Making Youth Sports Safe and Enjoyable
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Introduction
- Overuse injuries are a growing concern for all involved in adolescent and young adults sports
- Some estimate that up to 50% of all injuries in growing athletes are overuse
- Important – These can be eliminated

Where are we today?

Hopefully …
Preventing rather than treating

Youth Sports Injuries
- Over 7.3 million high school students involved in sports programs
  - Up from 4 million in 1971-72
  - Over twice that number involved in youth programs
  - 30 million in the 5-18 age group
  - Sports Med 2003

Sport Specific Rates
- Football historically has the highest injury rate
  - 8-10 per 1000 exposures
  - 30-35% of players sustain an injury
- Soccer and basketball are the most injurious sports for girls
  - 4-6 per 1000 exposures
  - 20-25% of players sustain an injury
Types of Injuries

- Over 50% are strains or sprains
  - Most are minor
- Knees are the most commonly injured joint and the most common joint requiring surgery
- Re-injuries account for approximately 11-15% of injuries overall

Most common injuries

- Other – (in order)
  - Knee other, Shoulder other, Hand/wrist fracture, Shoulder strain/sprain, Trunk strain/sprain, Hand/wrist strain

Age Differential

- Younger athletes are ‘top heavy’
  - Higher incidence of upper extremity injuries
- As athletes age and mature (become heavier) they are more apt to injury their knees, ankles, and legs in general

Issues

- Females
  - Vertical growth peaks at 12
  - Muscle growth peaks at 14-15
- Males
  - Vertical growth peaks at 13-14
  - Muscle growth peaks at 13-14

- Motor coordination comes with time
- Inflexibility is a certain consequence of rapid growth
Susceptibility

- Physis
  - Growth plate
  - 2-5 x weaker than surrounding bone
- Bone
  - Bone-tendon junctions

Physeal injuries
- Traction
  - Osgood-Schlatter’s
  - Sever’s
  - Little Leaguer’s shoulder

Mis-matched Participation

- Energy and force of participation increases as coordination often becomes an issue
- Severity of injuries increase
- Kids need to be kids
- Lessen exposure

Competition vs. Practice

- Competition is often what drives interest in sports
- Certainly wearing a uniform is exciting
- However, competition injury rates are 3-4x higher than those in practice

Sports do have an inherent risk of injury
- Injuries do occur and are ‘touchable’
Sports and Society

- Money and drive to win are huge motivators
- Steroids are a prime example of issues
  - Known to the athletes and coaches first
  - Then studied by the philosophers and psychologists
  - THEN we learned of the side effects and potential complications

Specialization

- Improves performance
  - Therefore specialization works in the eyes of the coach/parent/spectator
- Works best in untrained out of shape athletes
  - Improvements occur as quickly as 6 weeks, again worthwhile in eyes of others

Specialization

- Therefore if 6 weeks shows an improvement, 12 weeks will show more, and 48 weeks will.....

Concerning

- As many as 50% of sports injuries in adolescent athletes are overuse injuries
- Estimate in 2003 was that there was over 3.5 million overuse injuries

Overuse Injuries

- Rotator cuff tendinitis
- Swimmer’s shoulder
- Little League Elbow
- Patellofemoral malalignment
- Shin Splints, Stress fracture
- Spondylolisthesis

What is an Overuse Injury?

Excessive use of muscle group(s) that are not conditioned for the intended action and pain and dysfunction result leading to poor performance

Too much!
Overuse Injury Etiology

- Obviously no one cause
- Risky behaviors include:
  - Repetitive motion without rest or cross-training
  - Year round single sports play
  - Notion that ‘playing through the pain’ is appropriate or necessary

Injury Patterns

- Specialization use to occur in high school or college
- Earlier specialization is often when physical ability isn’t yet present
  - Same size and weight ball in youth baseball as in MLB
  - 100 yd field in Pop Warner and NFL

Problem is …

- Specialization works
- Starting from an untrained, out-of-shape condition – a six week training program will improve performance and ‘ability’ dramatically
- A learned behavior

So if 6 weeks is good, 12 weeks is better

- But specialization is not the path
  - Michael Jordan
  - Major League pitchers

Signs and Symptoms

- First signs of overuse problems that adults should be aware of in younger children:
  - Poor performance
  - Fatigue
  - Vague pain
  - Lack of enthusiasm

Overuse Injury

- Overuse injuries progress from
  - pain after activity
  - pain with activity which affects performance
  - pain at rest
Overuse Injuries

- Present most often as non-specific aches and pains
- Usually post-exercise ache is worst
- Often described as a throbbing, deep tooth ache

Classic Historical ‘Physical’ Exam

- Inability to find worst spot
- “It’s usually here but yesterday it was here. And mom, do you remember when it ran down the back of my leg?”
- “I don’t really feel like going to practice today”, “Is this game a friendly or league game?”

Concerning Signs and Symptoms

- Post-exercise pain that remains for > 24 hours
- Localizable pain
- Pain with effusion
- Repeated use of NSAID’s

Overuse Prevention

- Over 50% of these injuries are felt to be preventable
- Provide rest during year
- Assess tightness and address as needed
- Don’t encourage play-through-the-pain motto

No Pain – No Gain

- “Don’t throw your athlete in the pool if he/she can’t swim”

Sports Preparation

- Off-season training
- Gradual increase in activity in season
Lifting

- What age to start weight training?
  - YES

- Supervision and proper form are the issues
- Not the musculoskeletal stress
- Testosterone ‘allows’ hypertrophy
  - No testosterone = no bulk

Preventing Injury

- 1 to 2 days off per week
- Increase training by 10% each week
- 2 to 3 months away from a specific sport during the year.
- Encourage participation on only 1 team during a season.
- Brenner and Council on Sports Medicine

Preventing Injury

- Participate in athletics at a level that is commensurate with their skill and ability
- Adequate supervision
- Proper protective equipment
- Training programs
- Research
  - Equipment
  - Injury mechanisms

  - Stephens and Beutler. Am Fam Phys 2007

Sports Injury Prevention

- Equipment
  - Helmets
  - Facemasks
  - Mouth guards

Sports Prevention Program

- Prototypical example centering around female knee injuries in basketball
- 1995 Arendt and Dick reviewed NCAA injury data which revealed 4-to-6 fold increased incidence of serious knee injuries in females participating in the same cutting as males
Sports knee programs

- Cincinnati Sportsmedicine program
  - Sportmetrics – 1996
  - Reduction of serious knee injuries by 50% in high school women
- Most have duplicated the results
  - Increased vertical height, faster sprint times, better shuttle run times, better reaction times

Unfortunately ...

- Programs still remain isolated in few centers and high schools
- Constraints of time, money, and experience arise repeatedly

Knee injury prevention attitudes and practices: A comparison of high school coaches and athletic trainers

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Adolescent Pitcher’s

- Multiple theories
  - Wrong pitches
  - Too many pitches
  - Improper coaching
  - Under developed arms
- Much controversy

Recent Literature

- No kinematic and kinetic differences between curveball and fastball
  - College age pitchers
    - Fleisig et al – AJSM 2006
- Lower elbow stresses throwing curveball vs. fastball
  - Adolescent pitchers
    - Nissen et al – AJSM 2008

Too Many Pitches?

- Direct correlation between number of pitches and development of shoulder and elbow pain
  - Lyman – AJSM 2002
- Increased incidence in baseball players of shoulder and elbow injuries
  - Gughenheim - 1976

Prevention

- Stretching
  - Tightness can be relative
  - Loss of 10 degrees in arc of shoulder rotation is significant
- Limit year round pitching
- Reduce volume of pitches
Athletic Burnout

- Exists on several levels
- Hard to ‘see’ it
- Harder to prevent it

Nothing better than a couple hundred elementary aged kids on a soccer or football field on a fall Saturday afternoon
Nothing worse then the same kids playing their 6th game on Sunday night at 6pm

Preventing Burnout

- 1 to 2 days off per week
- 3 to 4 months off per year
- Increasing intensity no more than 10% per week
- Participate on 1 team at a time
- Focus on Participation, Skills, Sportsmanship

Recognize Burnout

- Non specific injuries
- Feigning injuries
- Poor performance
- Academic issues

Preventing Burnout

- Develop advisory boards
- Provide parent, coaches, and player informational conferences, talks, etc.
  - Nutrition
  - Training parameters
  - Heat/cold illnesses

- Brenner and Council on Sports Medicine

Thank you