



## You need an IO system that performs like you do.

When time and performance are critical, trust the innovative BD™ Intraosseous Vascular Access System to provide intraosseous access with needlestick safety protection.



# Indications

The BD™ Intraosseous Vascular Access System provides intraosseous access in the proximal tibia, distal tibia and humeral head (proximal humerus) of adult and pediatric patients, and the distal femur in pediatric patients when intravenous access is difficult or impossible to obtain in emergent, urgent, or medically necessary cases for up to 24 hours.



# Advantages to IO placement

- Fast access
- Easy to stabilize device
- “Straight-shot” access
- Non-collapsible stable space
- Comparable infusion capacity to traditional lines
- Any fluid that can be safely infused through an IV can be infused via IO
- Historically, IO procedures have low complication rates
- Blood samples drawn through an IO can be used for labs



## Contraindications: When to avoid IO placement

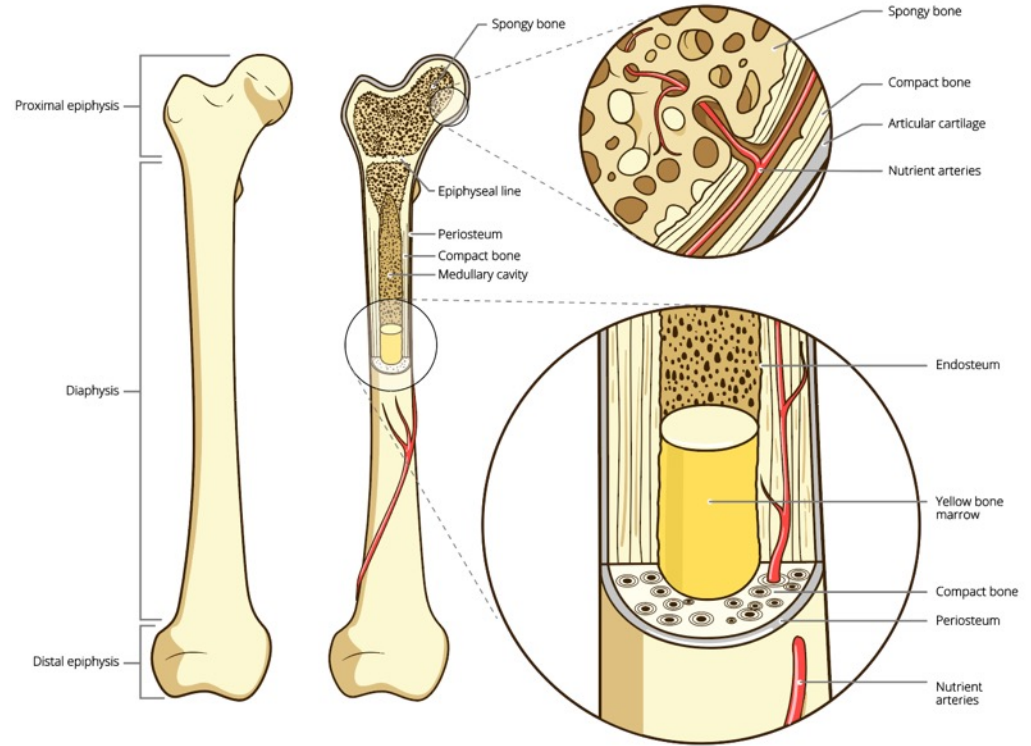
- Fracture in target bone
- Excessive tissue (*e.g., severe obesity*)
- Absence of adequate anatomical landmarks
- Bone Disease (*e.g., osteoporosis, etc.*)
- Infection at the insertion site
- Previous significant orthopedic procedure at the insertion site
- Prosthetic limb or joint near the insertion site
- Intraosseous access at the same insertion site in the past 48 hours
- Not for sternal use

A hand wearing a white latex glove is holding a clear plastic syringe. The syringe is held horizontally, with the needle pointing downwards and to the left. The background is a solid teal color with a faint, darker teal pattern of what appears to be a surgical drape or fabric. The overall image has a clinical and professional feel.

# Anatomy and placement

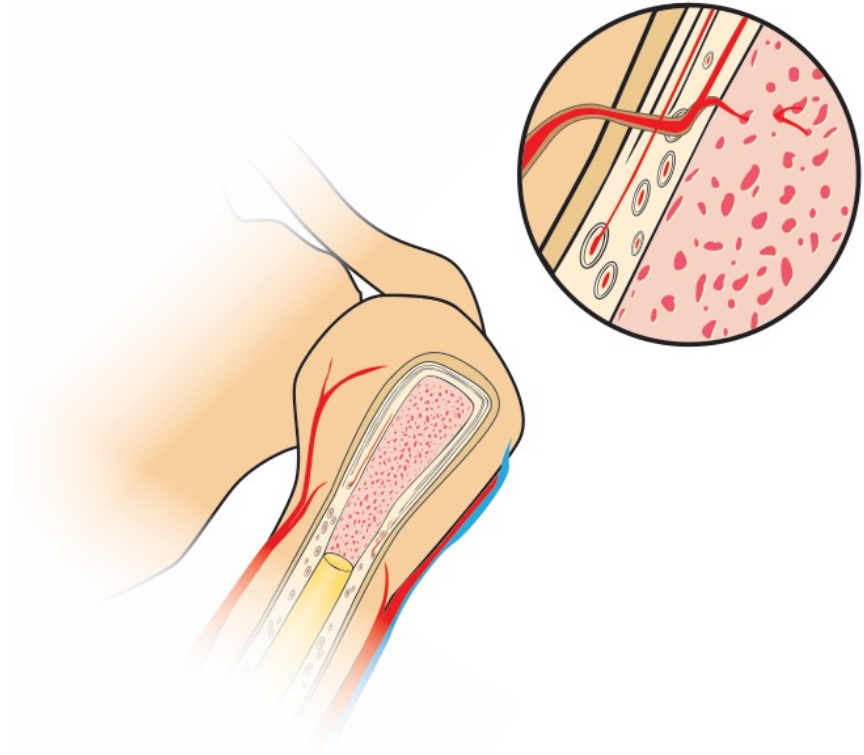
# Bone structure

- Intraosseous space refers to the spongy, cancellous region located at the proximal or distal end of long bones
- The shaft or medullary space houses a system of blood vessels which connect with the central circulation



# Blood supply

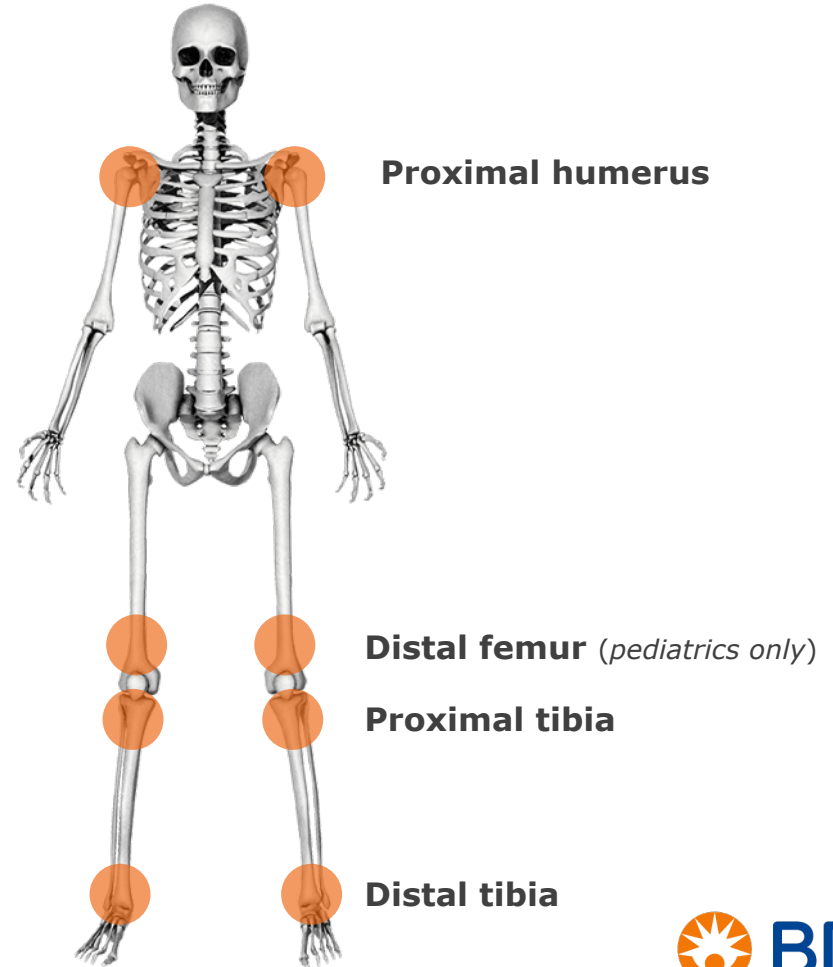
- The highly vascularized bone marrow is connected to the central vascular system via the medullary venous channel to nutrient and emissary veins. The hardness of compact bone and the presence of bone spicules where the marrow is contained make this cavity a non-collapsible system even in the presence of shock or profound hypovolemia.
- Bone spicules increase flow resistance between the bone cavity and vascular system which results in pressure bags being required to enhance flow rates.





# Placement locations

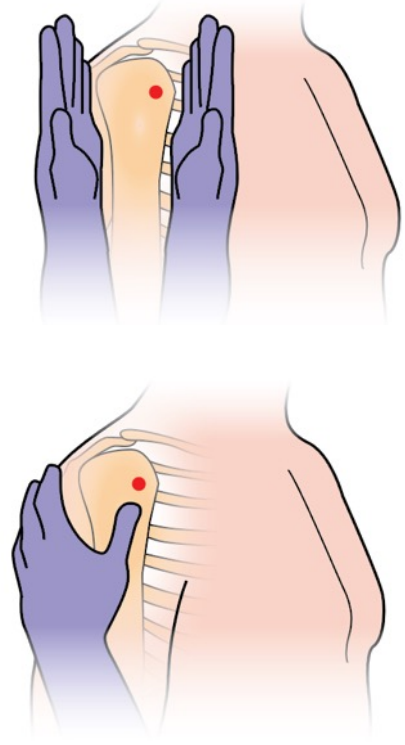
- Proximal humerus
- Proximal tibia
- Distal tibia
- Distal femur (*pediatrics only*)





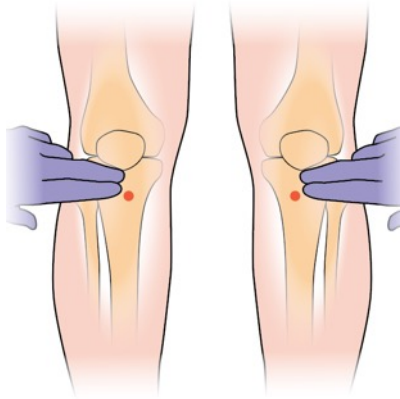
# Humerus

- Recommend that the patient be in a sitting position.
- Upper limb access should be bent at the elbow.
- Locate the core of the humerus, moving toward the shoulder.
- Near the shoulder, find a prominent, palpable area of the humeral head—the greater tubercle of the humerus.
- Using the other hand, feel for the protruding portion of the humerus in order to mark the injection site for IO access.
- In small children, finding the greater tuberosity of the humerus may be difficult.



# Proximal tibia

Locating the tuberosity of the tibia



**Adults:** Approximately 2 cm down from the tibial plateau on the middle portion of the tibial tuberosity



**Pediatrics:** 1–2 cm medially and around 1cm towards the foot from the tibial tuberosity to the flat portion of the bone. For older children, slightly lower injection site than in pediatric patients

# Distal tibia

Locating the medial malleolus



**Adults:** Insertion site is located the width of two fingers above the upper edge of the ankle; 1–2 cm proximal to the base of the medial malleolus (*4–5 cm above the end of the medial malleolus*)



**Pediatrics:** Insertion site is located one finger width above the upper edge of the ankle.

A hand in a white glove holding a syringe with a needle, set against a teal background. The syringe is positioned vertically, with the needle pointing downwards. The hand is holding the syringe from the side, with the thumb and index finger visible. The background is a solid teal color with a subtle pattern of white lines, possibly representing a medical setting or a clean environment.

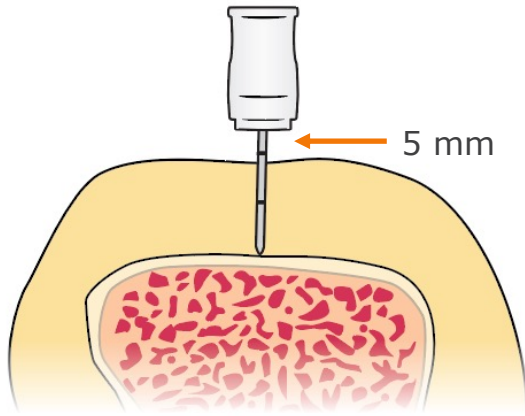
# BD™ Intraosseous Manual Driver and BD™ Intraosseous Powered Driver

# Needle selection

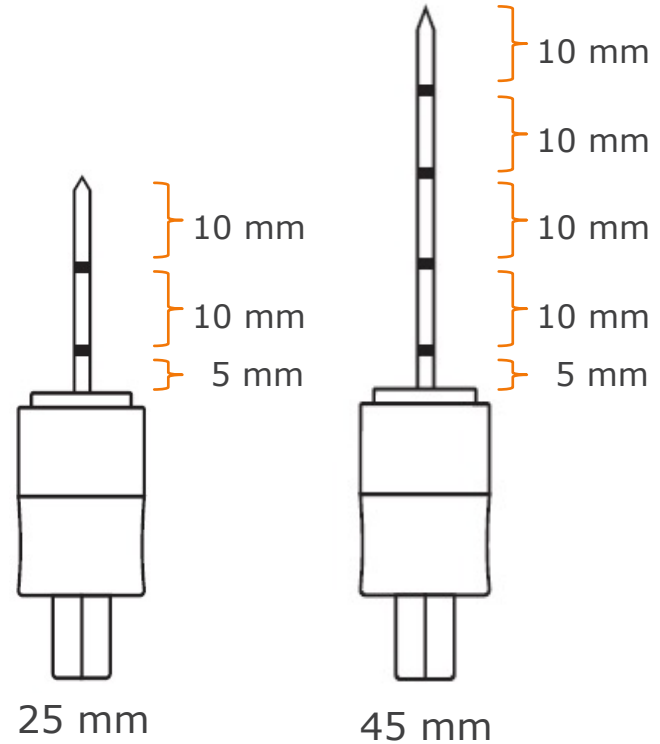
Appropriate needle selection is done based on tissue thickness at the insertion site and clinical judgement



# Needle selection



Confirm there is a 5 mm mark visible above the skin before insertion into the bone



# BD™ Intraosseous Manual Driver



15 mm  
(3–39 kg)

25 mm  
(>3 kg)

35 mm  
(>40 kg)

45 mm  
(>40 kg)

55 mm  
(>40 kg)



# BD™ Intraosseous Powered Driver



# Insertion actions

There are two  
distinct actions

**1.**

Insert needle into  
the skin and stop once  
you reach the bone

**2.**

Pull the drill trigger  
and apply pressure to  
advance the needle  
into the cortex of  
the bone

A hand in a white glove holding a syringe, with a teal overlay. The background is a blurred image of a hand in a white glove holding a syringe, overlaid with a semi-transparent teal color. The text is centered in white.

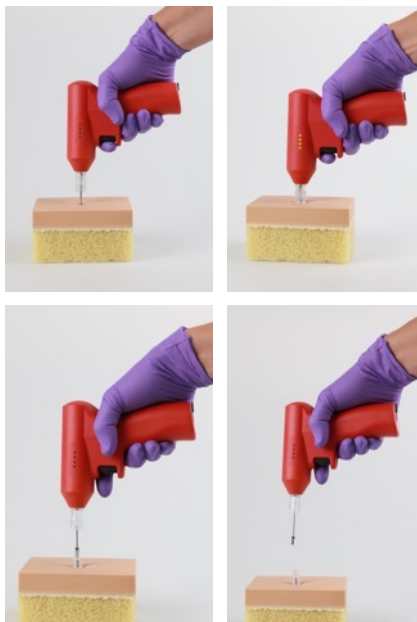
# How the BD™ Intraosseous Vascular Access System works

# Preparation



1. Take barrier precautions.  
**CAUTION: Use aseptic techniques.**
2. Prepare supplies.
3. Locate and prepare insertion site per institutional policy.  
**CAUTION: Not for sternal use.**
4. Palpate to check skin/tissue thickness at the insertion site.
5. Select proper needle length based on tissue thickness at the insertion site and on clinical judgement.
6. Prime the extension set.
  - **Note:** The first depth mark (black line) is 5 mm from the plastic hub. Each additional mark (if present) represents 10 mm from the previous mark.**CAUTION: Do not use if packaging is damaged or opened.**
7. Attach the BD™ Intraosseous Needle Set Kit to the BD™ Intraosseous Powered Driver.
8. Twist and remove the safety cap.
  - **Note:** The stylet is to remain in the needle during insertion.
  - **Note:** Only handle the needle set by the plastic hub.

# Insertion



9. Position the needle at the insertion site with the needle set at a 90-degree angle to the skin.

- **Important:** Control patient movement prior to and during procedure.
- **Important:** Needle should be used as a gauge to measure an/or verify tissue depth at the insertion site.
- Insert the needle set until the needle tip touches bone.
- 5mm of the BD™ Intraosseous Needle (at least one black line) must be visible outside the skin.

**CAUTION:** Check skin/tissue thickness prior to insertion.

**WARNING:** If the needle is too short and at least 5 mm of the needle (one black line) isn't visible outside the skin prior to penetrating the bone cortex, the tip of the needle may not enter the medullary space. If the needle does not enter the medullary space, infusion through the needle could result in extravasation.

10. Squeeze the trigger and apply moderate, steady pressure to penetrate the bone cortex.

- **Important:** Do not use excessive force, use moderate steady downward pressure and allow needle to rotate to penetrate the bone.
- **Note:** In case of a powered driver failure, the needle may be advanced manually through the bone cortex by rotating the drive adapter hub clockwise and counterclockwise while applying gentle, steady, downward pressure. Do not rock or bend needle during insertion.

11. Advance BD™ Intraosseous Needle Set and release the trigger.

- Maintain 90-degree angle.
- **Pediatrics:** Release trigger when sudden “pop” or “give” is felt, indicating entry into the medullary space.
- **Adults:** Advance needle set 1–2 cm into medullary space upon entry; for proximal humerus access, advance needle set 2 cm or until needle hub is flush with skin.

**WARNING:** Using a needle that is too long or advancing it further than these recommendations may cause the needle tip to become embedded in or penetrate the cortex opposite the insertion site. This may result in extravasation.

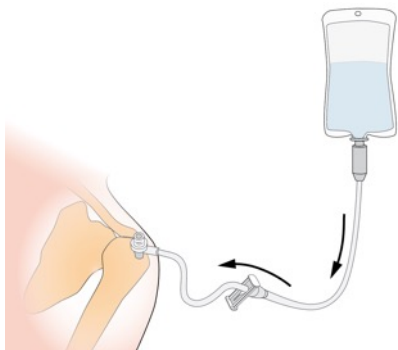
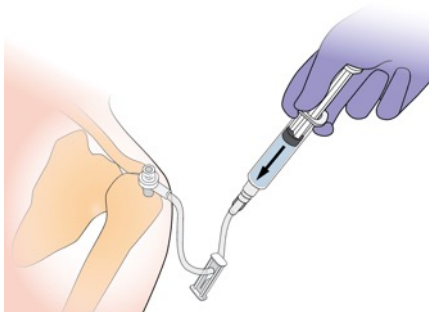
12. Remove the stylet by pulling straight back with the powered driver.

- **Note:** The stylet tip safety will automatically attach to the stylet tip as the stylet exits the needle hub.
- **Note:** If the powered driver separates from the drive adapter hub, or if the needle was inserted manually, remove the stylet by pulling straight back on the drive adapter hub.
- **Note:** Pull the drive adapter hub (or needle) out from powered driver by hand as needed.

13. Place the drive adapter hub assembly in a sharps container.



# Infusion



14. Remove the protective cover and attach the primed extension set to the needle hub.

**Note:** Firmly secure the extension set by twisting clockwise.

15. Prior to infusion, clean extension set valve with a sterile 70% IPA pad by wiping in a circular motion for 5 seconds and allow to dry for approximately 60 seconds:

**CAUTION:** To prevent valve damage, do not use needles, blunt cannula, luer connections with visible defects, or non-standard syringes/luer connections. Doing so may result in leakage and/or failure of the valve.

16. Flush the extension set with normal saline (0.9% Sodium Chloride, 5–10 mL for adults; 2–5 mL infant/child).

**Note:** Prior to flush, confirm needle placement by aspirating the extension set for visual confirmation of blood bone marrow.

**CAUTION:** Luer slip connections should not be left unattended due to potential disconnection.

17. For patients responsive to pain, consider infusing 2% preservative and epinephrine-free lidocaine (intravenous lidocaine) per institutional protocol/policy.

**CAUTION:** Before infusing, confirm device placement and patency.

18. Administer fluids or medications as indicated.

**CAUTION:** Monitor insertion site for extravasation.

# Stabilization



19. Use of the securement dressing is strongly recommended for all BD™ Intraosseous Needle Set insertions.

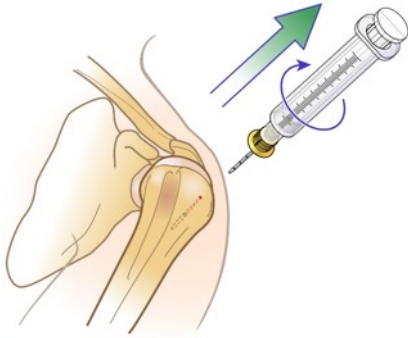
**CAUTION: Do not use on breached or compromised skin.**

20. Properly clean and dry the insertion area for optimal adhesion.
21. Open the center snap feature of the securement dressing.
22. Snap the feature closed around the needle hub.
23. Attach the adhesive of the securement dressing by pulling the tabs.
24. Press adhesive against the skin for proper stabilization.

**CAUTION: Do not leave needle inserted for more than 24 hours.**



# Removal



25. Remove the extension set and the securement dressing. To remove the BD™ Intraosseous Needle from the patient, twist clockwise while slowly applying traction to the BD™ Intraosseous Needle. Alternatively, attach Luer-Lock syringe to hub of needle and withdraw the needle by applying traction while rotating the syringe and needle clockwise. Maintain axial alignment during removal.

**CAUTION: Do not rock or bend the BD™ Intraosseous Needle during removal.**

26. Once removed, place the needle in appropriate sharps container.

**CAUTION: After use, this product may be a potential biohazard. Handle and dispose of in accordance with accepted medical practice and applicable local, state, and federal laws and regulation.**

27. Dress site per institutional protocol/policy.

A hand wearing a white latex glove is shown holding a syringe with a blue plunger. The syringe is held vertically, and the needle is pointing downwards. The background is a teal color with a faint, repeating pattern of the same syringe and hand. The text "The BD difference" is overlaid in white on the left side of the image.

# The BD difference

# Differences in procedure



# Differences in procedure

- Rechargeable battery with light indicator
- 5 needle length options vs 3
- Passive safety
- Securement device allows for contouring to relevant anatomy
- Two additional needle lengths to accommodate a broader range of patients



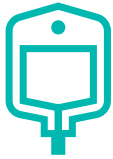
# Additional information



Policies and procedures  
(*Physicians vs RNs*)



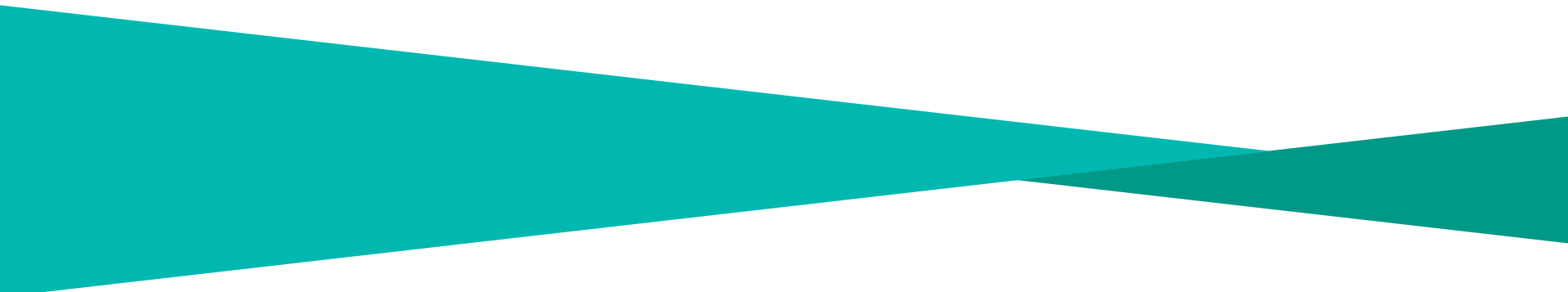
Care and  
maintenance



Infusion



Removal



Please consult product labels and inserts for any indications, contraindication, hazards, warnings, precautions and directions for use.

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