Key Points in Caring for Athletes with Disabilities

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Disclosures

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Learning Objectives

• Discuss injuries and medical conditions commonly experienced in athletes with certain disabilities.

• Explain the physiologic basis, presenting symptoms, and initial treatment for autonomic dysreflexia.

• Detect conditions that may limit participation or lead to injury in athletes with specific disabilities.
Paralympic Games

• Most recent summer games
• 4,333 athletes from 159 countries
• 22 sports
  • Archery, athletics, boccia, canoe sprint, cycling (road, track), equestrian, football, goalball, judo, powerlifting, rowing, sailing, shooting, sit volleyball, swimming, table tennis, triathlon, WC basketball, WC fencing, WC rugby, WC tennis
• 528 medal events
  • 220 World Records
  • 432 Paralympic Records
Paralympic Games

• Most recent winter games
• 547 athletes from 45 countries
• 5 Sports
  • Alpine Skiing
    • Snowboard debut
  • Biathlon
  • Cross-country skiing
  • Ice sledge Hockey
  • Wheelchair Curling
• 72 medal events
Eligible Impairment Types

- Impaired muscle power
  - SCI, spina bifida, post-polio, muscular dystrophy
- Impaired passive ROM – e.g. arthrogryposis
- Limb deficiency
- Leg length difference - Bone shortening in one leg due to congenital deficiency or trauma
- Short stature – e.g. achondroplasia
- Hypertonia – CP, TBI, stroke, multiple sclerosis
- Ataxia – CP, TBI, stroke, multiple sclerosis, Friedreich’s ataxia
- Athetosis – CP, TBI, stroke, choreoathetosis
- Vision impairment
- Intellectual impairment - originates before the age of 18
Athletes with Disabilities – Key Points

• It is about their ABILITY, courage, determination

• Participation in sports activities →
  • Social inclusion, new experiences, friendships
  • Improved self-esteem, self-confidence
  • Empowerment, respect, equality
  • Health benefits, reduced chronic disease
  • Mental well-being, positive impact on mood
  • Improved quality of life
  • Improved functional status
Athletes with Disabilities – Injuries

• With participation in sports there is inherent risk of injury

• Increasing # of participants and addition of different events → increasing # and types of injuries

• Understanding injury patterns, mechanisms and risk factors is important for treatment and prevention programs
Athletes with Disabilities – Injuries

- Injury rates are similar to those for athletes without disabilities
- Injury rate 9.3 injuries per 1000 AE
- Location of injuries is disability and sport specific
  - Ambulatory athletes
    - LE injuries most common
  - Wheelchair athletes
    - UE injuries most common

Injuries to athletes with disabilities: identifying injury patterns.
Ferrara MS1, Peterson CD.
The Research

• “The athlete with a disability demonstrated approximately the same percentage of injury as the athlete without a disability in similar sport activities.”
  • The Injury Experience of the Competitive Athlete with a Disability: Prevention Implications - Ferrara, MSSE 1992

• “…injury patterns for this population are similar to those for athletes without disabilities.”

• “No significant difference in overall injury rate between able-bodied and disabled skiers.”
  • Types of injury were statistically different

• “The injury patterns observed among winter Paralympians in this study are not appreciably different from able-bodied athletes competing in similar disciplines.”
High School Athletes with Disability

• Special Education school setting.

• Disabilities: sensory impairments (vision, hearing), autism, mental retardation, TBI, orthopedic impairments, emotional disturbances, developmental disabilities, language/speech impairments, and learning disabilities.

• Basketball, softball, soccer, field hockey

• Rate of injury: 2 per 1000 AE (soccer 3.7 per 1000)

• Highest risk – athletes with autism, those with history of seizures

• Conclusions:
  • “reasonably safe activity for children with disabilities”
  • “preparticipation medical examination may be an excellent opportunity to create special guidelines, particularly for athletes with autism and seizure history.”
Injuries/Illness

• Unique for each disability type and for each sport

• Acute, chronic, acute on chronic injuries
Wheelchair Athletes

- SCI (paraplegia, tetraplegia)
  - Post-SCI sports participation improves psychological adjustment to injury, reduces depression, improves self-image, increases QOL, helps with social reintegration, reduces risk of medical co-morbidities
- Polio/post-polio
- Neuromuscular and musculoskeletal disorders
- Congenital disorders
- Amputees
Wheelchair Athletes

- Peripheral nerve entrapments
  - >20% of WC athletes

- Carpal tunnel syndrome

- Compression of median nerve at the wrist

- Wrist extension posturing with propelling WC, transferring

- Wrist flexor tenosynovitis

- N/T, pain, weakness/atrophy

- Neutral splint - avoid extreme wrist flexion and extension; Padded gloves
Wheelchair Athletes

- Ulnar nerve
- Elbow
  - Prolonged elbow flexion
  - Repetitive FCU contractions
  - Resting elbow/forearm on hard surface
- Wrist – Guyon’s canal
  - Compression
- N/T, weakness
- Elbow pad, splint; Avoid prolonged elbow flexion; Avoid resting elbows on surface
Wheelchair Athletes

• Shoulder
  • RC impingement and tendinopathy; biceps tendinopathy
  • Weight bearing joint for WC propulsion and transfers → increased risk of overuse injuries
  • Role of muscle imbalance
    • abductors>adductors
    • weak scapular stabilizer
  • Decreased flexibility
  • Poor posture with scapular protraction
  • Rest is difficult; Prevention is key
Wheelchair Athletes

- **Prevention** is key
  - Education
  - Early symptom recognition
  - Nerve protection
  - Proper WC fit
  - Maintain healthy body weight
  - Maintain good technique for transfers and WC propulsion
  - Address any muscle imbalances
  - Stretching to maintain flexibility
Special Considerations – Spinal Cord Injury Athletes

- **Autonomic Dysreflexia**
- Orthostatic hypotension
- **Thermoregulation**
  - Hypothermia, hyperthermia
- Neurogenic bladder
  - Risk of UTI
  - Ensure regular bladder emptying
- Spasticity
- **Dermal injuries** – pressure (sacral/ischial)
- Premature osteoporosis
  - Increased fracture risk with minimal trauma (esp. pelvis and legs)
Autonomic Dysreflexia

- SCI T6 or above
- Noxious stimulus below level of lesion → abnormal sympathetic discharge → ↑BP → compensatory parasympathetic/vagal response → ↓ HR, CO, and vasodilation above level of injury →
- Symptoms: HA, HTN, bradycardia, blurry vision, nasal congestion, anxiety, piloerection, flushing, diaphoresis (above level)
Autonomic dysreflexia

• Treatment:
  • Sit them up
  • Treat HTN – Nitropaste to skin
  • Identify and remove noxious stimulus
    • consider bladder, bowel, tight clothes, skin breakdown, acute trauma, DVT, abdominal pathology
• Beware of Boosting!
  • Intentional induction of AD to improve sports performance (clamp urinary catheter, tighten leg straps, stab themselves with sharp object, sit on scrotum, etc.)
  • Can enhance athletic performance up to 10% (especially in endurance events)
  • Minimum 2-year sanction
Thermoregulation Disorders

• SCI population with impaired autonomic function
  • Hypothermia or hyperthermia
  • Loss of normal autonomic regulatory responses to cold (impaired circulation, inability to shiver) and for heat dissipation (impaired sweat gland function, cutaneous vasodilation, cardiac output)
  • Beware of clumsiness, HA, confusion, dizziness, nausea/vomiting
• Careful attention to prevention
  • Acclimatization, clothing, fluid schedule, monitor daily weights
  • Scheduling of events/training
Dermal injuries

- Skin breakdown:
  - Prolonged pressure in insensate/paralyzed location + shear + moisture → local tissue ischemia
  - Most commonly at the sacrum, ischium
  - Probably worse than it looks
  - Stages:
    • I – Skin intact but red, discolored, hardened, nonblanchable
    • II – Epidermis exposed
    • III – Wound extends beyond dermis to adipose layer
    • IV – Wound extends to muscle, bone; likely infection
Dermal injuries

• Prevention!!
  • Proper positioning, cushion, properly fitting equipment/prosthetics, **pressure relief** compliance, reduce skin moisture, treatment of spasticity
  • Frequent skin checks

• Treatment
  • Prompt identification and pressure relief
  • Keep it clean/dry; appropriate dressing
  • Maintain good nutrition (protein, vitamins, minerals) and hydration
  • No competition with an open sore
Amputee Athletes

- At least one major joint in a limb missing
- Includes congenital, traumatic
- May be a WC athlete depending on sport
Amputee Athletes

- Skin issues of residual limb
  - Abrasions, Pressure sores, Blisters, Rashes
  - Choke syndrome $\rightarrow$ verrucous hyperplasia
  - Appropriate prosthetic fit very important

- Spine
  - C/T spine in UE amputee
  - L spine in LE amputee

- Bursitis – socket irritation

- Overuse injuries of intact limb
  - Plantar fasciitis, Achilles tendonitis, stress fractures, hamstring injuries
Hypertonia/Ataxia/Athetosis

- Disorder of “movement and posture due to damage to area(s) of the brain that control and coordinate muscle tone, reflexes, posture and movement”

- Includes: Multiple sclerosis, cerebral palsy, CVA, traumatic brain injury, etc.
Hypertonia/Ataxia/Athetosis

- Spasticity, muscle imbalance
  - Predisposes to MSK injuries
  - Patellofemoral joint pain from hamstring/quad spasm
- Foot and ankle deformities
  - Equinovarus, valgus deformities
  - Plantar fasciitis, metatarsalgia, ankle instability, sprains, calluses, pressure sores
- Strains/soft tissue injury common
  - Spine, shoulder, trunk
- Other medical issues
  - Fatigue
  - Seizures
Seizure Disorders

- Common concern with special athletes as well as those with cerebral palsy.

- ________ is thought to be the drug of choice in the athletic population, with the least impairment to athletic function.

- Decreased potential for seizure activity with aerobic activity in great majority of patients.

- Important to not miss dosing schedules
Visually Impaired Athletes

• Any condition which results in visual loss (<20/200)

Table III. Classification system of athletes with blindness

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>Totally blind. May possess light perception but unable to recognise hand shapes at any distance</td>
</tr>
<tr>
<td>B2</td>
<td>Recognises hand shapes up to and including 20/600 acuity, or field of vision limited to &lt; 5°</td>
</tr>
<tr>
<td>B3</td>
<td>Visual acuity &gt; 20/600 up to 20/200. Field of vision limitation 5 to 20°</td>
</tr>
</tbody>
</table>
Visually Impaired

• **LE injuries** most common
  • Acute: ankle sprains, shin contusions
  • Overuse: tendinopathy
    • decreased proprioception → abnormal gait and poor biomechanics

• Prevention
  • Familiarize athletes with their environments
  • Provide adequate guidance
  • Identify and address abnormal biomechanics
Intellectually Disabled Athletes

- Athletes with substantial limits of intellectual function (acquired before age 18) in ≥ 2 adaptive skill areas:
  - communication
  - self-care
  - home living
  - social skills
  - community use
  - self-direction
  - health and safety
  - functional academics
  - leisure and work
Special Olympics

- Congenital heart conditions
  - Present in up to 50% of athletes with down syndrome (e.g. ASD, VSD)
- Visual impairment
- Seizure disorders
- Hypermobility – patellar instability
- Hip dysplasia
- Spinal disorders
  - Scoliosis
  - Atlanto-axial or atlanto-occipital instability
Atlanto-axial instability

- Cervical spine
  - Atlantoaxial instability – risk of SCI
  - Lateral cervical spine radiographs in neutral and flexion-extension
    - Look at atlanto-dens interval – normal for pre-adolescent is up to 4.5-5 mm.
  - Instability disqualifies athlete from high risk sports
    - Diving, gymnastics, squat/power lift, alpine skiing, high jump, pentathlon, soccer, swimming using flip turns/butterfly stroke
Cross-Over Athletes

• When can athletes with disabilities compete with able-bodied athletes
Thank You!