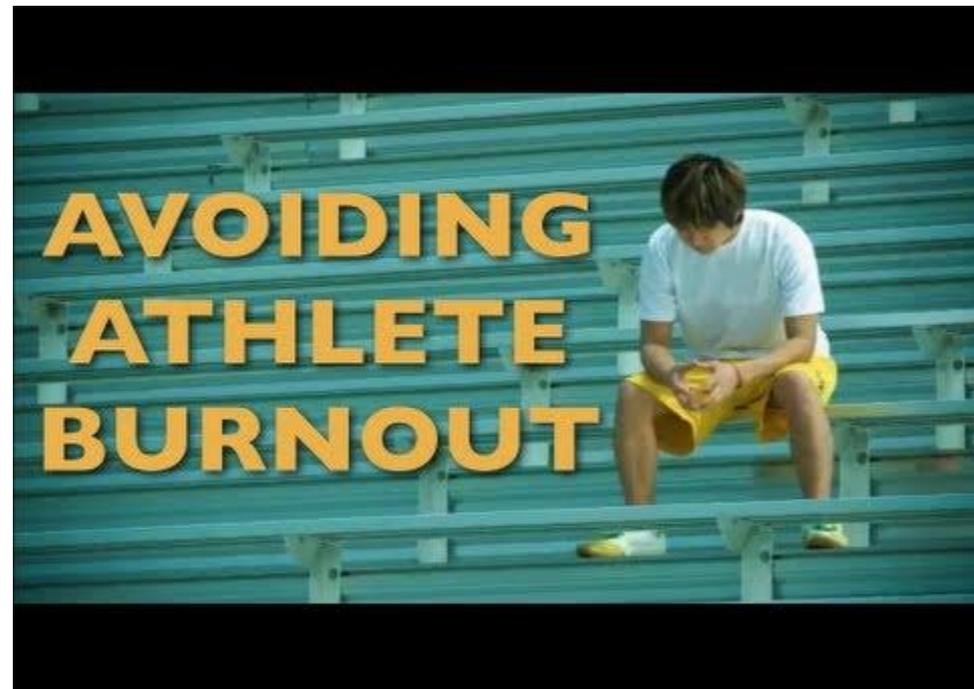


THE SPECIALIZED YOUTH ATHLETE AND AVOIDING BURNOUT

George Friedhoff D.O.
St. Vincent Charity
Spine and Ortho Group



19 y/o lacrosse player p/w with 3 days of persistent axillary pain and swelling especially with weight-lifting. Pain remains despite reduction in overhead training but still practices lacrosse. PE- localized swelling with tenderness and firmness over left axilla. Supine there is prominent venous structures with left UE > right. Which of the following is the presumed diagnosis?

- a) Superficial phlebitis
- b) Pectoralis major tear
- c) Labral tear
- d) Effort induced thrombosis
- e) Lymphangitis

Objectives

- I. Define Sports Specialization
- II. Recognize and Interpret Overuse Syndrome
- III. Identify High Risk Injuries
- IV. Develop Prevention Plan

D.O.'s Do It Better

Osteopaths(D.O.s)

- 60% Primary Care
- Back Pain
 - 84% of providers
- Foot Pain
 - 41% of providers

Allopaths(M.D.'s)

- 35% Primary Care
- Back Pain
 - 31% of providers
- Foot Pain
 - 10% of providers

Youth Participation

- 27 million youth between 6 to 18 y/o in team sports
- National Council of Youth Sports
 - 60 million participate in some form of organized sports
- Less than 6 y/o in organized sports
 - 1997: 6%
 - 2008: 12%

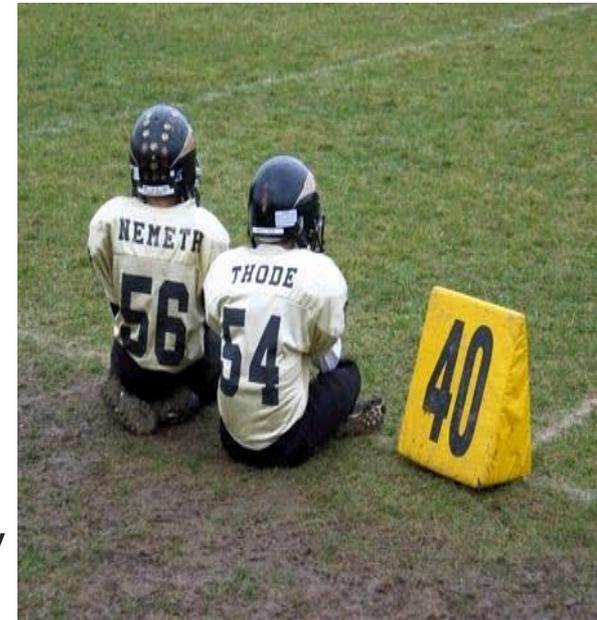


Defining Sport Specialization

- Intense year round training with exclusion of other sports?
 - Hours spent in Sport A > Sport B & Sport C
- Not a “single focus” but also training time
- Starting sooner & sooner(Age Limit)
- Multiple teams during single season

Introduction To Overuse

- Centers For Disease Control and Prevention
 - > 5 million children suffer sport-related injury annually
- Year-Round Specialized Training
- Safe Kids Survey
 - 9 out 10 parents underestimate length of recovery
- 25% of adult athletes



Burnout & Overtraining Syndrome

- Open Access Journal of Sports
 - 80% of youths quit by age 15
- Non-functional overreaching
- Overtraining Syndrome
 - Series of psychological, physiological and hormonal changes that result in decreased performance
 - Fatigue
 - Lack of Enthusiasm

TABLE 5. Factors Related to Burnout in Young Athletes^{184,187,188}

Environmental Factors

Extremely high training volumes

Extremely high time demands

Demanding performance expectations (imposed by self or significant other)

Frequent intense competition

Inconsistent coaching practices

Little personal control in sport decision making

Negative performance evaluations (critical instead of supportive)

Personal Characteristics

Perfectionism

Need to please others

Nonassertiveness

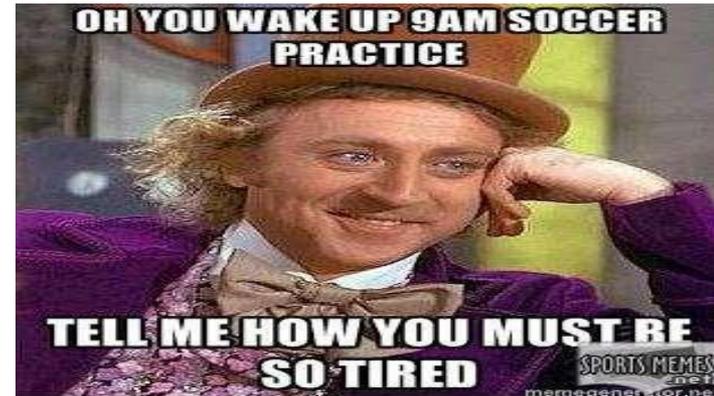
Unidimensional self-conceptualization (focusing only on one's athletic involvement)

Low self-esteem

High perception of stress (high anxiety)

Preventing Overtraining/Burnout

- 1) Keep practice fun
- 2) Take 1-2 days off per week
- 3) Permit longer scheduled breaks from training & competition focusing on cross-training
- 4) Be in tune with their bodies
- Organizations
 - National Youth Sports & Safety Institute(www.NYHSI.org)



Who Is Responsible?

- 1-Coaches
- 2-Parents

10-Child



Clinical Presentation



TABLE 6. Symptoms of Overtraining Syndrome/
Burnout^{180,187,188}

Fatigue	Insomnia	Loss of appetite
Depression	Irritability	Weight loss
Bradycardia or tachycardia	Agitation	Lack of mental concentration
Loss of motivation or interest	Decreased self- confidence	Heavy, sore, stiff muscles
Hypertension	Anxiety	Restlessness
Sleep disturbances	Nausea	Frequent illness

TABLE 7. Diagnosis of Overtraining Syndrome/Burnout^{180,19}

History

Decreased performance persisting despite weeks to months of recovery

Disturbances in mood

Lack of signs/symptoms or diagnosis of other possible causes of underperformance

Lack of enjoyment participating in sport

Inadequate nutritional and hydration intake

Presence of potential triggers: (a) increased training load with adequate recovery, (b) monotony of training, (c) excessive number of competitions, (d) sleep disturbance, (e) stressors in family life (parental pressure), (f) stressors in sporting life (coaching pressure and travel demands), (g) previous illness.

Testing (if indicated by history)

Consider laboratory studies: complete blood count, comprehensive metabolic panel, erythrocyte sedimentation rate, C-reactive protein, iron studies, creatine kinase, thyroid studies, cytomegalovirus and Epstein-Barr virus titers.

Profile of Mood States (POMS): A psychometric tool for a global measure of mood, tension, depression, anger, vigor, fatigue, and confusion.¹⁶⁹

Early specialization

Ericsson

- 10,000 hours of deliberate practice to achieve expertise
- Strong correlation between performance level & training hours
- Problems – elite performers don't always attain 10,000 hours
- Evidence of higher attrition & negative health outcomes

Early diversification

Cote

- More diverse range of skills developed through variety of sports
- Promotes development of intrinsic motivation, increased self-involvement
- Talent transfer across sports (cognitive and physical)
- Evidence from tennis (age 15), but still compile enough hours

Trends In Sports Specialization

- Children 6 Years Or Younger
 - 9% in 1997
 - 12% in 2008
- 77% of HS AD's Notice Trend
- ↑ USTA (70% by 14 & 95% by 18)
- Growing Number of Travel Leagues



the
S P O R T S
G E N E

INSIDE THE SCIENCE OF
EXTRAORDINARY
ATHLETIC PERFORMANCE

DAVID EPSTEIN

SENIOR WRITER, SPORTS ILLUSTRATED



Risk Factors For Overuse Injury

Intrinsic Risk Factors

Growth-Related Factors

- Susceptibility of growth cartilage to repetitive stress

- Adolescent growth spurt

- Previous injury

- Previous level of conditioning

- Anatomic factors

- Menstrual dysfunction

- Psychological and developmental factors—athlete specific

Extrinsic Risk Factors

- Training workload (rate, intensity, and progression)

- Training and competition schedules

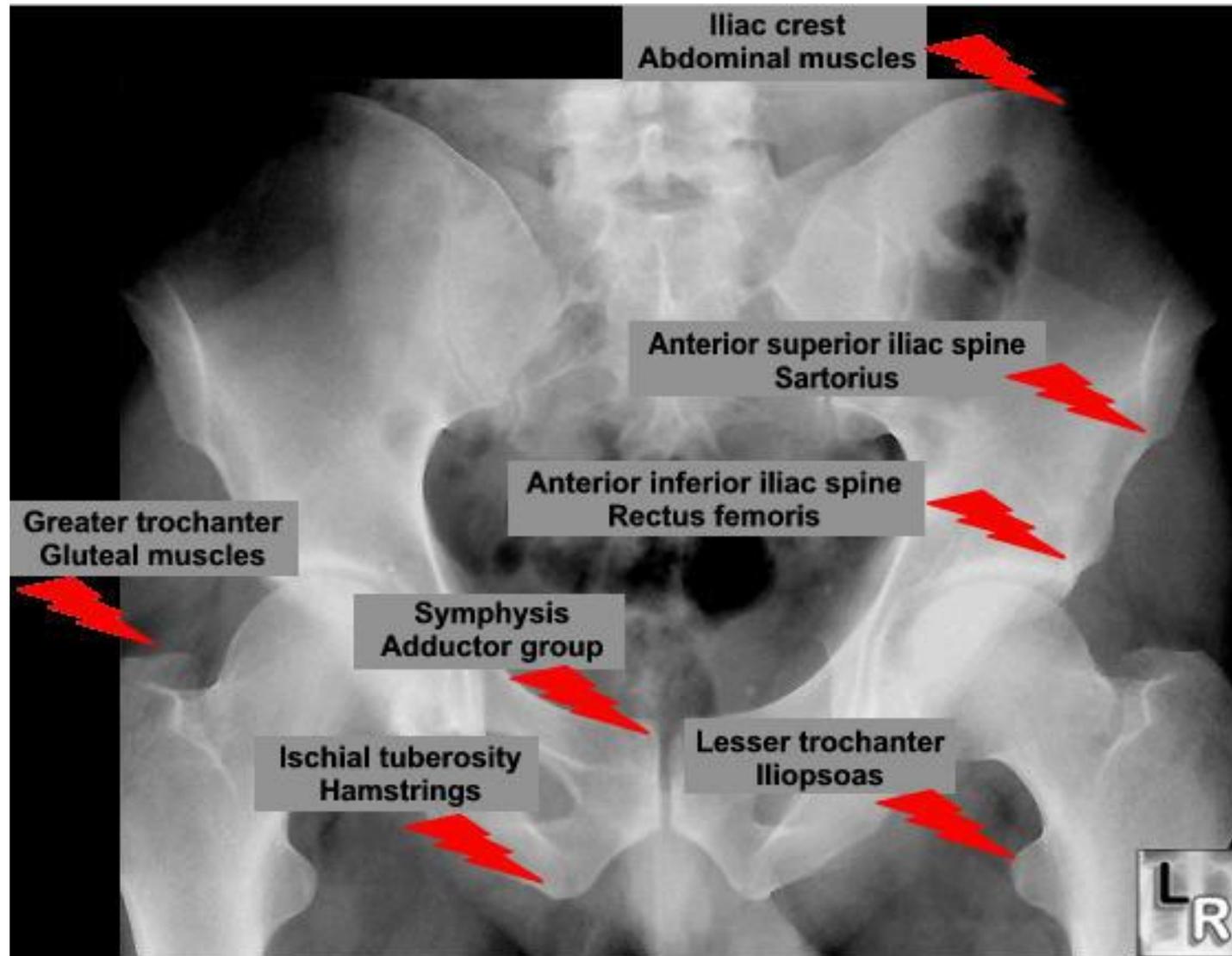
- Equipment/footwear

- Environment

- Sport technique

- Psychological factors—adult and peer influences

Physes Vs. Apophyses





Classification of Overuse Injuries

- 1) Pain In Affected Area After Physical Activity
- 2) Pain Without Restricting Performance
- 3) Pain With Restricting Performance
- 4) Chronic Pain Even At Rest

Overuse Injuries: Predisposing Factors

Extrinsic Factors

- Training Errors
 - Excessive Volume
 - Excessive Intensity
 - Rapid Increase
 - Sudden Change in Type
 - Inadequate Recovery
 - Faulty Technique
- Equipment
- Psychological Factors
- Environmental Conditions
- Inadequate Nutrition

Intrinsic Factors

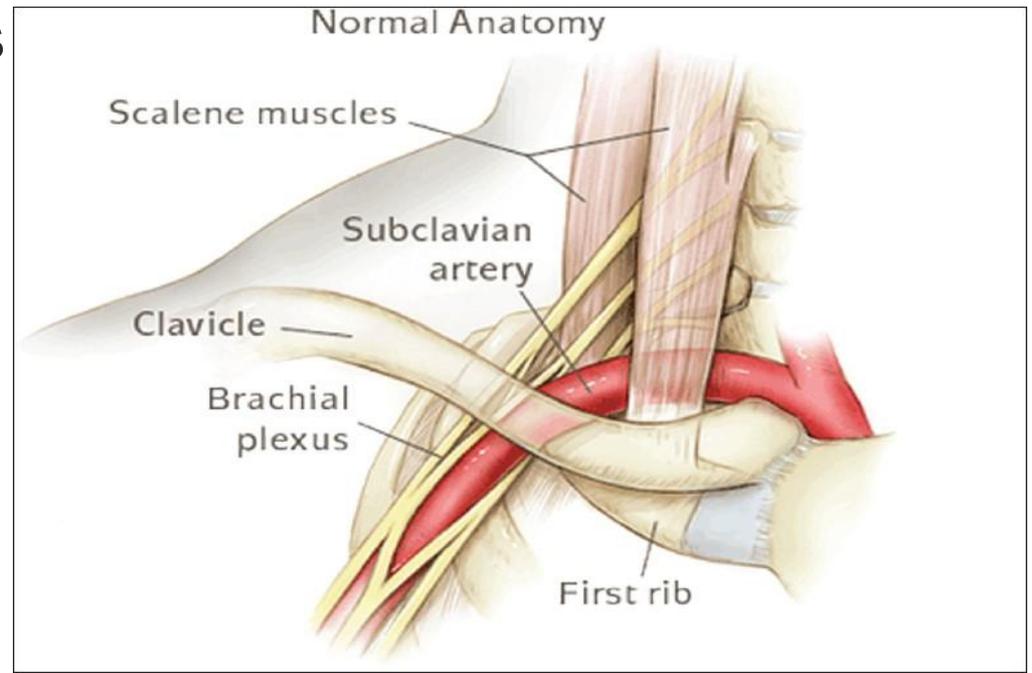
- Malalignment
- Muscle Weakness
- Muscle Imbalance
- Lack of Flexibility
- Sex
- Size
- Body Composition
- Other
 - Genetic Factors
 - Endocrine Factors
 - Metabolic Conditions

Location	High Risk	Low Risk
Hip/Pelvis	Femoral neck (tension-sided)	Femoral shaft stress fracture
Back (lumbar spine)	Pars interarticularis stress fracture	Congenital spondylolysis, pedicle stress fracture
Leg	Anterior cortical tibial stress fracture	Medial tibial stress fracture, fibular shaft stress fracture
Ankle	Medial malleolar stress fracture, talar dome osteochondral defect, talar neck stress fracture	Distal fibular stress fracture
Foot	Tarsal navicular stress fracture, fifth metatarsal proximal diaphyseal stress fracture, sesamoid stress fracture	Second, third, fourth metatarsal stress fractures, cuboid
Knee	Patellar stress fracture, osteochondritis dissecans of femoral condyle or patella	Tibial tubercle and inferior patellar pole apophysitis
Shoulder/arm	Effort thrombosis	Proximal humeral physeal stress fracture
Elbow	Osteochondral dissecans capitellum, apophyseal non-union of medial epicondyle	Medial epicondyle apophysitis
Wrist	Distal radial physeal stress injury	



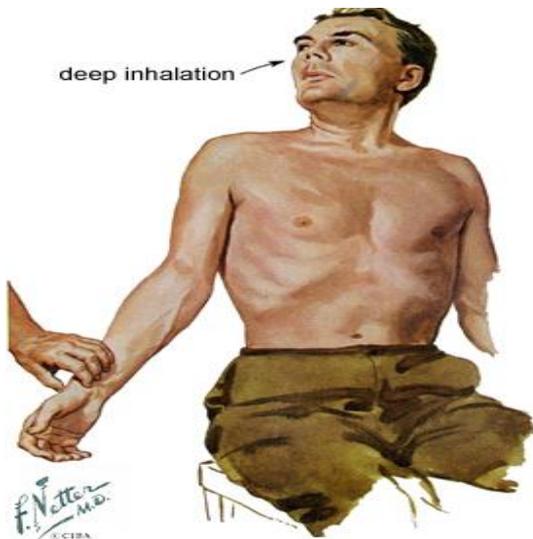
Thoracic Outlet Syndrome

- Costoclavicular space-clavicle and 1st rib
- Hyperabduction syndrome
- Overhead sportspeople
 - Poor posture-scapular protraction
 - Scapular dyskinesis
 - Anterior tilt



Thoracic Outlet Syndrome Presentation

- Symptoms-pain, numbness & weakness
- Venous engorgement
- Clinical tests
 - Adson's test-enhances sensitivity with doppler flow
 - Roos test-most sensitive

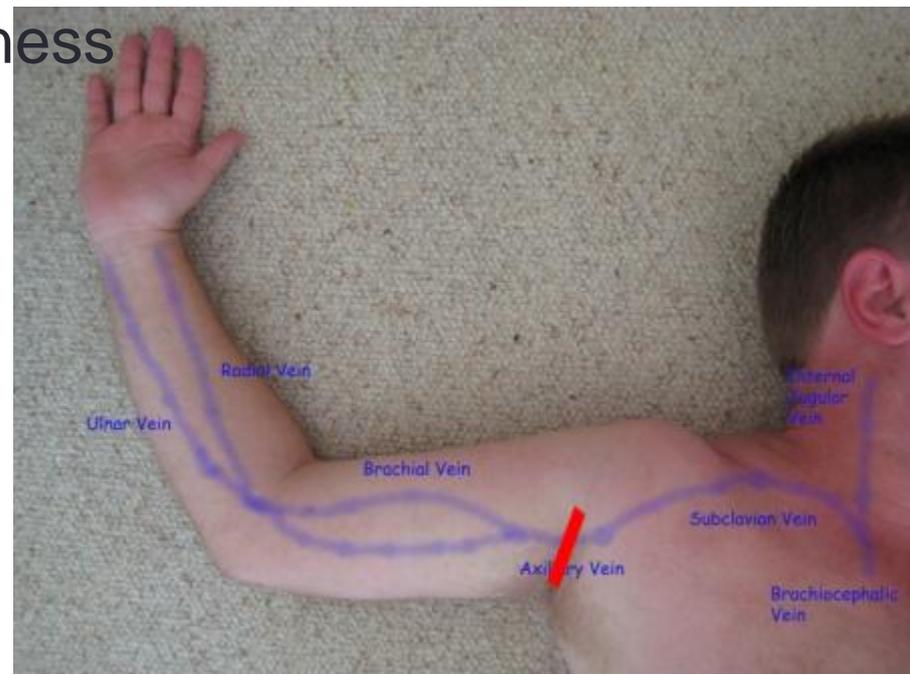


Thoracic Outlet Syndrome Management

- Physical Therapy
 - Pectoral and scalene stretching
 - Joint mobilization of 1st rib
 - Scapular and scapulothoracic mobilization
 - Thoracic extension and brachial plexus exercises
 - 3 to 6 months
- Anticoagulation & thrombolysis
- Thoracic outlet decompression
 - Unresponsive neurogenic
 - Vascular compromise

Axillary Vein Thrombosis “effort thrombosis”

- Paget-von Schrotter Syndrome
- Compression
 - Costoclavicular Space
 - Clavicle & 1st rib
 - Subclavian Muscle & 1st rib
- Presentation-fatigue & heaviness
- Physical Exam
 - Superficial veins prominent
- Venography
- Rest and Anticoagulation



Little Leaguer's Shoulder

- Olsen et al.
 - 6 innings with 7.9 months versus 4innings with 5.5 months
- 11-13 years of age
- Proximal humeral physis
 - Repetitive rotational stress

TABLE 1. Little League Baseball Pitch Count Regulations

Age (y)	Maximum Pitches Per Game
7-8	50
9-10	75
11-12	85
13-16	95
17-18	105



Little Leaguer's Shoulder Management

- Radiographs-Gasser & Carson
 - Widening
 - Sclerosis
 - Cystic changes
- Treatment
 - Progressive throwing program
 - Proper mechanics
 - 3 months

TABLE 2. Little League Baseball Rest Requirements for Pitchers Age 16 Years and Under

Pitches	Days Rest
1-20	No calendar day
21-40	1 calendar day
41-60	2 calendar days
> 61	3 calendar days

Little League Elbow

- Humeral origin of UCL
- 8-15 years of age
- Medial elbow pain with throwing
- Widening of apophysis
- Rest & biomechanical assessment





TABLE.

Little League Baseball Pitch Count Regulations

Age	Limits Per Game	Rest Requirements
17-18 years	105/day	76 or more pitches → 4 days rest
15-16 years	95/day	61-75 pitches → 3 days rest 46-60 pitches → 2 days rest 31-45 pitches → 1 day rest 01-20 pitches → 0 days rest
13-14 years	95/day	66 or more pitches → 4 days rest
11-12 years	85/day	51-65 pitches → 3 days rest 36-50 pitches → 2 days rest
9-10 years	75/day	21-35 pitches → 1 day rest
7-8 years	50/day	01-20 pitchers → 0 days rest

From The Little League® Pitch Count Regulation Guide for Parents, Coaches and League Officials; with permission.

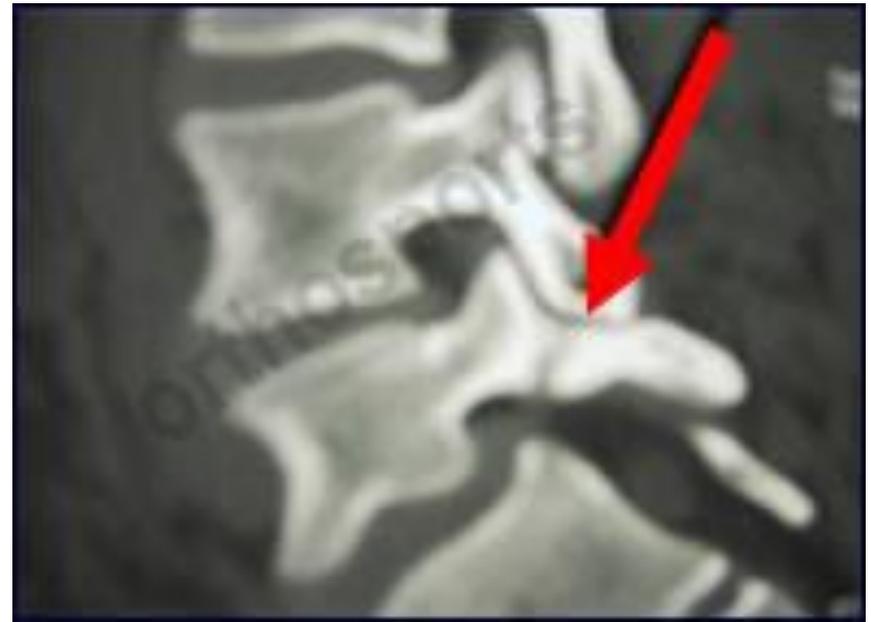
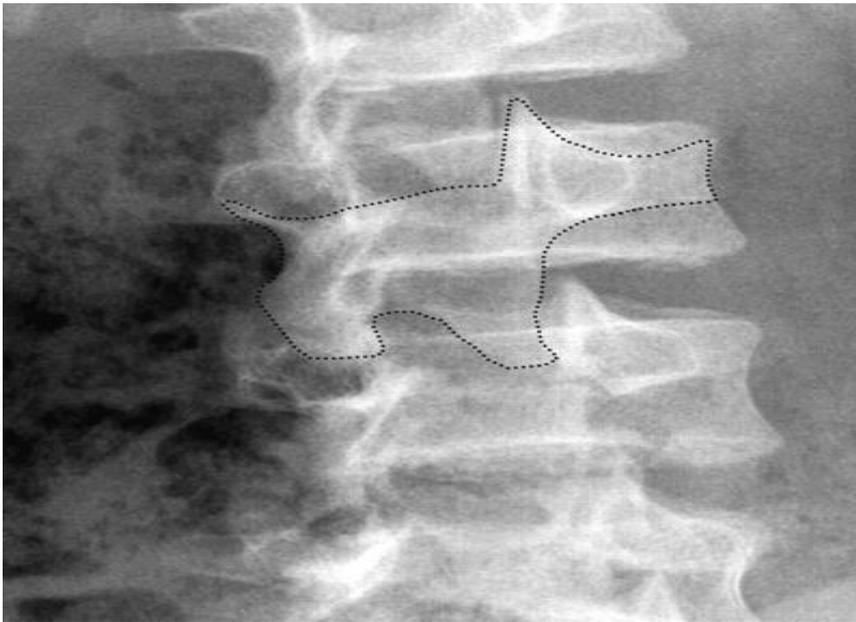
Shoulder Overuse Prevention

Table 2 General baseball pitching guidelines set forth by the American Sports Medicine Institute [6]

Age (years)	Maximum number of pitches/game	Suggested pitch types
8-10	52	8 years – fastball 10 years – change-up
11-12	68	Fastball, change-up
13-14	76	Fastball, change-up 14 years – curveball
15-16	91	Fastball, change-up 16 years – slider
17-18	106	Fastball, change-up, curveball, slider

Pars Interarticularis

- Insidious Onset
 - 48.5% youth athletes with back pain
 - Progression to non-union-14-70%
- Oblique plain films
 - Scotty Dog



Management

Imaging of Choice

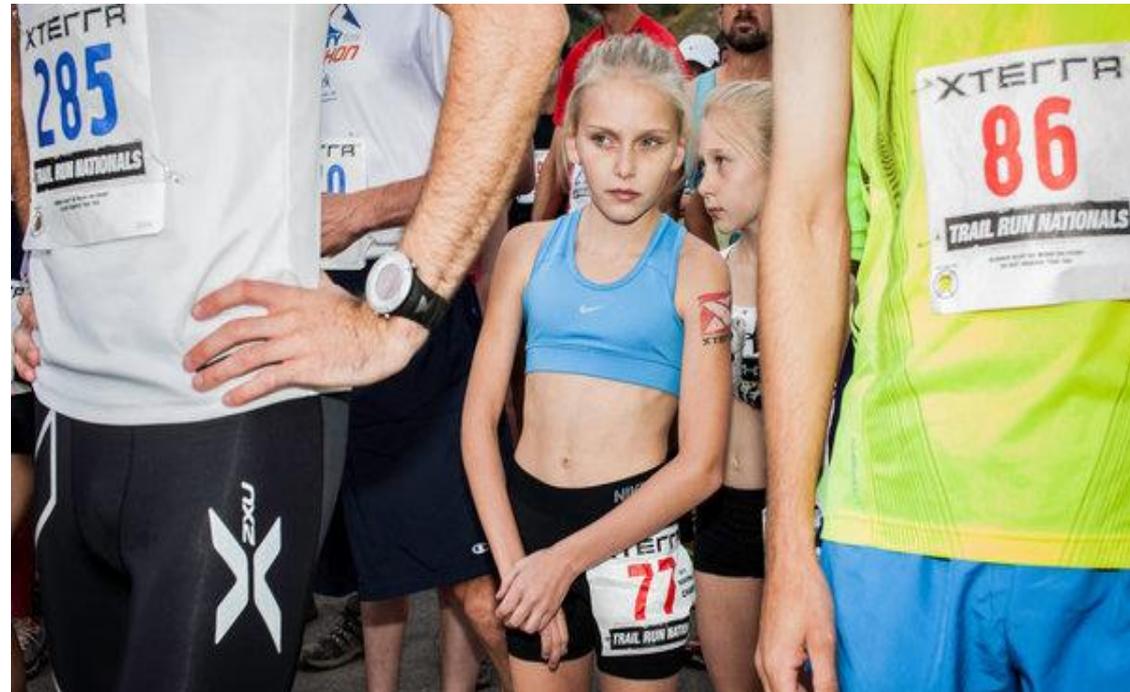
- MRI
 - No radiation
 - 85% & 95%
- SPECT scan
 - Radiation
 - 85%
- MRI vs. SPECT

Treatment Plan

- Goal-Pain Free
- Rest-3 months
 - 57 youth soccer players(optimal results)
- Physical Therapy
- Bracing ?

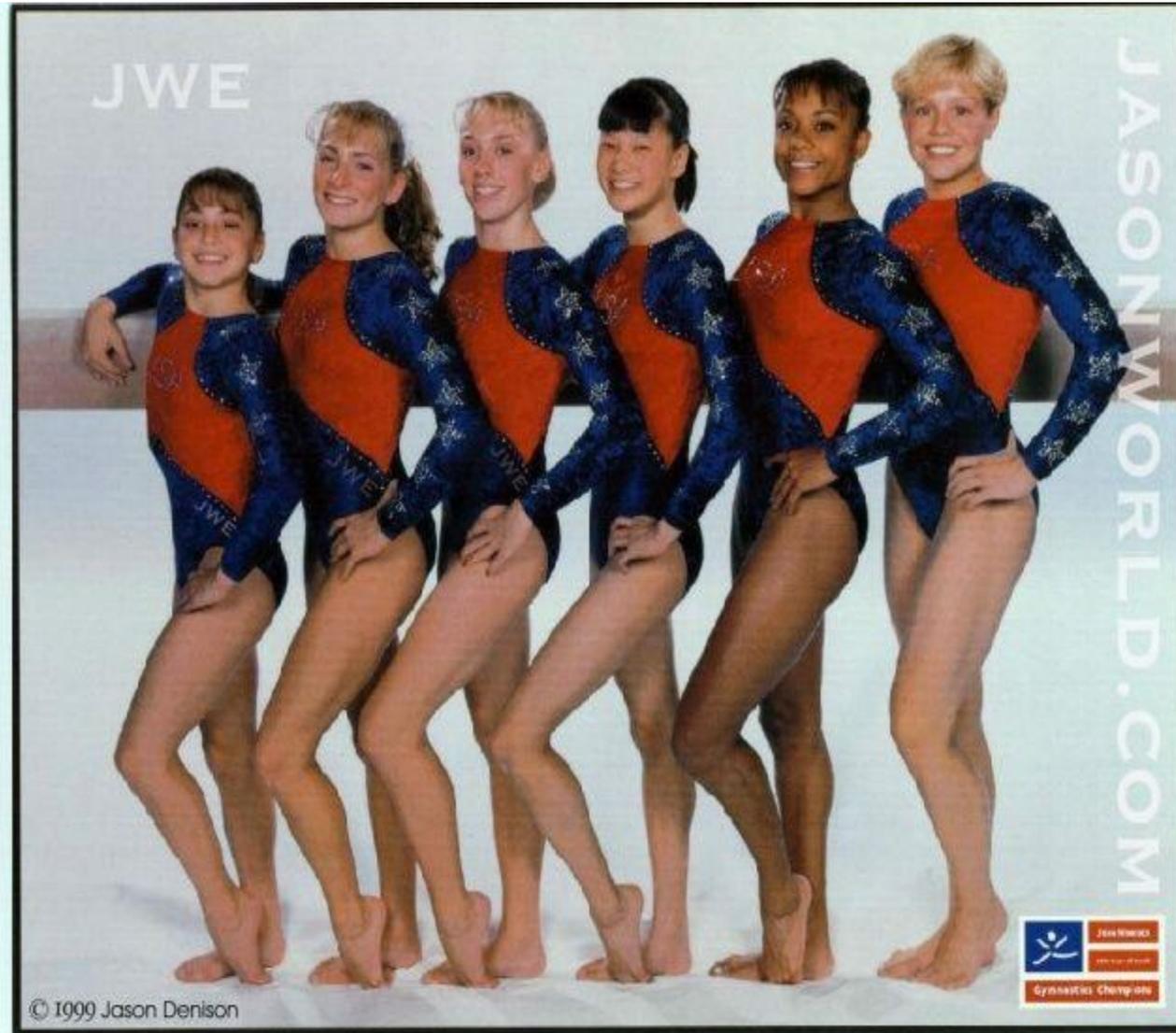
Endurance Athletes

- American Academy of Pediatrics
 - Triathlons Are Safe
- Marathons
 - 10% Rule
 - Heat Stress
- Nutrition
 - Total Caloric Intake
 - Iron
 - Calcium



Growth And Development

- Menarche
- Amenorrhea
- Pre-Selection
- Female Triad
- Boys vs. Girls



Will Early Specialization Get Me To the Pros?



- Swimming, diving, gymnastics and figure skating

What is the Goal?

- Pie In The Sky?
 - Professional Pie
- Area of Specialization
 - 0.2%-0.5% make it pro
- **Promote Lifelong Physical Activity**
- Unfulfilled Childhood Dreams



American Dream



Student Athletes	Men's Basketball	Women's Basketball	Football	Baseball	Men's Ice Hockey	Men's Soccer
High School Student Athletes	538,676	433,120	1,086,627	474,791	35,198	410,982
High School Senior Student Athletes	153,907	123,749	310,465	135,655	10,057	117,423
NCAA Student Athletes	17,984	16,186	70,147	32,450	3,964	23,365
NCAA Freshman Roster Positions	5,138	4,625	20,042	9,271	1,133	6,676
NCAA Senior Student Athletes	3,996	3,597	15,588	7,211	881	5,192
NCAA Student Athletes Drafted	46	32	254	678	7	101
Percent High School to NCAA	3.3%	3.7%	6.5%	6.8%	11.3%	5.7%
Percent NCAA to Professional	1.2%	0.9%	1.6%	9.4%	0.8%	1.9%
Percent High School to Professional	0.03%	0.03%	0.08%	0.50%	0.07%	0.09%

HELLO
my name is

Dream Killer



Social Risks- “I Just Want To Have Fun”

- Overdependence
- Social Isolation
- Problem Solving Skills
- Maladaptive Behaviors



Money Is The Root Of All Evil

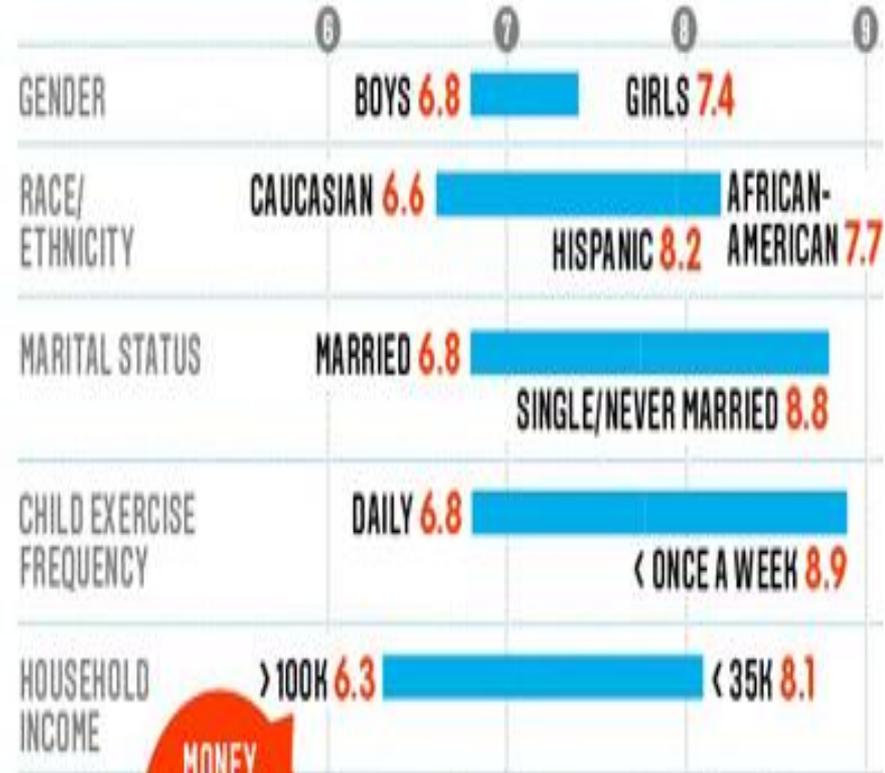
- Youth Sports Movement
 - \$7 Billion Industry
- Youth Sports Tourism
 - Fastest Growing Segment in Travel
- Columbus Dispatch
 - Non-profit Groups-\$5 Billion/Year in 2010



Odds of Going Pro	Odds
Odds of a high school football player making it to the NFL	1 in 6,000
Odds of a high school baseball player making it to MLB	1 in 4,000
Odds of a high school basketball player making it to the NBA	1 in 10,000
Odds of a high school soccer player receiving a full ride to a Div I or II School	1 in 90

The above is taken from a study on youth sports by Michigan State University. It surveyed 10,000 children ages 5-14 nationwide.

MEAN AGE AT ENTRY INTO ORGANIZED/TEAM SPORTS



MONEY DRIVES THE EARLIEST ACTION.

A Parent's Influence

- [YOUTH FOOTBALL PARENT OUT OF CONTROL - YouTube](#)

What To Tell Parents?

- 1) Well-Rounded Individual Leads To Success
 - Late Specialization Works
- 2) Enjoyment/Intrinsic Motivation
- 3) Supportive Not Authoritative
- 4) No Penalty For Starting Late



vs.



Summary

- 1) Specialization in a single sport before adolescence is discouraged
- 2) Clinicians should work with parents and coaches to strive for early recognition of overuse injuries
- 3) Be alert for signs and symptoms of overtraining including decline in performance, weight loss, apathy and fatigue
- 4) High risk injuries can lead to nonunion, result in chronic pain, and/or lead to the development of degenerative joint disease

19 y/o lacrosse player p/w with 3 days of persistent axillary pain and swelling especially with weight-lifting. Pain remains despite reduction in overhead training but still practices lacrosse. PE- localized swelling with tenderness and firmness over left axilla. Supine there is prominent venous structures with left UE > right. Which of the following is the presumed diagnosis?

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- c) Labral tear
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- e) Lymphangitis

Questions



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