



Calcaneal Osteotomies – The Evolution From Open to MIS Procedures

Steven Steinlauf, MD
Clinical Assistant Professor University of Miami
Clinical Assistant Professor Nova Southeastern University
Inagural Foot and Ankle Fellow's Conference
Tampa, Fl. October 2018



Goals

1. Learn Why MIS Techniques are a valuable "Tool"
2. Where to begin
3. Technique basics
 - ❖ **Key = Pivot point at the skin**
4. Pitfalls
5. Learn from my early mistakes!!!

Why Not Stay With What's Comfortable?



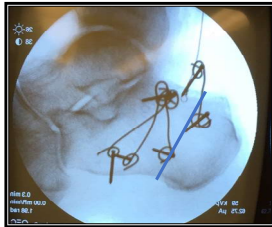
Bottom Line

- I was tired of people complaining about pain at the lateral heel incisions
- I was taught that I could cut straight to bone
 - No nerves of any significance
 - Then why were some people having "burning, electrical pain?"



What nerves were we cutting?

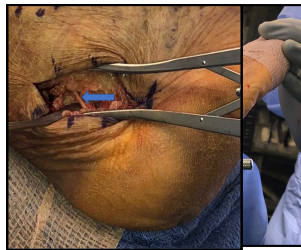
- Thus, we did a cadaver study of the sural nerve
- [Smyth NA¹, et. Al., JFAS 2017](#)



After the study I found my first LCN

- In reality I found many before
 - With my scalpel

- **Andrea Veljkovic, MD, et. al. FAI 2017:**
 - Cadaver study, Perc. Endo. Assisted
 - Vs. potential open approach
 - Only 1/11 LCN branches - PECCO
 - 8/10 LCN branches - open
- **Talusan PG, et. Al. FAI 2015:**
 - Open osteotomy - 3 of 10 MCNs, 3 of 10 LCNs
 - Percutaneous - 2 of 10 MCNs, 1 of 10 LCNs
 - Both - No lacerations of the sural, MP, or LP nerves



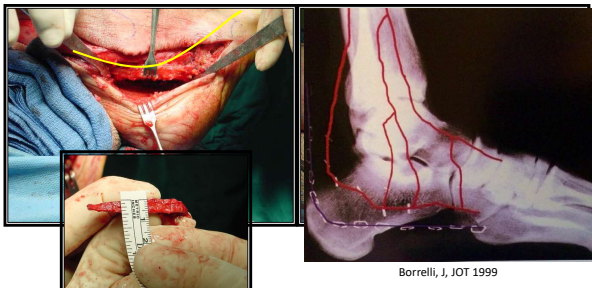
Other Motivating Factors

- More biologically friendly
 - Less soft tissue damage
 - Less bone burning???



Works Well In the Setting of
Combined Surgical Procedures

Cavovarus Correction with Peroneal Recon and Brostrom



Ollier's For Subtalar Fusion and Standard Lateral Incision for Medial Slide



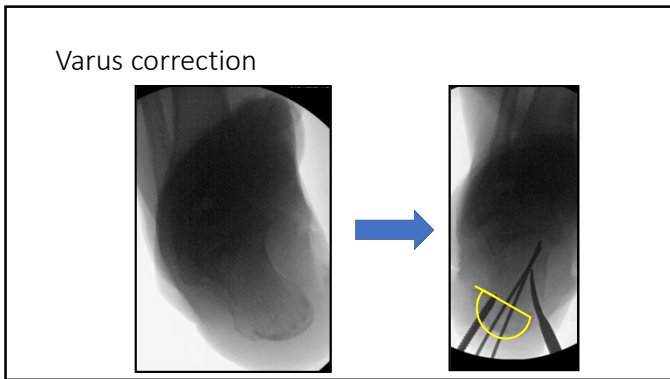
MIS Calcaneal Osteotomies – Less Soft Tissue Injury

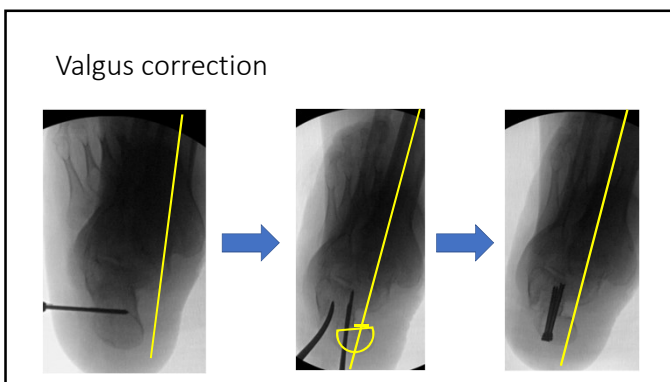
- Less risk of wound necrosis
- Less risk of infection



Very Powerful

- Walther M. et. Al., Oper Orthop Traumatol. 2016
 - Rate of injuries of the neurovascular bundle was not increased
 - Calcaneal shift - 1 cm
 - Additional correction - rotation of the tuber





More Efficient – “Orthopaedic Time”

• Standard Open Osteotomy	• MIS Osteotomy
• 30 Minutes – Medial slide	• 15 Minutes
• Slightly longer - Dwyer	

Technical Pearls


Learning Resources

- Baltimore minimally Invasive or similar courses
- **Wright Website**
 - VLC – Videos
- Minimally Invasive Surgery in the Foot and Ankle
 - Book by Anthony Perera
- Multiple Articles
 - Redfern and Vernois






PROstep™ MIS Calcaneal Tools



- 3x20mm Burr
- Longer burr exists
- Use only in very big patients
 - Otherwise you lose tactile feedback



Slow Speed, High Torque

- 6,000 RPM
- 15% Irrigation level

Technique Pearls

- Supine
- Leg on a bump
- I use large fluro
- Mark out standard incision (excellent guide)
 - 1 finger-breath behind and parallel to the peroneals
 - I do not like guide (saline does not get to bone)
 - K wire - Moses Lee, MD, et. AL. JFAS 2016

Technical Pearls

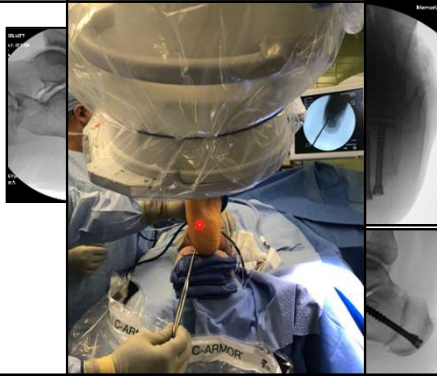
- Find starting point
- Protect sural branches with hemostat
- Axial to assess burr orientation
 - Can shorten or lengthen
- Cut near quadrants first and **stay in trough (It is a guide)**
- **Use finger for tactile feedback!!!**
- Cut far quadrants (in larger people burr is not long enough)
 - **The saline port may become clogged as it goes under the skin (Bone Burns!!!)**

Technical Pearls

- **You know osteotomy is complete-**
 - When it collapses on fluro
 - Bone "paste" comes out (same time)
 - You can move it
 - If unsure use freer to feel where it is not cut

Technical Pearls

- Translation (Medial or Lateral)
 - "Translator" – Too small – can break out in older bone
 - I like the joker
- Very powerful
 - Translation and rotation



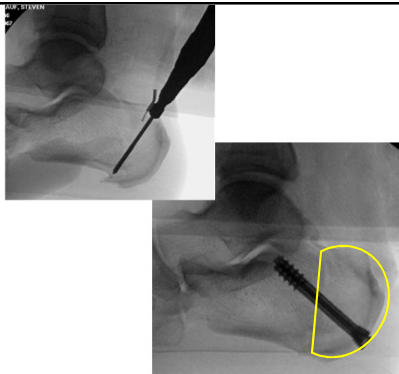
Errors:

1. Dorsal translation
2. Over correction
3. Likely burned bone – delayed union




Pitfalls

- **Chevron** "More Stable" – in experienced European Hands
 - May be less stable allowing rotation
 - More complicated to do at first
- **Oblique**
 - More familiar
 - More reproducible
- **Over correction** –
 - You get both translation and rotation



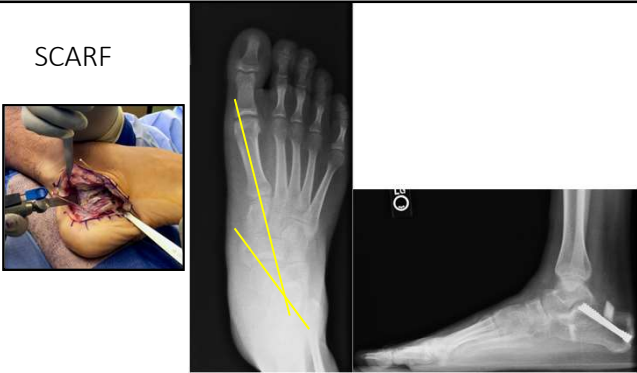
I Still Use SCARF Osteotomies

- Severe Abduction



The image contains two radiographs. The left one is a lateral view of the foot showing severe abduction of the first metatarsal. The right one is a dorsal view of the foot with two yellow lines indicating the planned SCARF osteotomy cuts: one parallel to the first metatarsal and one perpendicular to it.

SCARF



The image is a composite of three parts. On the left is an intraoperative photograph showing a surgical incision and the use of a drill bit on the foot. In the center is a dorsal radiograph of the foot with two yellow lines indicating the SCARF osteotomy cuts. On the right is a lateral radiograph of the foot showing the position of the first metatarsal and the placement of a screw.

Good Results, Low Risk

- **Ehab Kheir, et. Al., FAI 2015**
 - Thirty cases, flat foot recon.
 - Union - 100%
 - No neurovascular or wound complications.
 - All adequate alignment
- **Robert W. Mendicino, et. Al., JFAS, 2004**
 - Small lateral incision
 - Drill bit and osteotome
- **Durston A., et. Al. JFAS 2015**
 - 13 cadavers
 - Chevron with Shannon Burr
 - 2 branches of the sural nerve were transected
 - The medial neurovascular bundle was protected by the quadratus plantae
- **Didomenico LA., et. Al. JFAS 2011**
 - Cadaver study
 - No iatrogenic injury

Thank You
