

The Physically Challenged Athlete and Sports Participation

{AU: is this article intended to address the sport of triathlon only, or be more generalized to the physically challenged participating in other sports, such as wheelchair tennis, skiing, horseback riding, quad rugby? Perhaps the title should reflect triathlon participation only?}

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An overview of the evolution of challenged athlete participation in sports is presented. Currently there is little literature relative to sports participation for the physically challenged athlete. There is credibility for sports participation for the physically challenged relative to physical, mental, and social issues. Positive aspects of competitive sports for the challenged athlete are apparent to any health professional who has had the opportunity to witness first hand the growth in self-confidence, enhanced self-image, and all around maturity that accompanies those participating in sport.

Introduction

Sports for the physically challenged were pioneered by Sir Ludwig Guttmann in 1944 with the opening of a spinal cord unit at the Stoke Mandeville Hospital in Aylesburg, England. He organized the National Stoke Mandeville Games for paralyzed participants in 1948, which evolved into an international competition in 1952. Since the opening of the spinal cord unit

and the post-war emphasis on rehabilitation, sports for the disabled (challenged) athlete have continued to evolve. Through improvements in rehabilitation, prosthetics, and orthotics sports participation has gained popularity. Competition has intensified on all levels, including Olympic participation and participation in events such as triathlon worldwide. Through televised events and media exposure challenged athlete participation continues to expand. The limits seem to be of the mind versus the body, as is evidenced by the three cases cited in this article. Positive aspects of competitive sports for the challenged athlete are apparent to any health professional who has had the opportunity to witness the growth in self-confidence, enhanced self-image, and all around maturity that accompanies those participating in sport.

The Physically Challenged Athlete in Sports Participation

Medical professionals recognize the importance of sports in the successful rehabilitation and lifestyle perpetuation of individuals with physical challenges [1,2,3]. When faced with the reality of a disability, many individuals experience loss of confidence, depression, and believe their lives have ended. They are often alienated from family and friends because there are no shared positive experiences [4-6].

Sports offer the opportunity to achieve success in a very short time period; to use the success to build self-confidence and focus on possibilities instead of dwelling on what can no longer be achieved [5]. The ability to participate in a sport such as swimming, cycling, or running provides the opportunity to reunite with family and friends in a shared activity [1,4,7]. Competition improves skill in the activity of choice. It allows individuals to experience the excitement of competition and the thrill of victory, as well as the agony of defeat. These experiences help prepare individuals after rehabilitation to face the adversity of a disability in their lives and to learn to bounce back in the face of challenge and change.

Sport instills self discipline, a competitive spirit, and comradeship. Its value in promoting health, physical strength,

endurance, social integration, and psychological well-being is of little doubt. It is not difficult to understand why sport is so important for the welfare of the physically challenged [2•,4].

For many years physically challenged athletes have shown interest in sport. Although opportunities for certain types of sport were available in the past, it was not until the passage of Title 1 of the Americans with Disabilities Act of 1990, which took effect July 26, 1992, to provide facilities to enable disabled people to overcome handicaps that arose as a consequence of their disabilities [8].

Sport for athletes with disability has existed for more than 100 years. In the 18th and 19th centuries, contributions were made that proved that sport activities were very important for the re-education and rehabilitation of persons with a disability. After World War I, physical therapy and sports medicine became as important as orthopedic and internal surgery.

Sport for people with a physical disability was introduced after World War II to assist the medical and psychological needs of the large number of injured former servicemen and women, and civilians. In researching new methods to minimize the consequences of their immobility, it proved a new and great possibility for reviving the idea of sports as a means of treatment and rehabilitation.

About the same time Sir Ludwig Guttmann introduced sport as an essential part of the management of patients with spinal cord damage [4]. He described the effects of sport on the rehabilitation of people with paraplegia and tetraplegia and stressed that sporting activities enabled them to overcome boredom in the hospital and also promoted development of their physical and cardiovascular endurance.

The past five decades have seen an appreciable increase of interest in sport for disabled people not only in people with disability but also in the medical profession sporting organizations and the government. In 1978 the Sports Council stated that buildings to which they gave grant aid must provide facilities such as access for disabled people if they were to continue to qualify for aid.

Beneficial Aspects of Sports for the Disabled

A great many sporting activities that can be used for rehabilitation and recreation have become possible for the disabled [2•,5]. Sport is increasingly being used as treatment complementing the conventional methods of therapy. It helps to develop strength, coordination, and endurance. Some sports develop selected groups of muscles, for example, weight lifting and swimming help to strengthen the arm muscles of paraplegic patients, enabling them to gain independence in self-care activities. Swimming is generally accepted as a valuable form of exercise and treatment. Most recently it has become a popular sport for the physically challenged athlete thanks to such events as triathlon and organizations such as Ironman North America and the Challenged Athletes Foundation.

The buoyancy gained upon immersion into the water allows limbs to move freely, according to each individual's ability.

As a result, confidence is gained and conditioning is improved, as is the athlete's independence.

Wheelchair sports such as basketball and chair cycling help develop coordination, strength, and endurance, thus developing both the cardiovascular and musculoskeletal systems appropriate for longevity.

Social Benefits

Another important aspect of sports for the physically challenged is the opportunity they provide for the individual to establish social contacts [5]. Disability that persists can cause deterioration of disabled individuals' attitudes toward themselves and results in self pity, disruption of self esteem, and social isolation. An adverse psychological reaction may be reinforced by the embarrassed attitude of the able-bodied members of the community. Participation in sport can help newly physically challenged individuals regain self esteem; it can promote the development of a positive mental attitude, and help individuals come to terms with disability and therefore achieve social reintegration. Furthermore, disabled people with psycho-depressive states have been seen to achieve resolution of this aspect of their disability by being able to take part in sport.

Sports for Recreation

Over the years the realization that recreational aspects of sport are important has led to the development of a wide range of outdoor activities, water sports, and indoor sports. Although integrated sport is desirable for all members of society, totally integrated facilities are not always possible [7]. The sports that have become available to physically challenged athletes can be classified as 1) activities in which they can participate on equal terms with little or no modification, 2) existing sport that has been modified, and 3) sport that has been specially developed for physically challenged individuals.

Competitive Sport

Increasing interest in sport has resulted in the development of competitive sports avenues for the physically challenged athlete. The competitive aspect of sport is important as it indicates a measure of attainment. As with sports for the able-bodied, rules and regulations have been established. Often, different rules and classifications have been worked out for a particular sport to enable physically challenged athletes to compete on equal terms. Classifications of disability are many and varied, some based on the cause of disability, others based on the parts of the body affected such as arms, legs, and heart. Typically two types of classification exist: medical classification and functional classification

Medical Aspect

In general, a challenged athlete will consult his or her doctor before taking part in sporting activities and in some instances for

a certificate of fitness, which may be required (Tables 1 and 2). Physicians need to assess the abilities and cardiovascular function of individual athletes and may be able to advise them if precautions are indicated [2•,7]. Some medical conditions may prevent athletes from participating in a particular sport. For example, athletes with low cardiovascular endurance, retinal detachment, or hernias are often precluded from strenuous activities. An athlete with a healed cervical spine fracture or fused cervical spine should be advised against playing a contact sport. Sports with risks of cuts and falls cannot be advocated for athletes with hemophilia. In the case of absence or injury to one of a pair of organs consideration is indicated relative to the sport and the probability of damage to the remaining organ through participation (Table 3).

Special sports needs of challenged athletes include specialist coaching, informed medical supervision, accessible facilities, and information service. {AU: what exactly in information service?}

Challenged athletes undertake sports within the constraints of their mobility. Their physicians will therefore be concerned with preventing the usual complications of immobility and treating injuries that may result from sporting activities [2•]. Some disabilities do not prevent participation but require precautions over and above common ones. For example, athletes with paraplegia who are prone to spasm will need to use extra precautionary measures, such as restraints. {AU: chair restraints? to keep the athlete in the chair perhaps? or for some other reason?} Some medical conditions such as multiple sclerosis may have a variable course and others such as muscular dystrophy are progressive. The sports activity that is possible at one stage may not be so in the future. Medical reviews are necessary periodically to assess the individual's capacity to participate in their sport of choice.

Assessment

Assessment of the physically challenged athlete should also include assessment of orthotic and prosthetic devices, some of which may be hazardous in certain sports [2•,4,7]. Fortunately, with the advent of sophisticated devices it is possible to have several devices for different sporting events. In particular, for triathlon the athlete with an amputation or congenital absence of a limb will swim "limbless" and don separate prosthetic devices for the bicycle and run segments that will accommodate the biomechanics of the individual discipline of the sport.

Drugs

Challenged athletes may be taking medications for control of a disease process or the symptoms, or both. Advising physicians should be aware of drugs that, if used, infringe the rules and regulations of the sport or governing body of said sport. Self-medication with certain products sold over the counter (eg, for a common cold, cough, pain, indigestion), may contain banned substances. When in doubt, clarification should be sought from the appropriate governing body or venue management. Some

restricted drugs include sympathomimetic amines, central nervous system stimulants, antispasmodics, narcotic analgesics, nonsteroidal anti-inflammatory drugs, steroids, diuretics, β -blockers, and peptide hormones and their analogues.

Special Considerations for Challenged Athletes

{AU: is this specific to triathlon or generalized information?}

Swim considerations

The primary considerations for challenged swimmers are buoyancy and thermoregulation. Buoyancy has been addressed through the use of wet suits and plastic splints to maintain neutral buoyancy and extension of the lower extremities. Maintaining a horizontal position in the water improves efficiency, conserve energy, and improve safety.

Thermoregulation is a critical factor in all aspects of sports participation in which environmental conditions cannot be controlled. In the able-bodied individual the rise in core temperature is independent of the skeletal muscle mass employed and dependent upon the metabolic rate during exercise. The avenues of heat exchange for the challenged athlete are dramatically altered. During upper body exercise there is a greater dry heat loss from the torso but no additional heat loss from the exercising arms. If a challenged athlete performs upper body exercise in cold water there will be a greater heat loss and susceptibility to hypothermia. A spinal cord injury impairs the ability to thermoregulate because of a loss of autonomic nervous system control for vasomotor and sudomotor responses in the areas of the insensate skin. There is also a reduced thermoregulatory effector response for a given core temperature and a loss of skeletal muscle pump activity from the paralyzed limbs. As a result, a spinal cord-injured person has a reduced ability to tolerate thermal extremes and to perform aerobic activities.

The preferred way to measure core temperature is by rectal temperature measurements. Recent studies, however, have shown that rectal temperatures may underestimate the thermal burden imposed on challenged athletes in competition. Therefore, early intervention and frequent monitoring of athletes is indicated if they show signs of difficulty.

Additional logistics include an easy entry and exit of the swim area for the challenged athlete. Providing able-bodied assistance will facilitate getting the athlete into and out of the water. Having the athlete's day chair or prosthesis close to the swim finish will facilitate a smooth and efficient transition.

Bike considerations

For this portion of a triathlon spinal cord-injured participants use a hand cycle. Amputees have specifically adapted limbs to allow safe and efficient cycling technique. Athletes {AU: sometimes? always? all athletes?} need assistance changing gear from the swim in preparation for the cycling portion. Some participants need assistance mounting and dismounting their cycles.

Sun screen should be available as severe sunburn can result from this, or any outdoor, activity. With decreased sensation, athletes become more susceptible to the elements. Liberal application of sun block will assist in burn prevention.

Application of skin lubricant to decrease friction in specific regions (groin, axilla, ischial tuberosity) is recommended. Cycling gloves will prevent blisters on the hands.

The athlete will usually have a preferred hydration system for the bicycle portion of a triathlon. The system must be in good working order prior to the athlete leaving the transition area.

Run considerations

Preparation for the run segment of a triathlon is similar to that for the cycling portion. Athletes often change chairs, limbs, and clothing. Assistance is recommended and preferred. Re-application of sun block and skin lubricant is also recommended. Wheelchair athletes typically use special gloves to propel their race chairs. Prior to donning the gloves one must make sure the hands are dry to prevent blistering. Talc or powder in the gloves will reduce friction and help keep the hands dry. The same recommendations apply for the preferred hydration system as for the cycling segment of a race.

General Considerations

Separate staging area

Physically challenged athletes have special needs, particularly when participating in the sport of triathlon. In particular they have additional equipment that the able-bodied athlete does not. Most spinal cord-injured athletes have a day chair, a hand cycle, and race chair. These chairs can cost upwards of \$15,000 to 20,000 each, and the cost of prosthetic limbs of amputees is similar (if not greater). Visually impaired athletes usually ride tandem on the bicycle and have a tether for the run segment of a triathlon. Again, special needs for these athletes must be accommodated. Therefore, a staging area (preferably in the transition area near the swim finish) with easy entry and exit to the bicycle and run courses is recommended. A tent with adequate ventilation, privacy, and handicapped-accessible rest room facilities is required.

Bladder care and management

The body's urinary system has three major functions. It makes urine in the kidneys, stores urine in the bladder, and removes urine from the body via the urethra. Assuming that the athlete maintains adequate hydration (emphasis on drinking early and often in endurance events) the focus shifts to the elimination of urine primarily in the spinal cord-injured athlete. Staying well hydrated will help wash out waste materials and bacteria.

The bladder of a spinal cord-injured athlete is either spastic or flaccid. Spasticity usually occurs when the injury is above the T12 level. Athletes with a spinal cord injury below T12/L1 usually have a flaccid bladder. The choices of bladder management methods include an indwelling catheter (Foley) and a condom catheter (in men). If the bladder is flaccid or nonreflexive the athlete's reflexes may be sluggish or absent. The

athlete may not feel when the bladder is full. It may become stretched or over-distended. This will cause the urine to back up into the kidneys resulting in additional medical problems. This should be avoided; most athletes have a bladder management program under control prior to sport participation. Medical providers should not take this for granted and should query athletes prior to race participation.

Urinary tract infections (UTI) remain the most common secondary medical complication following spinal cord injury. Therefore, it is incumbent upon the athlete and the medical staff to prevent the occurrence at all cost. Make sure bladder management is a priority for the spinal cord-injured athlete participant.

In the separate staging area for the physically challenged athletes there should be a handicapped toilet facility available for the athletes to use and in which they can properly dispose of all bladder management materials. Appropriate supplies should be readily available.

Heat and hydration considerations

This area has already been addressed above; however, this is a consideration in all phases of athletic participation. In hot climates it is advisable to have an ice bath available in the transition area and at the main medical tent in the event that an athlete needs to be cooled immediately and rapidly. A better cooling method is to apply cool water to the athlete placed in front of a large fan; this facilitates the evaporative effects of cooling to decrease the athlete's core temperature. Heat-related illnesses are a medical emergency that must be anticipated in any athletic event. The physically challenged athlete with compromised thermoregulatory systems is more susceptible to heat illness and therefore must be accommodated appropriately.

Conclusions

The awareness of sports participation for the physically challenged athlete continues to grow (Table 4). The World Triathlon Corporation, the Challenged Athlete Foundation, and others have created media frenzy and public awareness opportunities to bring the capabilities and enlightening stories of these athletes to the general public. The ongoing war in Iraq has also contributed to the visibility of challenged athlete participation in sport. Sports programs and opportunities world wide have increased in scope and number as well. Sport has become a viable option for the physically challenged athlete.

References and Recommended Reading

Papers of particular interest, published recently, have been highlighted as:

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