Basketball Related Injuries

Background

1. General info
   - Basketball has been an organized sport since the 1890's
   - Considered a limited contact sport
     - Physical nature/contact has increased
   - Participants include males and females
     - All ages
     - 2/3 of participants male, 1/3 are female
     - In US 24-32 million recreational players
     - >1 million high school athletes
     - >30,000 collegiate athletes
   - Basketball—most popular girls high school sport by participation
   - Nearly 50% of all basketball players say "pickup" games are main form of play

2. Injuries
   - Mechanism of injury:
     - Overuse and acute
     - Majority are acute
       - Basketball involves running, jumping, cutting, pivoting and explosive movements
       - Expose body to stresses from sudden acceleration and deceleration
   - Most common injuries in basketball players involve ankle, followed by knee and foot
   - Injury risk is greater in female athletes
     - Female athletes have 4-6x greater risk of ACL injury than male athletes
     - ACL-injury-prevention training programs:
       - Incorporate proprioception-balance and/or plyometric-agility exercises
       - Promote movement awareness/proper technique
       - Have been demonstrated to reduce incidence of ACL injuries in female athletes

3. Intrinsic factors
   - Overall fitness
   - Strength
   - Flexibility
   - Biomechanical alignment

4. Extrinsic factors
   - Practice and game surfaces
     - Hardwood vs. synthetic vs. blacktop
   - Artificial playing surfaces increase injury risk in pivoting indoor sports
   - Foot wear
     - No difference in high top vs. low top basketball shoes for prevention of ankle sprains
   - Ankle braces may help prevent ankle sprains
Foot and Ankle Injuries

1. Ankle sprain
   - Rates of injury
     - Most common injury in basketball
     - Account for greater than 80% of lower extremity injuries\textsuperscript{12}
     - Responsible for >50% of time missed due to injury\textsuperscript{13}
     - Injury rate 3.85 per 1,000 participants\textsuperscript{14}
   - Mechanism of injury
     - Landing of body weight on foot while it is plantar flexed and internally rotated
     - Most common mechanisms involve:
       - Landing either on floor or another players foot
       - Sharp turn, collision or fall\textsuperscript{14}
   - Risk factors\textsuperscript{14}
     - History of ankle injuries
     - Air cells in heels of shoes
     - Inadequate stretching prior to activity
   - Ottawa Ankle Rules
   - Nonsteroidal anti-inflammatory drugs
     - Help reduce swelling and pain after ankle injuries
     - May decrease the time it takes for the patient to return to activity\textsuperscript{15}
   - Structured balance exercise program
     - More effective than traditional strength/conditioning exercises in preventing ankle sprains in high school athletes\textsuperscript{16}

2. Ankle fracture

3. Syndesmotic Ankle Sprain (High Ankle Sprain)
   - High ankle ligaments:
     - At tibia-fibula interface
     - Function to maintain integrity of ankle mortise/fibular motion
     - During ankle dorsiflexion anterior tibia-fibula ligament resists normal posterior displacement and external rotation of fibula
   - Can be isolated
   - Can be associated with medial deltoid sprains or fibular fractures
   - Mechanism of injury is externally or internally directed rotational force applied to a dorsiflexed and axially loaded ankle
   - Injury to syndesmotic ligaments are assessed by "squeeze test"
     - Compress tibia and fibula together just below knee
     - If ligaments torn or strained, resulting stress on syndesmotic ligaments will elicit pain above ankle

4. Foot Injuries in Athletes

Knee Injuries

1. ACL
   - Rates of injuries
     - More common in female athletes\textsuperscript{17}
     - In NCAA basketball statistics, account for 8% of all game injuries in women versus 1.8% of all game injuries in men\textsuperscript{18,19}
Mechanism
- Most common mechanism of injury in basketball is deceleration and change of direction when the tibia is externally or internally rotated
- Athlete typically feels a sudden pain in knee associated with a pop or tearing sensation
- Commonly have immediate effusion and inability to continue play

ACL-injury-training prevention programs
- Incorporate proprioception-balance and/or plyometric-agility exercises
- Promote movement awareness/proper technique
- Have been demonstrated to reduce incidence of ACL injuries in female athletes

ACL-injury-prevention training program resources:
- Reprint: A Randomized Controlled Trial to Prevent Noncontact Anterior Cruciate Ligament Injury in Female Collegiate Soccer Players, American Journal of Sports Medicine
  - http://ajs.sagepub.com/cgi/reprint/36/8/1476
- ACL - injury prevention program website
- ACL - injury prevention program pdf

HEENT Injuries
1. Concussion (Sports)
2. Eye trauma
3. Dental trauma in athletes
   - Mouthguards offer protection against orofacial injuries
   - Insufficient evidence to recommend for prevention of concussion

Extremity and Skin Injuries
1. PIP joint dislocations
2. Abrasions / lacerations
   - Abrasions occur on artificial turf, synthetic courts, asphalt, concrete
   - Treatment:
     - Clean/debride tissue with soap and water
     - Apply topical antibacterial ointment or silvadene
     - HIV in athletes
   - Due to risk of transmission of blood-borne pathogens, all wounds should be covered with occlusive dressing during play
   - NCAA mandate:
     - Athletes be removed from competition if they are actively bleeding
     - Bleeding must be stopped and covered with dressing before return to play
Medical Considerations
1. Exercise induced asthma
2. Cardiac disorders in athletes
3. Mononucleosis in athletes

Evidence-based Inquiry
1. Does a knee brace decrease recurrent ACL injuries?
2. How accurate is the physical examination in diagnosing acute knee injuries?
3. What is the best way to evaluate an acute traumatic knee injury?
4. Heat or ice for acute ankle sprain?

References
10. High-versus low-top shoes for the prevention of ankle sprains in basketball players(There was no significant difference among these 3 groups, leading to the conclusion that there is no strong relationship between shoe type and ankle sprains) Barrett JR, Tanji JL, Drake C, Fuller D, Kawasaki RI and Fenton RM American Journal Sports Medicine. 21(4):582-585, 1993
11. A semi rigid ankle brace worn during performance of high-risk sports such as soccer or basketball is an option to reduce the risk of future ankle sprains for patients with a history of ankle sprains Handoll HH, Rowe BH, Quinn KM, de
2. The efficacy of a semi rigid ankle stabilizer to reduce acute ankle injuries in basketball, American Journal of sports medicine, 1994; 4:454-61

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