Paediatric Intraosseous Needle and Infusion

Introduction
- Establish rapid venous access in an emergency situation when peripheral venous access is impossible
- Children 6 years or below
- The bone marrow cavity has an extensive non-collapsible vascular network communicating with the systemic circulation.
- All the standard IV drugs and fluids can be administrated via the I.O. route
- Bone marrow aspirated can be use for type and screen and other blood test

Site
- Proximal Tibia (The preferred site)
- Distal Tibia
- Other sites: Distal femur, humerus and sternum can be used in adult (Different I.O. Set)

Equipment
- Sterile gloves and gown
- Antiseptic solution to prepare the skin
- I.O. needle set
- 5ml syringe with NS flush
- I.V. line set
- Dressing, tape and splint
Procedure
1. Preparation of the site
   - Universal precaution
   - Supine position
   - Immobilize the extremity
   - Identify the puncture site: Anteromedial surface of proximal tibia, 1-3cm below the tibial tuberosity
   - Prepare the site with antiseptic and drape the area
   - Consider use of local anaesthetic if time allows
2. Insertion of needle
   - Needle handle is held in the palm of the hand while the thumb and forefinger grip the shaft about 1cm from the point
   - Firm pressure is applied while using a controlled screwing action until the bone cortex is transversed (approx 1cm or less below the skin)
   - Needle should be directed caudal away from the upper tibial epiphysys
   - Loss of resistance on entry into bone marrow
   - Remove the stylet
   - Attempt bone marrow aspiration
   - Flush the needle with 5-10ml of NS
   - Attach IV tubing for fluids and drugs administration
3. Points should be noted
   - Distinctive pop or loss of resistance is felt
   - Needle stands without support
   - Bone marrow is easily aspirated and fluid can be flushed without subcutaneous swelling

![Diagram of Proximal Tibia](image)
Complications
- Extravasation of fluids and drugs into skin or periosteum
- Blockage of needle if no inner stylet is used
- Cellulitis, skin necrosis and osteomyelitis
- Through and through puncture if advanced too far
- Tibial fracture
- Fat, bone marrow or air emboli
- Compartment syndrome

Contra-indications
Absolute
- Osteogenesis imperfect
- Osteopetrosis
Relative
- Traumatized limb or fracture
- Infection

Further information
1. Insertion of Cook intraosseous needle
   www.cookgroup.com
2. I.O. Needle insertion video on Youtube
   http://www.youtube.com/watch?v=JVbPANbgQM&feature=related