The Lapidus – Origins, Fixation, and Weightbearing

Why Lapidus?

**Lapidus procedure**: first metatarsal-cuneiform arthrodesis

**Indications**: HAV:IM angles 14-30 degrees, hypermobile 1st ray. Medial column in sufficiency, flatfoot deformity, morton’s foot, DJD of 1st met-cun joint, failed HAV procedures, hallux limitus/met primus elevatus.

**Contraindications**: Short 1st ray.

**Complications**: Currently: 3.3-12.0% non unions

**Types of fixation**:

**Suture** (lapidus 1934) - Sutures as adjuctive to procedure at Mini TightRope

**Screw fixation** (with AO principles of bone fixation): stainless steel screws are 4x stronger and 12x more stable than sutures.

- Sutures as adjuctive to procedure at Mini TightRope

**Gold standard**: Sangeorzan and Hansen (1989): 2 crossing screws 1st MTC (some do 3 from 1st met/med cun to inter cun.)

- Guber et al: crossing screws+dosomedial plate w/ 2 screws.
- Cohen et al: Crossing screws> Dorsal H plat without interfrag screw (cadver study).

**Plates**: Klos et al: dosomedial plate with compression screw> crossing screws.

- Screw + plate clinically better: inc fusion, earlier WB
- earlier generation plating vs. Newer generation plating (Lapidus plates/polyaxial)
- non-locking vs locking

**External Fixation**: Indication: Septis fusion (infected hardware, Osteomyilits)-Immediate WB

- Wang and Riley (102 pts): unassisted full WB in 13 days, fusion 5.3 wks, 5.5 wks fix removal.
- no delayed/non union: 1 pintract inf-resolved with care/abx
- Treadwell (11 lapidus): more pin tract inf 2 removal of hardware, 2 non unions.
- needs more research.

**Arthroscopy**: cosmetic, less shortening

- visualize plantar/lateral joint: 2 screws: Dorsal prox to distal planter/1st to 2nd met
- hardwear removal 12 weeks: NWB 12weeks

**Time line**
1934 - Lapidus: **Lapidus original**: Zero chromic catgut suture, immediate post op WB in leather-soled shoe with metal plate: 25% non union rate, 3mo to union.\(^2,7\)

1973 - Ruthorford: single screw (1\(^{st}\) met-inter cun) fixation: 6 wks NWB in short leg cast\(^2\)

1989 - Sangeorzan and Hansen: AO principle 2 screw fixation: toe touch WB 2 wks followed by “weight of leg ambulation in short leg cast” (1) 4 wks full WB with radiographic union. (2)-AO principle: one compression, one resist rotation\(^6\)

2000 - Bednarz and Manoli (30pts): screw fixation-100% union in early WB protocol w/ 2wks NBW, protected WB 2-6wks.\(^1\)

2009 - Sorenson et al: dorsalmedial locking plates with interfragmentary screw: WB 2 weeks with 100% fusion (6.95wks average)\(^1,7\)

2009 - Saxena et al (40 pts): locking plate (LPS) WB at 4 wks, 2 screws at 6 wks. no diff non unions/complications \(^1,5,7\)

2010 - Basile et al (41pts): 2 screws with k wire stabilization immediate partial WB, control 2 screw NWB for 6wks. 3\(^{rd}\) point fixation may help min load on lag screw construct\(^1,7\)

2011 - Wild et al: polyaxial locking plate: 98.6% union\(^7\)

2011 - Davries et al (143 fts): crossing screws vs. DM locking plate with no screws (89.4% WB 8.8wks vs 98.5% WB 7.8 wks union)\(^7\)

2011 - Menke et a (21ft): locking plate with interfragemntary screw: EWB program (4.7 wks mean TTWB) 90.5% union\(^1\)

2012 - Blitz-k-wires not suitable alone bc do not offer compression, encouraged EWB encouraged use of plates\(^1\)

2013 - Young and Zelen (2013): 2 screws and dorsomedial locking plate: NWB 2 wks in posterior splint, fiber glass cast for 4 wks “light” WB \(^1,7\)

2014 - Mallet et al: nickel-titanium staples in delta configuration: NWB 6wks post op WB progressed based on radiographs: 8.3% non union.\(^4\)

2014 - Lamm (20ft/19pts): External fixation: Immediate WB in wooden bottom surgical shoe until union, 90% rate (4.7-30.7wks), protected 1 mo s/p removal

**WB post-op:**

**Why do we care?**

Remember: 6-8wks to heal a fx in a healthy patient\(^7\)

Risks/complications NWB: Osteopenia, muscle atrophy, weight gain, DVT/PE\(^7\)

**Long NWB course:** Strict NWB 6-8wks\(^7\)

Supported by:

**Early Weight bearing:** WB <6-8 wks \(^2\) /2 wks NWB until surgical wounds have healed.\(^7\)

Supported by: Sangeorzan and Hansen, Sorenson et al,
Considerations: age/smoking Hx/ activity level/ NSAID use/ weight / neuropathic

Plates provide earlier weightbearing than Screws: Saxena

Conclusions:
Conclusion: Bc risks/cost of revisional Sx: good idea to use locking plate and interfrag screw and NWB 2 wks.  
Conclusion: screws/construct may resist tensile forces on the fusion. Pt selection key. 11.25% pts were smokers

References: