Does the intra-osseous needle have a role in trauma?

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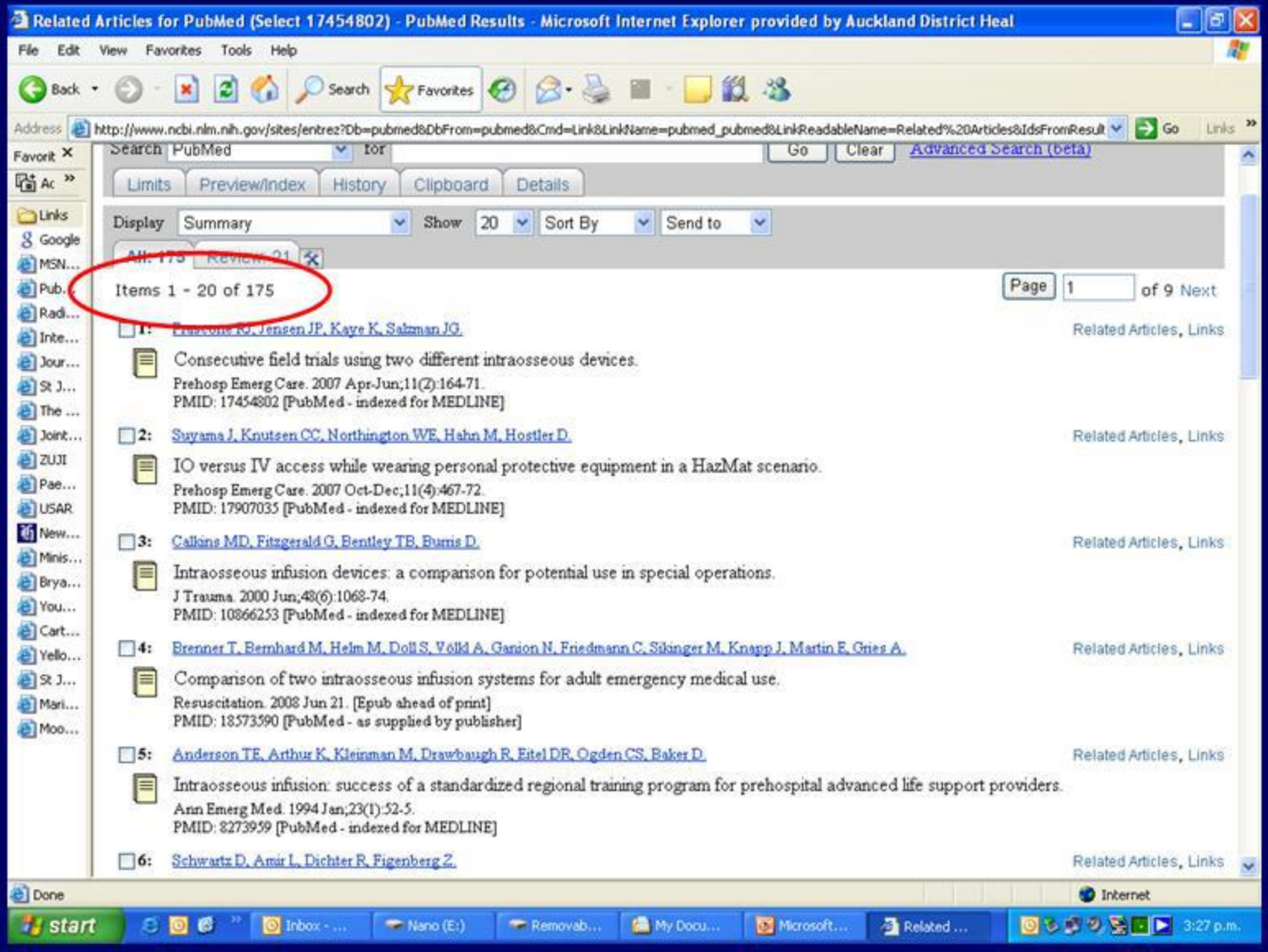
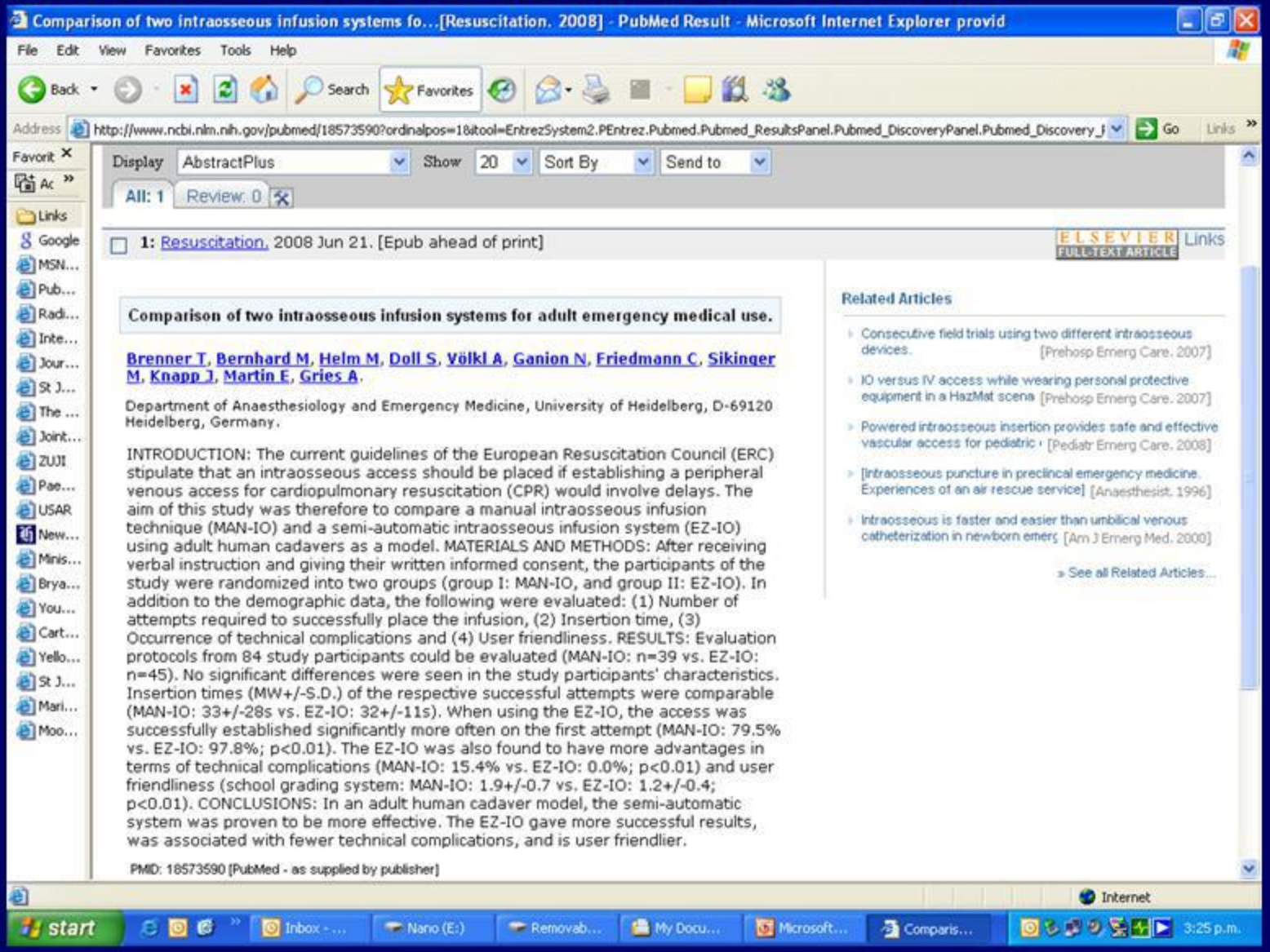
Resurgence recently



The literature



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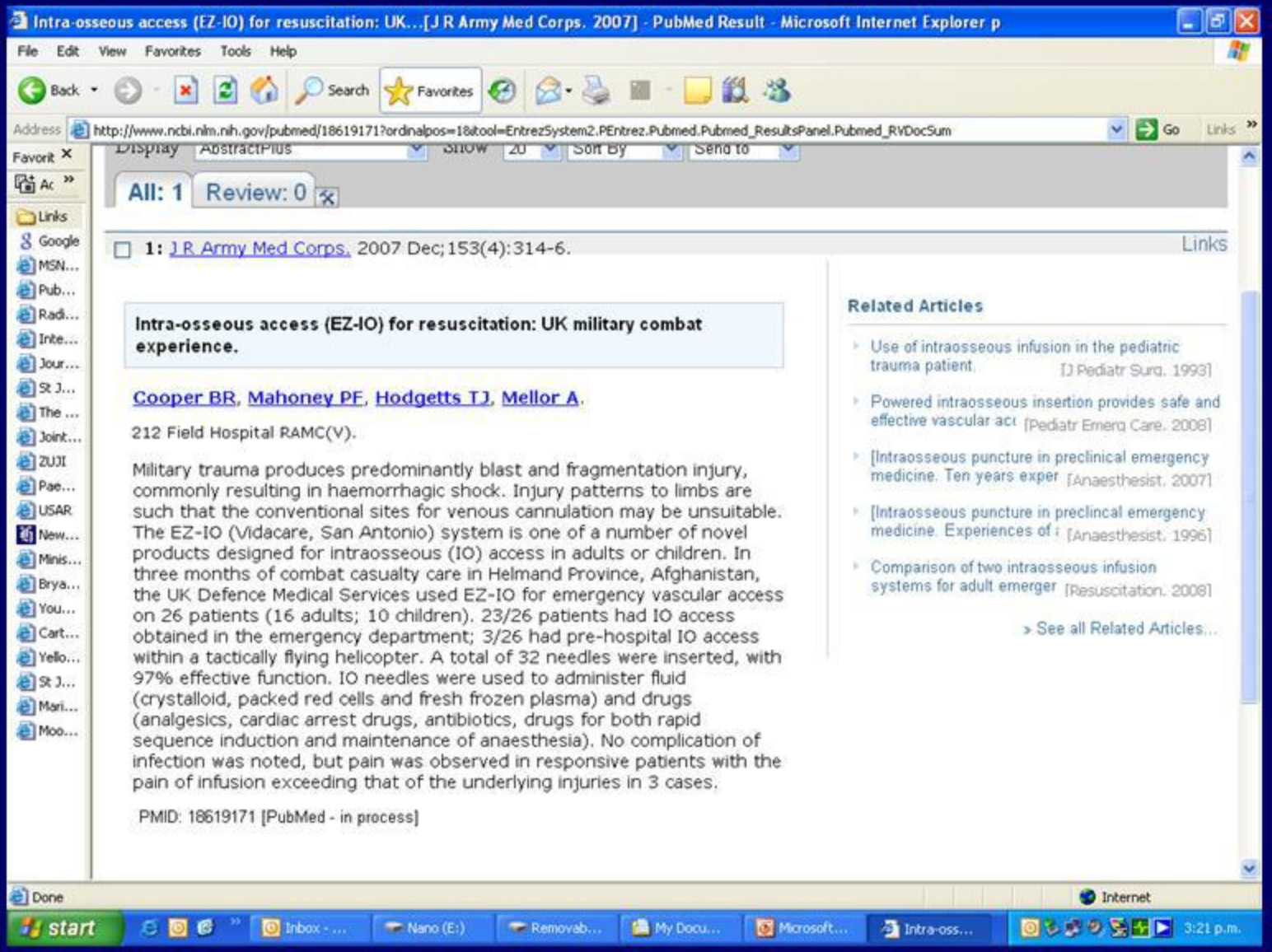


A summary of the literature

- Not a systematic review
- Dominated by pre-hospital use
- Use in adults is increasing
  - Particularly in military setting
- Some randomised trials
  - Comparing ease of placement of one type vs another
  - In general powered devices appear easier and quicker
  - Differences are statistically significant but not always clinically significant
- No meaningful outcome data

ION in St John

- We used a manual screw in ION for many years
- Only used in children, tibial site only
  - Required child to be fairly moribund
  - Used relatively infrequently
  - Took time and force to place
  - Approximate 20% failure rate
  - Tendency to be easy to dislodge

ION in St John

- Moved away from the manual screw in device to a spring loaded device (bone injection gun or BIG)
  - Easier and quicker to insert, more stable in the bone
  - Able to be placed in ‘less moribund’ patients
  - We carried the paediatric size only
  - All or nothing (unable to be altered)
  - A much higher failure rate than expected
  - We decided to move back to the manual

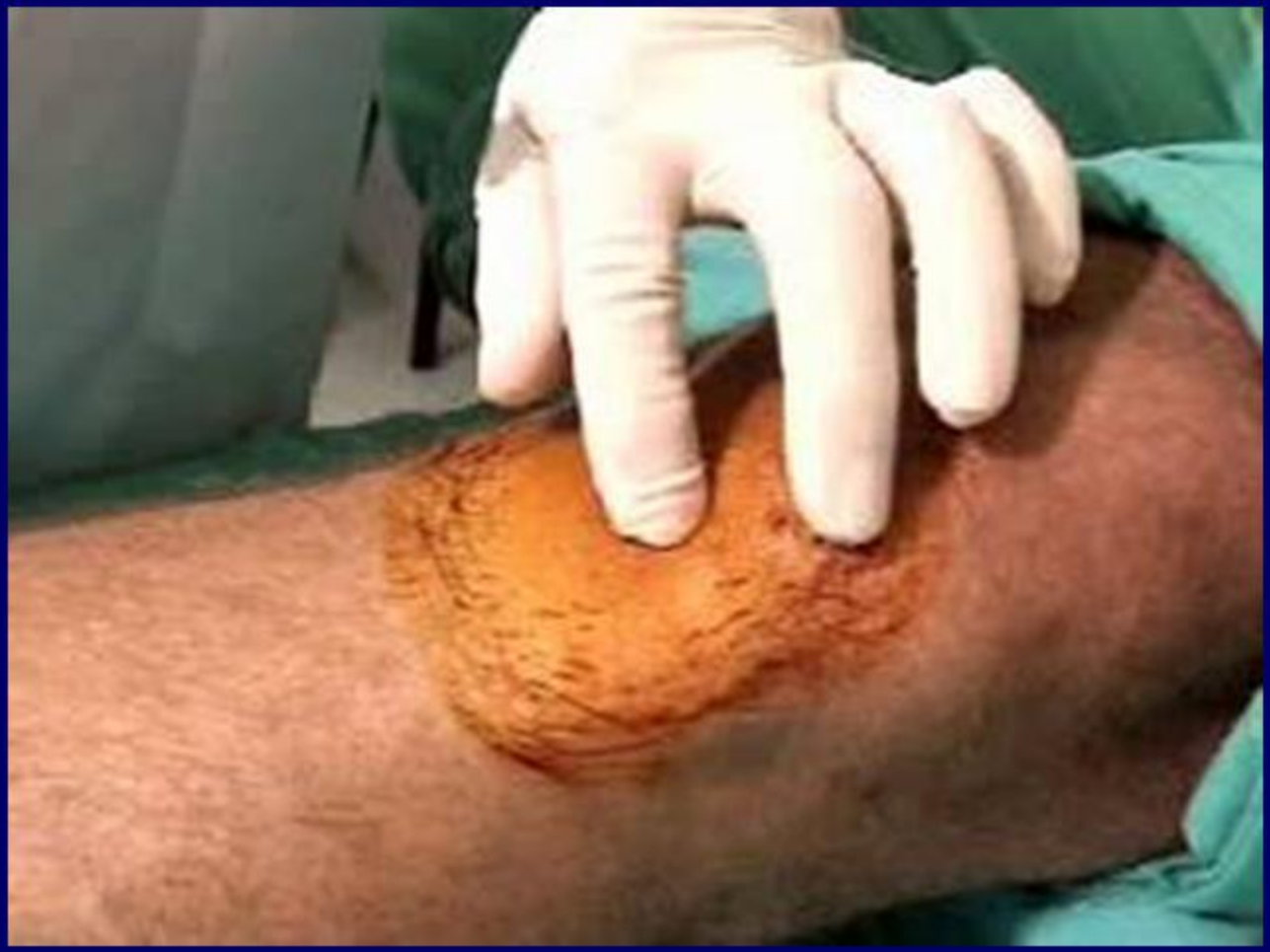
ION in St John

- We have also looked at the FAST ION
  - Sternal access only
  - Adults only
  - All or nothing
  - Originally required a separate device for removal
- We decided against introducing it

ION in St John

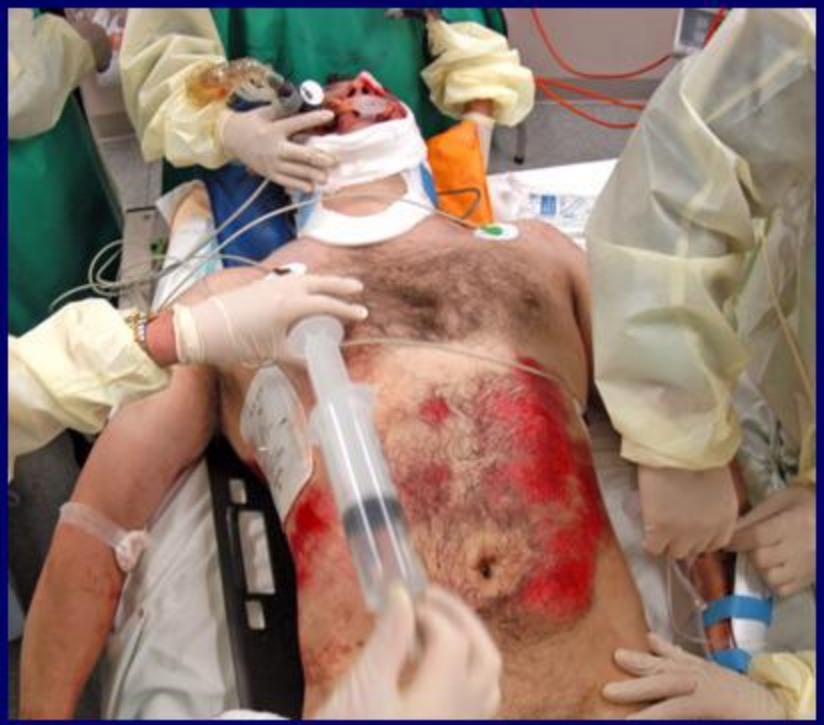
- We then evaluated drill powered devices
  - Relatively expensive
  - Very quick, easy, relatively painless
  - Adults and children
  - Multiple sites
  - Can be altered (not all or nothing)
- We have chosen to introduce the the EZ IO

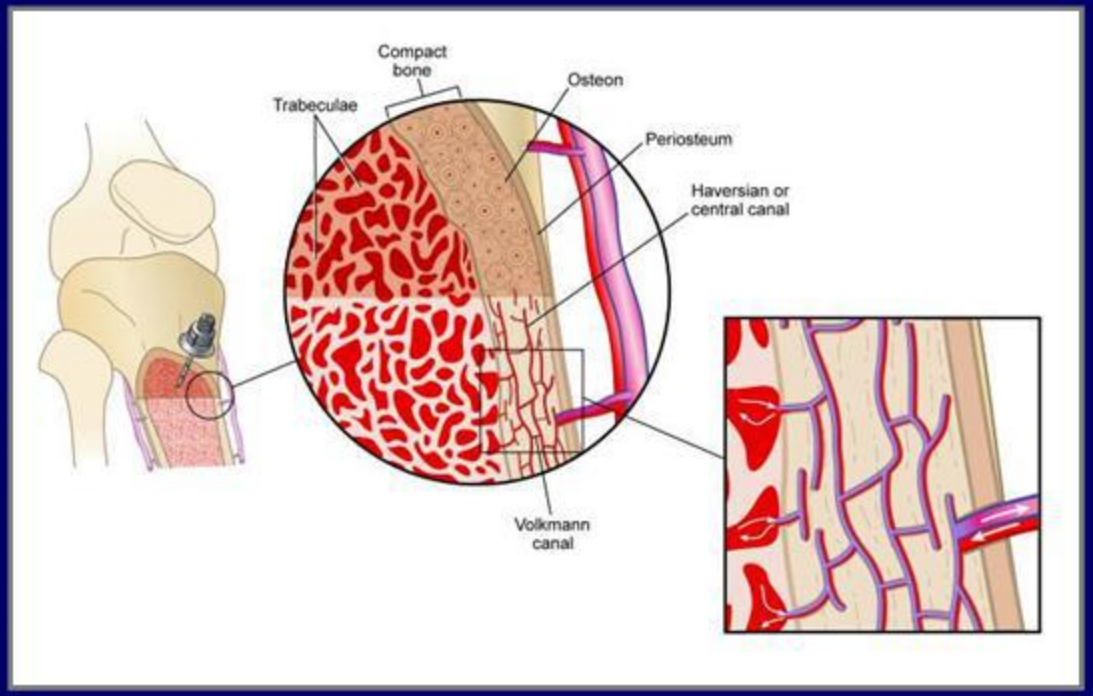
Insertion



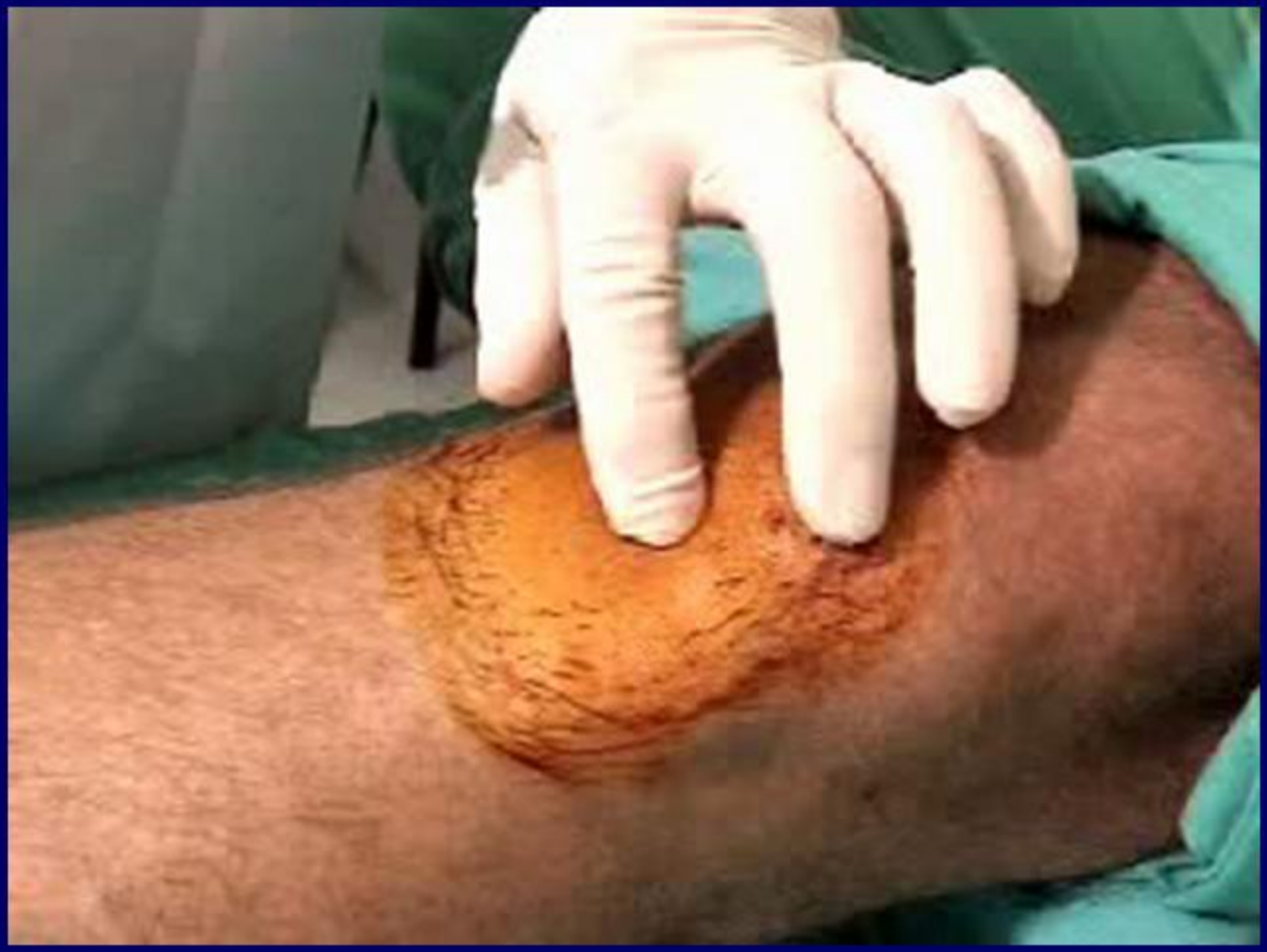
Intra-osseous needle and trauma

- Gaining vascular access can be difficult in trauma
- Bone marrow is highly vascular
  - Fluids and medicines injected into marrow are rapidly absorbed
- Intra-osseous access just another form of vascular access

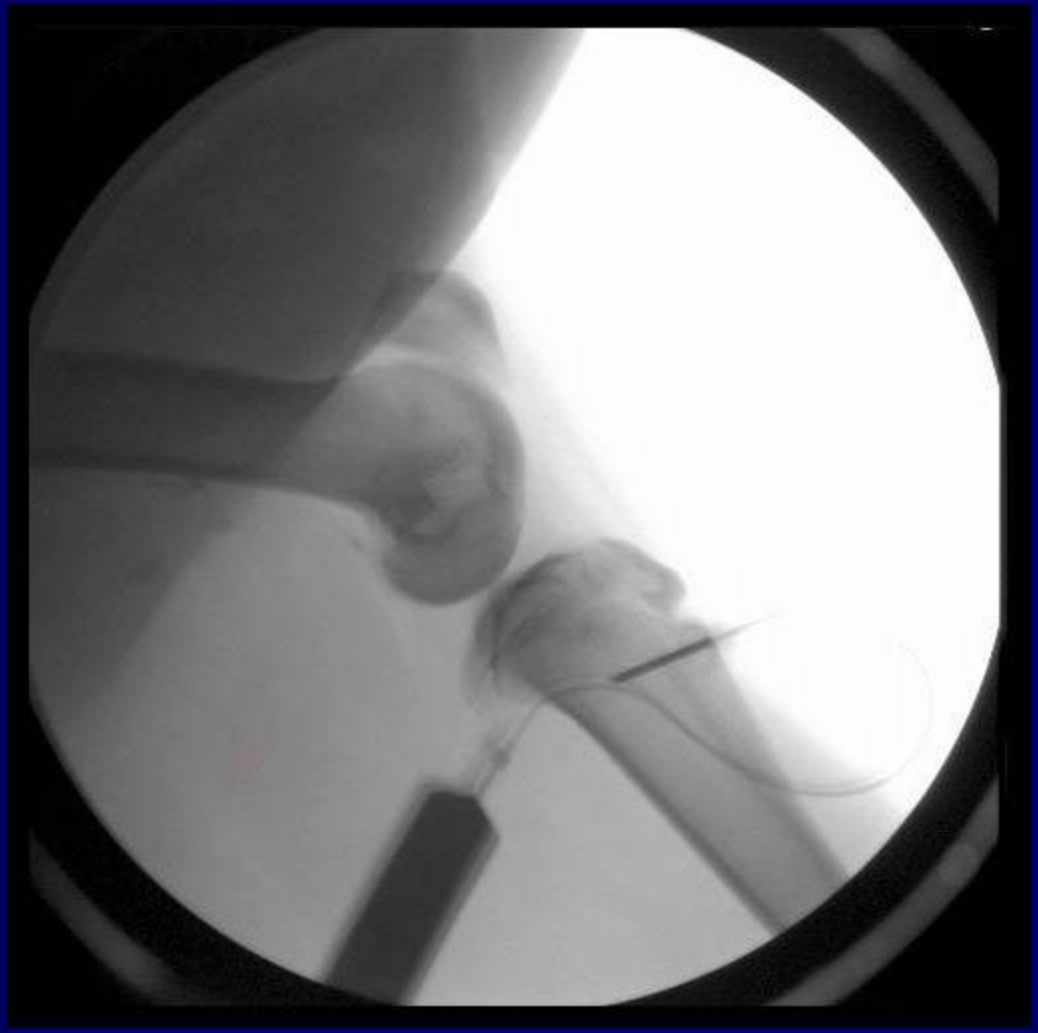




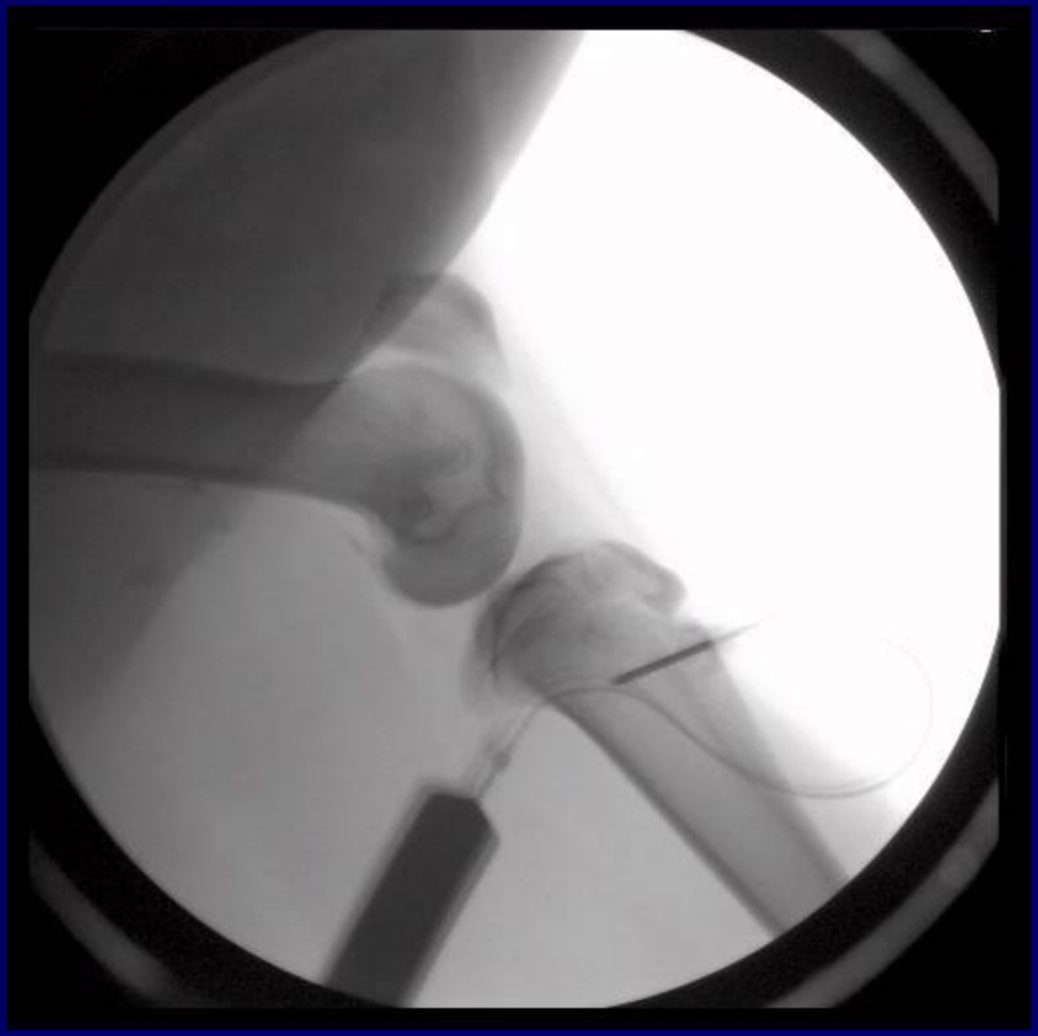
Insertion



Absorption

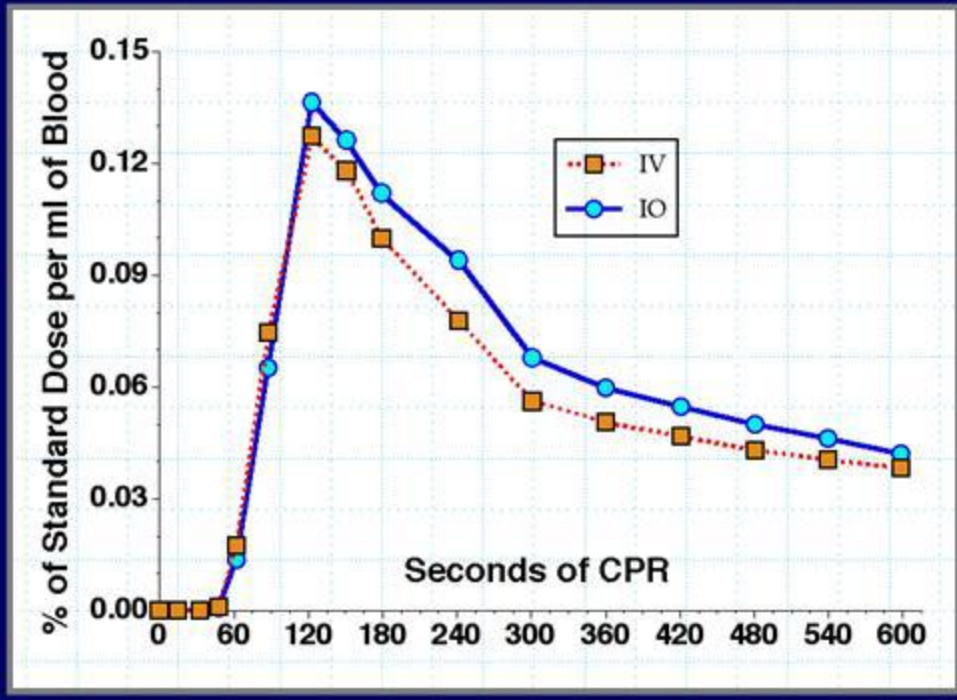


Absorption



How good are they really?

- Medicines are quickly absorbed
- Fluids require pressure
  - 1 litre crystalloid in 10-15 minutes
  - 1 bag blood in 15-20 minutes
  - This will be very sore if the patient is awake



But do they have a role in trauma ?

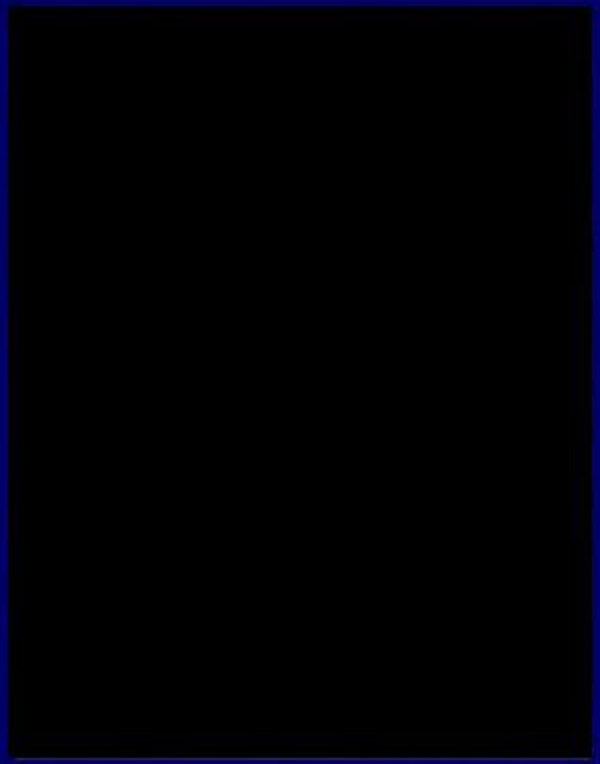
- Will not replace large bore veinous access
- Bridge to large bore veinous access when this cannot be achieved
  - Can be a quick and easy access port for medicines
- Case example
  - RTC, Truck vs van, van driver trapped
  - A and B OK, tachycardic and constricted, GCS 9 (M5), agitated
  - Trapped by legs, multiple compound limb fractures
  - Several attempts at IV access in one available limb
  - ION placed in humerus
  - RSI using ketamine, midazolam and suxamethonium
  - Fluid via ION during extrication
  - Large bore access gained via EJV once extricated

Summary

- The newer ION mean that IO access can be gained in both adults and children
  - Quickly and easily
  - In patients who are not moribund
  - In multiple potential sites
  - Ability to administer medicines and fluids
- Not a panacea
  - Another option for vascular access
- Will not replace large bore veinous access
  - They may be a bridge to it

Intra-osseous needle (ION) and trauma

- Discuss the history of ION
- Briefly summarise the literature
- Discuss the evolution of ION within our own service
- Discuss why we are moving to a powered drill device
- Discuss the potential role of the ION in trauma
- Present a case
- Questions and discussion



History

- ION have long been used as an alternative to veinous access
- Common in the 1930s and 1940s
- Originally in both adults and children
- Became less common in adults over time
- Resurgence recently