

FEEDBACK TO THE FIELD (FT2F) #3:

*Placement of Tibial Intraosseous Intravenous (IO-IV) Devices **

AFMES: COL (Ret) H.T. Harcke, MC, USA**
Lt Col E. L. Mazuchowski, USAF, MC

* RE-ISSUE: Original Released AFIP/OAFME Feb 2010

** American Registry of Pathology in support of AFMES

DISCLAIMER

The opinions or assertions presented hereafter are the private views of the authors and should not be construed as official or as reflecting the views of the Department of Defense, its branches, or the Armed Forces Medical Examiner System.

Original Release

FEEDBACK TO THE FIELD:

Placement of Tibial Intraosseous Intravenous
(IO-IV) Devices

H T Harcke, COL, MC, USA

Chief, Forensic Radiology

Armed Forces Institute of Pathology

Edward Mazuchowski, Maj, MC, USAF

Deputy Medical Examiner

Office of the Armed Forces Medical Examiner

OVERVIEW:

- Intraosseous Intravenous (IO-IV) Devices are being used for emergency treatment in the Combat Zone
- Preferred sites are the sternum and proximal tibia.
- We have observed placement of these devices when performing the Computed Tomographic Imaging that precedes each autopsy at the Dover AFB Mortuary.

OVERVIEW:

- Over 90% of tibial IO-IV's appear properly placed (our unpublished data) but we have observed two situations where the device is ineffective.

- (1) The IO-IV is not in the tibia.

- (2) The device is in the cortex of the tibia and not the medullary cavity, in this case fluid will not flow into the venous plexus.

OVERVIEW:

- In this communication we present images from two cases where tibial IO-IV devices were not in correct position at time of autopsy.

NOTE:

- This presentation makes no association between IO-IV position and outcome of treatment.
- We have no knowledge of the echelon of care, facility and individual(s) involved in device placement.

Tibial Interosseous IV's

Standard placement is in the medial aspect of the proximal tibia



Tibial Interosseous IV's

A radiograph shows presence and general position/direction but not precise tip location



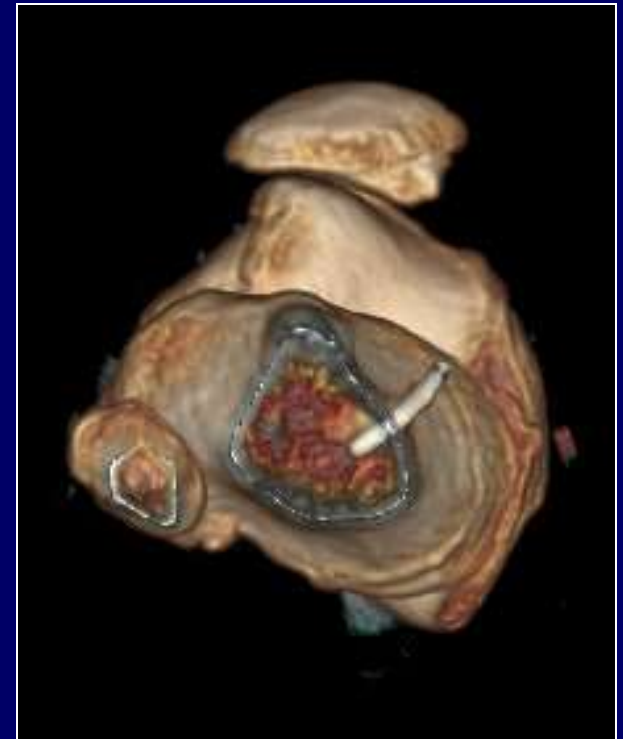
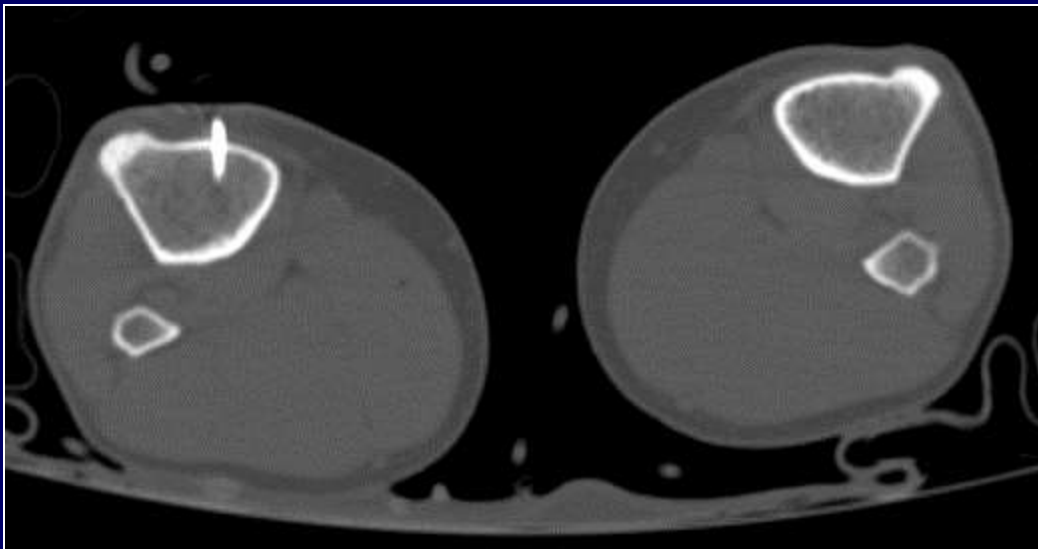
Tibial Interosseous IV's

Computed tomography (CT) shows precise location of the needle tip.



Tibial Interosseous IV's

When the needle tip is positioned in the medullary cavity of the tibia there is prompt entry of infused fluid in to the venous system.



Tibial Interosseous IV's

Contrast injection through a tibial IO-IV.



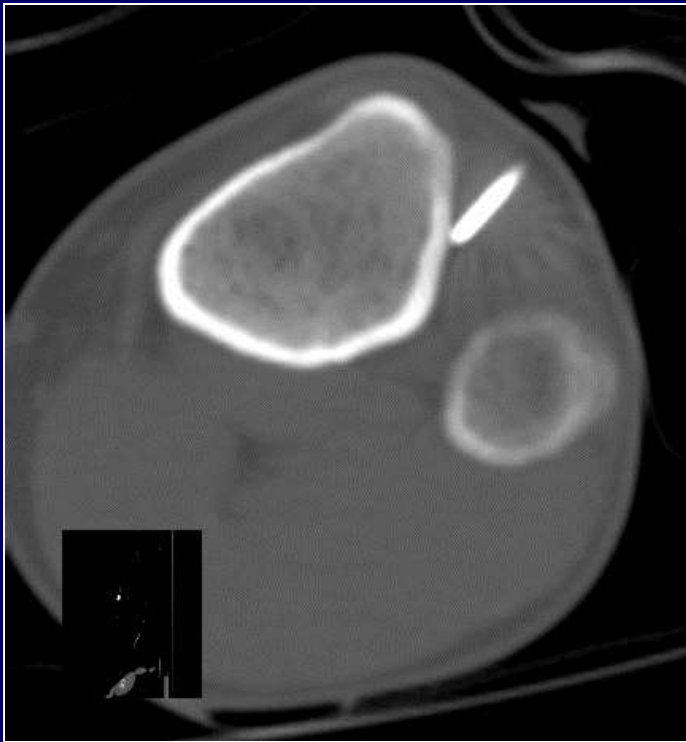
Immediate diffusion within the marrow cavity.



Rapid drainage into the popliteal vein (arrow).

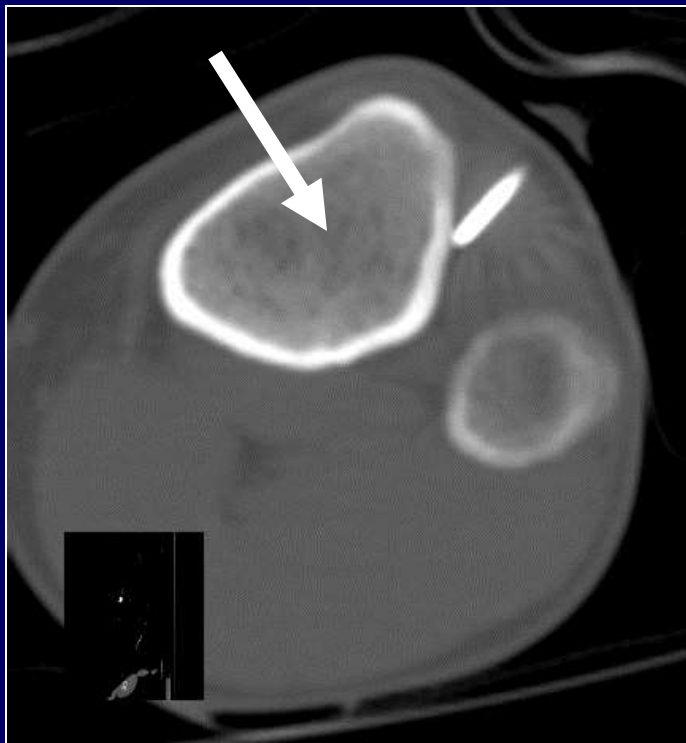
Case 1: Tibial IO-IV not in bone.

The insertion approach was from the lateral aspect where the bone surface is curved instead of the medial aspect where the bone surface is flat.



Case 1: Tibial IO-IV not in bone.

A lateral insertion must penetrate more tissue and is less likely to achieve a perpendicular approach to the bone.



The medial flat surface enables a perpendicular approach better able to penetrate the cortex (arrow).

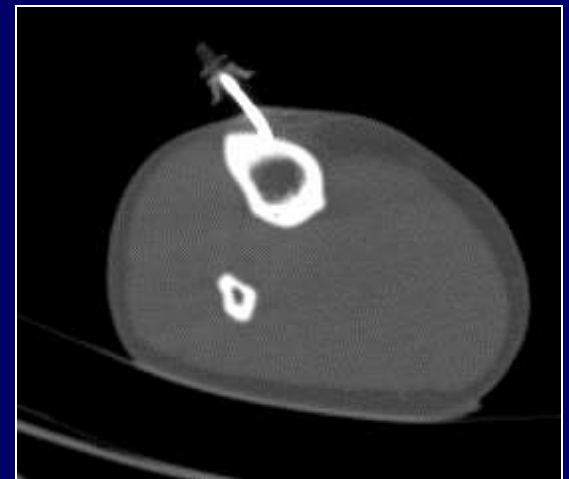
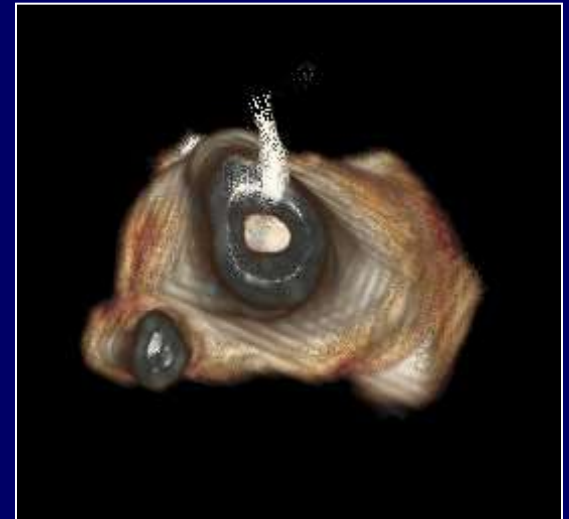
Case 2: Tibial IO-IV's in bone cortex.

The insertion approach was from the medial aspect but below the flat area and the needles are in the thick cortex of the anterior tibia.



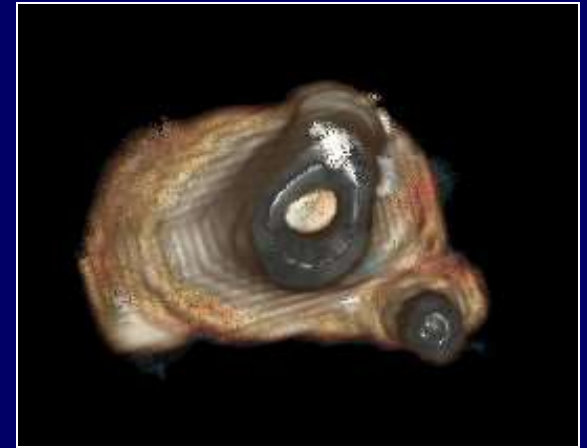
Case 2: Tibial IO-IV's in bone cortex.

The insertion on the right tibia was from the medial aspect but below the broad, flat area of the bone. The needle enters the thick anterior cortex.



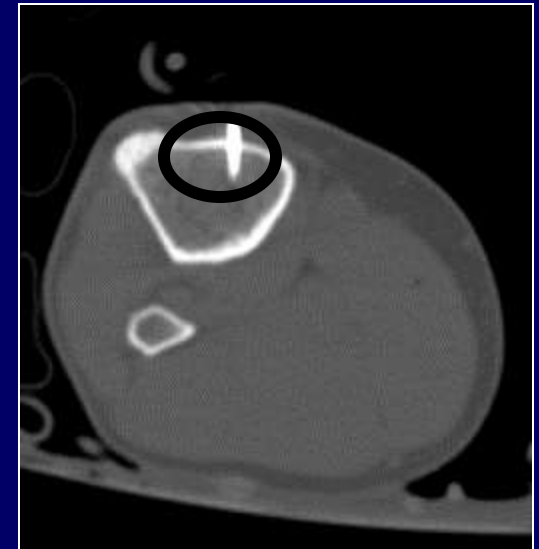
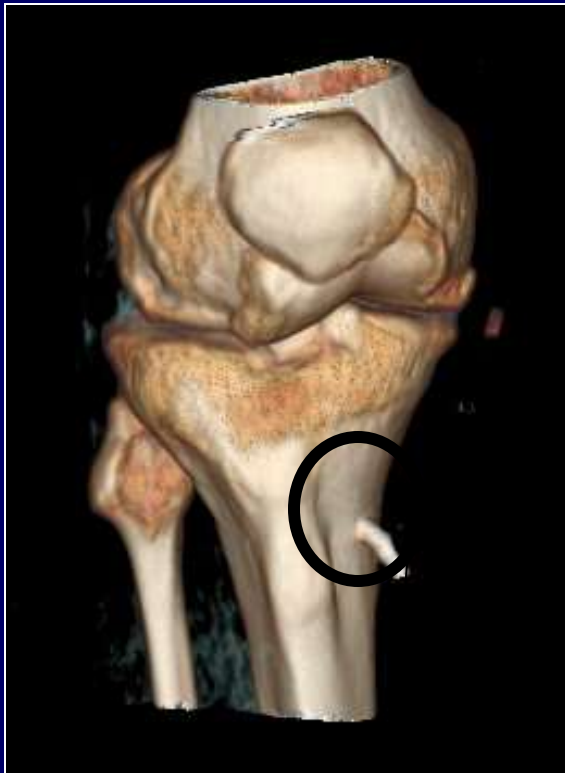
Case 2: Tibial IO-IV's in bone cortex.

The left tibia insertion while from the medial aspect is below the flat area and the needle is in the thick anterior cortex.



Tibial IO-IV's

We have observed the most successful insertions to be high (but below the tibial plateau), medial and perpendicular to the flat surface.



Caution:

This presentation makes no association between IO-IV position and outcome of treatment. The clinical circumstances and specific details surrounding the delivery of emergency treatment in these cases is unknown.

This material is intended for educational and training purposes. If portions are extracted, the following statement must be included:

“Source: Armed Forces Medical Examiner System”

NOTES of CAUTION:

- The clinical circumstances and details surrounding emergency treatment in these cases is unknown
- This presentation makes no association between device placement and outcome of treatment
- This case series is drawn from cases with fatal injuries, which may skew data

For FT2F Comments / Questions / Requests:
Contact the Armed Forces Medical
Examiner System (AFMES)

Contact Information:

Lt Col Edward L Mazuchowski, USAF, MC
Office of the Armed Forces Medical Examiner

edward.l.mazuchowski.mil@mail.mil
(302) 346-8648