Session Description

The physical therapist has a unique set of knowledge and skills that allow us to be a productive member of the sports medicine team for physically challenged athletes in the academic, recreational or professional setting. In January 2013, the United States Department of Education issued a clarification of the Americans with Disabilities Act, stating that students must be provided equal access to educational opportunities, including extracurricular activities. Individuals with disabilities have opportunities to participate in sports and recreational activities through school teams and club sports. They cannot be cut from a school sport solely due to their disability, diagnosis, or impairment. Dependent on the individual’s diagnosis or impairments, her or she may also be able to participate in Special Olympics and/or Paralympics. Physical therapists can assist these athletes to achieve sporting goals and provide care along the spectrum of injury prevention, pre-habilitation, rehabilitation and performance enhancement. As part of a sports medicine team, the physical therapist can assist with classification, venue coverage and training to allow full return and participation in competitive athletics for the physically challenged athlete.

Objectives

Upon completion of this session, you will be able to:

- Understand the role of a physical therapist as a classifier at a small and large scale events.
- Identify the role of the PT as a member of the sports medicine team in the medical tent for physically challenged athletes in small and large scale events.
- Understand proper triage, diagnosis and sideline treatment of physically challenged athletes.
- Understand the role of a physical therapist with the training and return to competition of physically challenged athletes.
• Identify some of the adaptations required to return a physically challenged athlete back to training and sport.
• Understand the importance of treating the “whole” person when dealing with physically challenged athletes.

Keywords: Physically challenged athlete, emergency response, athletic classification, competition day management, injury prevention

Session Outline

(5 min) Introduction - The Physical Therapy Role with Athletes with Disabilities (Schuemann)
(25 min) Classification for Athletes with Disabilities (Lucas)
(25 min) Medical Tent coverage for Athletes with Disabilities (Anderson)
(25 min) Prevention of Competition day injuries (Schuemann)
(25 min) Return to Sports for the Athlete with Disabilities (Springer)
(15 min) Question and Answer (panel)

Introduction

Spectrum of care provided for athletes with disabilities

• Injury Prevention
• Pre-habilitation
• Classification
• Sports Medicine Coverage
  o Team/Athlete
  o Venue
  o Medical Tent
• Rehabilitation/Return to Sport
  o From initial debilitating injury
  o From sports injury after disability
• Performance Enhancement

Classification for athletes with disabilities  Kathryn C Hickey Lucas, PT, DPT, SCS, CSCS

Opportunities for Individuals with Disabilities

• Club Teams
• School Teams
• Special Olympics
• Paralympics

Special Olympics and Paralympics
• Special Olympics
  o Athletes must have a medically diagnosed intellectual impairment
  o Mission: “to provide year-round sports training and athletic competitions in a variety of Olympic-type sports for children and adults with intellectual disabilities”
• Paralympics
  o Athletes must meet the minimum disability criteria set for the specific sport
  o Mission: “to promote and contribute to the development of sport opportunities and competitions, from initiation to elite level, for Paralympic athletes as the foundation of elite Paralympic sport”

Paralympics: 10 Eligible Impairments

• Ataxia
• Athetosis
• Hypertonia
• Impaired Muscle Power
• Impaired Passive Range of Motion
• Intellectual Impairment
• Leg Length Difference
• Limb Deficiency
• Short Stature
• Visual Impairment

History of Classifying

• The First Paralympic Games were in 1960

Sports and Classes:

• http://www.teamusa.org/US-Paralympics/Sports/Classification
• http://www.paralympic.org/classification

Importance of Classification

• “Fair and Equal Competition”
• Safety

How to Become a Classifier

• Fill out a “Interested Classifier Information Form” and email it to Sherrice.Fox@usoc.org
  o http://www.teamusa.org/~media/USA_Paralympics/Documents/General%20Classification%20Docs/INTERESTED%20CLASSIFIER%20INFORMATION%20FORM.pdf
Summary

- Sports and recreational activities are not only important for individuals with disabilities, but many options are available through schools, clubs, Special Olympics, and Paralympics.
- Paralympic sports are divided into classes, specific for each sport.
- Physical therapists can promote healthy lifestyles of our patients by assisting in getting them involved in sports and recreational activities.
- Physical therapists have tremendous skill as classifiers due to the knowledge of medical assessment coupled with the knowledge as movement specialists.

Medical Tent Coverage for Athletes with Disabilities  Mark A. Anderson, PT, PhD, ATC

I. Common disability groups seen in disabled sports (Klenck and Gebke, 2007)

<table>
<thead>
<tr>
<th>Disability Groups</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athletes in wheelchairs</td>
<td>SCI or disease with at least 10% loss of LE function (quad, para, polio, + amputees, CP)</td>
</tr>
<tr>
<td>Athletes with CP</td>
<td>Disorders of movement/posture due to damage to part of brain controlling muscle tone, reflexes, posture, tone (CVA, cerebral trauma, quadriplegia/ paraplegia with spasticity, ataxia, or athetosis)</td>
</tr>
<tr>
<td>Athletes with amputation</td>
<td>At least one major joint in a limb missing, congenital or trauma</td>
</tr>
<tr>
<td>Athletes with visual impairment</td>
<td>Visual loss &lt; 20/200</td>
</tr>
<tr>
<td>Les autres (the others)</td>
<td>Athletes do not fit into other categories (dwarfism, OI, MD, arthrogryposis)</td>
</tr>
<tr>
<td>Athletes with intellectual disability</td>
<td>Substantial limits in intellectual functioning in two or more areas (communication, self-care, home living, social skills, community use, self-direction, health and safety, functional academics, leisure or work)</td>
</tr>
</tbody>
</table>

II. What is the need for medical coverage at athletic events for athletes with disabilities?
   a. Epidemiology of Injuries in Paralympic sport (Johnson et al, 2004)
      i. Sports participation – inherent risk of injury to the athlete
         1. General belief that athletes with disability are at greater risk for injury able-bodied counterparts
         2. Athletes with disability experience injury rates similar to able–bodied athletes – IR = 7.23 per 1000 athlete exposures (Richter et al, 1998; Ferrara et al, 1998)
3. Summer Paralympic sports – sprains and strains most common
4. Winter Paralympic Sports – contusions, fractures, and concussions more prevalent
   a. Due to impact potential and speed of sports

ii. Injuries by sport
   1. Acute injuries – similar injury patterns as able-bodied athletes in similar sport
      a. Injury specificity by demand of the sport
         i. Ambulatory athletes
            1. Sprains
            2. Strains
            3. Contusions
            4. Abrasions
            5. Blisters
         ii. Non-ambulatory athletes
            1. UE > LE
         iii. Contact/collision sports
            1. Contusions
            2. Abrasions
            3. Fractures
            4. Dislocations
   2. Chronic injuries - similar injury patterns as able-bodied athletes in similar sport
      a. Injury specificity by sport demand
         i. “itis” conditions
            1. tendinitis
            2. bursitis
            3. fasciitis
         ii. upper versus lower extremity chronic injuries
            1. ambulatory
               a. lower extremity
            2. wheelchair use
               a. upper extremity
      a. football (soccer) 5-a-side
      b. powerlifting (bench press)
      c. goalball
      d. wheelchair fencing
      e. wheelchair rugby (murderball)
      f. athletics (track/field)
      a. Boccia (91%)
      b. Goalball (77%)
c. Cycling track (75%)
d. Football 7-a-side (73%)
e. Cycling road (71%)
f. Seated volleyball and wheelchair basketball (65%)

   a. Powerlifting (61%)
   b. Wheelchair fencing (58%)
   c. Archery (47%)
   d. Table tennis (45%)
   e. Rowing (40%)

iii. Injuries by disability
   1. Injury patterns by disability (Ferrara et al, 1992)

<table>
<thead>
<tr>
<th>Disability Group</th>
<th>Injury (% of total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NWAA athletes (wheelchair)</td>
<td>Shoulder, arm, elbow (57%)</td>
</tr>
<tr>
<td>USABA athletes (blind)</td>
<td>Ankle, lower extremity (53%)</td>
</tr>
<tr>
<td>USCPAA athletes (CP)</td>
<td>Knee (21%)</td>
</tr>
</tbody>
</table>

2. Athletes in wheelchairs
   a. Most common injuries
      i. UE muscular injury
      ii. Overuse entrapment syndromes common but not significantly different than non-athletes
         1. Tendinitis of RC and LH biceps
      iii. Cumulative trauma disorders, particularly shoulder
         1. Lowering wheelchair seat height for lower COG may place UE in a position of risk
         2. Stroke technique with hand in contact with rim + 270 deg may lead to rotator cuff injury
         3. Wheelchair propulsion emphasizes anterior chest wall muscular development with weak posterior muscular development creating muscular imbalance and alteration of normal scapulohumeral rhythm
            a. Abd > add/IR/ER
            b. Weak scapular stabilizers
            c. Superior displacement of humeral head and decreased subacromial space
      4. Rule out cervical/thoracic referred pain as cause
   iv. Peripheral nerve entrapment
      1. Median – carpal tunnel
      2. Ulnar – cubital tunnel (elbow) or tunnel of Guyon (wrist/hand)
   v. Premature osteoporosis
      1. Increased fracture risk
         a. Pain MAY NOT be the chief complaint
            i. Localized swelling
ii. Deformity
iii. Crepitus not in a joint

3. Athletes with amputation
   a. Residual limb injuries related to fit of prosthesis
      i. Abrasions
      ii. Pressure sores
      iii. Blisters
      iv. Rash
   b. Cervical and thoracic spine pain
      i. Seen in athletes with UE amputation due to imbalance and unequal UE movements during training/competition
   c. Lumbar spine pain
      i. Seen in athletes with LE amputation due to excessive lumbar spine lateral flexion and extension as compensation for lack of flexion at prosthetic joints
   d. Contralateral (sound) limb injuries
      i. Increased stress – overuse injuries
         1. Plantar fasciitis
         2. Achilles tendinitis
         3. Stress fractures

4. Athletes with cerebral palsy
   a. Spasticity predisposes athlete to injury
      i. Knee – patellofemoral pain syndrome
   b. Foot/ankle joint deformity – equinas, equinovarus, or valgus increase injury risk
      i. Metatarsalgia
      ii. Ankle instability
      iii. Callus formation
      iv. Pressure sores
   c. Gait deviations lead to increased fall risk

5. Athletes with visual impairments
   a. Decreased proprioception with vision loss
      i. LE > UE
      ii. Abnormal gait pattern with altered biomechanics
      iii. Increased incidence of LE overuse injuries
   b. Increased incidence of LE injuries – ankle sprains and shin contusions

6. Possible emergent conditions
   a. Autonomic dysreflexia – (World Anti-Doping Agency and IPC, ND)
      i. Seen in individuals with SCI above T6
         1. Loss of autonomic control of BP, HR, and bowel/bladder control
         2. HR does not increase with demand
            a. Max HR of 110 – 130 BPR
            b. Low BP
            c. Fatigue
d. Decrease performance / endurance

ii. Boosting – intentional induction of autonomic dysreflexia by an athlete to enhance performance
   1. Induced by causing noxious stimuli below level of lesion
      a. Clamping urinary catheter
      b. Excessive tightening of leg straps
      c. Twisting/sitting on scrotum
      d. Self-induced fracture – toe
      e. Intentional pain/pressure using external object
   2. Results in dangerous increase in blood pressure (25-300mmHG systolic; 100-120mmHG diastolic)
   3. Characterized by HA, piloerection, sweating (above level of lesion), bradycardia
   4. Results in increased BP, improved blood flow to working muscles, and improved performance / endurance
   5. Increased potential for stroke, intracranial hemorrhage, death
   6.IPC statement: Any deliberate attempt to induce autonomic dysreflexia is forbidden and if observed will lead to disqualification from the event and subsequent investigation by the IPC legal and ethical committee

b. Seizures (Johnson et al, 2004)
   i. Hypersynchronous discharge of cerebral neurons manifested in multiple ways
      1. Mild (petit mal) to severe (grand mal)
   ii. Often seen in athletes with motor dysfunction of cerebral origin
      1. CP
      2. Traumatic brain injury
      3. CVA
   iii. Factors potentially increasing the incidence of seizure
      1. Dehydration
      2. Stress
      3. Hypoglycemia
      4. Hyperventilation
      5. Electrolyte imbalance
   iv. Decrease in seizure activity in athletes due to an increased stability of neurologic membranes with an acidic pH rather than an alkaline pH
      1. Aerobic exercise produces metabolic acidosis
      2. Decrease in pH
      3. Typically results in decreased seizure activity

c. Thermoregulation issues
i. Most commonly seen in athletes with SCI at T8 or higher
ii. Dysfunctional sympathetic nervous system resulting in difficulty regulating internal temperature
iii. Loss of ability to sweat effectively
   1. Loss of control of peripheral dilating and sweating response
iv. Other athletes at risk for thermoregulation issues
   1. Those who have less body surface from which to sweat naturally (bilateral amputation)
   2. Those who lose excessive fluid through dysphagia (CP)
   3. Those who demonstrate poor motor efficiency (CP)
   4. Those whose medication induce a diuretic response
   5. Those who need support to obtain fluid
v. Athletic events with increased risk of heat stress
   1. High risk
      a. Athletics
      b. Cycling
      c. Equestrian
      d. Football (soccer)
      e. Distance running
      f. Wheelchair tennis
   2. Moderate risk
      a. Wheelchair basketball
      b. Goalball
      c. Wheelchair rugby
      d. Swimming
      e. Table tennis
      f. Seated volleyball
      g. Yachting
   d. Other
      i. Pressure ulcers
         1. SCI – skin damage due to shearing forces and friction
         2. Related to intensity and duration of the application of those forces along with tissue tolerance
         3. Sacrum most common, along with hips, buttocks, and heels
         4. Disqualifying condition at many competitions
      ii. Hydrocephalus
         1. ~90% of individuals with spina bifida
         2. Shunt malfunction
            a. Headache
            b. Blurred vision
3. Medical emergency

iii. Neurogenic bladder
1. Athletes with SCI
2. Increased incidence of UTI
3. Typical signs of UTI may be absent in athlete with SCI
4. Must look for subtle findings
   a. Increased spasticity
   b. Malaise
   c. Lethargy
   d. Sense of uneasiness
   e. Uninitiated autonomic dysreflexia

b. Medical staffing for disabled sports events
   i. Best done through a team approach
      1. Physician
         a. Trained in orthopedics, physical medicine or family medicine - background in sports medicine
      2. Physical therapist
      3. Athletic trainer
      4. 1st responders
      5. Prosthetist
      6. Wheelchair repair specialist
   ii. Minimal qualified level of medical staff coverage at practices or competition is to have one or more coaches/staff who have certification as an ARC First Responder and CPR

c. Suggested supplies - Medical Tent for disabled athletes
   - EMS on site or on-call
   - Tent with signage
   - Tables and chairs (supplies and treatment)
   - Wound care supplies, including non-latex gloves (increased incidence of latex allergy in this population)
   - Triangular bandages
   - Elastic bandages (or self-adherent wrap)
   - Splints – padded board, SAM, vacuum splints
   - Ice, bags, and towels
   - Spray bottles
   - Gait assistive devices – adjustable crutches at a minimum
   - Wheelchair
   - Medical injury reporting forms – DOCUMENT
   - Emergency supplies
      1. AED
      2. Spine board
      3. WBGT heat stress monitor
      4. + oxygen and delivery system
      5. ± lightning detection system
Prevention of Competition day injuries  Teresa L Schuermann PT, DPT, SCS, ATC, CSCS

Injury Prevention for all athletes

- Proper Fluid Status & Replacement

<table>
<thead>
<tr>
<th>Purpose</th>
<th>How to . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-event</strong></td>
<td></td>
</tr>
<tr>
<td>Ensure Proper Pre-exercise hydration status</td>
<td>Approx. 17 – 20 fl oz (500 – 600 mL) of water or sports drink 2 – 3 hours before exercise</td>
</tr>
<tr>
<td></td>
<td>7 – 10 fl oz. (200 – 300 mL) of water or sports drink 10 – 20 minutes before exercise</td>
</tr>
<tr>
<td><strong>During event</strong></td>
<td></td>
</tr>
<tr>
<td>Approximate sweat and urine losses</td>
<td>7 – 10 fl oz. (200 – 300 mL) of water or sports drink every 10 – 20 min</td>
</tr>
<tr>
<td>Maintenance of hydration at LESS than 2% body weight reduction</td>
<td></td>
</tr>
<tr>
<td><strong>Post event</strong></td>
<td></td>
</tr>
<tr>
<td>Correct any fluid loss accumulated during practice and/or event.</td>
<td>Water to restore hydration status to return athlete to proper body weight – replenishing lost water weight</td>
</tr>
<tr>
<td>Should be completed within 2 hours of exertion if bladder tolerates bolus</td>
<td>Electrolytes to speed rehydration per athlete tolerance</td>
</tr>
</tbody>
</table>

**AM I HYDRATED?**

Urine Color Chart

1. If your urine matches the colors 1, 2, or 3, you are properly hydrated.
2. Continue to consume fluids at the recommended amounts.
3. If your urine color is below the RED line, you are DEHYDRATED and at risk for cramping and/or a heat illness!!
4. YOU NEED TO DRINK MORE WATER!

CAUTION – you must consider medications and their effect on urine color!
• **Proper Nutrition**
  
  o **Athletes with Moderate levels of Intense training**
    - Exercising 2-3 hours/day, 5-6X/week OR high volume 3 – 6 hours/day in 1 – 2 workouts, 5 – 6 days/week, 600 – 1200 kcal/hr
    - Normal diet
      - 2,500 - 8,000 kcals/day
      - 50 - 80 kcals/kg/day for a 50 - 100 kg athlete

  
  **Macronutrients & Fiber**

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Average adult person, assuming 2000 kcal/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein (g)</td>
<td>50</td>
</tr>
<tr>
<td>(% of calories)</td>
<td>10 – 35</td>
</tr>
<tr>
<td>Carbohydrates (g)</td>
<td>300</td>
</tr>
<tr>
<td>(% of calories)</td>
<td>45-65</td>
</tr>
<tr>
<td>Fats (g)</td>
<td>65</td>
</tr>
<tr>
<td>Total Fats (% of calories)</td>
<td>25 – 35</td>
</tr>
<tr>
<td>Saturated Fat (% of calories)</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>Fiber (g)</td>
<td>25</td>
</tr>
</tbody>
</table>

Adapted from Food & Nutrition Board, Institute of Medicine: Dietary Reference Intake (DRI)
http://www.iom.edu/Activities/Nutrition/SummaryDRIs/~/media/Files/Activity%20Files/Nutrition/DRIs/1_%20EARs.pdf

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<th>Purpose</th>
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</thead>
<tbody>
<tr>
<td><strong>Pre-event</strong></td>
<td>Ensure Proper Pre-event fueling</td>
</tr>
<tr>
<td><strong>During event</strong></td>
<td>Ensure proper fueling for performance maintenance</td>
</tr>
<tr>
<td><strong>Post event</strong></td>
<td>Replenish glycogen stores, 300-400 total calories for events that last about one hour and increase with longer events Should be completed within 30 – 60 minutes of exertion if gut tolerates bolus</td>
</tr>
</tbody>
</table>
• **Thermoregulation**
  o *Know and plan for conditions!*
  o Appropriately layering of Athletic clothing
    ▪ Undergarments
      • Provide modesty and support
      • Wick moisture
      • Non-abrasive fabric
    ▪ Base Clothing layer
      • Main uniform
      • “Sponsorship layer”
      • Provide modesty
      • Wick moisture
      • Non abrasive materials/fabric
      • Sun protection
    ▪ Insulating Layers – prn for provision of warmth
    ▪ Wind protection
      • prn for protection of elements
      • Waterproof if needed
  ▪ Other
    • Sunglasses
    • Gloves
      o Protection
      o Warmth
    • Hats/Helmets
      o Sun protection
      o Fall protection
      o Sports specific
      o Warmth
  o Pre-cooling
    ▪ Controversial with athletes with SCIs
    ▪ Might be helpful for athletes in hot, humid conditions IF tolerant of cold application on body – RISKY so must be supervised and controlled.

Specific Prevention Strategies for Competition Day Injuries

• **Autonomic Dysreflexia** (Klenck and Gebke, 2007)
  o Prevention - Avoidance of noxious stimuli
  o Management
    ▪ Positioning of athlete
    ▪ Removal of noxious stimuli
• Medication
  o Boosting – AVOIDANCE as noted in Dr. Anderson’s outline and presentation

• Neurogenic Bladder
  o Prevention
    ▪ Regular bladder routine
    ▪ Proper hydration
  o Management
    ▪ Bladder emptying, antiseptic catheritization
    ▪ Proper hydration

• Skin Conditions
  o Pressure Sores
    ▪ Prevention
      • Regular plan for prevention
        o Positional changes & W/C presses
        o Skin observation
      • Appropriate fit of prosthesis
      • Appropriate “socking”/layering of prosthesis
        o Padding/covering
        o Non-abrasive materials
        o Moisture absorbing materials
    ▪ Management
      • Wound care with bio-occlusive dressings
      • Possible electrical stimulation for healing
  o Blisters
    ▪ Prevention
      • Appropriate clothing
        o Absorptive materials
        o CLEAN!
      • Care for highly abrasive areas
        o Skin glide or other tolerated ointment
    ▪ Management
      • Blister care

• Seizures
  o Prevention
    ▪ Thermoregulation
    ▪ Proper Hydration
    ▪ Proper Stress Management
      • Planning
      • Relaxation techniques
    ▪ Appropriate Medication
      • Dosage
• Timing of administration
  ▪ Management
    • Airway, Breathing & Signs of Life
    • Resolution of event
    • Removal of precipitating factor
      ▪ Thermal regulate
      ▪ Fluid replacement
      ▪ Medication
    • Supervision for Return to Sport

Key Points
• PREVENT, PREVENT, PREVENT with PLANNING, PLANNING and PRACTICE!
• Acute Care Management
  ▪ Primary Assessment - Airway, Breathing and Signs of Life
  ▪ Secondary Assessment – Further disability
    ▪ AVPU scale
    ▪ Glasgow Coma Scale
    ▪ Physical Exam (Head to Toe)
  ▪ Secondary Assessment PLUS
    ▪ SAMPLE history
    ▪ Management of Found problems

Return to Sports for the Athlete with Disabilities  Barbara Springer, PT, PhD, OCS, SCS

Overview
• Background
• Walter Reed Army Medical Center experience working with complex trauma and a variety of sports: Winter Sports, SCUBA, Running, Kayaking, Cycling, Softball, Golf, and many more…

Ride 2 Recovery 501c3 as an example of a Physical Therapist working in a “non-traditional” role.
  ▪ Ride 2 Recovery (R2R) is a groundbreaking Veterans program that started in 2008.
  ▪ It saves lives by restoring hope and purpose through cycling.
  ▪ Providing a way FOR life
  ▪ Vets helping Vets
  ▪ It’s not a handout, It’s hard work
  ▪ Founded on Cycling based programs
  ▪ Expert Staff who Care
• Organizational Structure: R2R has five main programs – Challenges, Honor Rides, Special Events Initiatives, and Project HERO
  ▪ Challenge Rides
Multi day program events with 200 healing heroes. It is the goal of every Project HERO rider to complete a Challenge ride

- Honor Rides
  - Community events geared towards raising awareness and funding for the R2R Program and connecting Veterans with riders in the local community

- Special Events
  - Programs geared towards off road, racing, and other non-Challenge riding programs for the healing heroes to reach a goal beyond their original expectation

- Initiatives
  - Initiative programs are specifically geared to a subset of the R2R heroes and their issues. Programs for Male and Female Sexual Assault Survivors are the primary Initiatives

- Project HERO (Healing Exercise Rehab Opportunity): Community and Military based recovery and rehabilitation programs that bring the benefits of R2R to more Veterans with one important goal: More riders riding more often.
  - 67 Project HERO Programs
    - Bringing Vets together to heal
    - Provides training and support for community based programs
    - Specially adapted bikes are designed and built

- Metrics/Program Analysis
  - 55% of R2R participants that take prescription drugs have reduced or eliminated them
  - Increased ability to perform normal day to day activities
  - Speedier recovery from injuries or conditions
  - Improved general health and fitness
  - Reduced pain
  - Improved sleep

- Research
- www.ride2recovery.com

Summary

References:


17. Cavill, N. & Davis, A. Cycling and health - what's the evidence? Transportation Research Board of the National Academies Report Accession# 01089935, Washington, DC
