# Percutaneous Treatment For Calcaneal Fractures: If so, Then When and How

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## Disclosure

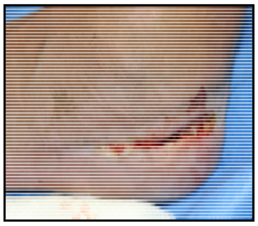
- I am a consultant and designer for Smith and Nephew (VLP Foot System)

## Goals

- To understand why some surgeons prefer "percutaneous exposures"
- To understand which fractures are best treated with "percutaneous exposures"
- To understand the benefits of the sinus tarsi exposure
- To learn technical pearls of the sinus tarsi exposure
- To understand the pitfalls of the sinus tarsi exposure

## Complications of Extensile Lateral Approach

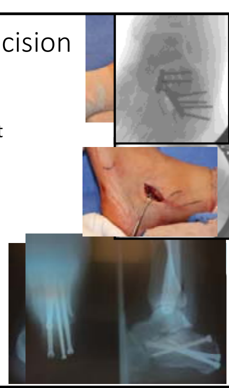
- Poor wound healing
- Risk of infection
- Significant scar tissue
- Backes M., et. Al. Int Orthop. 2014 - 191 patients –
  - 11% superficial
  - 14 % deep
- Folk JW., et. Al. JOT 1999 190 fxs.
  - 25% Wound problem
  - Diabetes, smoking, open fxs



## Small Incision Surgery

- A modification of standard fixation
- Joint surfaces must be visualized through adequate incisions
- The concept = Less damage to the soft tissues
- Must do before 14 days

## What are the Mini-incision Approaches?



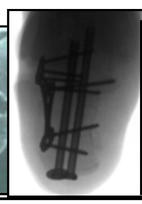
- Medial – Bordeaux, no direct reduction of post facet
- Medial and limited lateral
- Percutaneus Fixation
  - No signif joint displacement
- Sinus tarsi approach

## Sinus Tarsi Incisions



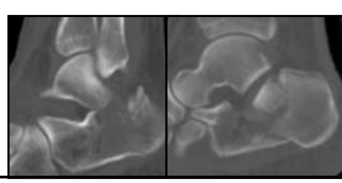
## Indications

- <u>Specific Fracture Patterns:</u>
  - Sander's 2 part (Easiest)
  - Sander's 3 Part with an anterior central part (Difficult)
  - Sander's 4 part (Fairly Straight forward) (If Fusing)
    - Need to reestablish articular anatomy grossly and then fuse
  - Excellent for open injuries in the correct setting



## Contraindications

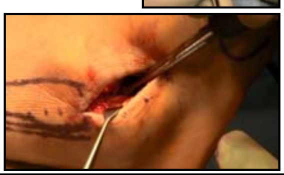
- Sander's 3 part fractures with posterior fragments
- You do not think that you can achieve an anatomic reduction
- ***<u>Small Incisions with a poor reduction achieve nothing!!!</u>***



## Step 1 -Medial Ex-Fix Placement

- "Pull" the posterior tuberosity out of the way
- Easier
  - Reconstruction of the posterior facet
  - Correction of height and varus
- No need for a medial screw

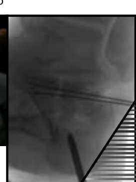
## Step 2 - Incision / Disimpaction

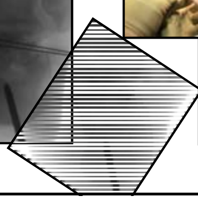


- Incision – Dorsal to the peroneals
- Keep the peroneals in their sheath
- Compress Lateral wall
- Make path for the plate
- Disimpact the joint

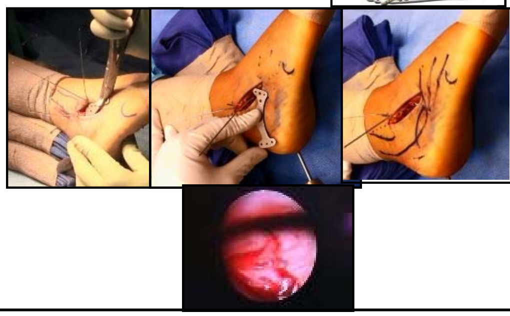
## Step 3 -Reduction and stabilization of posterior facet

- Lag –(2.0 to 3.0mm screws)
  - Aim towards sustentaculum
- Scope and fluro

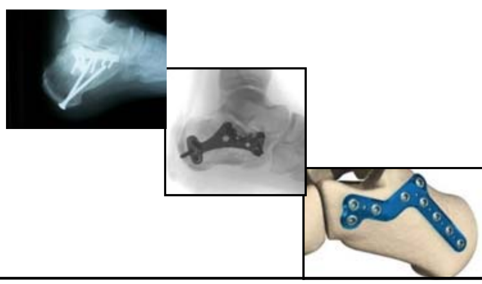




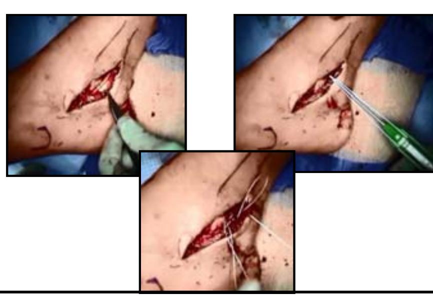
Step 4 - Plate Placement



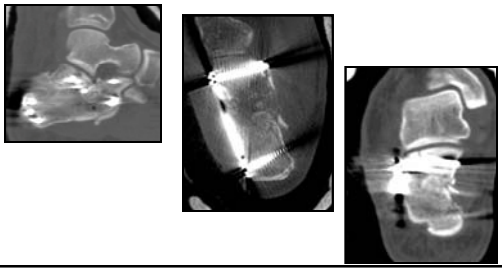
Fixation Options



Unstable Peroneal Tendons



## Get postop CT to learn and get better!!!

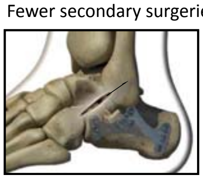


## Post-op Protocol

- Start Motion – 14 days
- Start 25% WB at 6 weeks and increase as healing progresses

## The Sinus Tarsi Approach Works

- Adequate reduction
- Good functional outcomes
  - Some studies – higher satisfaction
- Fewer wound issues / infections
- Fewer secondary surgeries



- Kikuchi C, et. Al. FAI 2013
- Nosewicz T., et. Al. FAI 2012
- Schepers T. Int Orthop, 2011
  - 8 case series - 271 calcaneal fractures
- Kline AJ, et. Al. FAI 2013
- Femino JE, et. Al. IOJ 2010
  - Extended sinus tarsi approach with plate
  - Do not dissect deep to SPR

## Complications

- Delayed wound healing
- Infection
- Sural nerve injury
- Peroneal tendonitis
- Painful hardware

## Direct Comparison Studies

- Fewer Wound complications / Infections
  - Yeo JH, et. Al. BMC Musculoskelet Disord. 2015
  - Kwon JY, et al. FAI 2015 (odds ratio 5.3)
- Some studies show better functional outcomes
  - Kline AJ, et. Al. FAI 2013
  - Chen L., et. Al. FAI 2011

## Sinus Tarsi Approach

**Pearls**

- Medial External fixator first
- Extend incision 1 cm up on fibula
- Dry arthroscope
- Lag screws – smaller, parallel to joint
- Plate – anterior to posterior

**Pitfalls**

- Fix later than 14 days
- Attempt for complex fractures
- Rough with the soft tissues
- Sural nerve injury

## Summary

- Both extensile and “percutaneous” approaches work well
- Fewer infections and wound healing complications with the sinus tarsi approach
- Excellent for Sanders 2 and 4 part fractures
- Sanders 3 fractures may be easier to fix with the extensile lateral approach

Thank You