Back Pain in the Long Distance Runner

Jeff Kannen, DO, MS
Family Medicine PGY3

Sports Medicine Symposium
2/22/2020

Agenda

1. Review the epidemiology of running injuries

2. Identify risk factors for low back injuries

3. Review specific back injuries related to running

4. Discuss treatment/rehabilitation modalities

Running the Jurassic Marathon

Runners experience less back pain than the general population and other athletic sports.

Running Injuries by the Numbers

Location	Percentage of Population
Knee	42.1%
Foot/ankle	16.9%
Lower leg	12.8%
Hip/pelvis	10.9%
Achilles/calf	6.4%
Upper leg	5.2%
Back	3.4%
Other	2.2%

*** Data taken from a 2002 retrospective study of running specific related injuries in the general population at a primary care sports medicine clinic

Running Injuries by the Numbers

Injury	Weekly Hours (mean 5.4)
Spinal Injuries	6.4
Tibial stress fractures	6.1
Patellar tendinopathy	6.1
Plantar fasciitis	5.9
Patellofemoral syndrome	5.4
Meniscal injury	5.1
Tibial stress syndrome	5.1
Achilles tendinopathy	5.1

*** Data taken from a 2002 retrospective study of running specific related injuries in the general population at a primary care sports medicine clinic

Differential Diagnosis of Low Back Pain

- Muscle/nerve
  - Mechanical back pain
  - Muscle strain
  - Sciatica
  - Nerve root impingement
  - Spinal stenosis
- Bone/disk
  - Fracture—insufficiency, stress, traumatic
  - Herniated disk/annular tear
  - Degenerative disk disease
  - Spondylolysis/spondylolisthesis
  - Scheuermann disease
  - Facet degeneration
  - Degenerative scoliosis
  - Seronegative spondyloarthropathy (ie. ankylosing spondylitis)
  - Hip osteoarthrosis/impingement
- Other
  - Infection
  - Malignancy
  - Metabolic bone disease
  - Intra-abdominal pathology (ie. appendicitis, urinary tract infection, pyelonephritis, nephrolithiasis, abdominal aneurysm)

Risk Factors for Back Injuries in Long Distance Runners

1. Mileage per week (risk increased at 20 mi/week, increasing at 40 mi/week)
2. Previous back injury
3. Inexperienced runner
4. Increased training intensity
5. Age, gender, running surface, cross training, running mechanics

Take home point: running related injuries are often multifactorial and can be difficult to pinpoint the cause but usually occur due to overuse

Initial Evaluation

1. Obtain an accurate history

- Training volume, intensity
- Level of experience
- History of previous lower extremity, hip, or back injuries
- Participation in other athletic events or cross training

2. Perform a thorough exam

- Rule out red flag or danger signs
- Consider gait analysis

Mechanical Low Back Pain

- Common
- Nondiscogenic pain provoked by physical activity and relieved with rest
- Stress or strain to spinal muscles, tendons, or ligaments from overuse
- May have associated iliopsoas, hamstring, adductor, or IT band strain
- No neurologic deficits

Diagnosis

- Clinical suspicion
- Radiographs usually normal, may have age related DDD or osteoarthritis

Treatment

- Brief rest, if needed
- Return to running if pain is mild and resolves
- Physical therapy
- OMT

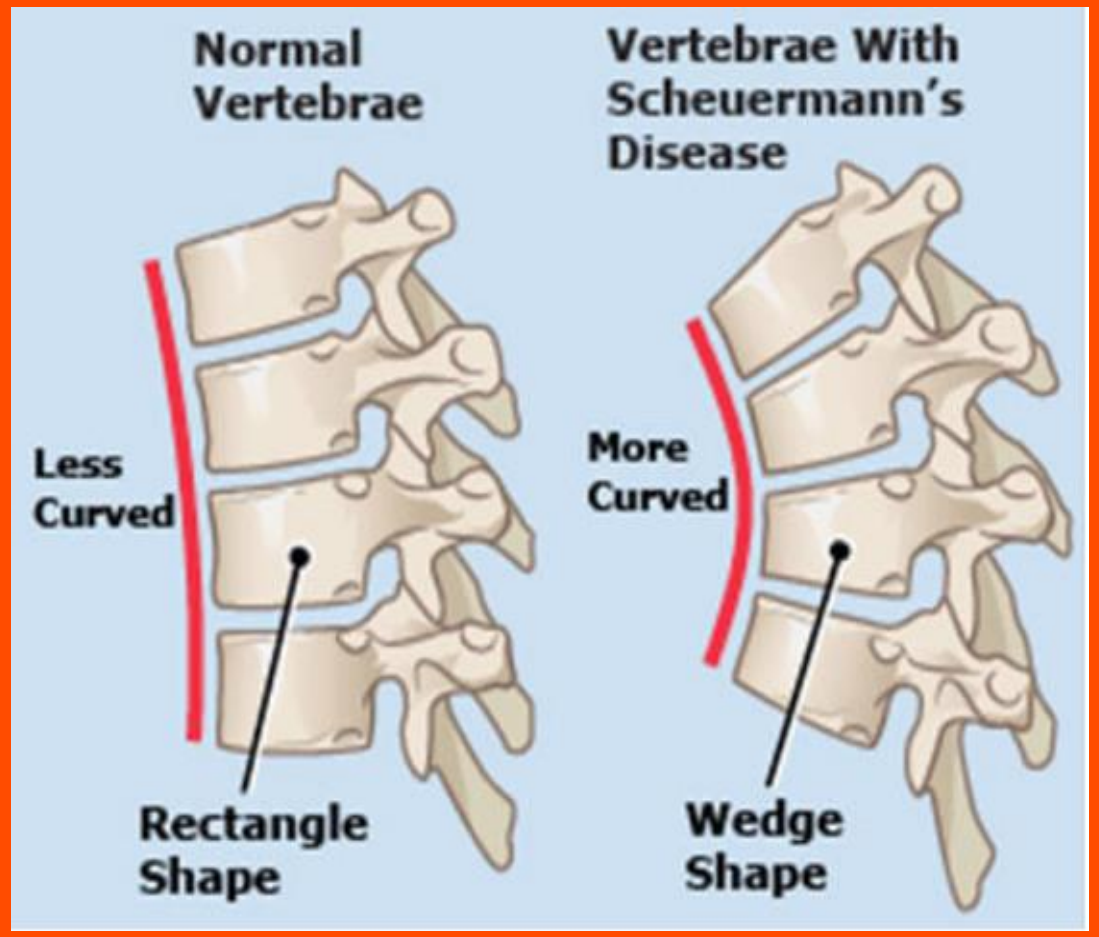
Scheuermann's Disease

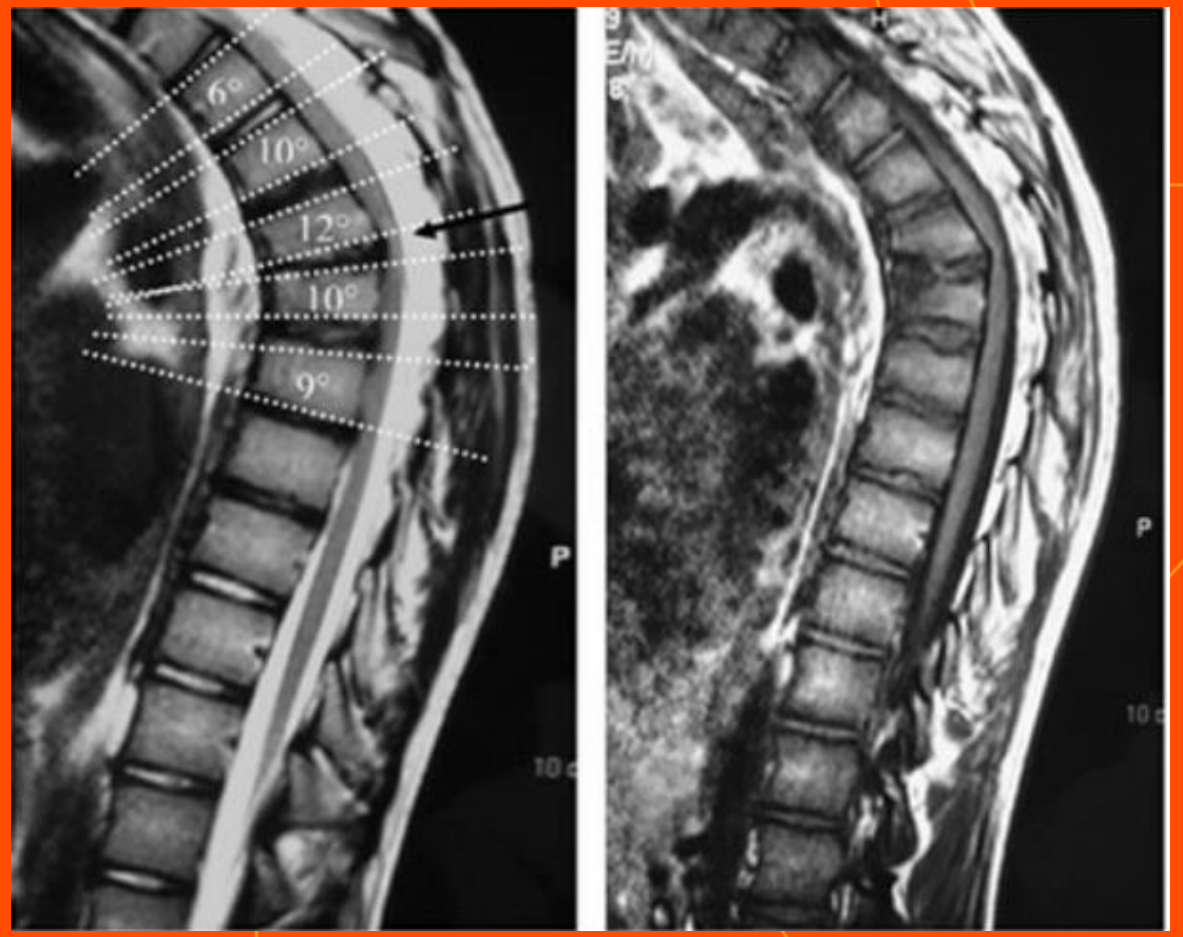
- Presents in late childhood or early adolescence (growth spurt)
- Characterized by accentuated thoracic kyphosis from a disturbance in the normal growth of the spinal column
- Presenting symptoms: pain in upper or mid back, low back pain
- Associated with hamstring/psoas tightness, scoliosis, herniated disks
- May develop lumbar spondylolysis/spondylolisthesis due to compensatory hyperextension in lumbar spine

Diagnosis

- Radiographs – anterior wedging of more than 5 degrees in 3 or more thoracic vertebrae
- MRI if symptoms refractory to treatment and to rule out disk herniation

Scheuermann's Disease





Scheuermann's Disease

Treatment

- In mild cases may continue running if not having pain
- Physical therapy – hamstring/ psoas stretching, strengthening core and back extensor
- Bracing
- Surgery (severe or progressive kyphosis despite conservative therapy)

Sacroiliac Joint Dysfunction

- Less common
- Presenting symptoms: achy low back pain, may localize to sacral sulcus or PSIS, may radiate to lower glute or groin
- Risk factors: female, abrupt changes in training, tight IT band or psoas, weak gluteus and core musculature
- Exam: localized tenderness to SI joints, provocative maneuvers for SIJ reproduce pain, +FABER

Diagnosis

- Clinical suspicion
- Radiographs may be helpful to rule out other pathology
- MRI

Sacroiliac Joint Dysfunction

Treatment

- Rest, if symptoms are mild may continue running with modification in training (less hills or trails)
- NSAIDs
- Physical therapy
- SI joint injections may provide diagnostic/therapeutic benefit
- OMT

Lumbar Disk Herniation

- Less Common
- Presenting symptoms: abrupt onset low back pain, pain radiating down one or both legs past knee, may have paresthesias or weakness in legs
- Risk factors: age 30-50 years, history of disk herniation, change in biomechanics or gait, heavy resistance exercise
- Running itself does not increase the risk of disk herniation and may actually be protective due to neutral spine position

Diagnosis

- Clinical suspicion
- Radiographs usually normal
- MRI if symptoms persist despite initial conservative therapy

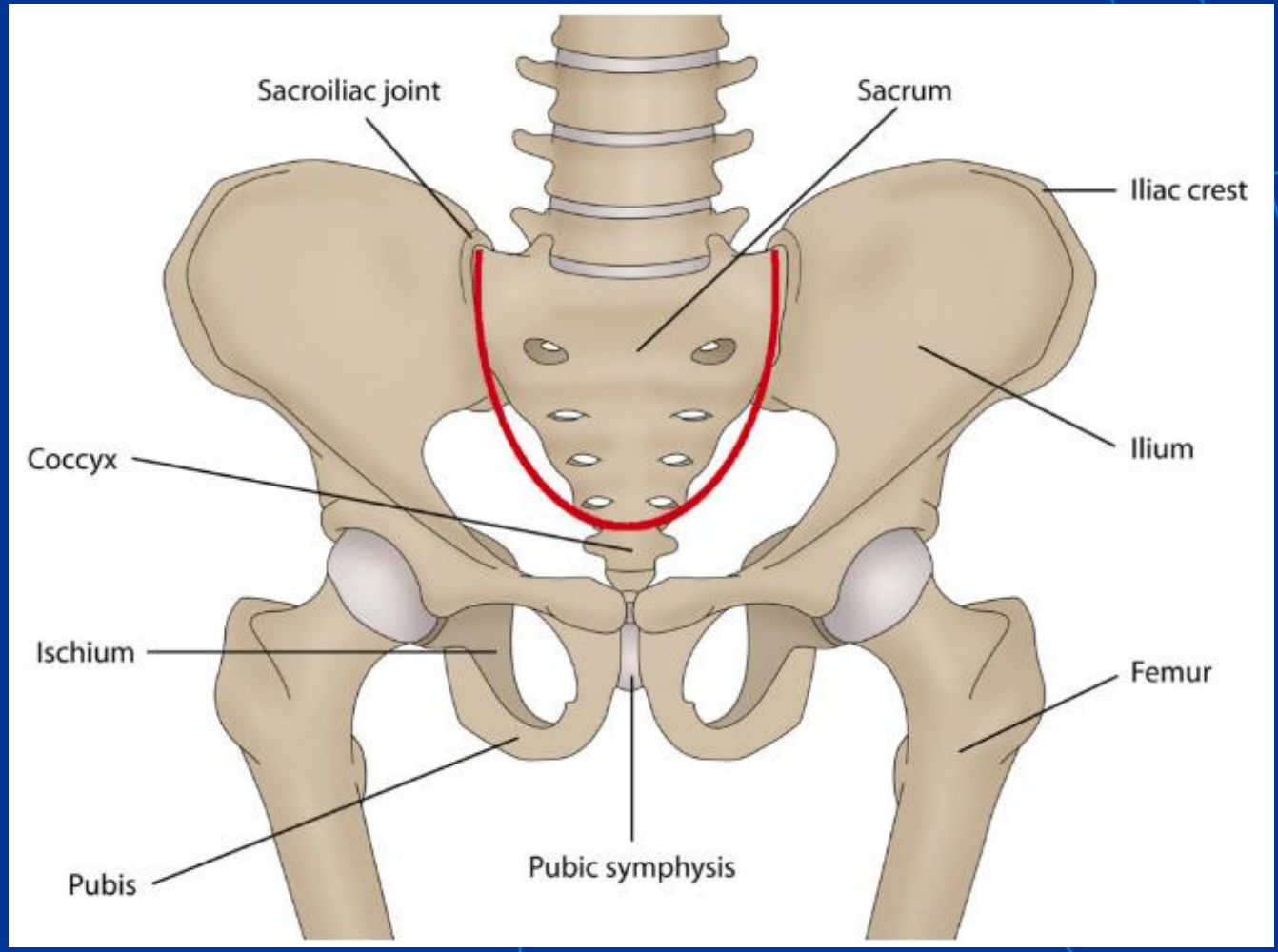
Lumbar Disk Herniation

Treatment

- Brief period of rest, 1-3 days
- NSAIDs, prednisone burst/taper
- Unloaded or underwater treadmill
- Physical therapy: McKenzie/Williams protocol
- Gradual return to running within 4-12 weeks

Sacral and Pelvic Stress Fractures

Why do they occur?



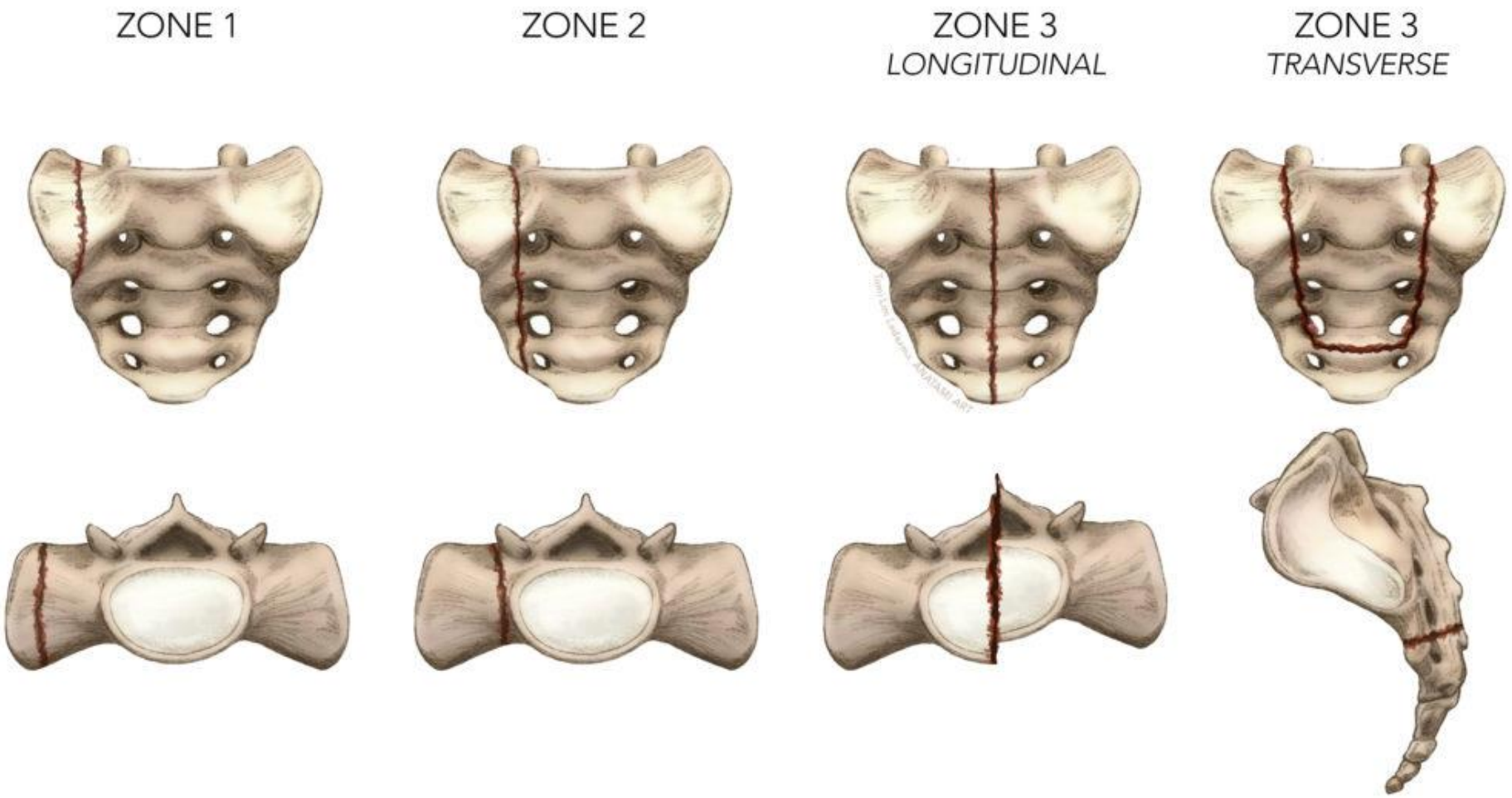
Sacral Stress Fracture

- Rare (may be underdiagnosed)
- Presenting symptoms: variable, sudden onset low back pain in low back or buttocks while running, nocturnal pain, may mimic disk disease with sciatica or have saddle anesthesia (severe)
- Risk factors: female +/- amenorrhea, low BMI, higher volume (>50 miles per week)
- Physical exam: unreliable, may have sacral or SI joint tenderness, single leg hop test, FABER

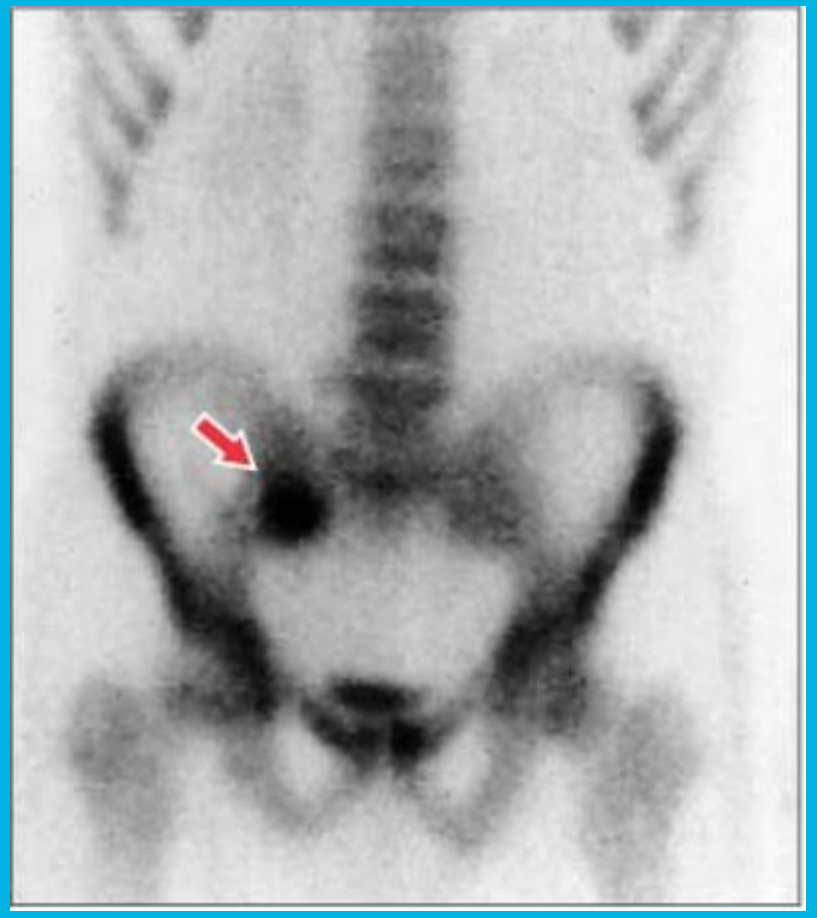
Diagnosis

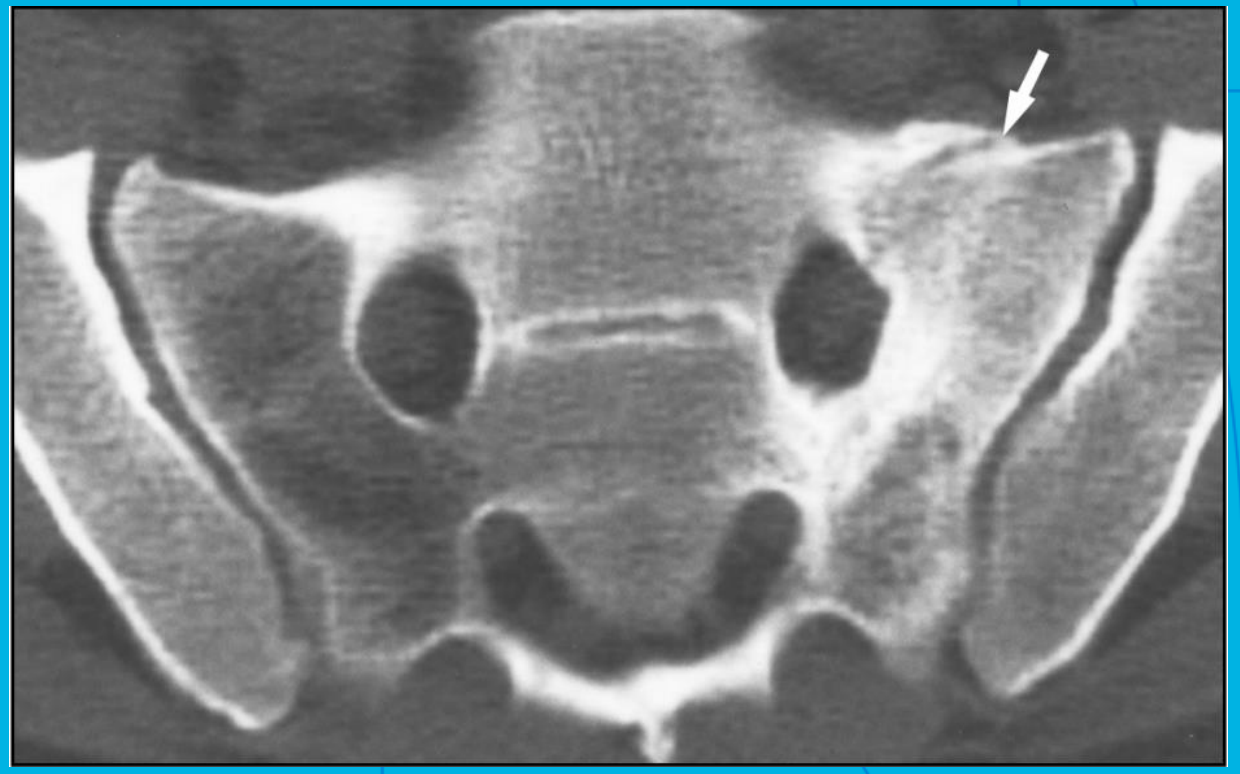
- Radiographs not sensitive
- Nuclear scintigraphy (bone scan)
- CT (axial views of sacrum/pelvis)
- MRI (sacrum/pelvis)

Sacral Stress Fracture – Denise Classification

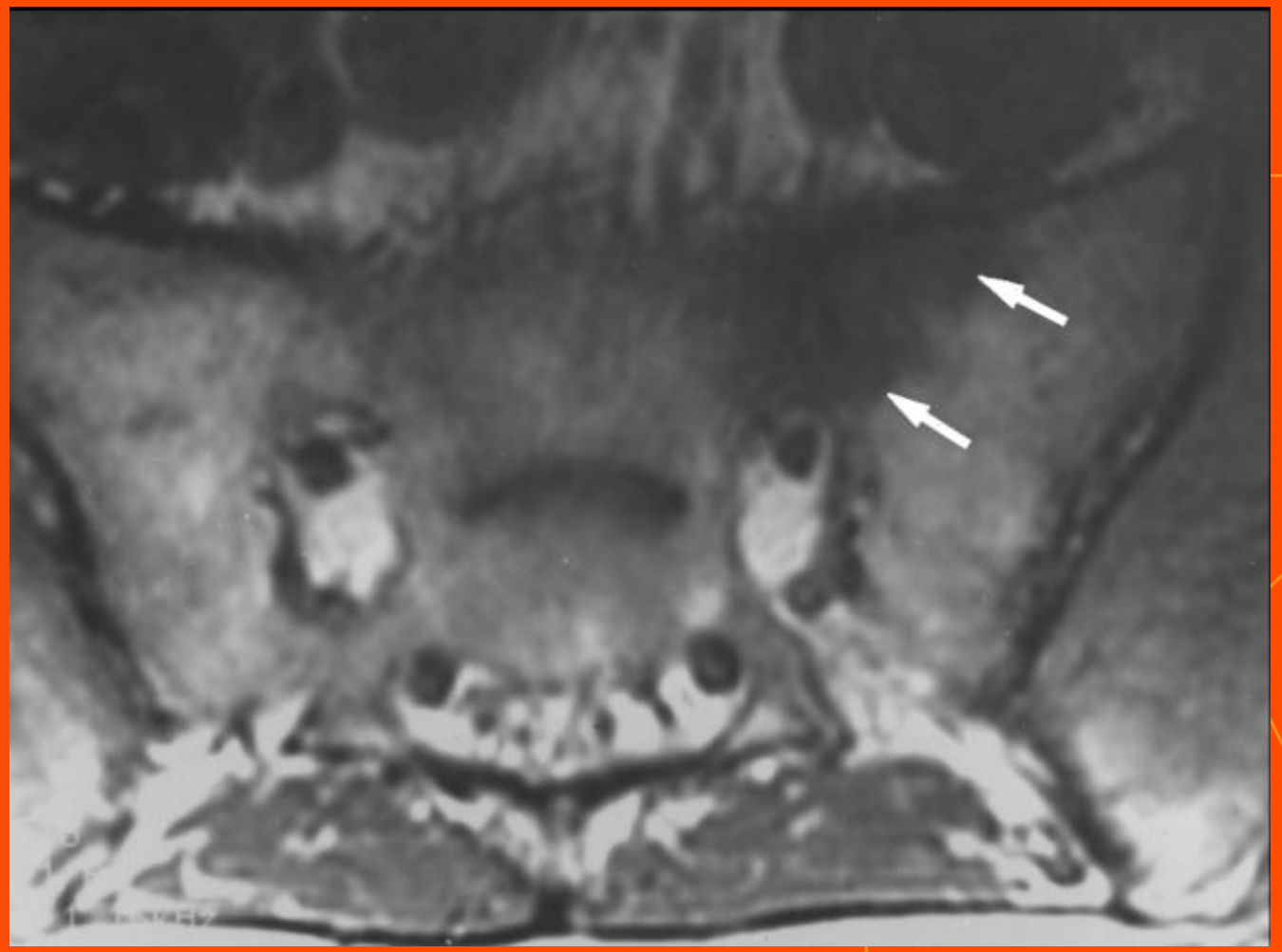


Sacral Stress Fractures - Imaging





Sacral Stress Fractures - Imaging



Sacral Stress Fracture - Treatment

- Weeks 1-2: complete rest and no weightbearing activity
- Weeks 2-12: physical therapy, gradual return to non-weight bearing exercise, cycling, deep water running, unloaded or underwater treadmill
- May need 3-6 month recovery period before full return to running
- Test and treat for hormonal/nutritional deficiencies in females
- Surgery (if displaced fracture or neurologic deficits)

Pelvic Stress Fracture

- Rare (account for 1-2% of all stress injuries)
- Result from overuse, increased training volume or change in terrain
- Presenting symptoms: variable, buttock or SI joint pain, groin pain, leg pain
- Risk factors: low BMI, female sex, higher volume (>50 miles per week), abrupt change in training or competition

Diagnosis

- Radiographs not sensitive
- CT
- MRI (sacrum/pelvis)

Treatment

- Similar to sacral stress fractures
- 6-12 weeks no running, may perform non-weight bearing exercise or unloaded running
- Physical therapy
- Treat nutritional/hormonal deficiencies in females

Rehabilitation: Unloaded Treadmills

Originally developed in the 1980s

Mechanically reduce the gravitational and ground reaction force on the spine by reducing body weight by a specific percentage

Popular brands are Alter G, LightSpeed

Protocols designed for acute lumbar disk herniation, pelvic and sacral stress fractures

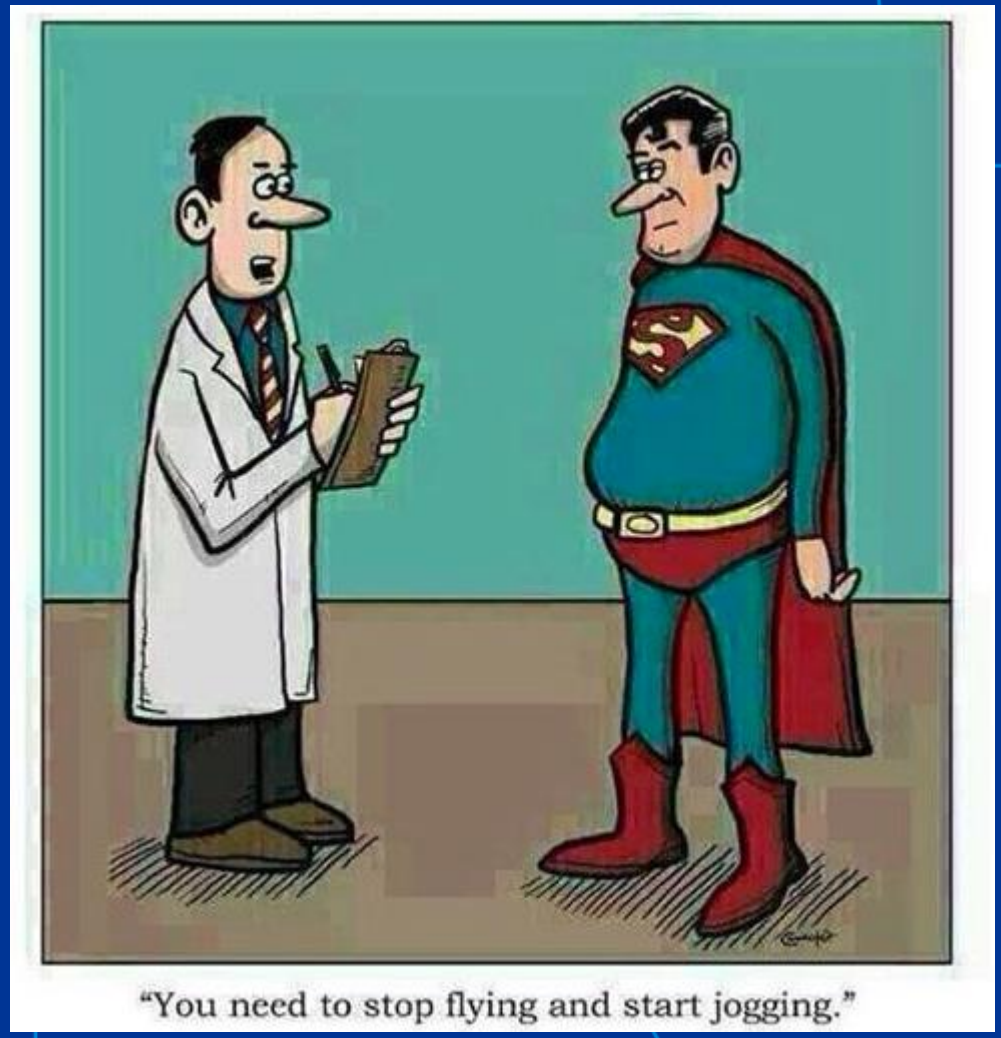
Athlete may advance to next phase, BW%, time, and frequency if symptoms do not worsen during or after each session

Summa Health

General Principles for Staying Injury Free

- 10% rule – increasing mileage, frequency, or intensity no more than 10% per week
- Long run should not exceed 30% of weekly mileage or increase by more than 2 miles per week
- Change shoes every 300-400 miles
- Incorporate resistance and core strengthening 2-3 times a week

Thank you



References

Epperly T, Fields K: *Epidemiology of running injuries.* The Textbook of Running Medicine. New York, NY, McGraw-Hill, 2001.

Simpson S, Bettis B, Herbertson J. *Unloaded treadmill training therapy for lumbar disc herniation injury.* J Athl Train. 1996;31(1):57–60.

Shane K. Woolf, MD, John A. Glaser, MD. *Low Back Pain in Running-based Sports*. Pages: 847-851 SMJ. Volume:97 Issue:9 September, 2004

Delanie Karen, Diane Susan Green, Gail M. Jensen, and Emily Savinar. *A Comparison of Muscular Tightness in Runners and Nonrunners and the Relation of Muscular Tightness to Low Back Pain in Runners.* Journal of Orthopaedic & Sports Physical Therapy 1985 6:6, 315-323

Moore, Melita N. et al. *Use of Partial Body-Weight Support for Aggressive Return to Running After Lumbar Disk Herniation: A Case Report.* Archives of Physical Medicine and Rehabilitation, Volume 91, Issue 5, 803 – 805

C. Miller, N. Major, A. Toth. *Pelvic stress injuries in the athlete: Management and prevention.* Sports Med. 2003; 33: 1003–1012.

Management and Prevention of Bone Stress Injuries in Long-Distance Runners. Journal of Orthopaedic & Sports Physical Therapy, 2014 Volume:44 Issue:10 Pages:749–765

M. Fredericson, L. Salamancha, C. Beaulieu. *Sacral stress fractures: Tracking down nonspecific pain in distance runners.* Phys Sportsmed. 2003; 31: 31–42.

References

Featherstone, T. *Magnetic resonance imaging in the diagnosis of sacral stress fracture.* British Journal of Sports Medicine 1999;33:276-277.

Ismar Dizdarevic, Meghan Bishop, Nicole Sgromolo, Sommer Hammoud, Alfred Atanda Jr. (2015) *Approach to the pediatric athlete with back pain: more than just the pars.* The Physician and Sports Medicine 43:4, pages 421-431.

Major, N. Helms, C. Sacral Stress Fractures in Long-Distance Runners. AJR:174, March 2000.