

# Intramedullary Rodding of Distal Tibial Shaft Fractures with Intra-Articular Extension

My Name is Claude Sagi  
CSOT Tampa, FL 2018

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## Disclosures:

- None, I am just a simple man.

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This talk is about treating these fractures



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How big of a problem is this really?

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**JOT JOURNAL OF ORTHOPAEDIC TRAUMA**

**Predictive Radiographic Markers for Concomitant Ipsilateral Ankle Injuries in Tibial Shaft Fractures**

Volume 28, Number 2, February 2014

Patrick C. Schottel, MD,\* Marshall B. Berkes, MD,\* Milton T. M. Little, MD,\* Lionel E. Lazaro, MD,\* Joseph T. Nguyen, MPH,\* David L. Helfet, MD,\*† and Dean G. Lorch, MD\*†

- 79 patients with IM Rod of ANY tibia shaft fracture
- X- Rays and CT scan in all patients = 49% incidence of jt extension.
- Predictive Factors for Intra-articular Extension (88% incidence):
  - DISTAL THIRD location
  - SPIRAL fracture pattern
- NEITHER fibular fracture pattern nor location was predictive.

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- 79 patients
- X-Ray
- Predictive markers:
  - DISTAL TIBIAL ANGLE
  - SPIRALITY
- NEITHER

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**JOT JOURNAL OF ORTHOPAEDIC TRAUMA**

### The Incidence of Posterior Malleolar Involvement in Distal Spiral Tibia Fractures: Is it Higher than We Think?

Volume 32, Number 11, November 2018  
 Garrett L. Sobol, MD, M. Kareem Shuaib, MD, Mark C. Reilly, MD, Mark R. Adams, MD, and Michael S. Sirkin, MD

- 193 DISTAL THIRD TIBIA SHAFT fractures
- X-ray and CT scan evaluation.
- Incidence of Intra-articular fracture:
  - SPIRAL FRACTURE pattern (n=25) = 92%
    - (50% not visible on plain films)
  - Non-Spiral fracture pattern (n=168) = 4%

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ARCHIVES OF  
Orthopaedic and Trauma Surgery

**Ankle injuries in distal tibial spiral shaft fractures: results from an institutional change in imaging protocol**

December 2014, Volume 134, Issue 12, pp 1661-1666  
Stephen J. Warner, Patrick C. Schottel, Matthew R. Garner, David L. Helfet, Dean G. Lorch

- 25 pts with Spiral Distal 1/3 tibial fractures
- AP/lateral X-ray, CT Scan & MRI of ipsilateral ankle
- By CT - 56% found to have injury to ankle
- Negative CT = MRI - 64% with injury to ankle
- Total with ankle injury = **84%!**

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**Presence of ipsilateral ANKLE INJURY is the RULE with SPIRAL DISTAL SHAFT fractures**

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JOT JOURNAL OF ORTHOPAEDIC TRAUMA

**Radiographic Investigation of the Distal Extension of Fractures Into the Articular Surface of the Tibia (The RIDEFAST Study)**

Lucas S. Marchand, MD,\* Ajinkya A. Rane, MD,\* Zachary M. Working, MD,\* Lance G. Jacobson, MD,\* Erik N. Kubiak, MD,† Thomas F. Higgins, MD,\* and David L. Rothberg, MD\*

- 26% of fractures with extension to articular surface (**only 38% of those were identified with X-ray**)
- Predictors of extension into joint:
  - Spiral Pattern
  - Ratio of fracture length and distance to plafond > 0.255




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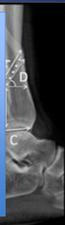
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In other words,  
**LONG SPIRAL FRACTURE  
 CLOSE TO THE JOINT**




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- 26% of fractures with extension to articular surface (**only 38% of those were identified with X-ray**)
- Predictors of extension into joint:
  - Spiral Distal 1/3 close to joint
  - Fibular fracture and location NO correlation with involvement of the articular surface.




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In other words,  
**The fibular fracture does  
 NOT predict intra-articular involvement.**




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How should we best go about treating it?

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**JOT** JOURNAL OF ORTHOPAEDIC TRAUMA  
 Posterior Malleolar Fractures Associated With Tibial Shaft Fractures and Sequence of Fixation  
 Volume 30, Number 10, October 2016  
 Harish Kempegowda, MD,\* Hemil H. Mantar, MD,\* Raveesh Richard, MD,\* Akhil Tawari, MD,\* Graham Jove, PhD,† Michael Suk, MD, JD, MPH, FACS,\* Michael J. Beebe, MD,‡ Chris Han, MD,§ Paul Tornetta III, MD,§ Erik N. Kubiak, MD,§ and Daniel S. Horwitz, MD\*

- 1113 Tibial fractures treated with IM Rod at 3 Level 1 centers
- Incidence of ipsilateral Posterior Malleolus fracture = 9%
- MALLEOLUS ORIF FIRST = 2% mal-reduction at articular surface.
- IM ROD TIBIA FIRST = 44% mal-reduction at articular surface.

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**ORIF Malleolus PRIOR to IM rod of Tibia to prevent mal-reduction at the articular surface**

- 1113
- Incid
- MAL
- IM R

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As an EXAMPLE...

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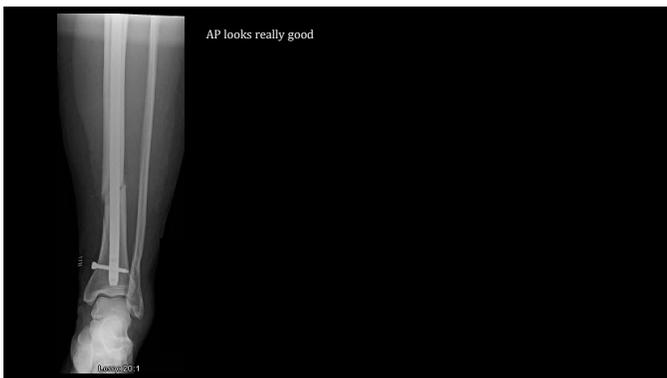
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Let's look at the lateral of the ankle a little more closely...



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Let's look at the lateral of the ankle a little more closely...



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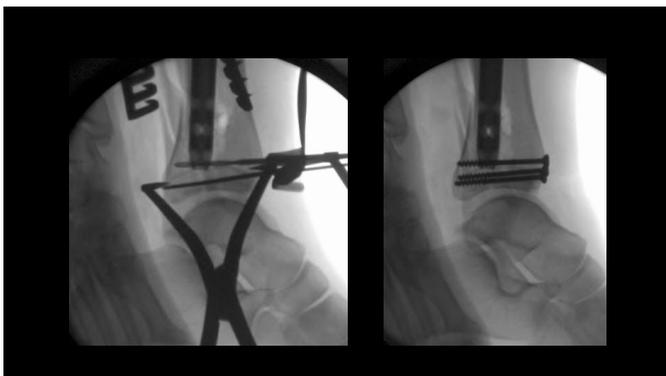
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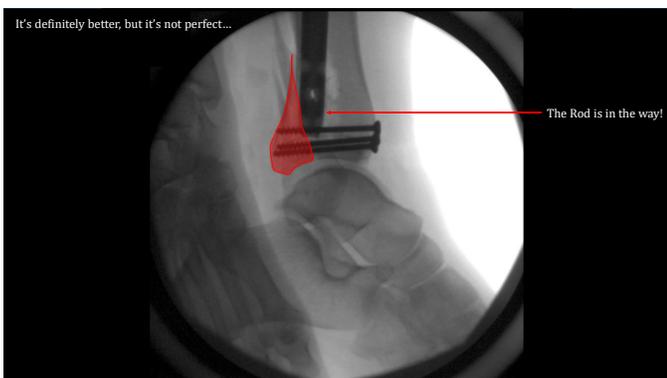
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**JOT** JOURNAL OF ORTHOPAEDIC TRAUMA  
 Does Fibular Plating Improve Alignment After Intramedullary Nailing of Distal Metaphyseal Tibia Fractures?  
 Volume 20, Number 2, February 2006  
 Kenneth A. Egol, MD,\* Russell Weisz, MD,† Rudi Hiebert, ScM,\* Nirmal C. Tejwani, MD,\*  
 Kenneth J. Koval, MD,‡ and Roy W. Sanders, MD†

- Retrospective review of 72 patients with distal 1/3 tibia shaft fracture treated with IMR +/- fibular ORIF.
- 75% of mal-reductions occurred in group **without** fibular fixation.
- Loss of reduction during healing occurred in:
  - 4% with fibular ORIF
  - 13% without fibular ORIF




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 Kenneth J. Koval, MD,‡ and Roy W. Sanders, MD†

**Conclusions:** In this study, the proportion of fractures that lost alignment was smaller among those receiving stabilization of the fibula in conjunction with IM nailing compared with those receiving IM nailing alone. **Adjunctive fibular stabilization was associated significantly with the ability to maintain fracture reduction beyond 12 weeks.** At the present time, the authors recommend fibular plating whenever IM nailing is contemplated in the unstable distal tibia-fibular fracture.




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**JOT** JOURNAL OF ORTHOPAEDIC TRAUMA  
 Alignment After Intramedullary Nailing of Distal Tibia Fractures Without Fibula Fixation  
 Volume 30, Number 10, October 2016  
 Anthony F. De Giacomo, MD and Paul Tornetta III, MD

- Retrospective Review
- 137 patients with distal 1/3 tibia shaft fracture with IM Rod
- None with Fibular fixation
- 3% mal-reduction and mal-union
- **AND**, 2 standard M-L locking screws are adequate!




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**But, this series did NOT include fractures with intra-articular or Posterior Malleolus extension**

- Retrospective
- 137 patients
- None with intra-articular extension
- 3% malunion
- AND, 2 screws




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So, if by some stroke of madness, you think you might want to ROD this fracture...



**B**  
X-Table

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- 1) Consider fixing the Fibula to help with:
  - Length
  - Positioning of the posterior malleolar
  - Stability of the construct
- 2) Fix the joint first to prevent mal-reduction after IM rodding.




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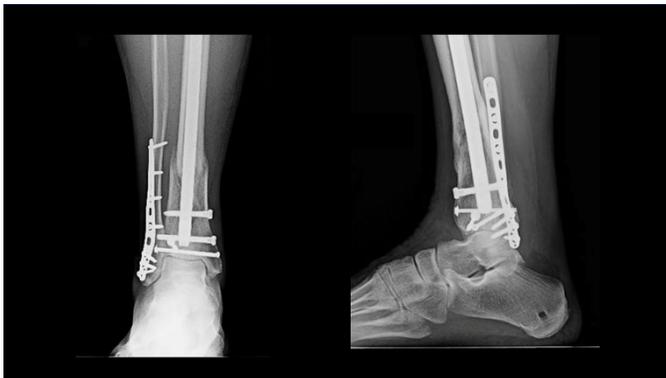
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**In Conclusion:**

There is a very high incidence of intra-articular extension or involvement of the posterior malleolus with SPIRAL fractures of the DISTAL THIRD of the tibia that approaches 100% in many studies.

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**In Conclusion:**

If you are treating a SPIRAL DISTAL THIRD tibial fracture, a CT SCAN is recommended in ALL cases to rule out intra-articular extension.

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**In Conclusion:**

Reduction and Stabilization of the ARTICULAR component FIRST, PRIOR to intramedullary rodding of the shaft component appears to result in a LOWER mal-reduction and mal-union rate (of the joint).

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**In Conclusion:**

While ORIF of the fibular fracture may not be required for all distal third tibial fractures, it does in help with rotational control of the distal segment and should be considered when intra-articular involvement is present.

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Thank you very much for listening to me.

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