



Professional guide to x-series injectable product installation

Disclaimer

This document is intended for use by professionals only. It is meant to supplement their professional training to support the safe installation our specific x-series injectable products such as our RFID or NFC transponder products as well as our injectable biomagnet products. This document is not intended to be used as a how-to guide for laymen, or to replace or supersede professional training.

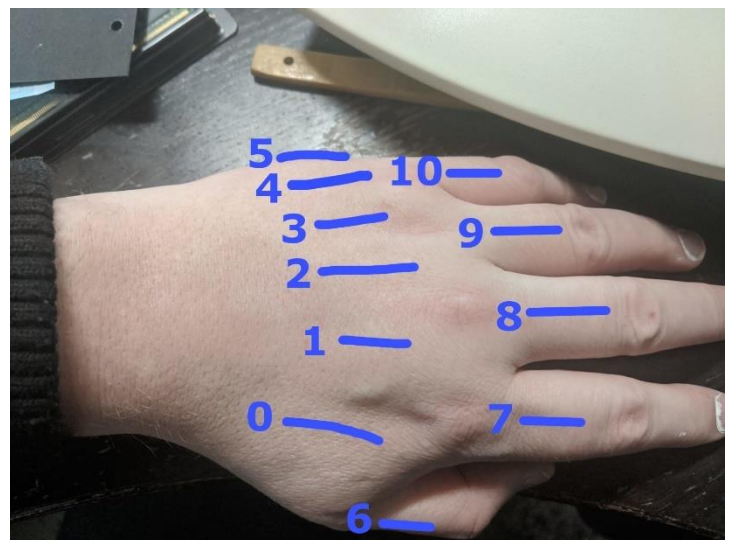
Typical Installation Location and Orientation

The extremely short communications range of our transponder devices requires the customer to be able to manipulate and position the transponder with the greatest degree of freedom and range of motion possible. Because of this, the hand is the typically the chosen location for transponder installation.

Critical considerations for x-series product installations include;

- Install only into the fascia tissue between dermis and muscle
- There must be 5mm+ between the deployed device and bone to avoid compression damage
- There must be 5mm+ between the deployed device and any other compatible x-series device
- Do not install under skin of any gripping area (palm side) or area of flexion (like folds of webbing)

There are several positions in the hand which are typically viable for x-series injectable product installation. They are defined by a numbering system starting from 0 which is the most typical and lowest risk location of the hand, resting between the thumb and index metacarpal bones, up to position 5 that describes the outer knife edge of the hand. Higher number positions are only suitable for flex device installation because they are located over bone. Positions on the right hand are referred to with an R prefix such as R0 or R3, and on the left with the L prefix, such as L2 or L5. For current information regarding positions and location information, visit <https://dngr.us/locations>



DANGEROUS THINGS

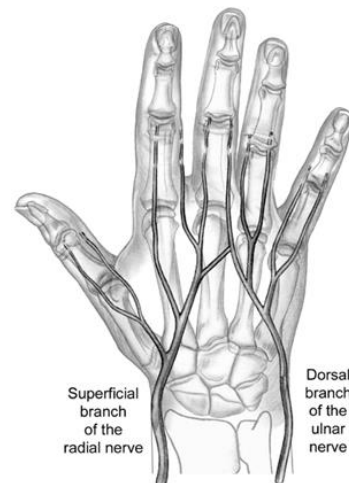
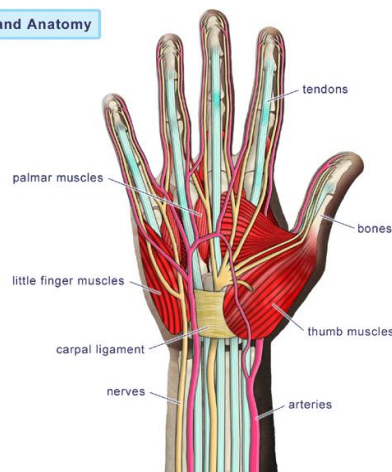
The most typical location in the hand, and the position most people start with is position 0. This position carries the lowest risk for the following reasons;



- low risk of damaging major radial and median nerves
- low risk of damaging major blood vessels
- low risk of damaging tendons or their synovial sheaths
- plenty of soft tissue to help absorb blunt force impacts
- good distance from bones to avoid pinching and crushing

Ultimately the transponder should rest parallel to the metacarpal bones of the index finger with at least 5mm between bone and device. Do not install under the skin of any gripping surface like the palm of the hand. The folds of the webbing also need to be avoided as mechanical stresses in that area could cause migration and / or rejection problems.

Hand Anatomy



This anatomy illustration shows major nerve bundles, large blood vessels, and critical tendons in the hand. It is extremely important that you accurately target the proper tissue depth such that the injectable product deposits in the fascia tissue layer between dermis and muscle. How to do this is described in the following procedure guide.



Installation Procedure

This procedure guide assumes you, the installing professional, is fully trained in all required blood borne illness, cross contamination, first aid, and CRP resuscitative practices in order to legally perform the safe installation of our products for your customer.



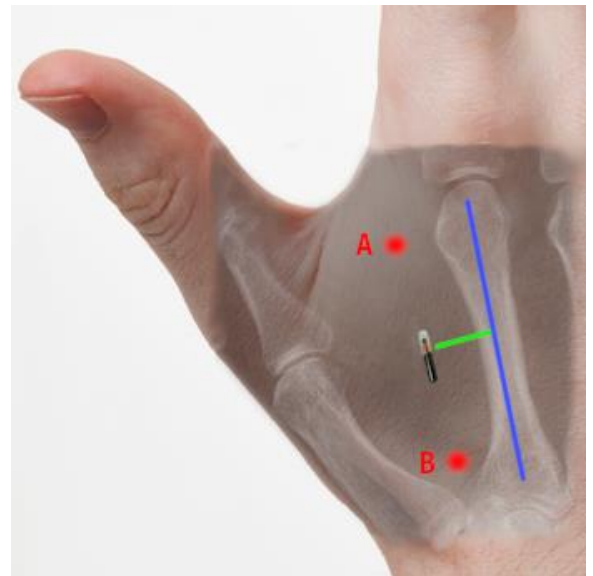
Dangerous Things, in cooperation with VivoKey Technologies, has co-developed an installation video guide for the VivoKey Spark chip implant. This video accurately portrays the best practices and procedural guidelines for all Dangerous Things x-series injectable products.

Watch it at <https://dngr.us/spark-install>

Step 1) Properly assess the installation location

For the purposes of this guide, we will assume position 0 between the thumb and index metacarpal bones has been chosen for the installation site. For proper installation in position 0, you must assess the length of the index metacarpal bone and envision the device's final position to be parallel to it, located in the center of it's length, and offset by at least 5mm. Incision points must be chosen at least 15mm away from the desired final resting position, depicted here by points A and B.

The typical length of an x-series injectable device is 13mm. However, a deployed device will tend to migrate back toward the incision site by at least 5mm during healing, so it is important to take this into consideration when choosing an incision site.



Step 2) Properly prep the installation site

This guide assumes you have already performed all antiseptic preparation of the operating field, equipment, and incision site according to best practices guidelines common to your industry. You may choose to use your own materials for this, or you can use the chlorhexidine wipes included in our installation kit. Chlorhexidine can be extremely effective disinfecting human skin if thorough and rigorous scrubbing is performed for at least 30 seconds. Chlorhexidine also requires at least 60 seconds for full effectiveness. No matter what antiseptic process you use, treated skin will be dry and extremely tacky to the touch since most oils will have been removed. This will make the needle insertion process encounter a lot of friction and resistance. Be prepared for this. If you routinely use needle or instrument medical lubricant which is sterile, you may want to apply some to the intended incision location.

Step 3) Mark the desired placement with sterile skin marking pen

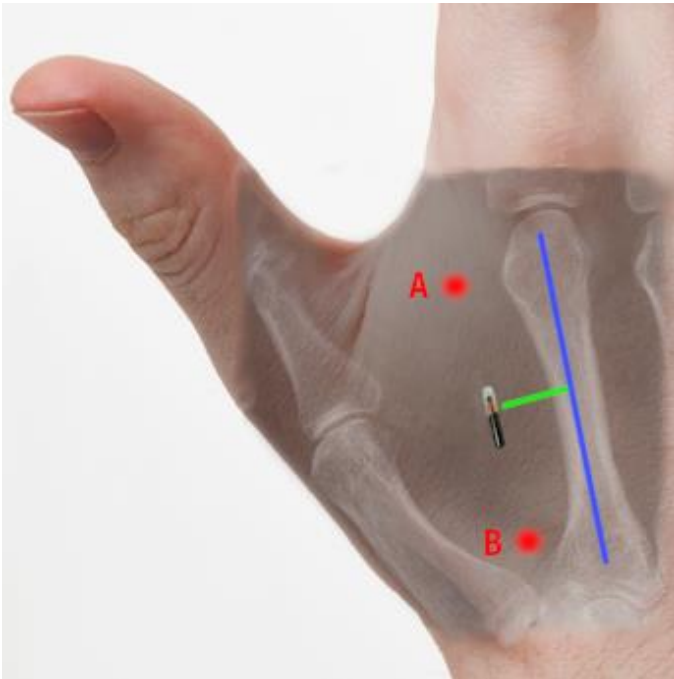
Assuming position 0, find the trapezium and trapezoid bones where the metacarpal bones of the thumb and index finger meet. Next find the first proximal interphalangeal joint (first knuckle) of the index finger, then move up half the distance between the bottom of that joint and the top of the carpometacarpal joint above the trapezoid bone. Using an industry accepted safe skin marking pen, place a small T mark over this center point above the index finger metacarpal bone such that the top of the T runs parallel to the bone and the leg runs perpendicular, out towards the metacarpal of the thumb. Make the perpendicular leg of this marking at least 5mm long.



When injecting the transponder, you will want the center of the 12mm transponder to rest directly under the dot mark you just made.

Step 4) Prepare to inject the x-series device

Grip the skin just beside the index metacarpal bone pull it up to tent it away from muscle tissue. Roll the skin, try to note any large blood vessels that may pose a problem during injection so you can work around them. This palpation process also helps loosen fascia tissue and desensitize the area's tactile and pain receptors.



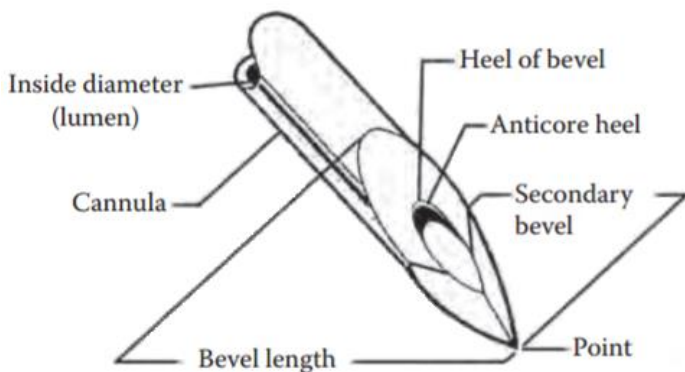
The typical length of an x-series injectable device is 13mm. You will be pushing the device injection needle about 18mm deep into the fascia layer between dermis and muscle, then retracting the needle by about 13mm such that the needle creates a channel or “pocket” for the device to rest, then ejecting the device. However, a deployed device will tend to migrate back toward the incision site by at least 5mm during healing, so it is important to take this into consideration when choosing an incision site which accommodates both the depth of the needle and the device's additional backward migration.

Step 5) Insert needle into fascia between dermis and muscle tissue

As you press the needle into the skin, take advantage of the tent of the skin to ensure you enter directly into the connective fascia. Be sure to keep the axis of the needle parallel to the index finger metacarpal bone to control your horizontal alignment, and your vertical alignment parallel with the tissues of the hand to ensure you do not puncture dermis or muscle tissue. The x-series device needs to be deposited subdermally, in the fascia layer, no deeper.



A word about bevel position



Bevel direction (up away from skin or down toward the skin) is a professional preference. However, due to the tackiness of the skin after disinfection, the heel will present a challenge getting under the skin. Sterile needle lubricant will help, but if such lubricant is not available you may consider approaching with the bevel down. When tenting the skin up as shown above, it minimizes the amount of skin collected inside the lumen. However, the bevel down method does require greater control over the skin to avoid the point erupting back out of the skin.



Step 6) Retract and deposit the x-series device


Once the bevel heel is under the skin, gently guide the needle in until you assess the needle has made its way to the proper depth. If necessary, loosen your grip on the tented skin slightly to allow the needle to reach at least 18mm depth. Once you reach the proper depth, retract the needle by 13mm or so. This will leave a channel or “pocket” of separated fascia tissue that the x-series device will be ejected into.



Depress the plunger completely until you can feel and possibly hear the solid *click*. This is the plunger reaching full extension and locking in the depressed position. At this point gently remove the needle, completely, cover the wound with sterile gauze, and apply pressure for 2 to 5 minutes until all bleeding has stopped. Apply a standard adhesive bandage.

Professional partnership with Dangerous Things

Dangerous Things partners with professional installers all over the world. If you would like to become a partner, please visit <https://dngr.us/partners> and contact us by tapping the orange help icon

 Help



Aftercare Instructions

Once bleeding has stopped and you have worn an adhesive bandage for at least a few hours, a simple scab should have formed over the incision site. Once this occurs, normal activities like hand washing or bathing can resume.

Healing begins almost immediately, starting with the skin itself. Your body will attempt to heal around the newly installed device, encapsulating it in a layer of collagen and fibrin. This process takes about 4 weeks (30 days), during which time it is important to not push or “play with” the implant too much. It’s also important to eat well and stay hydrated during this time. It is also suggested that you can speed healing and lower the risk of migration (the implant moving around and not “locking down”) by taking prenatal vitamins during this period.

As your body heals, you may notice short bouts of itchiness or twinges of tactile sensation at the implantation site. These mild sensations may come randomly for up to a year after installation, and are a normal part of the healing process. They are caused by sensory nerves healing around the implant site which were damaged by the installation process.

Bruising can be normal if larger blood vessels are damaged during the installation process. This will cause the normal swelling and slight sensitivity in the surrounding area as any bruise.

Redness, swelling, acute pain to the touch, or throbbing pain is a clear indication of infection, likely caused by a contaminated installation process. Seek immediate medical attention from your family doctor or typically consulted medical professional. Treatment with antibiotics and possibly device removal may be prescribed by your medical care professional.

If you have any non-medical questions regarding your new x-series device, please visit our lively and friendly community forum at <https://dngr.us/forum>