

“THE ACTIVE FEMALE – THROUGH THE AGES”

Dr. Gloria Cohen

NEW MEXICO ORTHOPAEDICS



Introduction

- ▣ Females have shown increasing participation in recreational and competitive sports
- ▣ 1896 1st women's intercollegiate basketball championship between Stanford and UC Berkeley
- ▣ 1943 The All-American Girls Professional Baseball League was formed



The Boston Marathon



- ▣ Women were not allowed to run officially until 1972
- ▣ 1966 Roberta Gibb crossed the finish line in 3hrs 21 minutes
- ▣ 1967 Katherine Switzer is attacked by Jock Semple

1972 Title IX



- ▣ “No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving federal financial assistance”.
- ▣ These few words are credited with launching a revolution in education and sports for women.

Making “Her Story”

- ▣ 1984 1st Olympic marathon for women
- ▣ 1984 1st Olympic cycling Road Race for Women
- ▣ 1991 FIFA 1st Women's Soccer World Cup
- ▣ 1996 Olympic debut for Women's Soccer



Today

- ▣ Females of all ages have shown increasing participation in sports and physical activity
- ▣ Attention directed to the injuries and medical concerns of the active female



Anatomy

- ▣ Musculoskeletal - overuse
- ▣ Gynecology/Endocrinology
- ▣ Breast
- ▣ Pelvis
- ▣ ACL injuries



Lower Extremity Anatomy and Biomechanics

- ▣ Females tend to have wider pelvises and greater genu valgum than males
- ▣ Biomechanical malalignment may predispose to overuse injuries of the lower extremity, especially in the unconditioned state
- ▣ Patellar tracking
- ▣ Pronation and supination
- ▣ Muscle imbalance

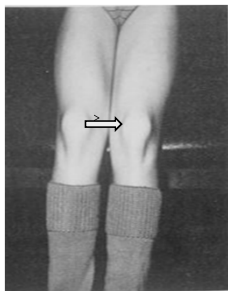


Patellofemoral Pain Syndrome

- ▣ Most common type of knee pain in adolescents: girls more than boys
- ▣ Causes: tight hamstrings; rapid growth; inadequate quads/hamstring muscle balance; biomechanical alignment; training errors
- ▣ Sxs: knee pain; positive "theater sign"
- ▣ Exam: rarely swelling; "squinting patellae"; medial tenderness; positive compression test



Vastus medialis (VMO)



PFPS Treatment

- ▣ Stretching and strengthening exercises
- ▣ Taping
- ▣ Modification of activity
- ▣ Pain management
- ▣ Orthotics



Shin pain – Tibia



- ❑ Medial tibial stress syndrome
- ❑ Stress fracture



Tibial Stress Syndrome

- ❑ Common type of shin pain occurring in females more than males

CAUSES: overuse training errors; repetitive traction at the origins of the tibialis posterior, tibialis anterior, and soleus resulting in a periostitis.

A **STRESS FRACTURE** occurs when periosteal resorption in response to periostitis outpaces lamellar bone formation.



Stress Fracture - Tibia



Tibial Stress Syndrome, Stress Fx Treatment

- ❑ Athletes with TSS may continue to train but at decreased levels
- ❑ Stretching and strengthening of the tibialis posterior and soleus muscles
- ❑ Orthotics if indicated
- ❑ For stress fx an impact free period of 6-8 weeks
- ❑ A long pneumatic boot or splint is often used for both injuries
- ❑ Nutrition, hormonal, bone density

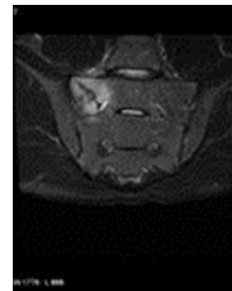


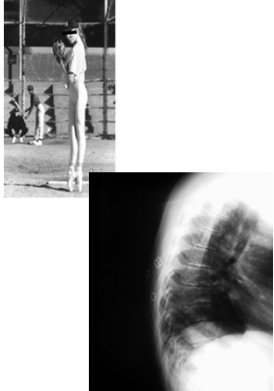
Case Report 32 y.o. female runner

- ❑ Runs 5 – 10 miles, 6 times a week
- ❑ Complains of right low back pain initially only with running
- ❑ No radicular symptoms
- ❑ Menstrual history: Oligomenorrhea; G1 P1
- ❑ P.E.: Ht 5'4" Wt 105 lbs BMI 18
- ❑ Tender over R SI joint
- ❑ X-rays pelvis, L spine – N



MRI Sacrum

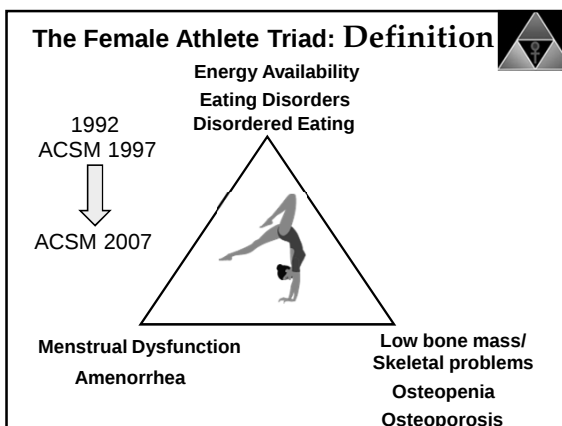




- 14 yr old dancer dx of osteoporosis, AN, amenorrhea
- Followed by pediatrician, nutritionist, psychologist
- Dances 15 hrs/wk; sports
- c/o recent mid-thoracic back pain
- P.E. Ht 5'4" Wt 98 lbs (86 lbs) BMI 16.8 (14.8)
- Localized mid thoracic tenderness
- X-rays thoracic spine – anterior wedging of T6 (T7)



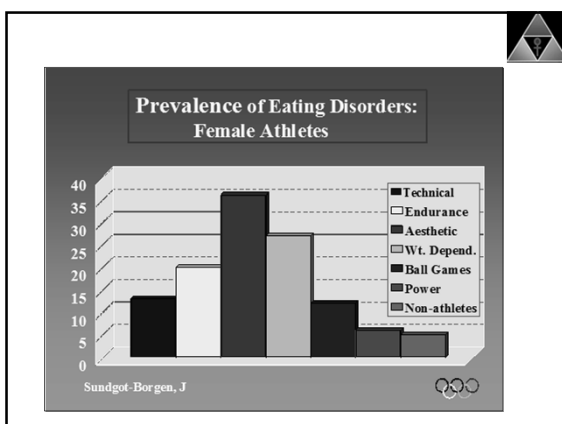
- Bone scan shows mild increased uptake suggests subacute vertebral compression fxs T6 & T7
- Treatment Modified rest; no dance/sports
- PT strengthening & conditioning program
- F/U x-ray @ 4 mos – stable thoracic compression fxs healed
- Patient asymptomatic
- Gradual return to modified dance & ex program
- Continued weight gain



Prevalence

?

- Full triad: 1.2 – 4.3% (Nichols, Beals, Sundgot-Borgen)
- Single component (DE): Up to 70% + Depends on the sport



Epidemiology of Disordered Eating in the “FAT”

- Eating disorder behaviors exist on a continuum from skipping meals to using diet pills, diuretics, or laxatives, to purging to AN.
- The hallmark is distorted body image.
- Up to 62% of college athletes practice some form of pathologic weight control behavior.



Definition: Eating Disorders

- ▣ Anorexia Nervosa
- ▣ Bulimia Nervosa
- ▣ Eating Disorders not otherwise specified

Definition: Anorexia Nervosa

- ▣ Weight 15% below expected
- ▣ Morbid fear of fatness
- ▣ "Feel Fat" when thin
- ▣ Amenorrhea
- ▣ Specify type: Restricting or Binge-Eating/Purging

Warning Signs: Bulimia

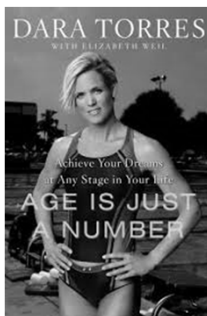


- ▣ A noticeable weight loss or gain
- ▣ Excessive concern about weight
- ▣ Bathroom visits after meals
- ▣ Depressive moods
- ▣ Strict dieting followed by eating binges
- ▣ Increased criticism of one's body

Factors Associated with Increased Risk for Eating Disorders

- ▣ Chronic dieting
- ▣ Low self-esteem
- ▣ Family dysfunction
- ▣ Physical or sexual abuse
- ▣ Biological factors (????)
- ▣ Perfectionism
- ▣ Lack of nutrition knowledge

Diagnose Early



- ▣ "A few times during college I sought out help. My sophomore year, I told an orthopedist I knew that I thought I had bulimia. Eating disorder wasn't his thing. To his credit, he brought me some literature, but I just used it to excuse myself..."

Sport Risk Factors

- ▣ Sports with subjectively scored performance
- ▣ Endurance sports
- ▣ Sports with body contour revealing competition clothing
- ▣ Sports using weight categories
- ▣ Sports emphasizing pre-pubertal body habitus
- ▣ Over-trained and undernourished



Health Consequences of Eating Disorders

MORTALITY:

- 10 – 18% will die prematurely from medical problems or psychological problems leading to suicide

Health Consequences of Eating Disorders

MORBIDITY

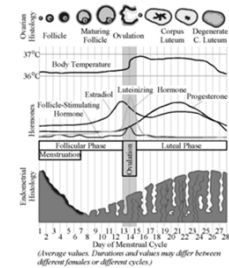
- Reproductive function
- Irreversible bone loss
- Psychological problems
- Gastrointestinal disorders
- Thermoregulatory dysfunction

Symptoms of Inadequate Calories

- Fatigue
- Irritability, hunger, difficulty concentrating
- Frequent injuries
- Poor athletic performance
- Growth failure in adolescence
- Weight loss
- Amenorrhea

Menstrual Disorders / Amenorrhea

- Normal cycles: 23-35 days; 10 -13x/yr
 - Amenorrhea: Absence of menses 3 mos or < 3 cycles /yr
 - Primary amenorrhea
 - Secondary amenorrhea
- RULE OUT PREGNANCY



Prevalence of MD among Athletes

- Non-athletes 2.5%
- Ball Games 12%
- Swimming 12-30%
- Running 6-43%
- Gymnastics 60%+



Prevalence of Amenorrhea

- 2 – 5% in general population
- 1 – 44% in female athletes

Health Consequences of Amenorrhea - Known

- ▣ Infertility
- ▣ Decreased bone mass / osteoporosis
- ▣ Cholesterol abnormalities

Training-related Menstrual Dysfunction

- ▣ Luteal phase deficiency: short luteal phase, decreased progesterone levels, normal cycle length and menses
- ▣ Anovulatory cycles
- ▣ Exercise-associated amenorrhea: can be reversed by an increase in calorie intake or a reduction in training intensity

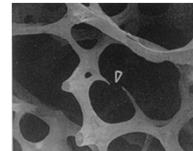
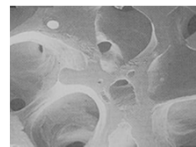
Evaluation of Amenorrhea

- ▣ Hx and PE
- ▣ Pregnancy Test, FSH/LH, TSH/T4, Prolactin
- ▣ Progesterone challenge



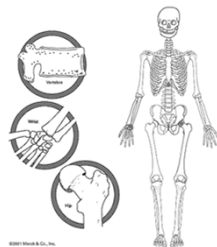
Osteoporosis

A disease characterized by low bone mass and microarchitectural deterioration of bone tissue leading to enhanced skeletal fragility and increased risk of fracture



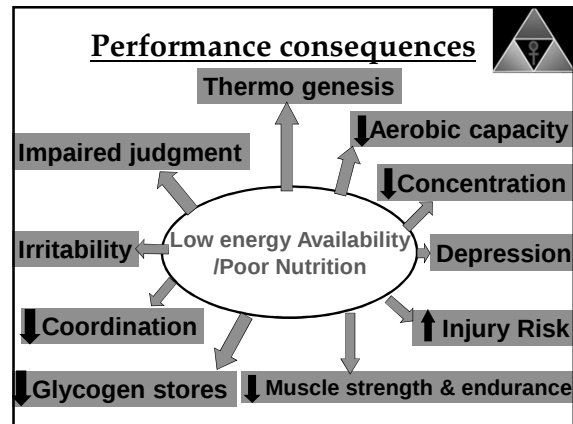
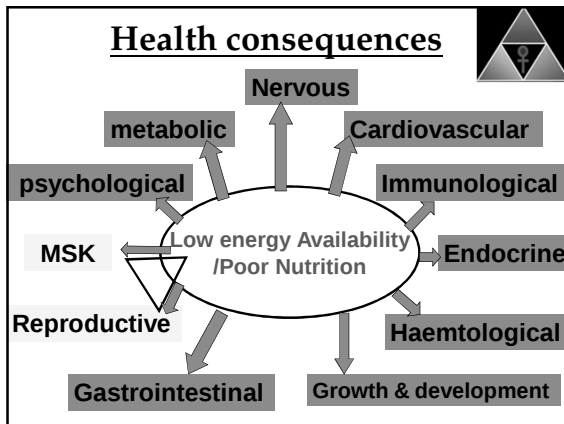
Health Consequences of Osteoporosis

- ▣ Premature bone loss
- ▣ Increased stress fractures
- ▣ Increased fractures spine, hip, sacrum



Bone Loss in the Amenorrheic Athlete

- ▣ Athletic amenorrhea of duration > 3 yrs may not be entirely reversible
- ▣ Evidence exists that some bone can be regained if the athlete resumes normal menses or with associated wt gain, but values still remain low and do not normalize (*Drinkwater*)



Prevention

- ❑ Education to dispel myths regarding body weight, appearance, and relationship to performance
 - ❑ Sensitivity
 - ❑ Early recognition
 - ❑ Early intervention
- 



Treatment

- ▣ Multidisciplinary team
- ▣ Threshold for intervention
- ▣ Referral mechanism



Treatment Plan

- ☐ Rest and modified activities
- ☐ Hormonal work-up
- ☐ Bone density study
- ☐ Nutrition consult
- ☐ Biomechanics assessment
- ☐ Evaluation of training routine
- ☐ Assess for any psychological factors
- ☐ Return to Play Guidelines

Return To Play Guidelines

- ▣ 2014 Female Athlete Triad Coalition Consensus Statement
- ▣ Risk stratification point system

[illegible]

The Pregnant Athlete

- Many studies have shown that exercise of moderate intensity is safe during uncomplicated pregnancy.
- ACOG guidelines
- Enlarging abdomen affects center of gravity and balance.
- Adequate calories and fluid intake

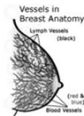


Breast Injuries



- Mastalgia
- "Cyclist's or Jogger's nipples"
- Contusion
- Abrasion
- Laceration
- Hematoma
- Mondor's Disease

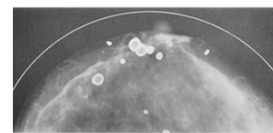
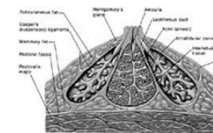
Breast Contusion



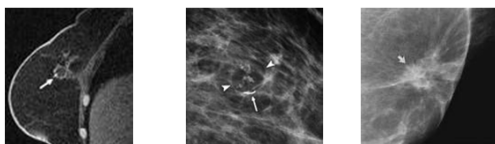
- Regular contusions are usually mild
- Involve superficial capillary rupture
- Apply ice; analgesia; firm support

Breast Hematoma

- Sometimes surgical aspiration may be necessary
- Traumatic Fat necrosis may occur



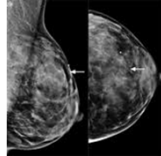
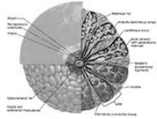
Traumatic Fat Necrosis Mammogram



Mondor's Disease

- Thrombophlebitis of the superficial veins of the breast
- The athlete may or may not recall injury
- Usually subsides spontaneously with symptomatic management
- Tenderness gradually decreases over a period of 3 to 4 weeks
- Disappears by 6 to 8 weeks

Mondor's Disease



Vulvar Hematoma

- ❑ Straddle bicycle accident; waterskiing
- ❑ X-ray pelvis to rule out pelvic fx
- ❑ Evaluate the integrity of the vagina, urethra, bladder and anus
- ❑ Ice first 48 hours; then heat
- ❑ If expanding – refer to surgery
- ❑ Occasionally hospitalization required and catheterization
- ❑ Most treated as outpatient

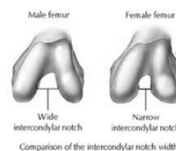
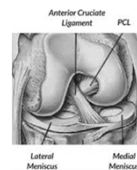


ACL Injuries in Females Incidence Rates

- ❑ NCAA study (Arendt and Dick Am J Sport Med 1995)
- ❑ Rates were based upon 1000 athlete exposures
- ❑ Soccer: 0.31; Males 0.13
- ❑ Basketball: Females 0.29; Males 0.07



ACL Intrinsic Factors



- ❑ Mechanical alignment
- ❑ Femoral notch
- ❑ Joint laxity and flexibility
- ❑ Menstrual cycle

ACL Extrinsic Factors



- ❑ Muscular strength and imbalance
- ❑ Muscular activation patterns
- ❑ Joint stiffness
- ❑ Jumping and landing characteristics

Prevention of ACL Injury

- ❑ Primary prevention: Prevent the injury from happening
- ❑ Secondary prevention: Modify the injury when it happens
- ❑ Tertiary prevention: Modify the effects of the disease (ACL deficiency)

The Master Athlete

- ▣ Improved muscle mass
- ▣ Decreased rate of decline of physiological capacity
- ▣ Life-long exercise may preserve age-related changes to brain WM integrity (Tseng B.Y. et al 2013)
- ▣ Running: female finishers have moved past male ones in U.S. race participation



Conclusion

- ▣ The female athlete has different needs and unique medical concerns
- ▣ Recognize the need to screen them differently from male athletes
- ▣ Extend lessons learned in the care of the elite female athlete into your practice

Further Information

- ▣ Female Athlete Triad Coalition
www.femaleathlete.com
- ▣ IOC Triad Prevention Program
- ▣ July 2010 Healthy Body Image 4 videos
www.olympic.org/hbi
- ▣ 2014 Female Athlete Triad Coalition Consensus Statement on Treatment and Return to Play of the Female Athlete Triad, American College of Sports Medicine *BJSM* 2014;48:289; *Clin J Sport Med* 2014;24:96-119
- ▣ *Warrior Girls* Protecting Our Daughters Against the Injury Epidemic in Women's Sports, Michael Sokolove 2008



Thank you



Questions?

