HALLUX LIMITUS VS. TURF TOE

EATA Conference 2015
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Hallux Limitus
- First Described in 1887 – Davies-Colley
- First Referred to as Hallux Flexus

Turf Toe
- First Mentioned in 1975 – Round Table Discussion in Physician & Sportsmedicine.
- 1976 – Bowers & Martin.

Two Entirely Different Conditions
HALLUX LIMITUS

TRAUMA

ACQUIRED DEFORMITY

CONGENITAL

JOINT DISEASE

TURF TOE

TRAUMA

ETIOLOGIES
HALLUX LIMITUS

- Stage I – Functional Limitus
- Stage II – Joint Adaptation
- Stage III – Joint Deterioration/Arthritis
- Stage IV – Stage of Ankylosis

TURF TOE

- Grade I – Mild
- Grade II – Moderate
- Grade III – Severe

STAGES
BOTH CONDITIONS WILL RESULT IN:

- PAIN INVOLVING THE 1ST MTPJ
- PAIN IN GAIT
- DECREASE IN FUNCTIONAL RANGE OF MOTION

HALLUX LIMITUS / TURF TOE
To differentiate Hallux Limitus from Turf Toe, it is essential to have an accurate history, physical exam, including a biomechanical evaluation. Weight bearing radiographs can offer critical information.

HALLUX LIMITUS / TURF TOE
…”sprain of the plantar capsule-ligament complex of the great toe metatarsophalangeal joint.”


TURF TOE
Has become a term used to refer to any soft tissue injury of the 1\textsuperscript{st} MTPJ, usually a hyperextension mechanism.

TURF TOE
Plantar Plate
Flexor Tendon
Joint Capsule
Ligaments
Sesmoids

TURF TOE
TURF TOE
MRI Evaluation can be very important in helping to establish an appropriate treatment plan.
Severity or grade of injury as with any soft tissue injury will dictate the aggressiveness of the treatment.

TURF TOE TREATMENT
Ice
Rest
Modalities
NSAID’s
Corticosteroids
Splinting
Orthotics

TURF TOE TREATMENT
Turf Toe – 1st Met Extension

Hallux Limitus – 1st Met Cut Out

ORTHOTICS
1887 Davies-Colley called it Hallux Flexus.
1891 Anderson the progressive loss of motion.
1938 Lambrinudi related it to metatarsus elevatus.
1921 Jansen differentiated from hallux abducto valgus (bunion).

HALLUX LIMITUS
Hallux Limitus will begin as a functional condition in Stage I, and will progress to restrictive motion even in open kinetic chain situations.
STAGE I ➔ STAGE IV
Hallux Limitus can clinically present with pain free passive ROM, when the forefoot is not loaded.
Hallux Limitus is a gradual degenerative pathological condition involving the 1\textsuperscript{st} MTPJ.

It can potentially progress to a full ankylosis of the joint.
STAGE II – HALLUX LIMITUS
Hallux Limitus although it can be caused due to trauma, it is typically brought about as a result of a genetic structural predisposition, or a biomechanical anomaly.
Hallux Limitus in athletes can be a progressive condition due to hypermobility of the 1\textsuperscript{st} metatarsal, resulting in an elevatus when the foot is loaded, restricting extension of the hallux, and a constant jamming.
STAGE II - III HALLUX LIMITUS
Hallux Limitus often results in a hyperkeratotic build up on the medial aspect of the hallux and the 1st metatarsal head.
Hallux Limitus often causes callus formation on the plantar aspect of the 2nd metatarsal head due to lack of ability to propulse off the 1st MTPJ.
Stage I – Orthotics, Joint Mob, NSAIDs

Stage II – Same as with stage I, and corticosteroid injections.

Stage III & IV often require surgical intervention.

TREATMENT OF HALLUX LIMITUS
Hallux Limitus in early stages can be successfully treated with orthotics, appropriately maintaining the 1st metatarsal in a planter flexed or declined position.
Surgical repair of soft tissue structures with Turf Toe, and excision of bone with decompression osteotomy with Hallux Limitus.

SURGICAL TREATMENT
Plantar Fascitis
Shin Splints
Metatarsalgia
Plantar Fasciitis  OR  Plantar Fasciosis
Inflammation Clinically;
1. Erythema
2. Edema
3. Increase temperature
4. Pain
Inflammation
Histologically;

Acute – Leukocyte accumulation
Inflammation Histologically;

Chronic – Infiltration of Macrophages, Lymphocytes, Plasma Cells, Tissue Destruction, Vessel Proliferation, Fibrosis
By definition, for an inflammatory condition to be present, Clinical and Pathological findings must be present.
For over 50 years authors have and continue to refer to heel pain as “Plantar Fasciitis”, when in fact the Fascia is Not inflammed.
Calcaneal Spur
Torn Plantar Fascia
Tarsal Tunnel Syndrome
Calcaneal Stress Fracture
Lipoma
Bone Cyst
Plantar Fibroma
Schepsis et al, Clin Ortho. 1991
Tountas & Fornasier, Clin Ortho. 1996
Lamont, Clin Path. 2003
Wearing, Sports Med. 2006
Tendonitis or Tendinosis??
Biopsy studies concluded tendinosis is major cause of tendinopathy, 163 patients.
US Pat # 7041075B2 May, 2006

- Specialty Orthotic
- OrthoDynamics Purchased
- Paterson, NJ
- 1 800 275-1842
BAREFOOT / SPECIALTY ORTHOTIC

- Orthotic Device for Barefoot Sports
- Orthotic for Specialty Sports
- Orthotic for Cleats, Spikes, Skates, Ski
BAREFOOT ORTHOTICS

- Gymnastics
- Dance
- Martial Arts
- Diving
- Sprints
KISTLER FORCE PLATFORM

• Forces 8 – 10 Times Body Weight at Toes

• Forces Greater Than 15 Times Body Weight at the Rearfoot

• Thanks to Brown University
KISTLER FORCE PLATFORM

• Consistently Recorded Duration of Impact from Digits to Calcaneus Just Over .20 Seconds

Thanks to Brown University
HIGH SPEED VIDEO

• Reverse Gait
• Deformation of Foot
• Transfer of Forces to Lower Extremity
• Effects of Orthotic
BAREFOOT ORTHOTICS

- Lack of gait cycle in all sports
- Importance of controlling the average center of pressure
- Importance of controlling the movement of the center of pressure
- Importance of limiting the amount of movement of the center of pressure
TEKSCAN - MATSCAN

- Technology - Resistive ink
- Sensor thickness - 2.0 mm
- Sensor resolution - 1.4 cells per cm²
- Recording frequency - 200 Hz
- Dynamic range - 1 - 3000 PSI
- Number of sensors - 2228 Sensels
- Accuracy - 5 - 10%
TEKSCAN PRESSURE PLATE

- Each Sensel = 2 mm
- 13.5 Sensels at Foots Widest Point
- 27 mm at the Foots Widest Point

- MatScan Pressure Measurement System
TEKSCAN PRESSURE PLATE

• Foot Approximately 9.64 cm at Widest Point

• Impact With Specialty Orthotic Resulted in Center of Pressure Moved on Average Laterally by 5 mm

• MatScan Technology
TEKSCAN PRESSURE PLATE

- Movement of Center of Pressure Was Reduced and Maintained Within Boundary of the Foot.

- MatScan Technology
Ortho-Dynamics

- P.O. Box 1506
- Paterson, New Jersey
- 07544-1506
- 1-800-275-1842
- Mr Steve Tushingham
Sir Issac Newton upon his retirement – “If I could see further than others, it’s because I stood on the shoulders of giants”