE BEEN USEFUL?
YES = 2
NO = 0

Table 6. Information Provided on Increasing Biomechanical Efficiency During Athletics

DID YOU RECEIVE INFORMATION ABOUT WAYS TO INCREASE YOUR BIOMECHANICAL EFFICIENCY?

a. YES = 0
b. NO = 5

if no: WOULD THIS INFORMATION HAVE BEEN BENEFICIAL?
YES = 4
NO = 0
MAYBE = 1

Table 7. Information Provided on Injury Prevention

DID YOU RECEIVE INFORMATION ON INJURY PREVENTION FOR ATHLETICS?

a. **YES = 1**

if yes: WAS THIS INFORMATION BENEFICIAL?
YES = 1
NO = 0

b. **NO = 4**

if no: WOULD THIS INFORMATION HAVE BEEN BENEFICIAL?
YES = 4
NO = 0

Table 8. Data of Benefits of Sports Participation from the Subjects' Perspective

STATEMENT *# of RESPONSES*

	Strongly Agree	Agree	Dis-agree	Strongly Disagree
Sports has offered me social connetions	3	2		
Sports has offered a support group	1	3	1	
Sports has offered me friendships do you meet outside of sports? yes=5	3	2		
Sports has increasde my asseertiveness	3	2		
Sports has given me an internal sense of control	2	3		
Sports has helped to relieve tension	5			
Sports has increased self-satisfaction	3	2		
Sports has increased my self-image	3	2		
I participate for the social experience/benefits	3	1	1	
I participate for the health/fitness benefits	2	2	1	
Sports has helped me increase strength	3	2		
Sports has helped me increase coordination	1	4		
Sports has helped me increase balance	1	3	1	
Sports has helped me increase endurance	3	2		

Appendix A

QUESTIONNAIRE

I. DEMOGRAPHICS

1. Sex: ____male ____female
2. Age: _____
3. Marital Status: _____
4. Employment: _____not employed _____part time _____full time
5. Date of injury: _____
6. Level of injury/ complete or incomplete? _____

II. ATHLETIC HISTORY

1. Did you participate in sports before your injury? _____ (if no, go to (b))
   a. if yes: what sport(s) did you play? (please list all you were involved in) _____

_____

_____

_____

* which did you play for recreation? please write (R) next to the sport above, and which did you play for competition? please write (C) next to the sport above

*how often (average days/hours per week) did you play each one?_____

_____

b. if no: please explain why not

_____

III. PRESENT ATHLETIC INVOLVEMENT

1. What sport(s) are you currently involved in (please list all)?

_____

_____

_____

_____ 2. Do you play for recreation?(mark with 'R'), for competition?(mark with 'C')
3. How often do you play each sport (avg. hours/days per week)?_____

_____

_____

_____ 4. Are there factors that limit the number of sports or amount of time you play?_____ if yes: what are they?

5. Does accessibility/availability of community sports complexes limit your play? _____ , please briefly explain _____
_____
_____

IV. INFORMATION GIVEN ABOUT SPORTS (post injury)

1. What/who were your primary sources of information about sports? (i.e. brochures, verbal, written information, other...)
_____
_____

a. Did you receive information from an Occupational therapist (OT)____ or Physical therapist (PT)_____ Recreation therapist _____ Physician _____ in rehabilitation _____ in outpatient therapy clinic_____

b. What information did you receive?
_____
_____
_____

c. Were you satisfied with the information you received? please circle one of the following: yes / no / somewhat
Did the information suit your needs? yes / no / somewhat
Please rate its helpfulness to you on a scale of 1-10 for each of the choices in section (a.):
_____
_____
_____

d. Would you have liked to receive additional information ?_____ please briefly explain
_____

2. Did you receive information on wheelchair design/adjustments for sports?_____ (If no then go to (B)).
(A)if yes: * From whom (i.e. friend/ health professional) and where?
_____
*What info was given ?(briefly explain)
_____
_____

*Where you satisfied with the information?circle: yes/no/somewhat
*Did the information suit your needs? yes/no/somewhat?
*How helpful was it to you (on a scale of 1-10)?_____

(B) if no: Would this have been beneficial for you?

_____

3. Did you receive information in working to increase your biomechanical efficiency (i.e. seating and body positioning, chair adjustments, adaptive equipment)? _____ (if no then go to (b)).

a. if yes? From whom/where?_____

Where you satisfied with the information? please circle : yes / no/ somewhat

Did it suit your needs? please circle: yes / no / somewhat.

Please rate its helpfulness to you on a scale of 1-10 _____

b. if no? Would this have been beneficial for you?_____

4. Did you receive information on injury prevention?_____

a. if yes: From whom/where_____

Were you satisfied? Please circle: yes / no / somewhat. Did it suit your needs? yes / no / somewhat. Please rate its helpfulness to you on a scale of 1-10 _____

b. if no: Would this have been beneficial for you?_____

5. Who and What were your primary reason to become involved in wheelchair sports?

_____

6. How/by whom were you first introduced into your current programs?

_____

7. What were your initial feelings on playing? Did they change over time? How?

_____

_____

_____

_____

_____

V. BENEFITS

Please respond with one of the following for each statement below:
strongly agree, agree, disagree, or strongly disagree

1. Sports has offered me social connections _____
2. Sports has offered me a support group _____
3. Sports has offered me f riendships _____
   if yes: do you meet outside of sports? _____
4. Sports has helped increase my assertiveness _____
5. Sports has helped to relieve tension _____
6. Sports has helped give me an internal sense of control? _____
   if yes: please explain._____
7. Sports has helped increase my satisfaction with myself_____
8. Sports has helped increase my self image_____
9. I participate for the social experience/benefits _____
10. I participate for the health/fitness benefits_____
    if yes: what areas of health and why?_____
11. Participating in sports has helped me increase strength_____
12. Participating in sports has helped me increase coordination_____
13. Participating in sports has helped me increase balance_____
14. Participating in sports has helped me increase endurance_____

**** do you feel any of statements numbered ,11,12,13, or 14, have carried over to help you in every day life events? Please explain briefly.

_____
_____
_____
_____
_____

!!!!!!!!!!!!!!!!!!!!!!!!!!THANK YOU VERY MUCH FOR YOUR TIME!!!!!!!!!!!!!!!!!

Appendix B

REVISED 1994 IRB
Guidelines

October

1994

****
IRB #_____ Date Received_____
Accepted_____Denied_____Date_____
Dept._____Prof._____
Student_____NYSIRB____Pop._____
AMCIRB_____UG_____G_____INT_____EXT_____Grant_____
__
****

APPLICATION FOR PROJECT REVIEW
SAGE COLLEGES INSTITUTIONAL REVIEW BOARD
(For all questions use additional sheets, as necessary)

Please Type or Print Using Black Ink

1. Title of Project: The Acquisition of Information and Perceived Benefits of Sports Participation Among Individuals with Spinal Cord Injuries
2. Proposed Starting Date: As soon as possible
3. Funded By: Principal Investigator (Maureen Fitzpatrick-student)
4. Principal Investigator(s)
   Faculty supervisor: Ed Hickling Brian Foster
   If student project, student involved: Maureen Fitzpatrick
5. Qualifications of Investigator(s): I, Maureen Fitzpatrick, am in my fifth year in the BS/MS occupational therapy program at Russell Sage College. I have received extensive course work on psychological and physical implications of spinal cord injuries. I completed a three month clinical fieldwork at a rehabilitation hospital where I treated several individuals with spinal cord injuries (paraplegic and quadriplegic) for physical, social, and psychological concerns. I have also been involved with leaders of community based wheelchair athletic programs to help promote the sports.
6. Description of the Project:
   a. Identify the problem under investigation and the purpose of the study. There is well documented research that demonstrates involvement in wheelchair sports for individuals with spinal cord injuries has physical, psychological, and social benefits for the player. However, there is also research stating that sports participants

seldomly report their rehabilitation clinician or physician as a primary motivator for athletic involvement, despite the strong evidence of its benefits. Previous research has also demonstrated that problems with availability, accessibility, and support of wheelchair sports in the community impede one's involvement. It is the premise of this research to determine factors that influence spinal cord injured persons to become motivated for initial
involvement wheelchair sports and to continue his/her involvement in the activity. The purpose of this study is to investigate the primary stimulus for involvement, the acquisition of information pertaining to athletic programs, and perceived benefits from participation along with perceived factors that may limit involvement.

b. describe the procedures involved in the collection of the data.

Individuals above the age of eighteen with spinal cord injuries, who use manual wheelchairs as their primary mode of ambulation, will be interviewed. The subjects will be recruited in the following ways: (a) referrals from persons in the community who organize wheelchair athletics; and (b) referrals from wheelchair athletes.

A structured interview will be used and will contain the following:

a. Demographic data section. designed to specifically request sex, age, marital status, employment (full or part time), date of the onset of injury, level of injury, and primary diagnosis.

b. Pre-injury athletic involvement. Tailored to specifically request information of the sports the individual participated in and the frequency in which s/he was involved in the sport.

c. Post-injury involvement. This was designed specifically to request data pertaining to the type of sports the individual is currently involved in and the frequency in which s/he plays. Also included are the factors that may limit involvement.

d. Acquisition of information. This was tailored to request material on primary providers of information, type of information, and perceived usefulness of information.

e. Perceived benefits. Designed to request information on physical, social, and psychological benefits from the individual's perspective.

7. Participation of Human Subjects in the project:

a. Ages: at least eighteen and above

b. Will there be female subjects? unknown at this time

c. If so, can the study have any adverse effects on pregnancy?

YES_____ NO__X____

d. Identify the subject population. Individuals at least eighteen years of age with a diagnosis of either paraplegia or quadriplegia who currently participate in wheelchair sports.

e. Will the study involve any of these special populations? Circle all that apply.

minors prisoners mentally disabled persons incompetent persons

f. State how subjects will be selected and what remuneration they will receive.

Subjects will be selected by referrals from individuals in the community who organize wheelchair athletic programs and from wheelchair athletes themselves. Subjects who have been confirmed to play wheelchair sports by their referral source will be selected. All subjects will be ensured confidentiality before participation in the interview and their identity will be protected by not placing names of the interview form.

g. How will confidentiality be maintained?

All subjects will be ensured verbal and written confidentiality before participation in the interview and their identity will be protected by not placing names of the interview form.

8. Are subjects at risk? YES__X__ NO___

Subjects are at minimal risk by requesting information pertaining to their injury. Before the interview begins the individuals will be told the contents of the interview form and will have the option to pass on any question or stop the session upon request.

9. Will deception (purposefully misleading subjects as to the purpose of the study) be used? YES_____ NO __X___

If yes:

1. Justify the use of deception.
2. Explain how subjects will be debriefed as to the real purpose of the study.

10. List all other institutions operating in the project. Attach written permission from each. No other institution is involved.

11. Name, address, and telephone number(s) of persons to contact if additional information is required and to send the IRB decision:

Maureen Fitzpatrick
70 Mt. Pleasant Ave.
Troy, NY 12180 273-1484

12. PLEASE NOTE: Where projects involve risk to subjects, the Investigator must notify the Board immediately of any harm or injury suffered by subject while participation in the study, or any potential or emergent problems posing additional risk to subjects. In addition, a report regarding human subjects (including the consent procedure and protection of subject's rights and welfare) is required annually and within 90 days of the completion of the project. Remember also that any alterations or changes in procedures or protocols require notification and approval from the Board.

_____ _____

Signature of Principal Investigator Date

Signature of Student (if student project) Date

VOLUNTEER AGREEMENT

(To be submitted with application requiring full review)

A. DESCRIPTION OF STUDY (By Responsible Investigator) To the participant

There is well documented research that demonstrates involvement in wheelchair sports for individuals with spinal cord injuries has physical, psychological, and social benefits for the player. However, there is also research stating that sports participants seldomly report their rehabilitation clinician or physician as a primary motivator for athletic involvement, despite the strong evidence of its benefits. Previous research has also demonstrated that problems with availability, accessibility, and support of wheelchair sports in the community hinder one's involvement. It is the premise of this research to determine factors that influence spinal cord injured persons to become motivated for initial involvement wheelchair sports and to continue his/her involvement in the activity. The purpose of this study is to investigate the primary stimulus for involvement, the acquisition of information pertaining to athletic programs, and perceived benefits from participation along with perceived factors that may limit involvement.

Individuals above the age of eighteen with spinal cord injuries, who use manual wheelchairs as their primary mode of ambulation, will be interviewed. A structured interview will be used and will contain the following:

a. *Demographic data section.* designed to specifically request sex, age, marital status, employment (full or part time), date of the onset of injury, level of injury, and primary diagnosis.

b. *Pre-injury athletic involvement.* Tailored to specifically request information of the sports the individual participated in and the frequency in which s/he was involved in the sport.

c. *Post-injury involvement.* This was designed specifically to request data pertaining to the type of sports the individual is currently involved in and the frequency in which s/he plays. Also included are the factors that may limit involvement.

d. *Acquisition of information.* This was tailored to request material on primary providers of information, type of information, and perceived usefulness of information.

e. *Perceived benefits.* Designed to request information on physical, social, and psychological benefits from the individual's perspective.

Due to the nature of the interview, subjects will be asked questions regarding their injury, and a comparison of pre-injury and post-injury sports involvement. Subjects have the right to not answer any questions and discontinue the study at any point.

Confidentiality will be ensured as the interview data sheets will not contain the subject's names. Names will not be included in the tabulation or report of data in the research paper.

_____ _____

Subject's Initials Signature of Investigator

B. INFORMED CONSENT

I, _____, having full capacity to consent, do hereby volunteer to participate in a research study entitled: The Acquisition of Information and Perceived Benefits of Sports Participation Among Individuals with Spinal Cord Injuries under the direction of Maureen Fitzpatrick.

I. The implications of my voluntary participation have been explained to me by _____ as outlined in Section A of this agreement, including the nature, duration, and purpose of the study; the methods by which it is conducted; the inconveniences and risks which may reasonably be expected; and alternative procedures and treatments beneficial to me.

II. I have been given an opportunity to read and keep a copy of this Agreement and to ask questions concerning this study, Any such questions have been answered to my full and complete satisfaction.

III. In the event that I am harmed by participating in this study, and this harm can not be attributed to the fault or negligence of the investigator, I understand that compensation and/or medical treatment is not available from Russell Sage College. However, compensation and/or medical costs might be recovered by legal action.

IV. I understand that I may at any time during the course of this study revoke my consent and withdraw from the study without prejudice.

Signed _____
Volunteer

WITNESS: I was present during the oral explanation and question period referred to in Parts A and B above and have witnessed the above signature.

Signature of Witness:_____ Date_____

This research has received the approval of the Sage Colleges Institutional Review Board which functions to insure the protection of the rights of human subjects. If you have any complaints as a participant in this study, please call:

Dr. Catherine G. Adams
Professor of Nursing
Ackerman Hall
Russell Sage College
270-2002

February 23, 1998

Maureen Fitzpatrick
70 Mt. Pleasant Avenue
Troy, New York 12180

Dear Ms. Fitzpatrick:

Your research project, No. 9876, has been reviewed by The Sage Colleges IRB.

The IRB review of your project indicates that subjects are not at risk, or appropriate steps have been taken to protect the subjects. You may proceed with your project. This permission is granted for a period of one year. If your research is going to last more than one year, you must contact IRB for an extension.

If you have any questions, please contact the Graduate School office at 518/244-2264.

Sincerely,

Edward Hickling Psy.d
Co-chair, Institutional Review Board

EH/nac

cc: Prof. Ed Hickling
Prof. Brian Foster