Session Description

Triathlon is a growing sport. As a multidimensional sport, triathletes need to be proficient in swimming, cycling, and running to be successful and injury free. As the sport grows, so does the participation and number of competitions. This growth requires an increase number of qualified sports medicine team members to provide appropriate and efficient venue coverage for both training sessions and competition. Triathlon training and competition offers a unique set of challenges for injury and illness management of its participants and for treating sports clinicians with the three components of this sport. This course will explore the issues specifically related to the acute injury and illness management of the triathlete. This course’s aim is to equip each physical therapist with the tools to address the needs of these athletes during competition.

Objectives

Upon completion of this course, you will be able to:
1. Identify the different types of triathlon events and distinguish the unique sports medicine coverage needs for each of the event types.
2. Identify the components of a triathlon and understand the unique sports medicine coverage needs for each component.
3. Identify the role of the PT during sideline emergency response to triathletes at small and large scale running events.
4. Understand the planning requirements for emergency response for the triathlete.
5. Understand proper triage, diagnosis and treatment of the triathlete.
6. Understand strategies for prevention of race day injuries.

Keywords: triathlete, triathlon injuries, emergency response, endurance athletes, race day management

Session Outline

10 mins: Introduction- What is Triathlon? (Schuemann)
25 mins: Venue coverage for Triathlon (Weinstein)
25 mins: Medical Tent coverage for the Triathlete (Smith)
25 mins: Prevention of Race day Injuries (Schuemann)
15 mins: Questions and Answer
Triathlon – What is It?

Historical perspective

Triathlon in the United States started in Southern California. The early races were held in San Diego’s Mission Bay.

The sport grew and 2 national governing bodies emerged:
- Feb. 16, 1982, James Gayton and John Disterdick founded the U.S. Triathlon Association
- March 15, 1982, Jarold Johnson, Michael Gilmore and Penny Little founded the American Triathlon Association
- April 9, 1982, the two organizations merged to form U.S. Triathlon Association (USTA)
- By the end of 1982, USTA membership was 1500 triathletes.

- 170,033 adult and youth members as of December, 2014
- Recognized as a NCAA sport
- Sanctioned events/clinics have almost tripled since 2004 with approximately 2400 events in 2014.

Components

1. Swimming
2. Cycling
3. Running

Distances (Sprint OR Endurance events)

- Sprint (Short)
- Olympic distance (Intermediate)
- Half Ironman distance (Long)
- Ironman distance (Ultra)

Multisport Variations

- X-Terra
- Duathalon
- Aquathlon/Aqua Bike

Venue coverage for Triathlon (Weinstein)

- 3 different sports coverage
  - Swimming
  - Cycling
  - Running
- Governed by International Triathlon Union http://www.triathlon.org and USA Triathlon http://www.usatriathlon.org
- Medical coverage MUST Understand Rules (General and venue specific)
  - Medical coverage CANNOT intervene with the athlete unless he/she is an approved medical provider. If you are not an approved medical provider, the athlete may be disqualified for accepting outside assistance.
  - Medical coverage can only provide supplies and advice (as a coach) unless approved for further intervention by a course marshall/official. If you are not cleared by a race official, the athlete may be disqualified for accepting outside assistance.
- Swimming
  - Wet Suits
    - allowed at triathlons with water temperatures of 75 degrees Fahrenheit or below.
  - Swimmer/Spotter Ratios
- Cycling
- Running
- Epidemiology
- PT and Team of providers
- Staffing
- Training

• ECC guidelines
• IAP & EMS relationships
• Location of AS and supplies

Medical Tent coverage for the Triathlete (Smith)
• Triage
  ▪ treat vs transport
  ▪ location
  ▪ Diagnosis and Treatment
  ▪ Cardiac Pathologies
  ▪ Thermal Pathologies
  ▪ Metabolic Pathologies
• 4 Most Important Questions
  o What was your fluid intake (amount and type)
  o What was your fuel intake (amount and type)
  o Did you do anything different today compared to training?
  o Is this your first (*insert distance) race?
• Additional Questioning....
  o Vomiting/Diarrhea?
  o During /after race
  o Pre /Post race weight?
  o Urine color and volume?
  o Medications/supplements?
  o Pre race injury/illness?
• Treatment
• IV- when/who
• Cramping
  ▪ Pulmonary Pathologies
  ▪ Dermatological Pathologies
  ▪ Orthopedic Pathologies
The Collapsed Athlete Algorithm:

Prevention of Race day Injuries (Schuemann)

Equipment for Injury Prevention
- Sun Exposure
- Swimming
  - Warm-up IN THE WATER
    - Allows acclimation to temperature
    - Decreases panic attacks during swim phase
  - Equipment Check during Warm-up
    - Goggles
    - Swim Cap
    - Swimsuit
    - Wet Suit
    - Line-up per skill level
    - Avoidance of swim overs
- Cycling
  - Helmet
    - Appropriate model/type
    - Appropriate size
- Cycle
  - Appropriate size
  - Appropriate bar ends
  - Appropriate wheels for environment
    • Disc wheels and Crosswinds
- Cycling technique
  - Avoid drafting
  - Know skill level on different terrain
    • Turns & curves
- Running
  - Environmental needs
    • Sunglasses
    • Hat (sun or warmth)
    • Footwear
      • Foot rinse/toweling

Nutrition
- 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

<table>
<thead>
<tr>
<th>Dietary Reference Intake (DRI)</th>
<th>Macronutrients &amp; Fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Average” adult person, assuming 2000 kcal/day</td>
<td></td>
</tr>
<tr>
<td><strong>Protein (g)</strong></td>
<td>50</td>
</tr>
<tr>
<td>(% of calories)</td>
<td>10 – 35</td>
</tr>
<tr>
<td><strong>Carbohydrates (g)</strong></td>
<td>300</td>
</tr>
<tr>
<td>(% of calories)</td>
<td>45-65</td>
</tr>
<tr>
<td><strong>Fats (g)</strong></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><strong>Fiber (g)</strong></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/DRIss/1_%20EARs.pdf
# Minerals

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Function</th>
<th>Source</th>
<th>DRI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Major minerals</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium</td>
<td>Bone health; blood clotting; nerve transmission; muscle contraction; disease prevention and weight management</td>
<td>Milk; yogurt; cheese; cottage cheese; green leafy vegetables</td>
<td>800-1100 mg/day*</td>
</tr>
<tr>
<td><strong>Trace Minerals</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>Oxygen transport and utilization; immune function; brain development; energy production</td>
<td>Beef; poultry; fish; soy products; dried fruits; legumes; whole grains; fortified cereals</td>
<td>5-18 mg/day*</td>
</tr>
<tr>
<td>Zinc</td>
<td>Wound healing; RNA and DNA synthesis; tissue growth and maintenance; hormone production; protein synthesis; GI and reproductive systems function; brain function</td>
<td>Beef and other dark meats; fish; eggs; whole grains; wheat germ; legumes; dairy products</td>
<td>7-9 mg/day*</td>
</tr>
</tbody>
</table>

*Range indicates the range between men and women, which also varies by age. Note that young and post-menopausal women have higher calcium requirements; while women aged 19-50 have higher iron needs.

### Caloric Intake
(Nutrition plan dependent on type of event!)

- **Sprint Distance**
  - No need to increase CHO or glycogen load the night before the race.
- **Olympic Distance Event**
  - Top off fluid and glycogen stores by eating an additional serving of CHO the night before the race.
- **Long and Ultra-distance**
  - Start the week before event with decreasing alcoholic intake and increasing CHO and glycogen stores
  - 3 days before event – decrease fiber and spice to reduce GI distress
  - If “heavy” sweater – Sodium load 12 – 15 hours before race (typically fine with increased salt load with foods only – no necessarily salt tablets)

- **Pre-event**
  - 3 hours prior: 150-200g carbohydrates
  - 90 minutes prior – 60-100g carbohydrates
  - Within one hour of race start – 25-50g carbohydrates
• **During event**
  o Emphasis on fluid replacement although some studies advocate a CHO/Protein replacement drink to supplement 15 – 20% of calories burned

• **Post-exercise Hydration**
  o Goal – replenish glycogen stores, 300-400 total calories for races that last about one hour and increase with longer races.
  o Should be completed within 30 – 60 minutes of exertion
  o Consist of
    ▪ Water to restore hydration status
    ▪ Carbohydrates in a tolerable form
    ▪ Electrolytes to speed rehydration

**Fluid Replacement**
  o **Water or “Tested” Electrolyte Drink**
    ▪ **Pre-event**
      • Ensure Proper Pre-exercise hydration status
        o Approx. 17 – 20 fl oz (500 – 600 mL) of water or sports drink 2 – 3 hours before exercise
        o 7 – 10 fl oz. (200 – 300 mL) of water or sports drink 10 – 20 minutes before exercise

  ▪ **Fluid Replacement During Event**
    • Approximate sweat and urine losses
    • Maintenance of hydration at LESS than 2% body weight reduction
    • Requirements
      o 7 – 10 fl oz. (200 – 300 mL) of water or sports drink every 10 – 20 min

  ▪ **Post-exercise Hydration**
    • Goal – correct any fluid loss accumulated during practice and/or event
    • Should be completed within 2 hours of exertion
    • Consist of
      o Water to restore hydration status
      o Carbohydrates to replenish glycogen stores
      o Electrolytes to speed rehydration

• **Hypothermia (Swimming portion)**
  o Wear Wetsuit if allowed (water temperature below 75 deg F) (USA Triathlon)
  o Selection of type based on air & water conditions
  o Other equipment to combat cold water temperatures (Koskella K)
    – 2 swim caps – top being neoprene
    – Ear plugs
    – Neoprene socks
  o Practice in cold water for at least 2 weeks prior to race

• **Exhaustion**
  o **“Know thyself”**
    – Know expected splits from your training and PACE yourself appropriately
- Hydrate & Fuel appropriately
- Clothe/Layer appropriately
  - Protection from Environment
  - Versatility is key!
  - PRACTICE TRANSITIONS
    a. Mental practice
    b. Actual practice
    c. Organize your equipment needs
      i. Clothing
      ii. Equipment
        1. Swim – googles, swim cap
        2. Cycling – helmet
        3. Running – footwear, sunglasses, headgear

References:

1. Bernhardt, B. Training Plans for Multisport Athletes. 2007
3. USA Triathlon website www.usatriathlon.org


