Addressing Plantar Plate Pathology

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Plantar Plate Pathology

Goals:

- Anatomy
- Pathophysiology
- Physical Examination
- Diagnostic Findings
- Treatment Options
ANATOMY OF THE MTPJ

- THE MTPJ’S REST ON A SUSPENSION BRIDGE LINKED TO THE PLANTAR FASCIA

Lawrence Ford, DPM, Podiatry Today, April 2017
Pathophysiology of Lessor MTPJ

- Repetitive Increased load/stress @ MTPJ
- Acute Injury can destabilize MTPJ
- Plantar fascia function related to plantar plate
- Extension as position of function in foot

Kirby K., Understanding The Biomechanics of Plantar Plate Injuries. Podiatry Today: 30-38, April 2017

Listen to Patient History & Chief Complaint

- Plantar Pain
- Plantar swelling
- Deformity/Deviation of the 2nd Toe
- “Toe is raising up more”
- Feels like marble under ball of foot.
Physical Examination

- OPEN CHAIN – Active flexion of the toes reveals isolated extension of the 2nd toe (prox. phal.)
Clinical examination of plantar plate abnormality: a diagnostic perspective.

Role of magnetic resonance imaging versus ultrasound for detection of plantar plate tear

Musculoskeletal ultrasound for preoperative imaging of the plantar plate: a prospective analysis.

Nery C etc al. Found high correlation between staging and surgical findings in 55 plantar plate tears. Lessor MTPJ Instability: Prospective evaluation repair of plantar plate. Foot Ankle Int. 2012; 33:301-11
Nonoperative Treatment of a Lessor Toe Plantar Plate Tear with Serial MRI Follow-up: A Case Report
Surgical Treatment Options: Considerations & Controversy

- Doral vs. Plantar Approach for Repair
- Metatarsal Osteotomy vs. No Osteotomy
- Plantar Plate Repair vs. FDL Transfer
Plantar Plate Repair Using a Direct Plantar Approach: An Outcome Analysis

• Results demonstrated that this approach provides excellent postoperative pain relief, improvement of the associated disability, and improvement in activity limitations.
Dorsal Approach

No Plantar Incision = WB Earlier
No Plantar Scar
Metatarsal Osteotomy vs. No Osteotomy


- Found that long 2\textsuperscript{nd} metatarsal was a risk factor for developing 2\textsuperscript{nd} MTPJ Plantar Plate Tears.


- Study shows that a relatively elongated 2\textsuperscript{nd} metatarsal is associated with increased sub-second metatarsal head plantar pressure during ambulation.
- Elongated 2\textsuperscript{nd} metatarsal is potential contributor to metatarsalgia that can lead to plantar plate injuries.

- 64 feet: 29 feet very satisfied, 15 satisfied minor reservations, 6 major reservations, 14 patients unhappy
- Function of 2nd toe improved, most had pain relief, substantial number patients dissatisfied because stiffness toe


- Flexor-to-extensor tendon transfer is appropriate for rigid stage 3 & stage 4 deformities and all patients with symptomatic neuroma of 2nd web space.
- Stiffness of the MTP joint is a potential problem with flexor-to-extensor tendon transfer.

- 97 feet with 138 plantar plate tears, dorsal approach with Weil osteotomy followed for 12 months.
- Eighty of patients scored “good” to “excellent” satisfaction scores at 12 months.
- VAS Pain Score 5.4/10 pre-op & 1.5/10 post-op
**Plantar Plate is thin or almost gone**

**FDL AUGMENTATION**

- Sutures are passed through the FDL while it is held under tension = reinforce plate
Plantar Plate Pathology
Weil Osteotomy Thoughts
Addressing Plantar Plate Pathology

CONCLUSIONS

- Deformity and Instability of the 2nd MTPJ is likely plantar plate disruption (attenuation, rupture, or dislocation)
- Dorsal and Plantar approaches have demonstrated good post operative results in recent studies and new instruments/techniques.
- New studies demonstrate length of 2nd metatarsal needs to be evaluated preoperatively and addressed if long.
- Flexor-to-extensor tendon transfers should be considered in stage 3 and stage 4 deformities.
- To address this subluxation of MTPJ, long metatarsal, plantar plate tear deformity: bone and soft tissue needs to be considered.
Thank You!

Plantar Scar

Dorsal Scar