FLAT TIRES AND BUSTED SHOCKS: FOOT AND KNEE PROBLEMS IN THE NOT SO YOUNG ADULT

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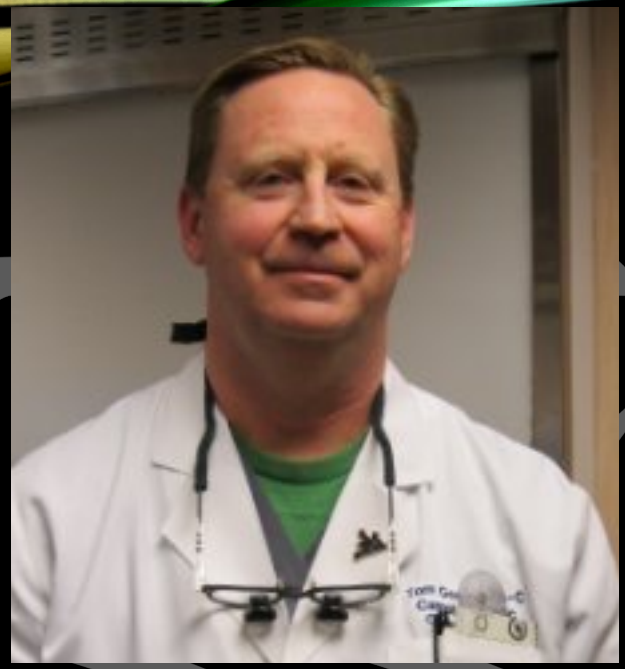
LEARNING GOALS

At the end of this session you will be able to:

Describe and Interpret normal plain radiographs for the foot

- Describe, Evaluate and Treat Osteoarthritis of the Knee
- Describe, Evaluate and Treat Plantar Fasciitis
- Describe, Evaluate and Treat Retrocalcaneal Bursitis/Tendonitis
- Describe, Evaluate and Treat Posterior Tibial Tendonitis/Dysfunction
- Describe, Evaluate and Treat 5th Metatarsal base fractures



Title: Foot and Knee Problems in the not so young Adult

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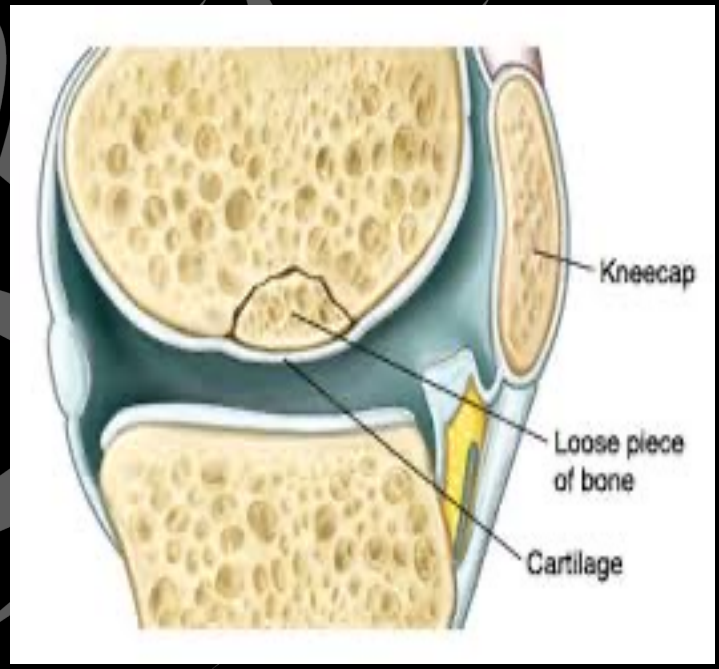
OSTEOCHONDRAL INJURIES

OSTEOCHONDRAL INJURY

- Articular surface injury involving hyaline articular cartilage and/or subchondral bone
  - Repetitive stress to knee causes disruption to bone & blood supply
  - Weakness in articular cartilage & shear forces gradually dissects articular cartilage from subchondral bone
- Clinical presentation & symptoms variable
  - Juvenile
  - Adult
- Knee (most common)
  - 70% knee lesions medial femoral condyle(MFC)
    - Posterolateral
  - Complete detachment = loose body

OSTEOCHONDRAL INJURY

- Occurs female > male
- Usual onset idiopathic
- Possible contributing Factors
  - Corticosteroid use (oral vs. injected)
  - Renal Transplant
  - Sickle Cell
  - Smoking
  - Altitude
  - SCUBA
  - Systemic Lupus Erythema
  - IV drug use
  - Heredity



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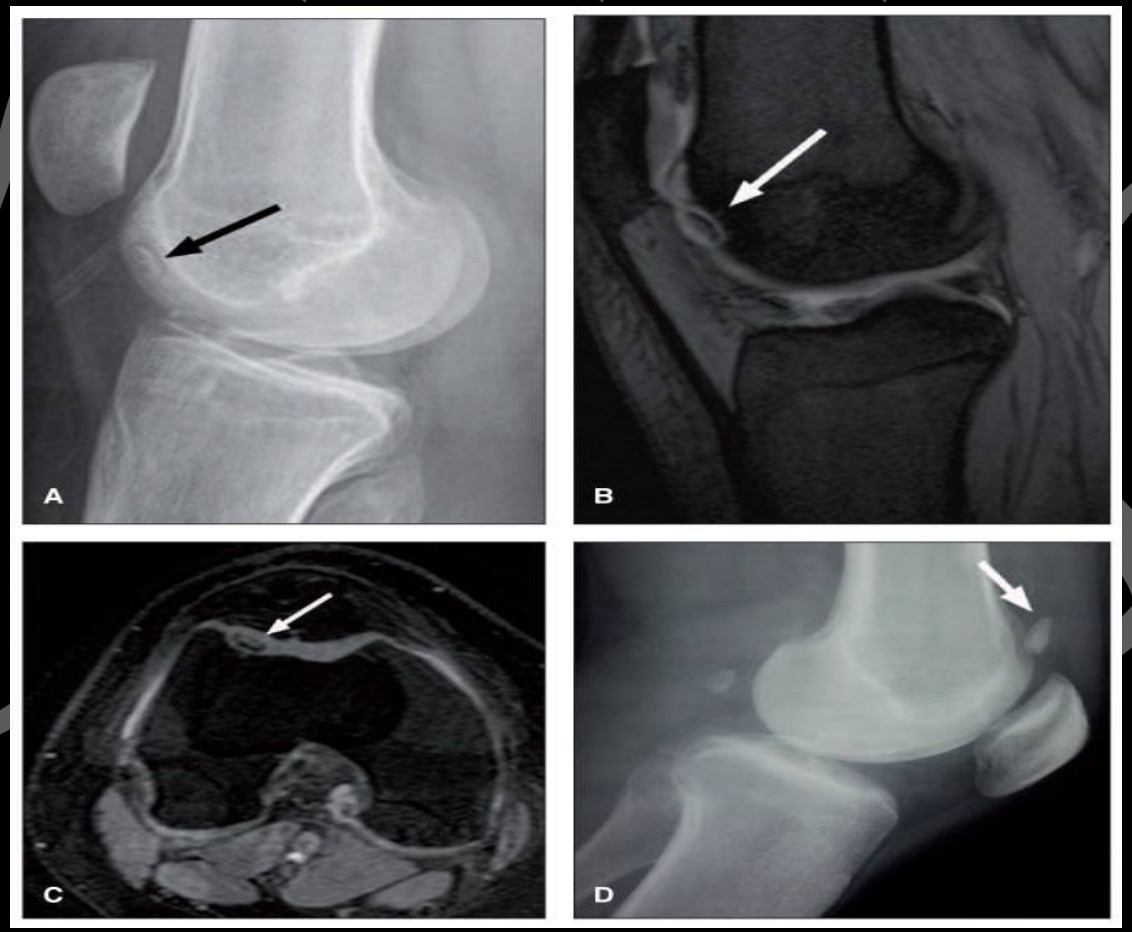
OSTEOCHONDRAL INJURY

- Radiographs
  - Wt-bearing AP, lateral & notch (tunnel, Rosenberg)
    - Knee bent 30-50 degrees-better visualize femoral notch
  - Lesion most often seen MFC posterolateral aspect
- MRI
  - Synovial fluid behind the lesion on MRI correlates with a worse prognosis
  - Better identifies:
    - Lesion size
    - Staging OCD lesion
    - Signal intensity of lesion
    - Loose bodies

OSTEOCHONDRAL INJURY



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OSTEOCHONDRAL INJURY

- **Acute Injury**
  - Immediate Treatment
    - ICE
    - Knee Aspiration:
      - pain control
      - Fat droplets – indicative of osteochondral injury
    - Knee Immobilizer – patient comfort
      - Wear as needed
      - Remove Daily
        - skin care
        - protected bathing (consider age and patient abilities)
    - Assisted Ambulation
      - Crutches vs. Walker vs. Wheel-chair
      - Weight-bearing status surgeon preference
    - Pain management

OSTEOARTHRITIS

KNEE OSTEOARTHRITIS

- General
  - Most common form arthritis
  - Knee most often involved
  - Can affect other joints
  - Advanced age > younger age
  - Men=Women
  - Immobility stiffness
  - Non-inflammatory arthritis
    - Primary: native defect
    - Secondary: due to trauma, infection
    - Chondrocytes unable to repair following injury

KNEE OSTEOARTHRITIS

- General
  - Progression of osteoarthritis
    - Deterioration hyaline articular cartilage
      - Leads to loss of cartilage on bearing surface
    - Osteophyte development
    - osteochondral junction breakdown
      - Interface between hyaline cartilage and bone surface lost
    - cartilage breakdown
    - subchondral microfractures
    - subchondral cyst formation
      - 2nd to increased pressure of synovial fluid over production

KNEE OSTEOARTHRITIS

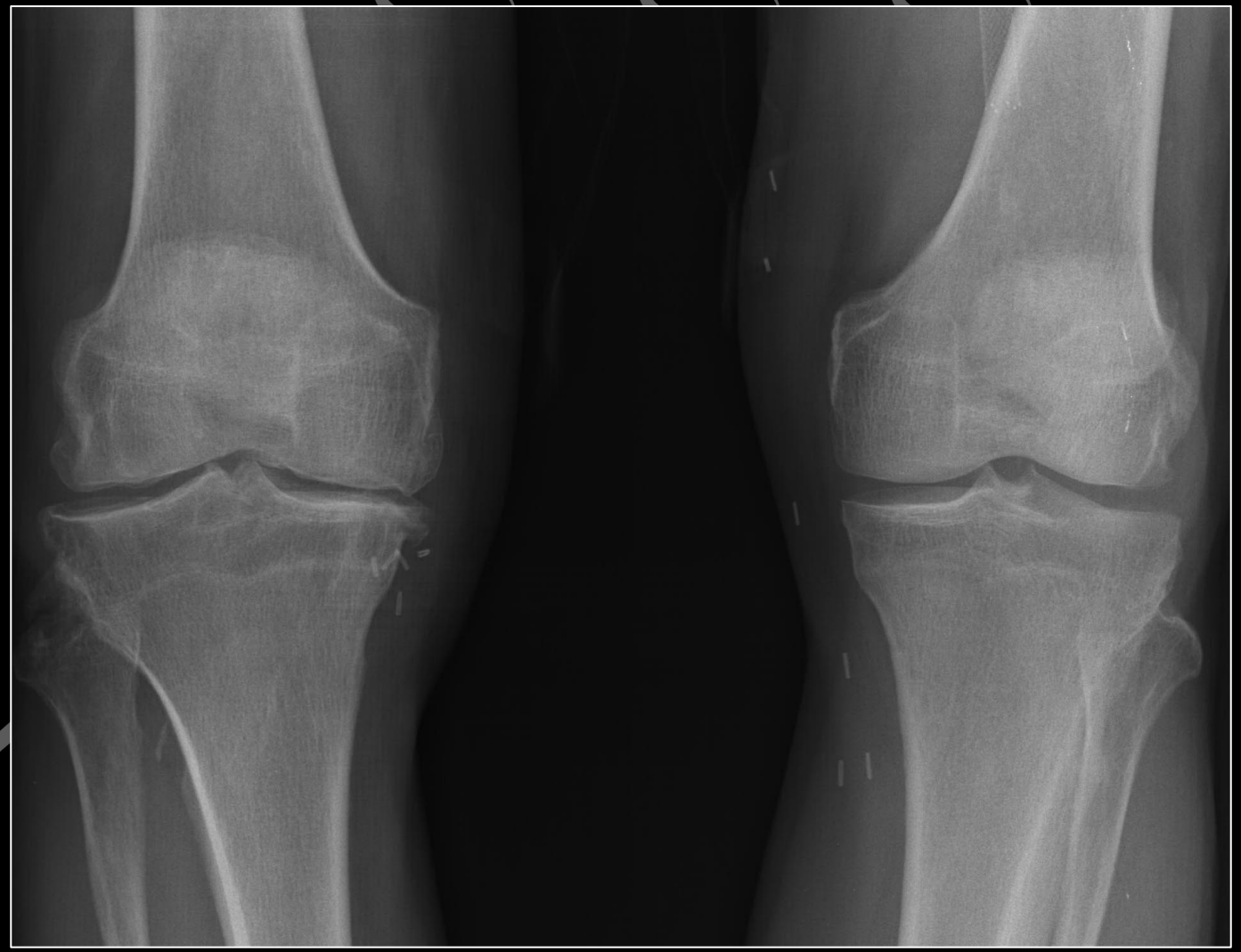
- Arthritis knee
  - Osteoarthritis: age and activity related
  - Rheumatoid arthritis: autoimmune disease
  - Post traumatic Arthritis: injury related
    - Delayed onset
    - Similar symptoms
    - Variable treatments
    - Similar outcomes

KNEE OSTEOARTHRITIS

Radiographs

- X-ray views
  - Standing AP, Lateral, Rosenberg and sunrise
  - Findings
    - Joint space narrowing
    - Eburnation of bone
    - Subchondral sclerosis
    - Subchondral cysts
- MRI
  - Not necessary to determine amount of osteoarthritis
  - Meniscal and OCD pathology can still occur in the pt with knee arthritis

KNEE OSTEOARTHRITIS-MODERATE



KNEE OSTEOARTHRITIS MODERATE TO SEVERE

KNEE OSTEOARTHRITIS

KNEE OSTEOARTHRITIS - SEVERE

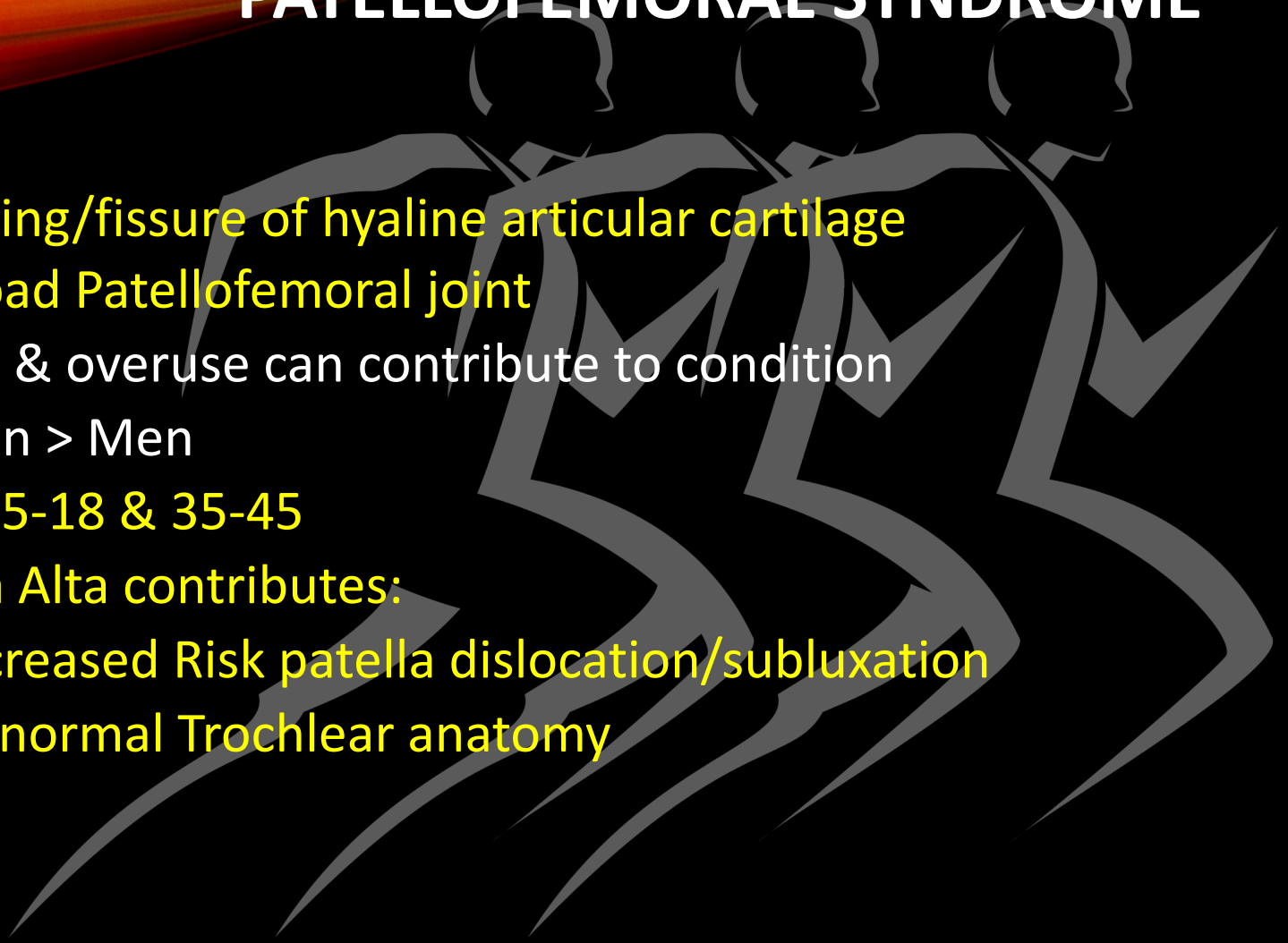
KNEE OSTEOARTHRITIS-SEVERE

KNEE OSTEOARTHRITIS

- Treatment - Nonoperative
  - NSAIDS
    - Reduce inflammatory effects & pain reduction
    - Acetaminophen pain relief – no anti-inflammatory effects
  - Physical Therapy
    - Improve gait
      - Unloading braces : ? improve alignment and gait
    - Improve strength & flexibility
    - Structured programs
  - Injection therapy
    - Corticosteroid joint injections
    - Viscosupplimentation joint injections
      - no strong evidence to support

PATELLOFEMORAL PAIN SYNDROME

PATELLOFEMORAL SYNDROME

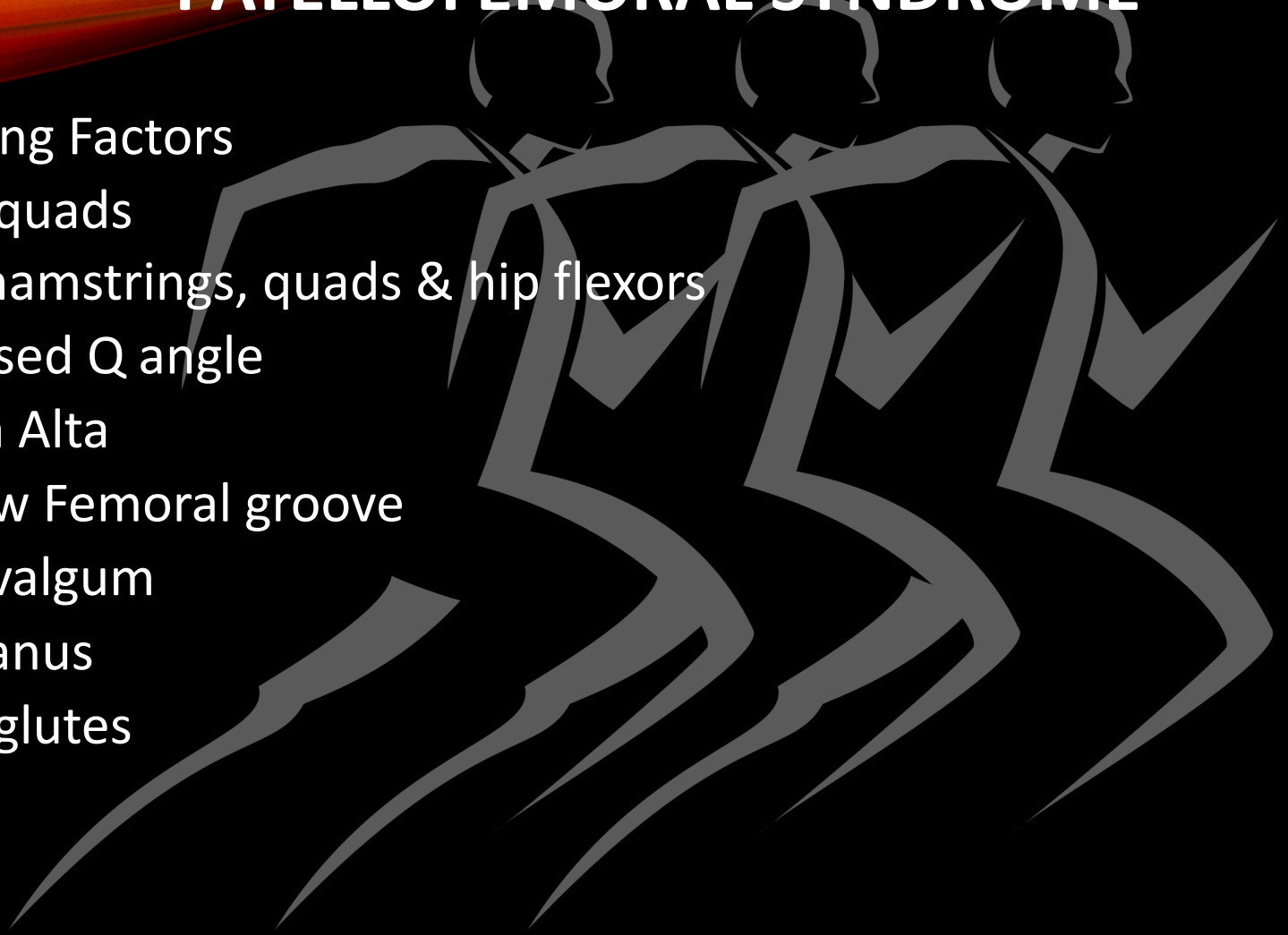


- General
  - Softening/fissure of hyaline articular cartilage
  - Overload Patellofemoral joint
  - Disuse & overuse can contribute to condition
  - Women > Men
  - Ages 15-18 & 35-45
  - Patella Alta contributes:
    - Increased Risk patella dislocation/subluxation
    - Abnormal Trochlear anatomy

PATELLOFEMORAL SYNDROME

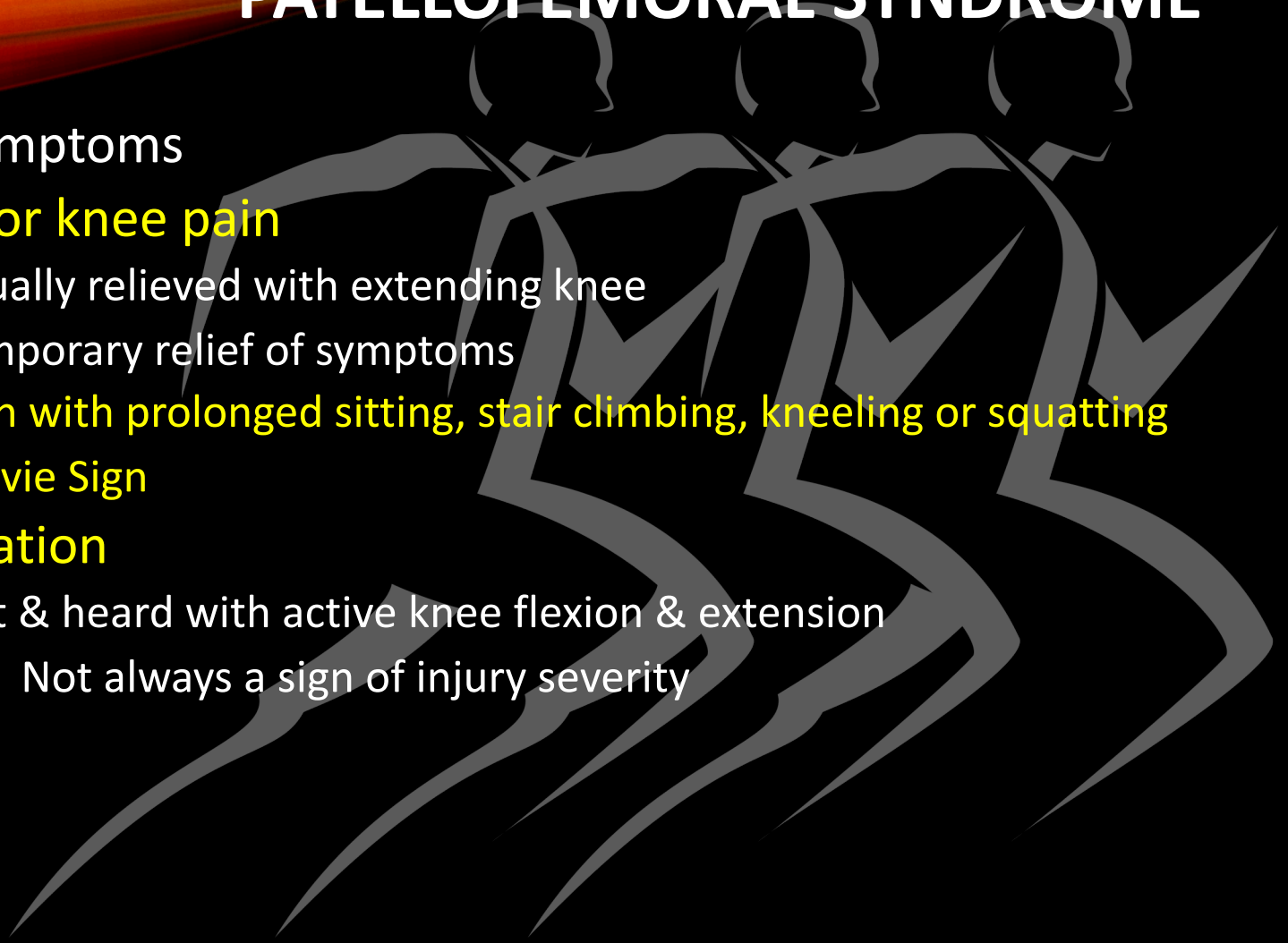
- Stages of Chondromalacia
  - Stage I: swelling & softening hyaline articular cartilage
  - Stage II: fissure develops within damages areas
  - Stage III: disruption hyaline articular cartilage to subchondral bone
  - Stage IV: destruction hyaline articular cartilage with exposed bone
    - All stages best determined at time arthroscopy

PATELLOFEMORAL SYNDROME



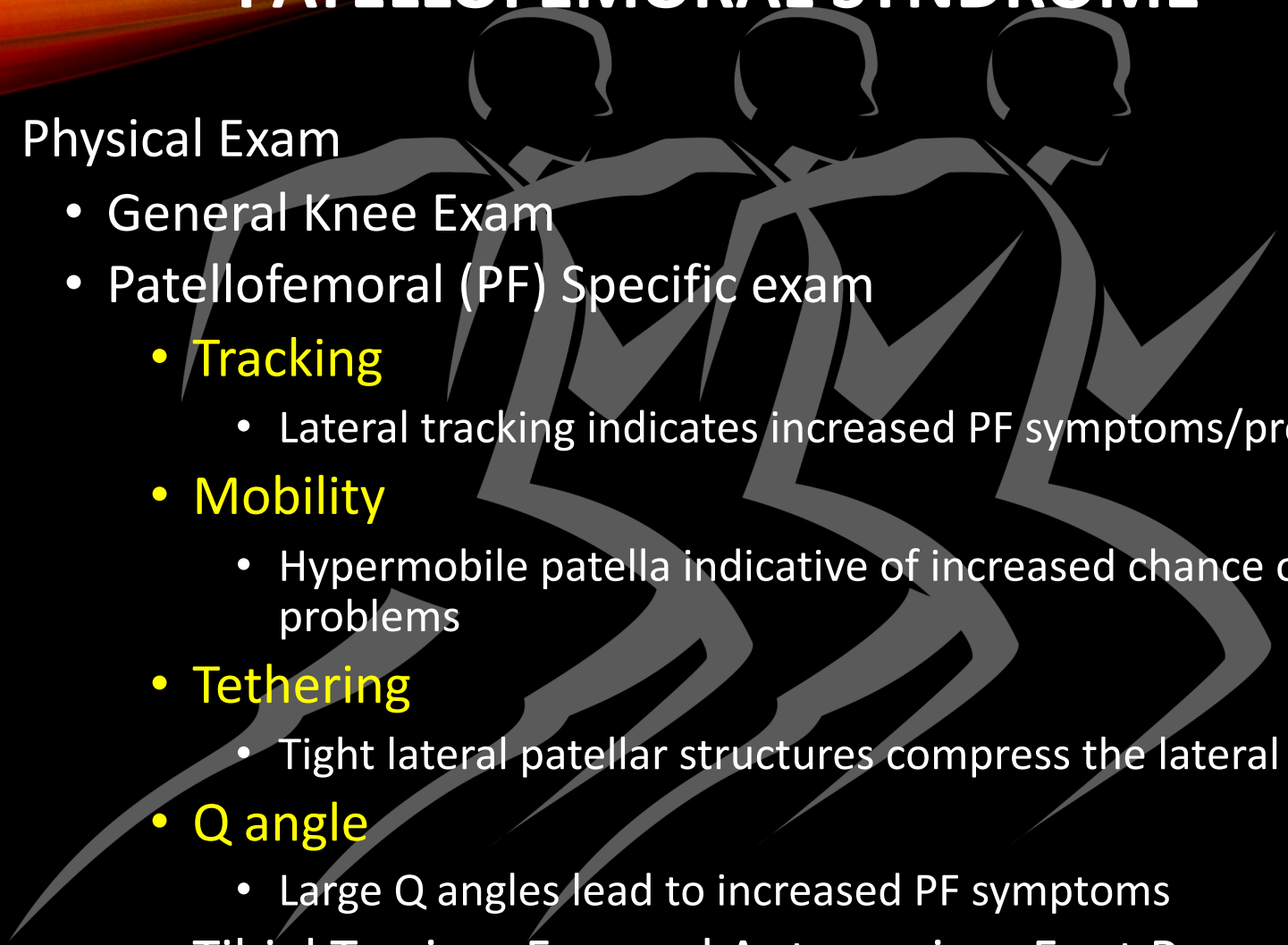
- Contributing Factors
  - Weak quads
  - Tight hamstrings, quads & hip flexors
  - Increased Q angle
  - Patella Alta
  - Shallow Femoral groove
  - Genu valgum
  - Pes Planus
  - Weak glutes

PATELLOFEMORAL SYNDROME



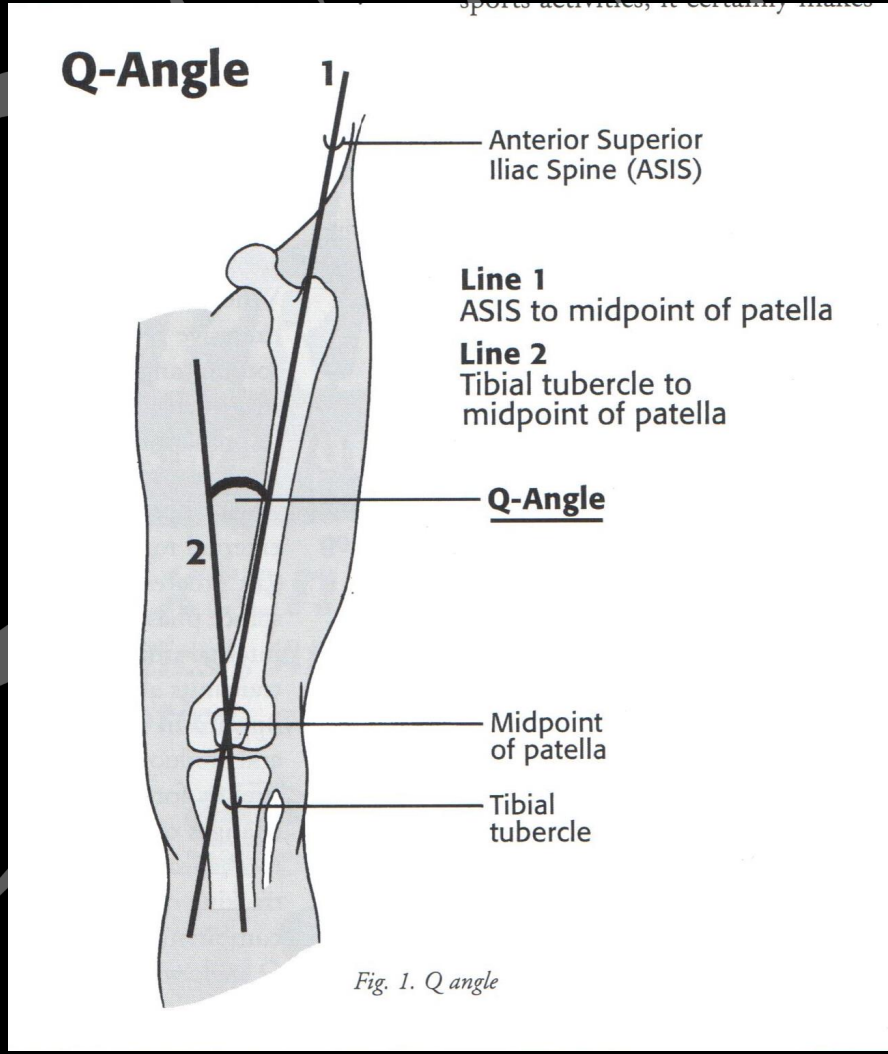
- Clinical Symptoms
  - Anterior knee pain
    - Usually relieved with extending knee
    - Temporary relief of symptoms
    - Pain with prolonged sitting, stair climbing, kneeling or squatting
    - Movie Sign
  - Crepitation
    - Felt & heard with active knee flexion & extension
      - Not always a sign of injury severity

PATELLOFEMORAL SYNDROME



- Physical Exam
  - General Knee Exam
  - Patellofemoral (PF) Specific exam
    - Tracking
      - Lateral tracking indicates increased PF symptoms/problems
    - Mobility
      - Hypermobile patella indicative of increased chance of PF problems
    - Tethering
      - Tight lateral patellar structures compress the lateral patella facet
    - Q angle
      - Large Q angles lead to increased PF symptoms
    - Tibial Torsion, Femoral Anteversion, Foot Pronation

PATELLOFEMORAL SYNDROME



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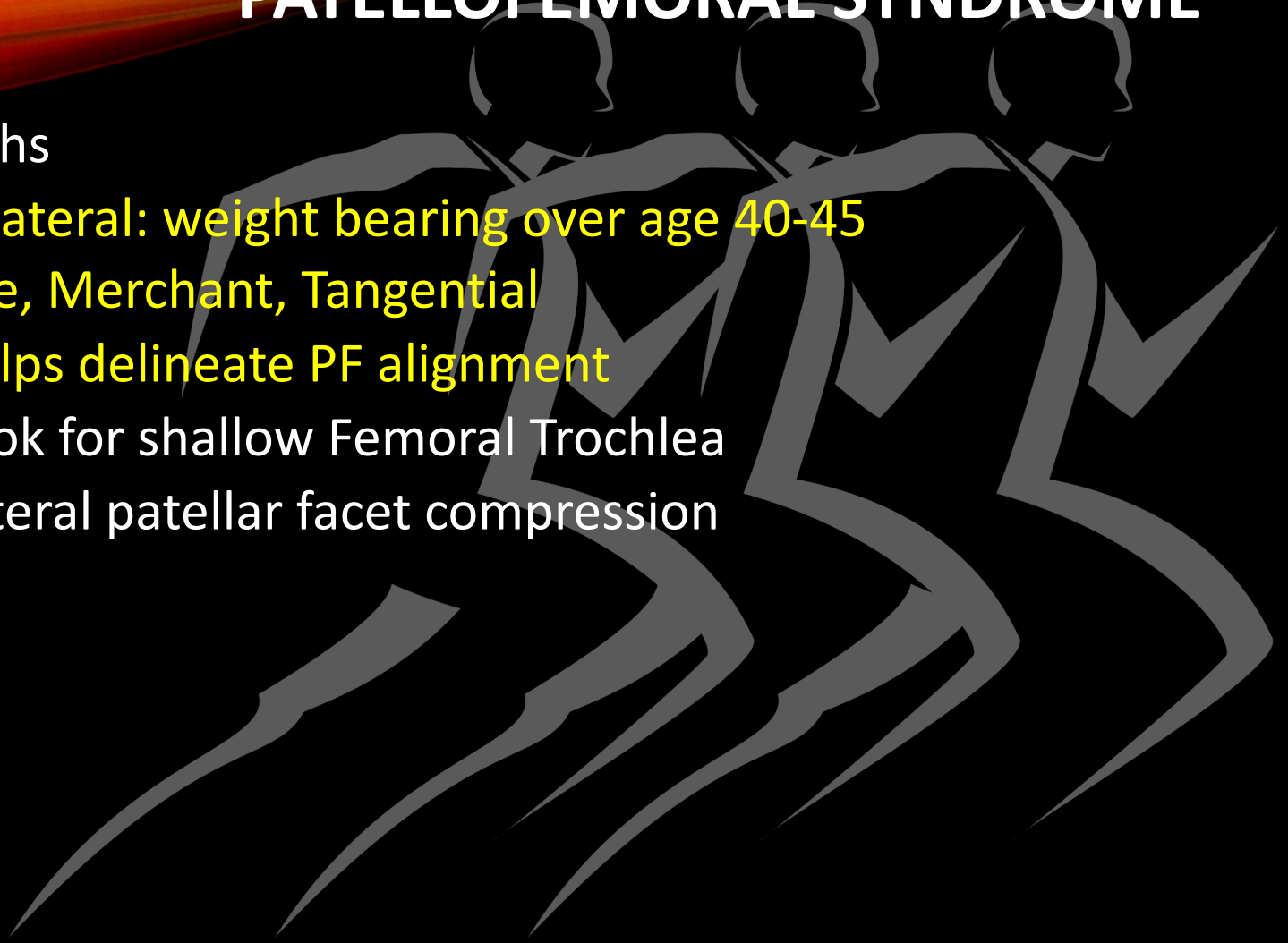
PATELLOFEMORAL SYNDROME



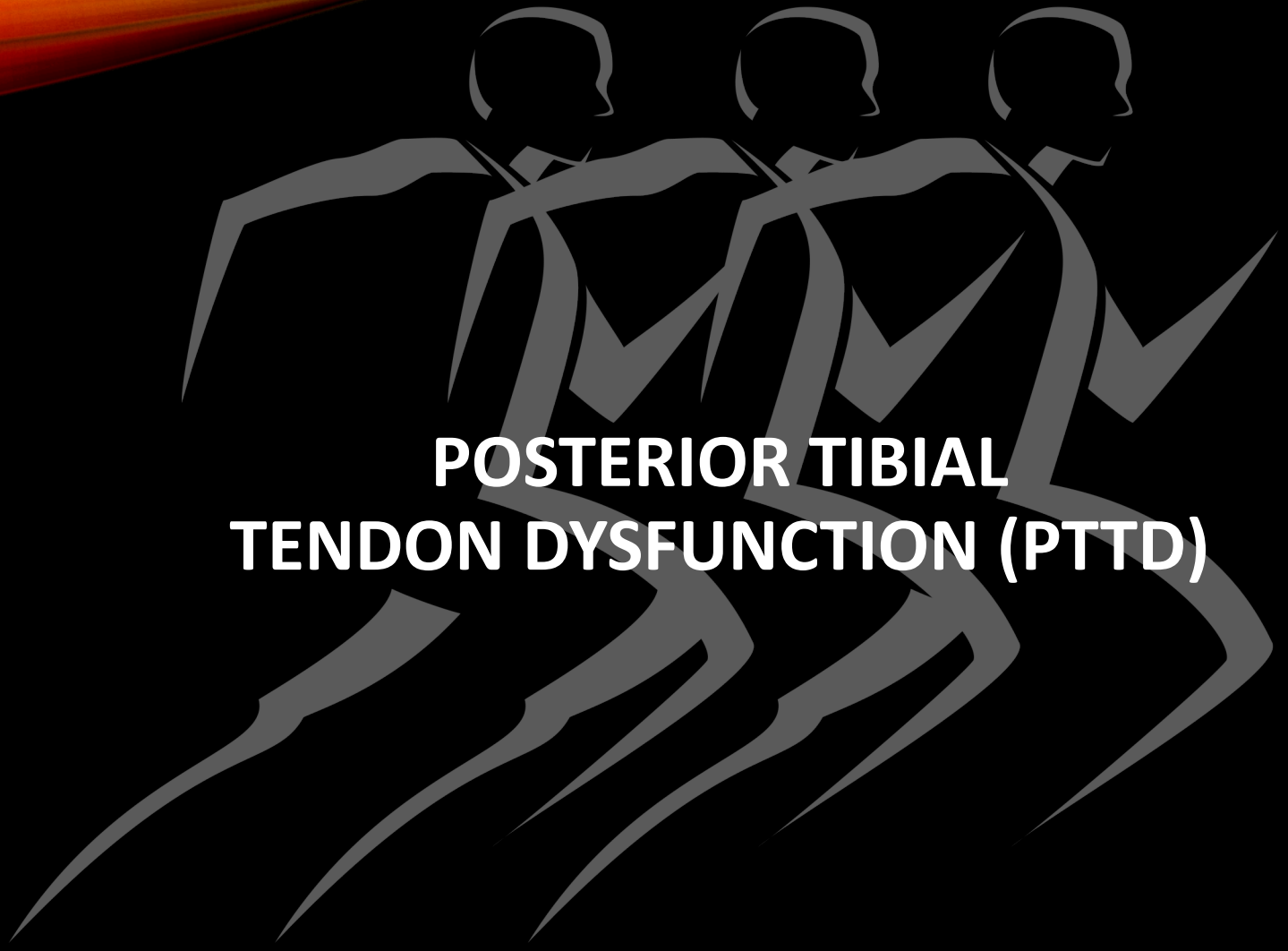
- Radiographs
  - AP & Lateral: weight bearing over age 40-45
  - Sunrise, Merchant, Tangential
    - Helps delineate PF alignment
    - Look for shallow Femoral Trochlea
    - Lateral patellar facet compression

PATELLOFEMORAL SYNDROME

Lateral tracking & tethering patella

PATELLOFEMORAL SYNDROME

- Treatment Option
  - Non-operative:
    - Majority fall into this category
    - Change activity
    - NSAIDS and ICE
    - Avoid Open Kinetic Chain Leg Extensions
    - Increase Flexibility & Strength (VMO)
    - Decrease stresses on PF joint
    - Supportive braces (lateral buttress brace/ J brace)
    - Physical Therapy: best bet for improvement
      - MODALITIES
      - MCCONNEL / KINESO TAPING



POSTERIOR TIBIAL TENDON DYSFUNCTION (PTTD)

POSTERIOR TIBIAL TENDON DYSFUNCTION

- Cause:
  - Degenerative change in the PT
  - Occurs in area of decreased vascularization distal to medial malleolus
  - Contributing factors
    - Obesity
    - PVD
    - Diabetes
    - Spondylopathy
    - Chronic steroid use
    - Trauma
    - Pes Plano valgus (flat feet)
    - Tarsal coalitions

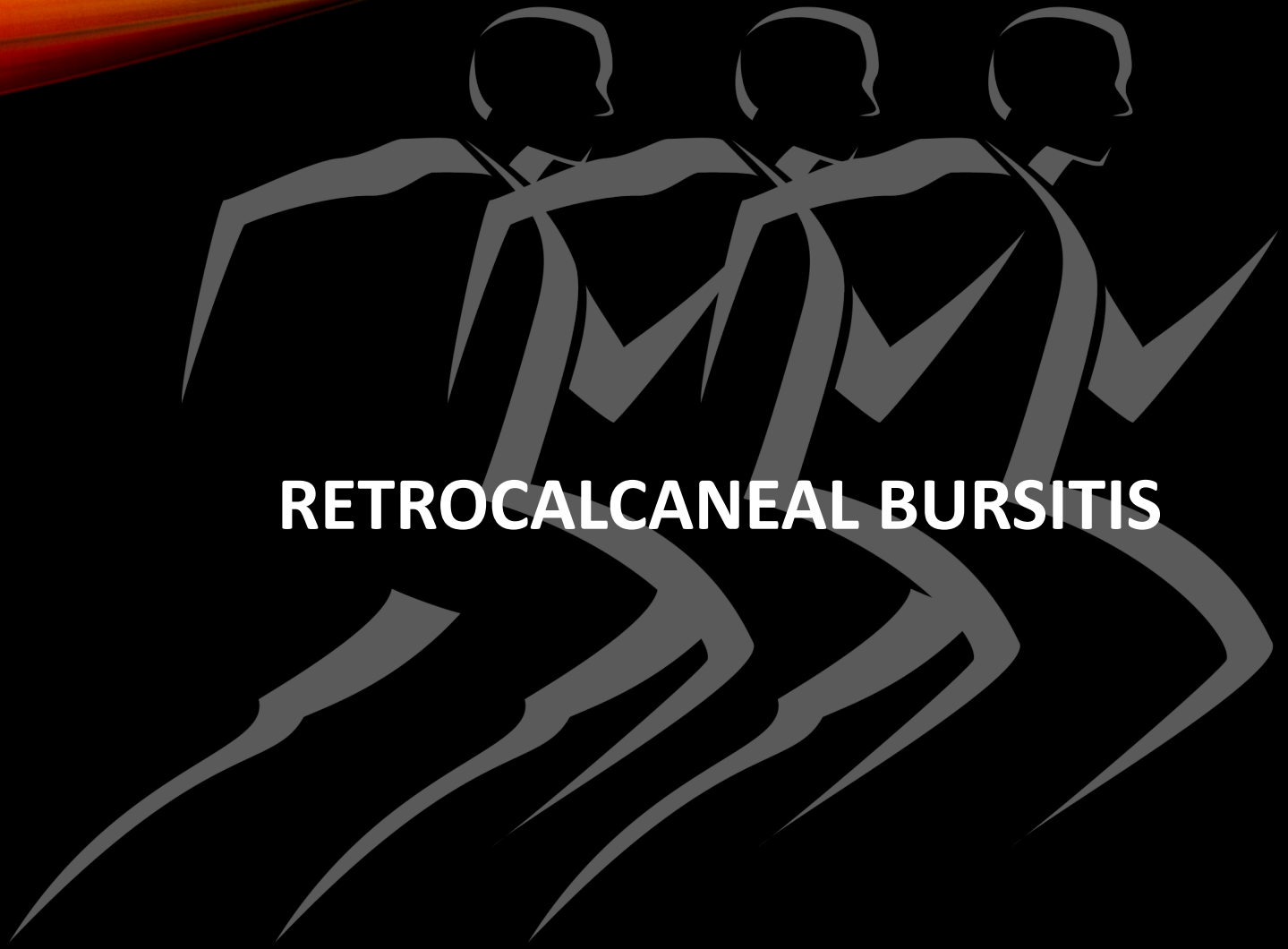
Posterior Tibial Tendon Dysfunction

- Physical Exam
  - Marked planus foot
  - Increased rear-foot valgus
  - Too many toes sign
    - Hindfoot valgus
    - ABD toes
  - Weak inversion
  - Unable to single toe raise on affected foot

Posterior Tibial Tendon Dysfunction

Treatment:

- Recognize possibility of PTTD
- RICE
- NSAIDS
- Immobilization / orthotics
  - Removable short leg cast
- Modify activity
- Referral to Foot and Ankle specialist



RETROCALCANEAL BURSITIS

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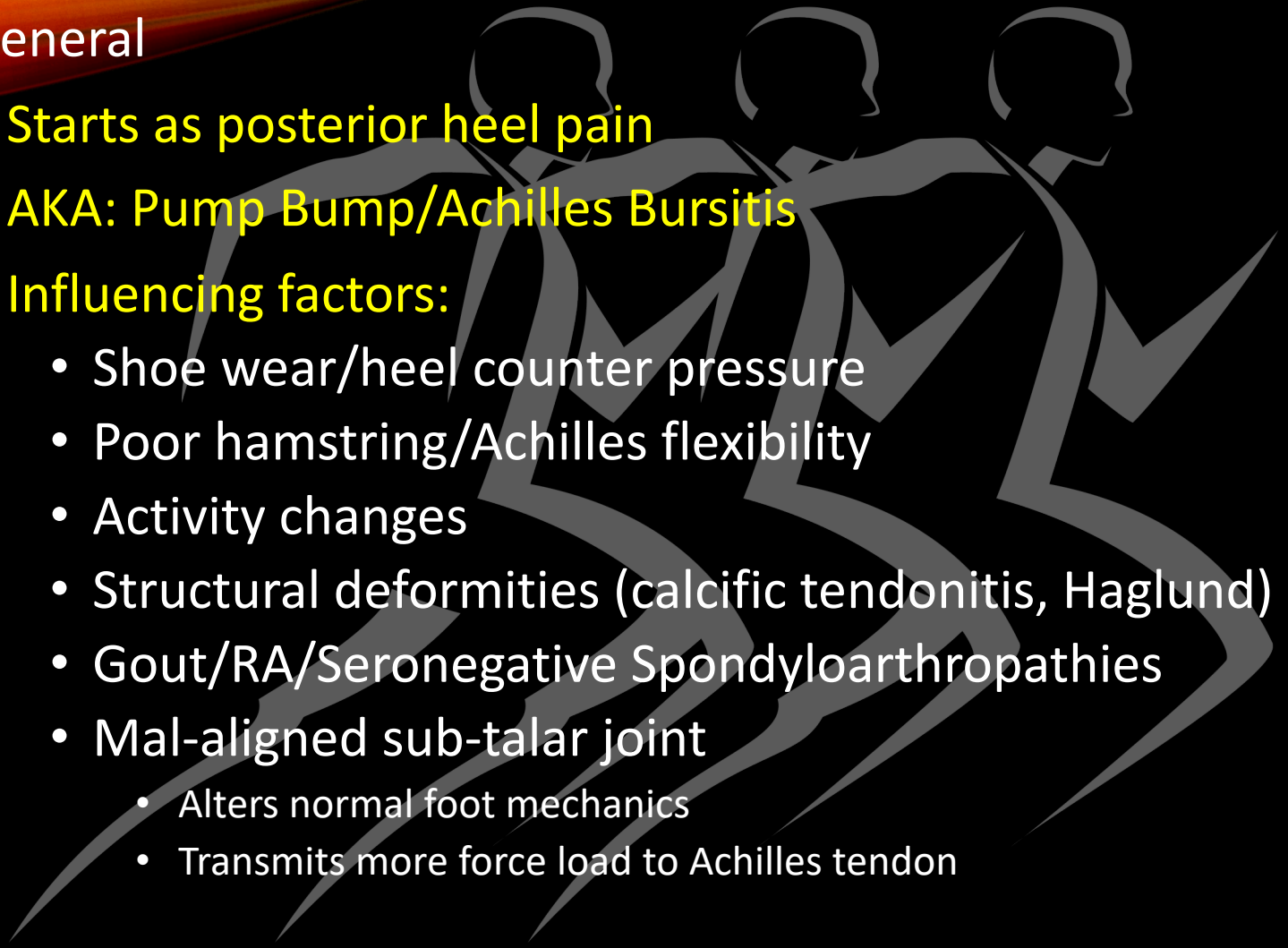


General

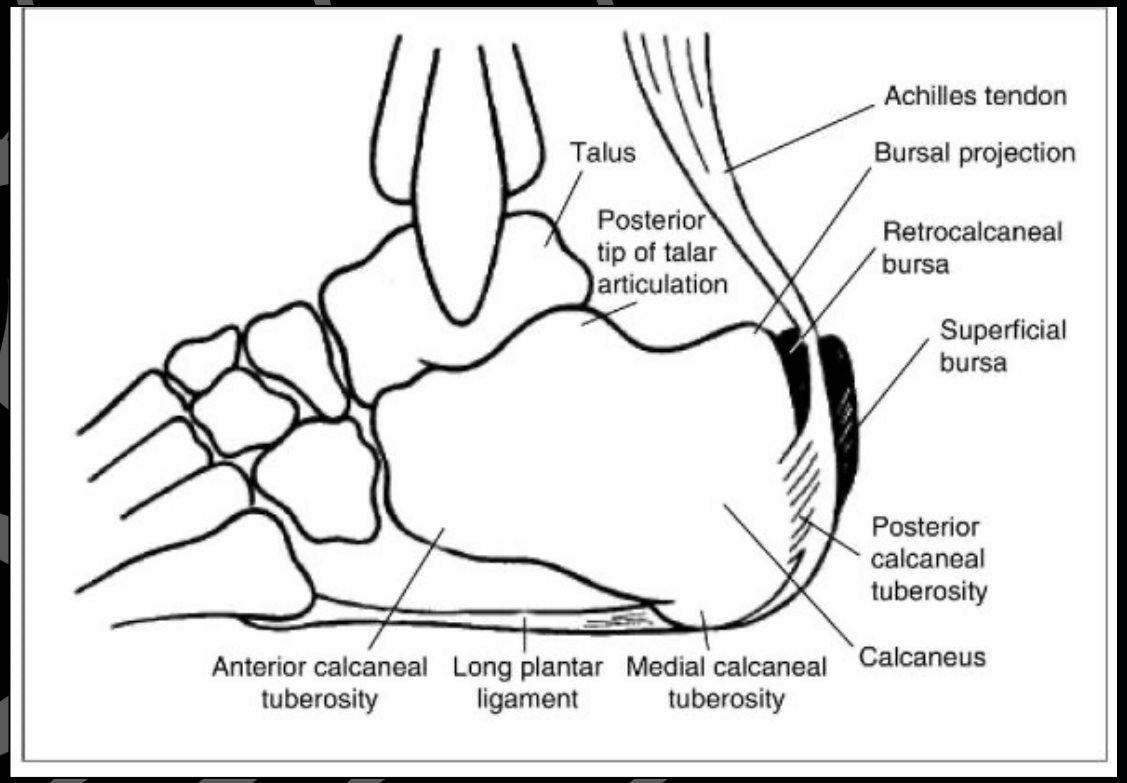
- Starts as posterior heel pain
- AKA: Pump Bump/Achilles Bursitis
- Influencing factors:
  - Shoe wear/heel counter pressure
  - Poor hamstring/Achilles flexibility
  - Activity changes
  - Structural deformities (calcific tendonitis, Haglund)
  - Gout/RA/Seronegative Spondyloarthropathies
  - Mal-aligned sub-talar joint
    - Alters normal foot mechanics
    - Transmits more force load to Achilles tendon

Reddy SS: Surgical Treatment for Diseases and Disorders of the Achilles Tendon; JAAOS 17(1):3-14, Jan 2009

Retrocalcaneal Bursitis

Anatomy

- Achilles' tendon inserts into Calcaneous
- Calcaneous usually down sloping
  - Haglund deformity increases contact pressure of Achilles on calcaneous Dorsiflexion
- Bursa
  - Retrocalcaneal: between bone and tendon
  - Superficial: between skin and tendon



RETROCALCANEAL BURSITIS

Physical Examination

- Inspection
  - Assess gait
  - Rear-foot alignment
    - Neutral-Varus-Valgus
    - Pes Planus – Cavus
    - "Too many toes sign"
- Palpation – tender Achilles insertion calcaneous
- ROM/Strength
  - Decreased KBDF/KEDF
  - Hind foot varus & Rigid 1st ray predisposed ?
- Neuro/vascular – no changes
- Ortho exam – Look @ mortise & sub-talar stability

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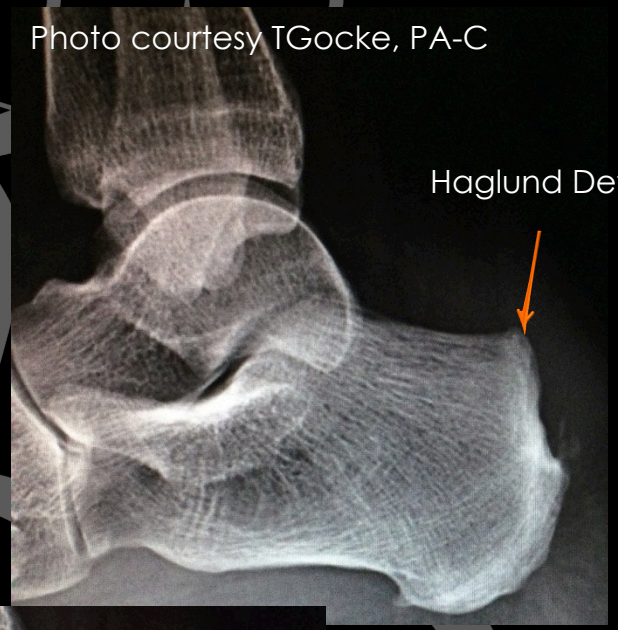
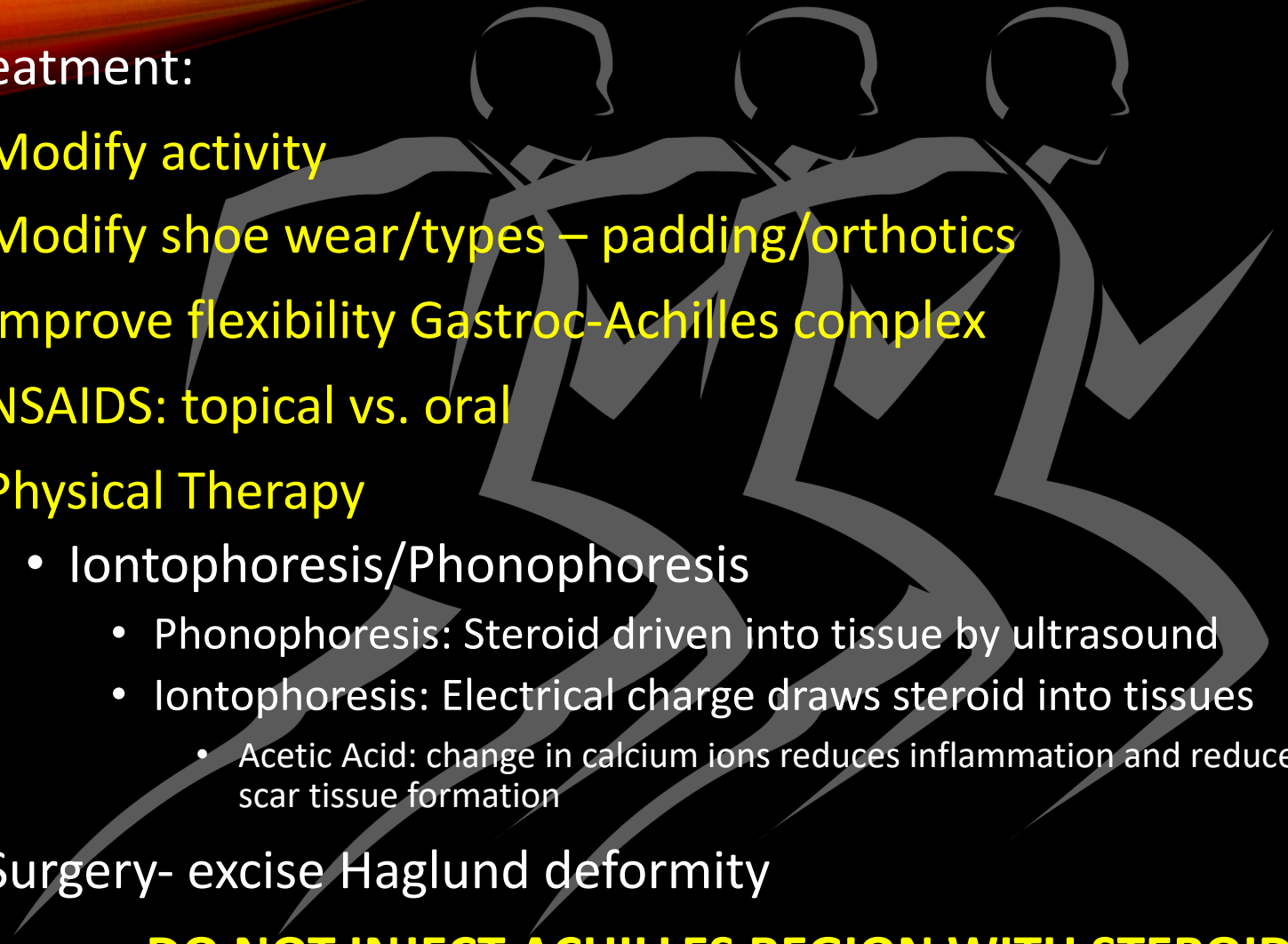
RETROCALCANEAL BURSITIS

- Radiographic views
  - Ankle: AP, Lateral, Mortise (standing)
  - Foot: AP, Lateral, Oblique (standing)



RETROCALCANEAL BURSITIS



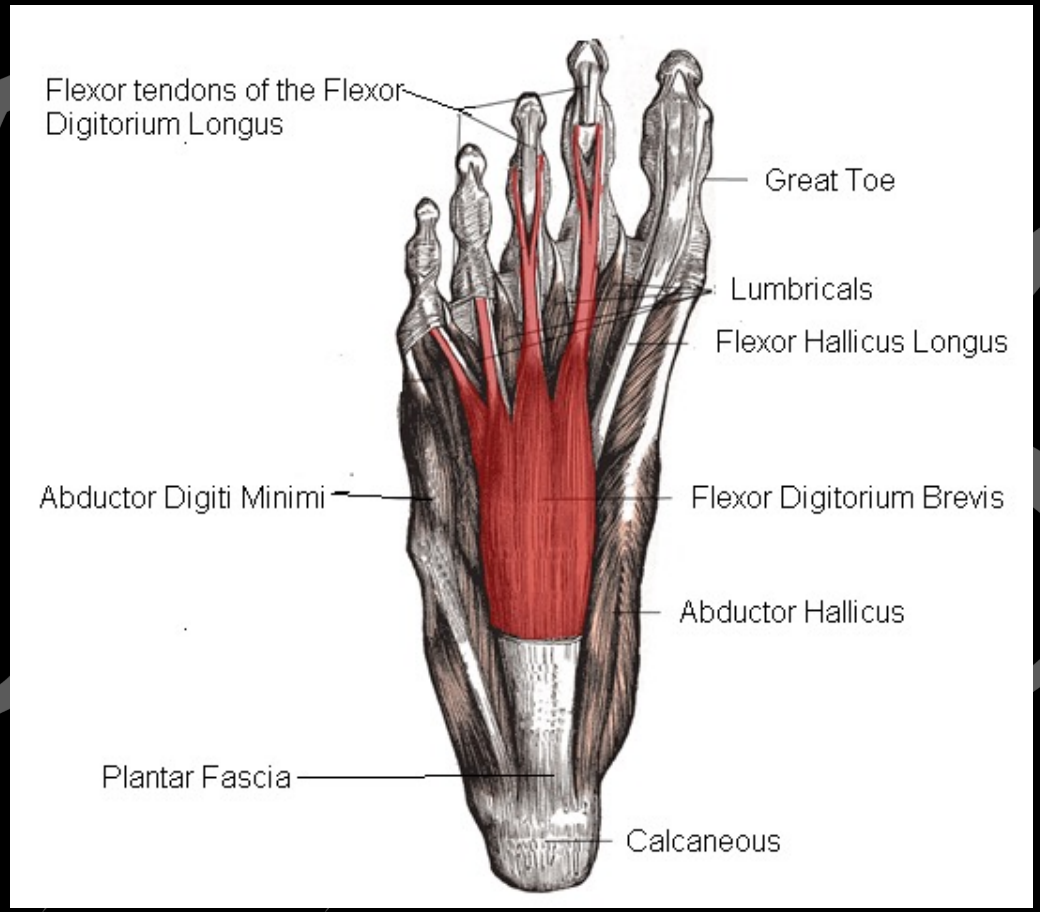
Treatment:

- Modify activity
- Modify shoe wear/types – padding/orthotics
- Improve flexibility Gastroc-Achilles complex
- NSAIDS: topical vs. oral
- Physical Therapy
  - Iontophoresis/Phonophoresis
    - Phonophoresis: Steroid driven into tissue by ultrasound
    - Iontophoresis: Electrical charge draws steroid into tissues
      - Acetic Acid: change in calcium ions reduces inflammation and reduces chance of scar tissue formation
- Surgery- excise Haglund deformity

DO NOT INJECT ACHILLES REGION WITH STEROIDS

PLANTAR FASCIITIS

PLANTAR FOOT



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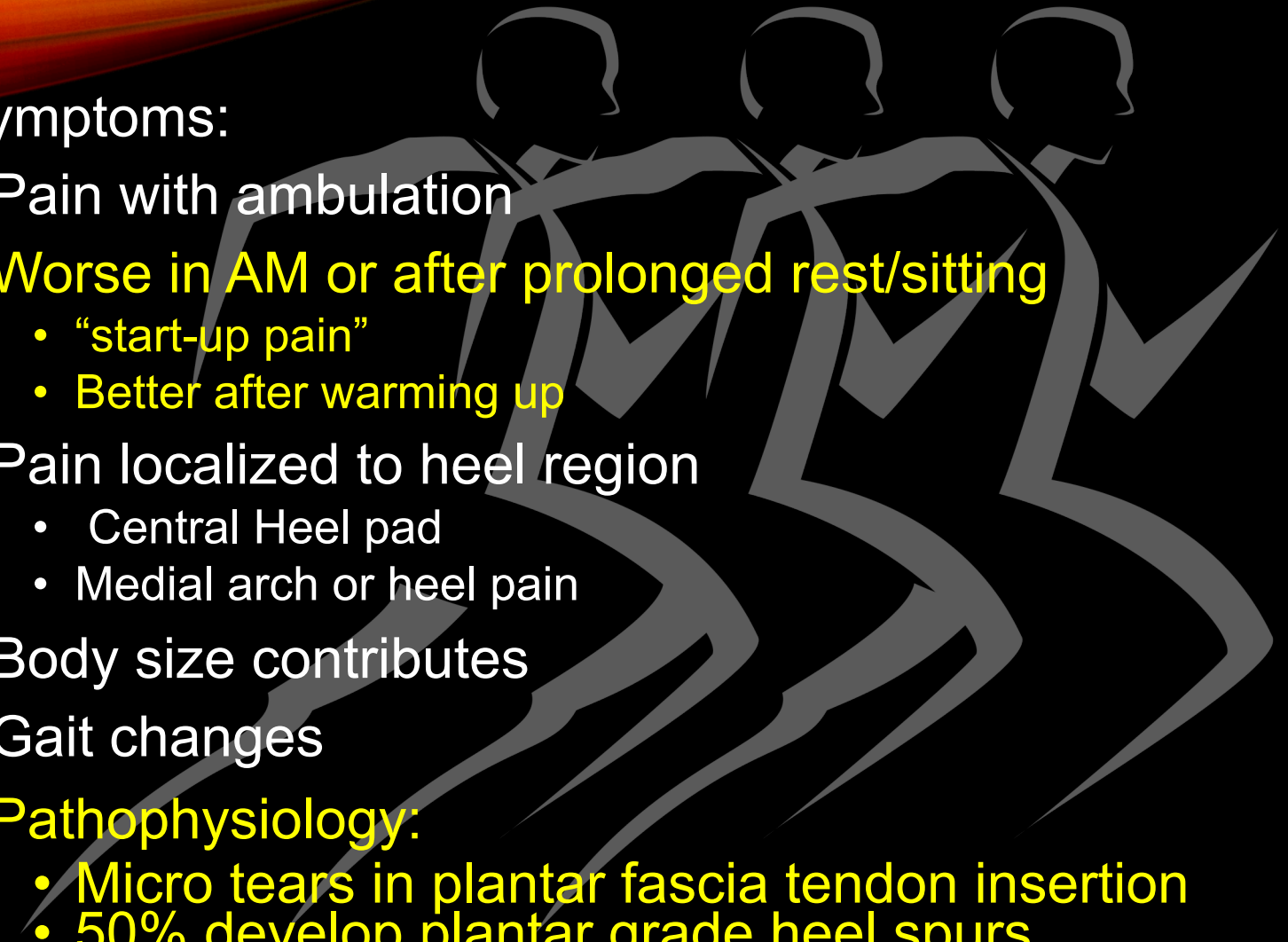
PLANTAR FASCIITIS

- Definition: inflammation of the fascia
- “Heel spur pain”
- Plantar fascia has 3 slips.
  - Medial – Central – Lateral
  - Central slip arises from medial Calcaneal tuberosity
  - Inserts to 5 digits Flexor Tendons
- Primary function is for support longitudinal arches (med/lat)
- Affects women > men
- Average onset 45 yrs
- Obesity worse
- Extreme changes in activity
- Poor foot wear choices
- Poor Flexibility

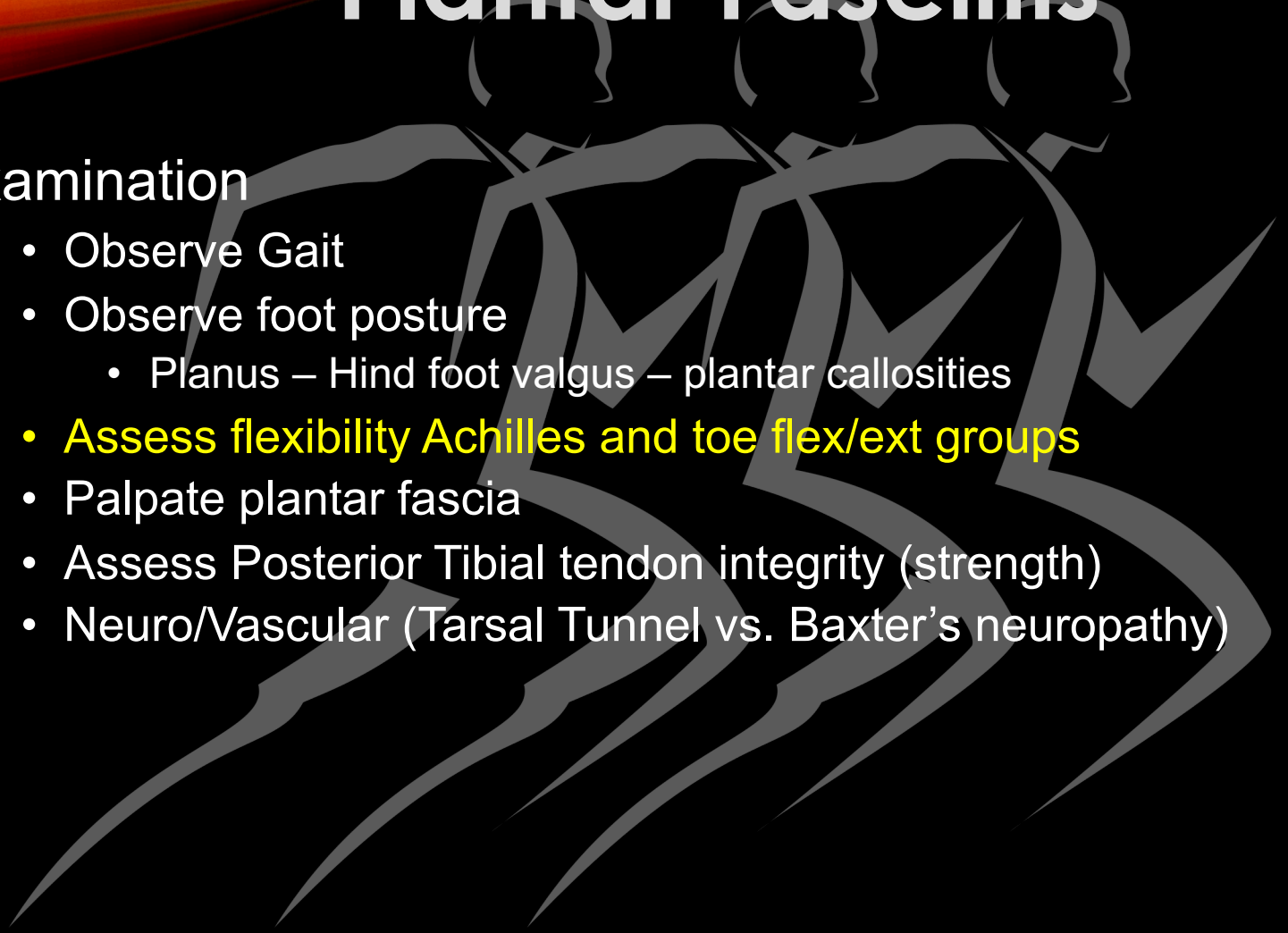
Plantar Fasciitis



Symptoms:

- Pain with ambulation
- Worse in AM or after prolonged rest/sitting
  - “start-up pain”
  - Better after warming up
- Pain localized to heel region
  - Central Heel pad
  - Medial arch or heel pain
- Body size contributes
- Gait changes
- Pathophysiology:
  - Micro tears in plantar fascia tendon insertion
  - 50% develop plantar grade heel spurs

Plantar Fasciitis

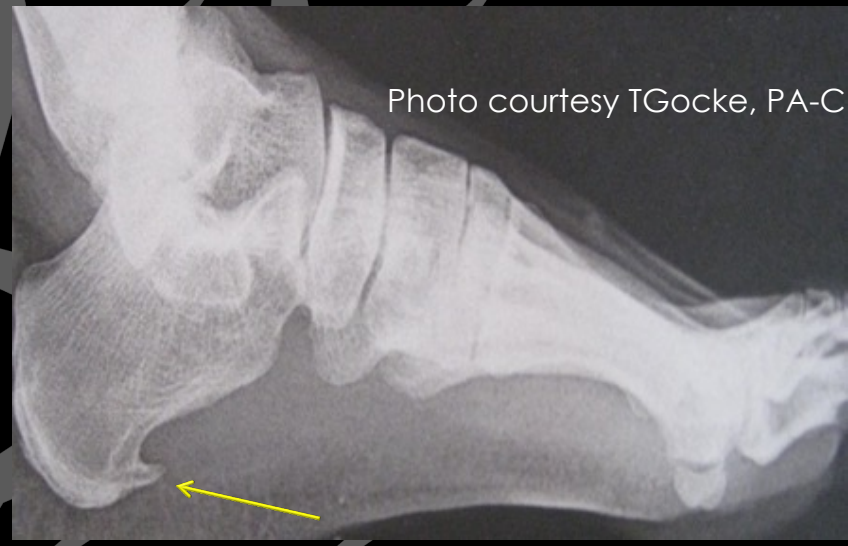


Examination

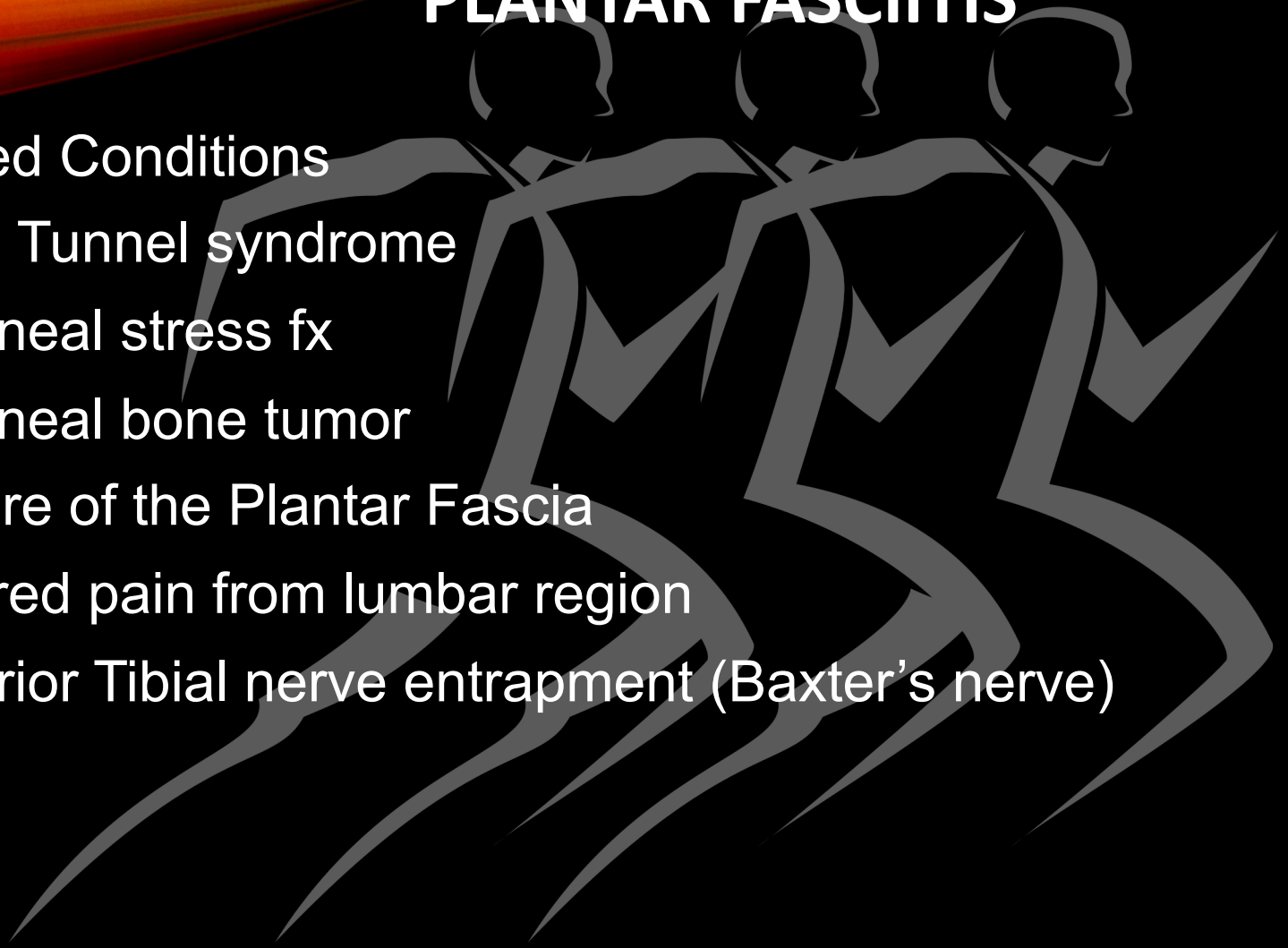
- Observe Gait
- Observe foot posture
  - Planus – Hind foot valgus – plantar callosities
- Assess flexibility Achilles and toe flex/ext groups
- Palpate plantar fascia
- Assess Posterior Tibial tendon integrity (strength)
- Neuro/Vascular (Tarsal Tunnel vs. Baxter's neuropathy)

PLANTAR FASCIITIS

- X-ray: Standing lateral
  - Traction spur considered a normal finding (**arrow**)
  - Not cause for Plantar Fasciitis
  - High suspicion for Calcaneal stress fracture or tumor
  - Prior to corticosteroid injection
  - Consider CT, MRI or bone scan if failed treatment 4-6 weeks

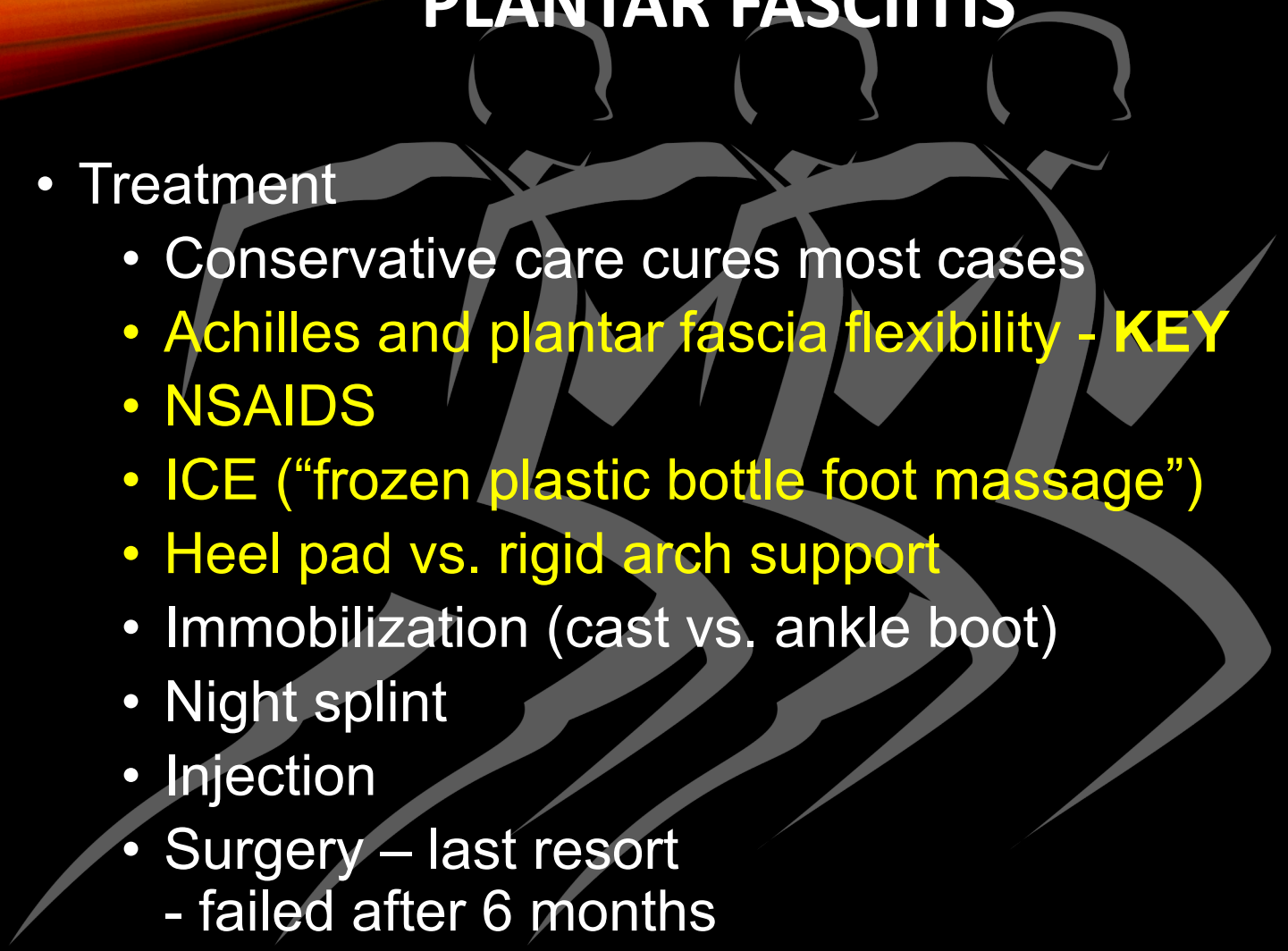


PLANTAR FASCIITIS



- Associated Conditions
  - Tarsal Tunnel syndrome
  - Calcaneal stress fx
  - Calcaneal bone tumor
  - Rupture of the Plantar Fascia
  - Referred pain from lumbar region
  - Posterior Tibial nerve entrapment (Baxter’s nerve)

PLANTAR FASCIITIS



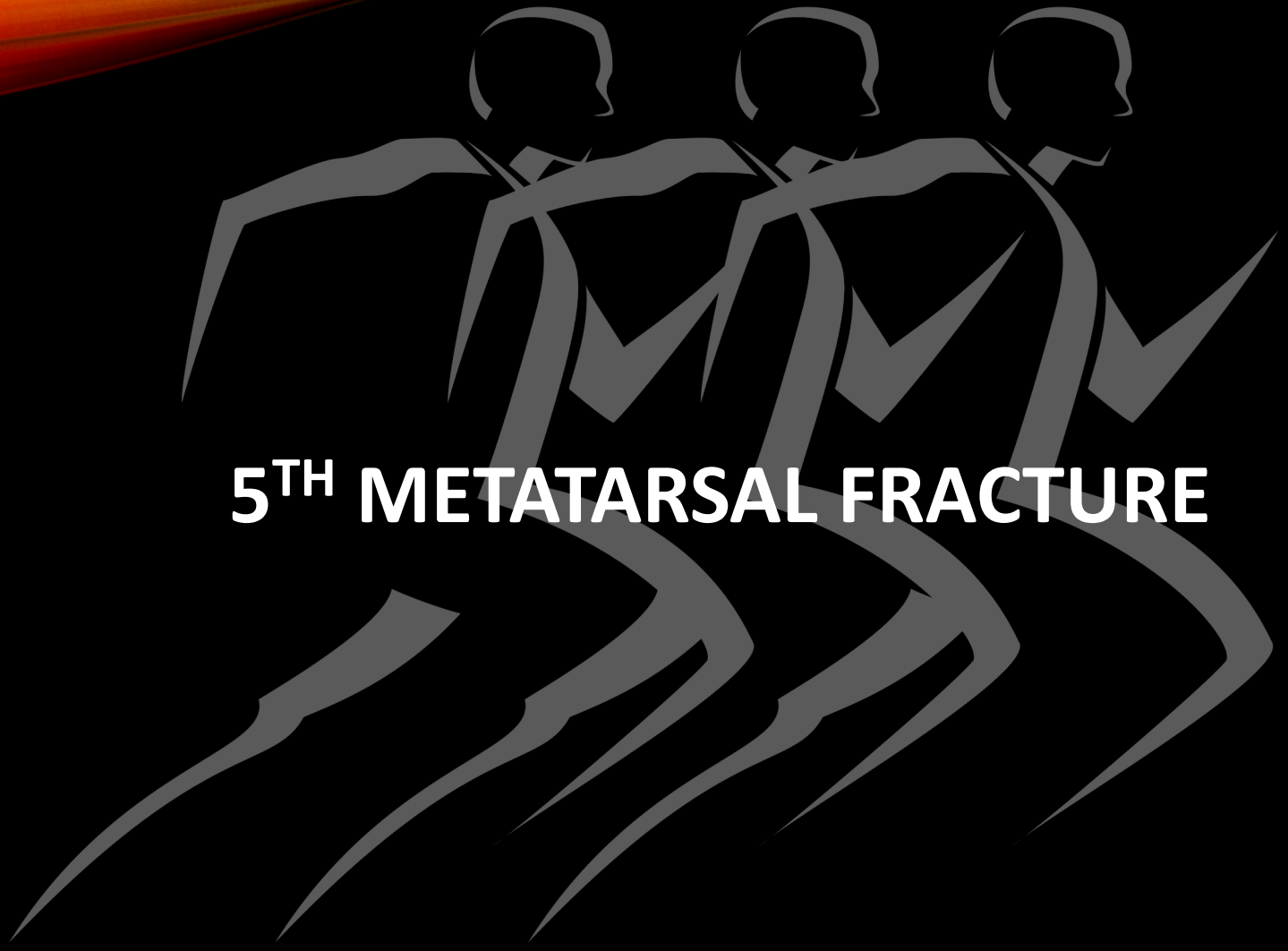
- Treatment
  - Conservative care cures most cases
  - Achilles and plantar fascia flexibility - **KEY**
  - NSAIDS
  - ICE (“frozen plastic bottle foot massage”)
  - Heel pad vs. rigid arch support
  - Immobilization (cast vs. ankle boot)
  - Night splint
  - Injection
  - Surgery – last resort
    - failed after 6 months

PLANTAR FASCIITIS

- Calf/Gastroc Stretch

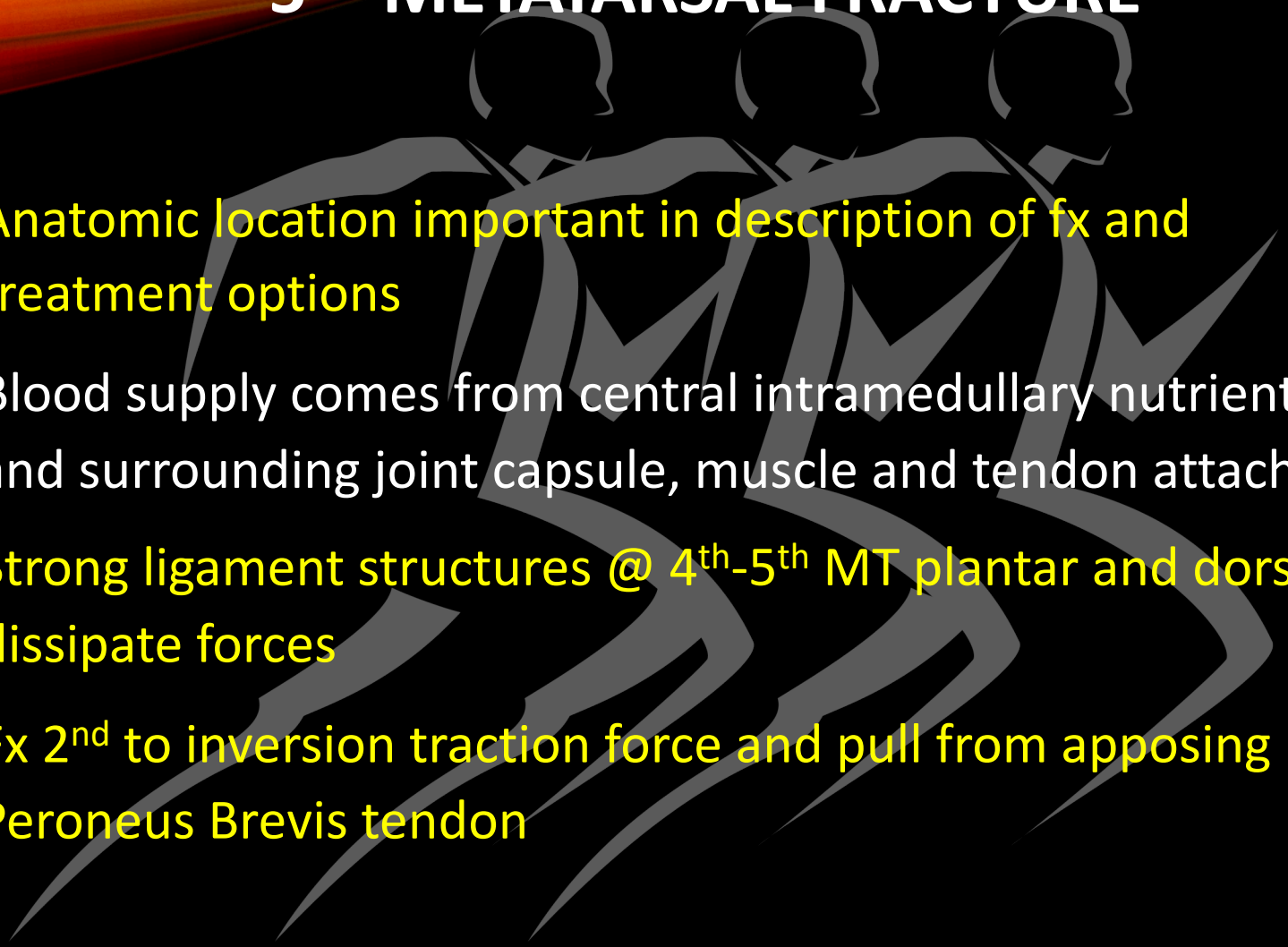
- Toe Flexor stretch

Plantar fascia massage



5TH METATARSAL FRACTURE

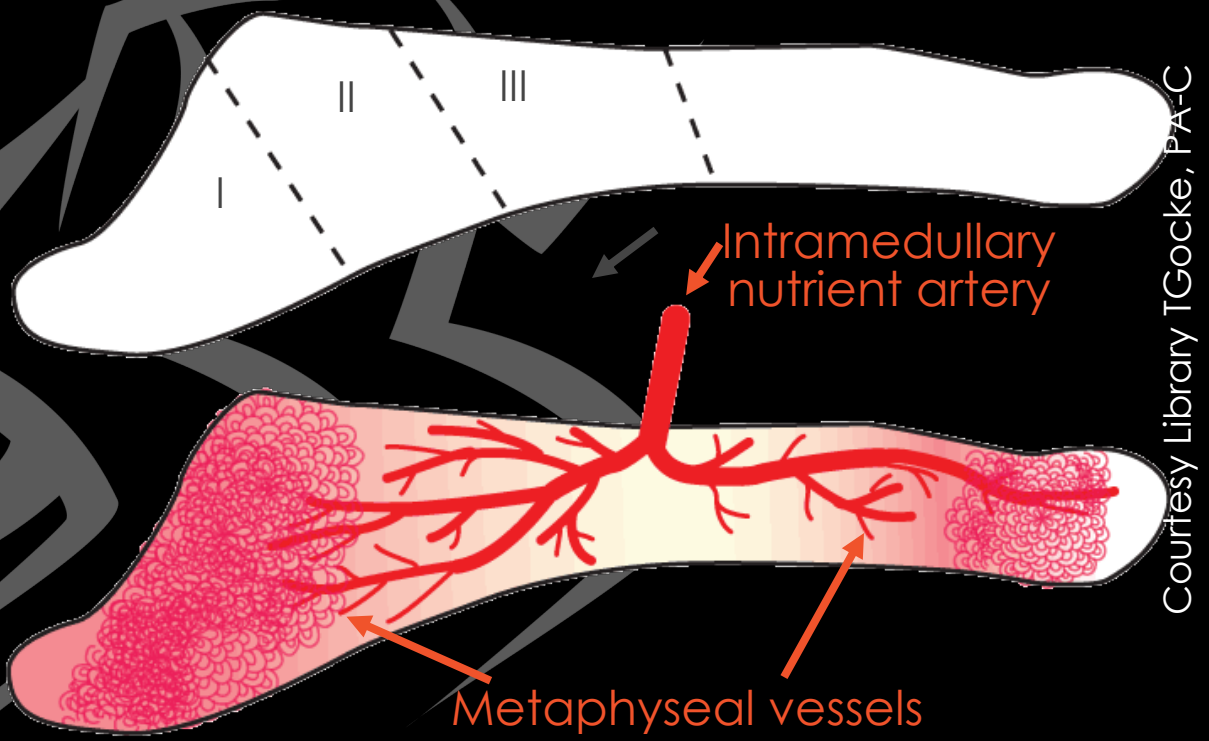
5TH METATARSAL FRACTURE



- Anatomic location important in description of fx and treatment options
- Blood supply comes from central intramedullary nutrient vessel and surrounding joint capsule, muscle and tendon attachments.
- Strong ligament structures @ 4th-5th MT plantar and dorsal dissipate forces
- Fx 2nd to inversion traction force and pull from apposing Peroneus Brevis tendon

5TH METATARSAL FRACTURES

- **3 Zones base 5th MT**
- Zone I- articular surface for the metatarsocuboid joint
- Zone II – articulation of the 4th and 5th metatarsals (Jones Fracture)
- Zone III – extends 1.5 cm distal to zone II



Dameron, TB: Fractures of the Proximal Fifth Metatarsal: Selecting the best Treatment option; JAAOS 3(2), March/April 1995.

5TH METATARSAL FRACTURE

Zone I

- Most proximal and is considered the base of the 5th MT
- **Peroneus Brevis and lateral cord of plantar aponeurosis**
- **Fx starts lateral cortex and extends medially into the metatarsocuboid joint**
- Good healing associated w/ Zone I injuries
- X-ray - > 3mm dorsal displacement may need surgical fixation
  - **Symptoms subside long before healing seen on x-ray**
  - **Asymptomatic non-union not uncommon**

Dameron, TB: Fractures of the Proximal Fifth Metatarsal: Selecting the best Treatment option; JAAOS 3(2), March/April 1995.

5TH METATARSAL FRACTURE

Zone II

- More distal part tuberosity
- **Strong ligament attachment dorsal / plantar for 4th-5th MT**
- **Fx this area extend into articulation of 4-5 MT**
- **More painful than zone I injury**
- **Symptoms dependent on activity level**
- No improvement on healing WBAT vs. non-Wt-bear
  - Recommendation for 2-4 wks. Non-wt.-bearing initially then WBAT
- Higher incidence asymptomatic non-union

Dameron, TB: Fractures of the Proximal Fifth Metatarsal: Selecting the best Treatment option; JAAOS 3(2), March/April 1995.

5TH METATARSAL FRACTURE

Zone III

- Most often assoc w/ stress fx mechanism
- Fx distal to ligament attachment binding 4/5 MT
- **Slow healing- poor metaphyseal blood supply**
- Slow Response to conservative measures
  - SLC NWB 4-6 weeks w or w/o Bone Stimulator
  - Surgical intervention
    - Intramedullary 4.5 cancellous lag screw
    - Non-union may need grafting
    - SLC 4-6 wks

Dameron, TB: Fractures of the Proximal Fifth Metatarsal: Selecting the best Treatment option; JAAOS 3(2), March/April 1995.

FIFTH METATARSAL FRACTURES

Fifth metatarsal base fractures are **common fractures usually seen after acute inversion ankle injuries**. Radiographically, the **apophysis** appears as longitudinal line parallel to the long axis of the **fifth metatarsal**, whereas avulsion **fractures** usually have a transverse orientation. May 15, 2014

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