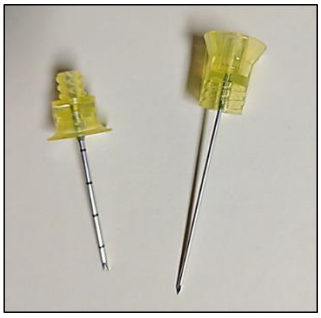
Intraosseous Catheterization - EZ-IO

Updated November 2016

The EZ-IO® Power Driver is an intraosseous vascular access gun. It is battery-operated and operates only on the manufacturer charge. The battery cannot be replaced or recharged. This is a human product marketed by Arrow®EZ-IO® for Teleflex Medical.

What is in the case?

The yellow storage case contains the EZ-IO® Power Driver and brief safety and use information from the manufacturer. The information from the manufacturer is for human use of the EZ-IO®. There is room in the storage case for the IO needles (ordered separately). The EZ-IO® sits in an attached trigger guard for storage.



What is in each training needle set?

Each training set contains the EZ-IO needle, the EZ-Connect extension set (with a priming volume of 1ml), an EZ-IO wristband, and a NeedleVise® 1-port (single use) sharps container. The training needles are available in 1.5cm, 2.5cm, and 3.5cm lengths. All are 15ga needles.

Training needle sets *ARE NOT STERILE*. If they are to be used in clinical patients, the set must be gas-sterilized.

Be sure to SAVE and clean the needle and stylet. The needle set can be re-sterilized and used again 2-3 times.

What are the indications for intraosseous catheterization?

Almost any medication or fluid that can be administered IV can also be administered IO, including blood products. It is not recommended to administer alkaline (sodium bicarbonate) or hypertonic solutions through an IO catheter. IO catheterization, with or without an EZ-IO power driver, may provide more rapid parenteral access than IV catheterization in certain patients. Patients with small peripheral vasculature, peripheral vasoconstriction (due to shock, cardiovascular collapse or cardiorespiratory arrest), polytrauma to the legs, or difficult IV access due to conformation (ex. chondrodystrophic dogs) may benefit from rapid IO access. An IO catheter can act as a bridge for emergent treatment while

simultaneously working on IV access. In most cases, an IO catheter is a short-term solution for parenteral access and should be removed once IV access can be obtained.

Where can an intraosseous catheter be inserted?

The most common sites are the greater tubercle of the humerus and the trochanteric fossa of the femur. In larger dogs, the flat medial surface of the proximal tibia, the tibial tuberosity, the wing of the ileum, and the ischium can also be used for IO access. See below for instructions regarding insertion in each site.

What are the risks and contraindications of IO catheterization?

An IO catheter should never be inserted into a broken bone. Additionally, an IO catheter should not be inserted through damaged or infected skin. The most common complications are dislodgment of the catheter and leakage of the infused fluid/medications into the surround tissues. Other potential complications include introduction of infection, bone fracture, nerve injury and compartment syndrome. Infusion of irritating, hypertonic, and alkaline solutions increase the risk of compartment syndrome.

Using the EZ-IO power driver

1. For all insertion sites, clip the skin of fur and sterilely prepare the skin, in the same manner as placing an IV catheter. Given that the EZ-IO is used most often in emergency situations, this should be completed rapidly and efficiently.
2. Choose the appropriately sized needle set and remove from the sterile packaging.
3. Attach the needle set to the driver – there is a strong magnet that holds the needle in place on the driver.
4. Grasp the power driver with your dominant hand. Locate the site of insertion and firmly push the needle through the skin until bone is reached. Holding the skin taut with the other hand, depress the trigger on the gun to drive the needle through the bone into the medullary cavity. Once the base of the needle is against the skin, release the trigger of the gun. Detach the gun from the needle base.
5. Remove the stylet by twisting the upper plastic portion off, revealing the lumen of the catheter.
6. A luer-lock syringe can be attached directly to the catheter, if desired. If using the EZ-attach extension set, prime the tubing with 1ml sterile saline before attaching to the catheter. Attach a luer-lock syringe to the extension set and apply negative pressure to the line. If no blood or bone marrow contents appear within the line, flush a small volume of saline to clear any potential bony plugs from the catheter. Then try re-aspirating. Once blood or bone marrow appears, correct placement is confirmed and the catheter can be used for injections.

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Humerus

An IO catheter can be placed into the flat portion of the greater tubercle of the humerus. In most patients, the needle is introduced on the craniolateral aspect of the greater tubercle, perpendicular to the long axis of the leg. The needle is angled just slightly caudally. In very small patients, it may be necessary to position the needle parallel to the long axis of the humerus, to prevent traversing the medullary cavity and penetrating the opposite cortex.

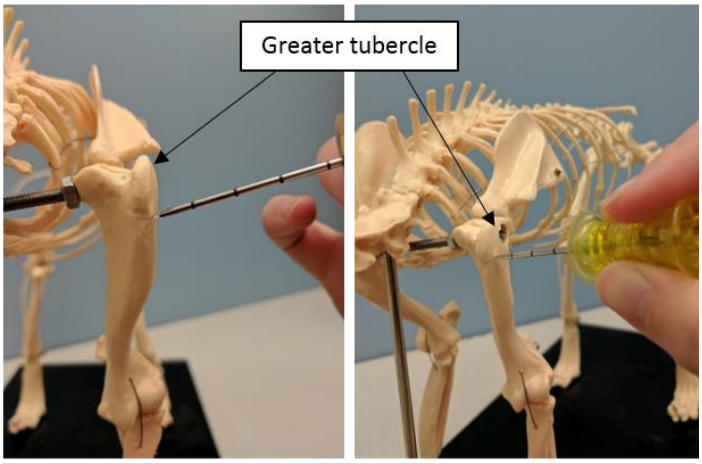
Proper placement in greater tubercle of the humerus

Proximal humeral IO insertion

- Position IO needle or gun perpendicular to the humerus, with needle pointed slightly caudally
- In very small patients, can angle needle along long-axis of humerus

Dogs <60# - 1.5cm, >60# - 2.5cm

Needle shown here is much too large for a patient this size (skeleton). Large size shown for illustration purposes



Insertion into greater tubercle of the humerus.
Needle alignment perpendicular to humerus in large patients.

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Femur

An IO catheter can be placed in the trochanteric fossa of the femur. After identification of the greater trochanter of the femur, the needle can be directed medial to the trochanter into the trochanteric fossa. This location works especially well for small dogs, cats, and pediatric patients. In larger, well-muscled patients, it may be difficult to properly palpate the greater trochanter. If there is a significant fat or muscle layer, a larger needle may be needed to reach the cortex.

Canine Cadaver Model

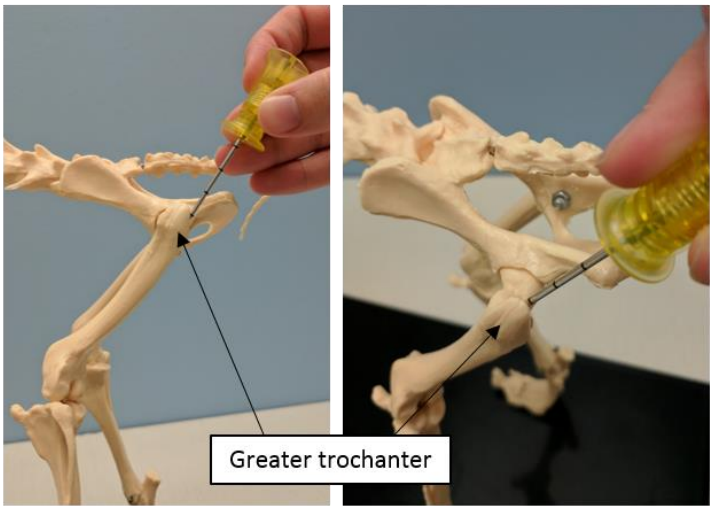
Proper placement in the trochanteric fossa of the femur

Femoral IO insertion

- Position IO needle or gun within the trochanteric fossa, just medial to the greater trochanter
- The needle should be directed parallel to the long axis of the femur

Dogs <40# - 1.5cm
40-80# - 2.5cm
>80# - 4.5cm

Needle shown here is much too large for a patient this size (skeleton). Large size shown for illustration purposes



Insertion into trochanteric fossa, medial to greater trochanter
Needle aligned with long axis of femur

