Sport and recreational opportunities for people with disabilities are increasing year by year. Sport has immense therapeutic value because it helps maximize the individual’s physical and psychological strengths. Participation in sport is generally associated with increased social interactions, increased self-confidence, and improvements in physical conditioning.

Medical professionals sometimes fail to promote sport and physical activity as an option for people with disabilities because they are not aware of the opportunities available. Other times, people with disabilities are integrated directly into existing club and community sport programs such as Little League or community swim teams without any modifications. In some cases only minor modifications are needed to allow the athlete with a disability to participate and reach his or her maximum potential.

As with any activity, injuries may result from participation. Injury trends for athletes with disabilities will follow those of their counterparts without disabilities. Runners tend to have lower extremity injuries, swimmers tend to have shoulder pathology, and soccer players tend to have ankle and knee injuries.

The clinician should employ similar evaluative methods to determine the severity of the injury and the appropriate course of treatment. This article highlights the injuries common to this population and the injuries that are specific to certain disabilities.

**General Injury Investigations**

It has long been felt that sport activities for the disabled place the athlete at an increased risk of injury. However, it has been documented that the percentage of injuries is no higher for athletes with disabilities than for those without disabilities (Ferrara et al., 1992). Furthermore, injuries in both disabled and nondisabled athletes tend to follow similar patterns, with a few exceptions.

Ferrara and Buckley (1996) created the Athletes with Disabilities Injury Registry (ADIR) to determine the risk and severity of injury to athletes with a disability from 1990 to 1992. The overall injury rate during this period was 9.45 per 1,000 athlete-exposures. This value was found to be within the normative rates for non-disabled athletic populations. Overall, 52% of the reported injuries were categorized as minor (0–7 days missed), 29% were moderate (8–21 days missed), and 19% were major (22+ days missed).

The time loss from activity was greater for this population than for a study conducted by Powell (1988) on a nondisabled population of student athletes. Powell’s study reported 70% minor, 20% moderate, and 10% major time loss. Musculoskeletal injuries accounted for 81% of the reported injuries and illness while disability related problems accounted for 19%. Also, 15% of the moderate and major injuries were not evaluated medically, which raises questions about access to appropriate medical care for sport related injuries.

During competitive events, athletic therapists treat problems such as illnesses, dehydration, and minor sprains and strains for athletes with disabilities.

Burnham et al. (1991) found that the majority of injuries to athletes in the 1998 Paralympics were minor and acute in nature. Illness as well as injuries to the shoulder, lower back, and knee were the most common maladies reported. Illnesses are not uncommon considering the changes in environment, diet, stress, and sleep patterns that occur from travel and competition.
In 1989 a cross-disability retrospective injury survey was administered to athletes who were spinal-cord injured, blind/visually impaired, or had cerebral palsy. This was the first large-scale study that employed time-loss as a definition of injury (Ferrara et al., 1992). In total, 385 injuries were reported in this population during a 6-month period, the most common being injuries to the major joints such as the knee, shoulder, and ankle (see below).

<table>
<thead>
<tr>
<th>Joint</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder</td>
<td>22%</td>
</tr>
<tr>
<td>Leg/ankle</td>
<td>17%</td>
</tr>
<tr>
<td>Knee</td>
<td>15%</td>
</tr>
<tr>
<td>Hand/finger</td>
<td>10%</td>
</tr>
<tr>
<td>Neck/spine</td>
<td>7%</td>
</tr>
<tr>
<td>Arm/elbow</td>
<td>7%</td>
</tr>
<tr>
<td>Hip/thigh</td>
<td>6%</td>
</tr>
<tr>
<td>Forearm/wrist</td>
<td>5%</td>
</tr>
<tr>
<td>Foot/Toes</td>
<td>5%</td>
</tr>
<tr>
<td>Trunk</td>
<td>4%</td>
</tr>
<tr>
<td>Head/face</td>
<td>3%</td>
</tr>
</tbody>
</table>

Illness or disability related problems also contributed to days lost to participation.

**Disability-Specific Injuries**

The following section describes injuries or conditions found in specific disabilities. This is not an exhaustive list but rather an explanation of the common problems an athletic therapist may face when working with athletes with disabilities. We will describe some of the common injuries and management techniques.

**Spinal Cord Injured Athletes**

Athletes with disabilities suffer injuries that are specific to the demands and risks of their sport. Track, road-racing, and basketball have the highest incidence of injuries. In a study on wheelchair athletes, Curtis and Dillon (1985) found a relationship between the incidence of injuries, number of hours spent training per week, and age of athletes. Those in their 20s suffered the highest number of injuries.

Ferrara and Davis (1990) found that 50% of the injuries to wheelchair athletes were strains and muscular injuries of the upper extremity.

**Heat Illness.** Athletes with spinal cord injuries are more susceptible to heat injuries. Quadriplegics and those with a spinal lesion above the first thoracic level are particularly vulnerable to heat stress. Spinal cord injury may compromise the parasympathetic nervous system, which controls heat regulation and sweating. These athletes do not sweat below the level of the spinal cord injury, thus they have no effective mechanism for cooling the body.

Given the greater likelihood of heat illness for athletes with disabilities, prevention is a major issue. Among the preventive measures that should be considered when working with these athletes is that of limiting practice sessions and games when the temperature is above 85°F and the humidity is above 70%.

**Hypothermia.** The athlete’s ability to tolerate cold is based on several factors: level of fitness, percent body fat, and environmental conditions (wind chill factor, dampness). The body’s normal mechanisms for heat production such as shivering, goose-bumps, and circulatory shunting may not be mobilized in athletes with a spinal cord injury. For example, temperatures around 50°F may be problematic for athletes with quadriplegia.

Physicians and other allied medical personnel should investigate the athlete’s medical history prior to participation in winter sports. Previous episodes of hypothermia may predispose the athlete to further problems with a cold environment. Also, certain medications or medical conditions may predispose the athlete to temperature regulation problems in the cold.

Athletes should wear appropriate clothing when participating in a cold environment. Fabrics that wick the moisture away from the body are best for the innermost layers of clothing. Additional layers of clothing will help maintain...
body heat. Hats should be required, since approximately 25% of one’s body heat can be lost through the head.

All wet clothing should be removed immediately after the exercise session. This will eliminate postexercise lowering of body temperature. Careful attention should be given to athletes with communicative or cognitive disorders who may not be able to relate the symptoms of hypothermia.

**Amputee Athletes**

**Stump Problems.** The athlete who has an amputation is subject to the same injuries and stress as the athlete without a disability. Additionally, the amputee may be subject to irritations at the junction of the amputated limb with the prosthetic device. This problem is more common with lower limb prosthetics and is characterized by redness and irritation at the prosthetic junction.

The athlete is normally aware when a skin irritation or breakdown from the stump is beginning. These problems can be prevented by ensuring a proper fit with the prosthetic device. An excessively loose or tight fit will increase stress at the junction. Various materials—gels, soft materials, and foam padding—have been used between the skin and the socket to reduce the stress from vigorous athletic activity.

Advances in prosthetic design, development, and fit have reduced the number of problems related to prosthetics. New knee prosthetic devices allow for a purer knee range of motion and less rotational stress. Additionally, devices that permit plantar flexion of the prosthetic foot following heel strike permit absorption of associated forces that used to be transmitted to the knee.

**Athletes With Cerebral Palsy**

**Muscle Strains.** There are varying degrees of cerebral palsy, ranging from severe spasticity to barely perceptible levels of muscular involvement. Muscular strains are common and could be due to the influence of spasticity and/or athetotic movements of the muscle. Many individuals with cerebral palsy have limited joint range of motion due to spastic muscles. These spastic muscles are continuously contracted, placing a greater load on the muscle unit and joints.

To help control these conditions, many people with cerebral palsy have had Achilles tendon and hamstring surgery to allow for more range of motion. This surgical intervention may cause a decrease in the active muscle units and result in less efficient and forceful muscular contraction. Also, muscle imbalances may develop between the agonist and antagonist muscle groups.

Muscular injuries can be prevented through flexibility and strength training programs. It is important that athletic therapists work within the available range of motion to maintain and/or restore motion that may be lost due to contractures and muscle spasms.

Proprioceptive neuromuscular facilitation (PNF) stretching appears to be particularly effective when used in conjunction with a comprehensive static stretching program. Furthermore, strength training of sport-specific muscles to achieve a muscular balance between agonists and antagonists will not only improve performance but also reduce muscle injuries.

The management of a muscle strain should follow the typical treatment pattern. If anti-inflammatory medication is prescribed, the physician should be aware of possible drug interactions with anti-seizure or other related medications the athlete may be taking.

**Athletes With Visual Impairments**

**Barrier Problems.** The athlete with a visual impairment may not have the visual cues about road surface and condition, other competitors, or environmental barriers such as walls and curbs. The lack of visual cues can lead to inadvertent falls and torsion injuries. Events such as running and cycling utilize a guide runner or pilot to assist the athlete who is visually impaired. The guide provides auditory assistance about potential barriers so the athlete can adjust his or her activity to prevent injury.

Athletes with visual impairments tend to have a high proportion of lower extremity injuries. Ferrara et al. (1992) found that 26% of the injuries were to the leg/ankle, 11% to the feet/toes, and 10% to the knee. This high number of injuries to the lower extremity may be due to biomechanical changes or poor training techniques. Changes in stepping frequency, stride length,
prolonged stance time, and excessive braking and acceleration forces were documented.

Athletes with visual impairments may expend more energy than other athletes when performing the same tasks, and therefore are more likely to fatigue quickly. This can lead to a higher incidence of chronic or overuse injuries of the lower extremity.

Monitoring the training program and maintaining an awareness of the natural biomechanical differences are extremely important components of preventing overuse injuries. Furthermore, consideration should be given to selecting a physiologically and biomechanically matched guide runner to maintain an even pace and stride length.

Conclusions

Athletes with disabilities form an ever growing body of sport participants. Athletic therapists will be increasingly called upon to manage their consequent sport health care needs. Athletic therapists are already well trained to manage most of the sport injury problems that arise in this population. With proper instruction about some disability-specific injuries, the athletic therapist can become a very positive medical care provider to these active individuals. The benefits to participants and athletic therapists can be mutually rewarding.

References


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