



Professional Guide to 2x12mm Glass Transponder Installation

Disclaimer

This document is intended for use by professionals only. It is meant to serve as an example of how to install any Dangerous Things 2x12mm glass encased transponder product. This document is not intended to be used as a how-to guide for laymen, or to replace or supersede professional training.

Installation Location and Orientation

The extremely short communications range that these small, magnetically coupled 2x12mm bioglass encased transponders requires the subject to be able to manipulate and position the transponder with the greatest degree and range of motion possible. The human hand, specifically the posterior (dorsal) area between the metacarpal bones of the thumb and index finger, is the ideal location for these transponders. We call this area of the hand “the triangle”, and it is ideal for the following reasons;

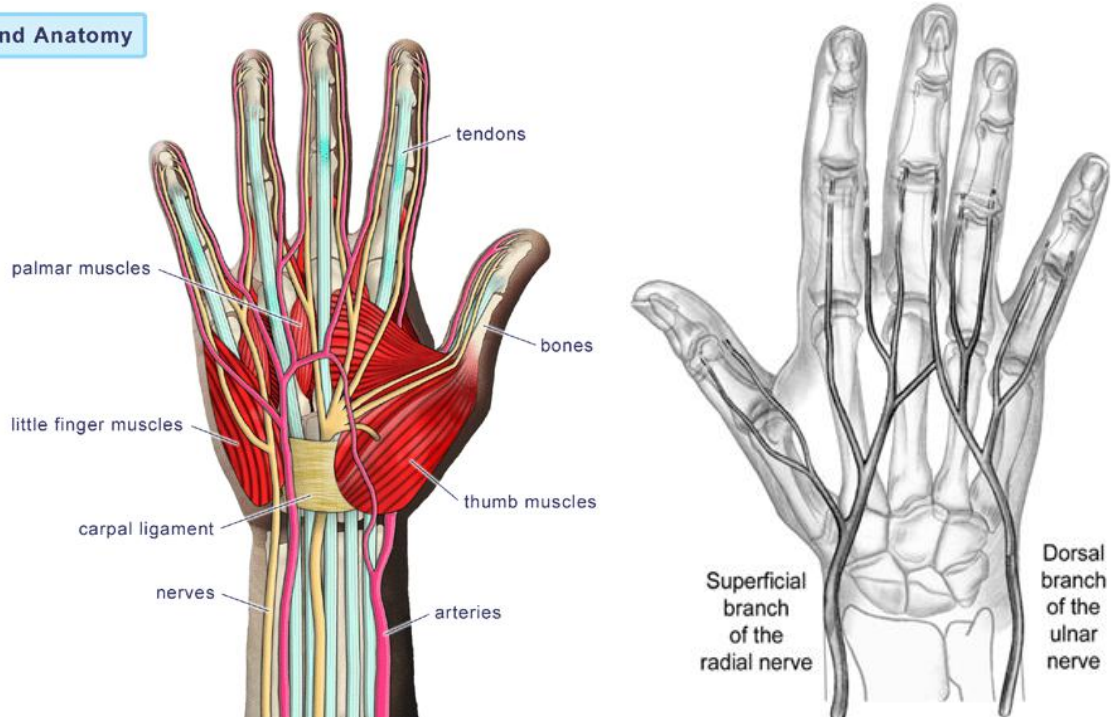


- 1) low risk of damaging major radial and median nerves
- 2) low risk of damaging major blood vessels
- 3) low risk of damaging tendons or their synovial sheaths
- 4) plenty of soft tissue to help absorb blunt force impacts
- 5) good distance from bones to avoid pinching and crushing

Ultimately the transponder should rest parallel to the metacarpal bone of the index finger with at least 5mm between bone and glass. The folds of the webbing also need to be avoided as mechanical stresses in that area could cause rejection and breakage problems.

This hand anatomy illustration clearly indicates major nerve bundles, blood vessels, and tendons. It should be obvious that the posterior section of the hand between the metacarpal bones of the thumb and index finger is clearly the ideal location to install a 2x12mm glass transponder with minimal risk.

Hand Anatomy





Installation Procedure

Dangerous Things assumes the practicing professional has already performed all antiseptic preparation of the operating field, equipment, and incision site according to best practices guidelines common to their industry.

Step 1) Remove the plunger safety clip from the injection assembly.

The safety clip is a plastic retaining clip designed to cling to the plunger between the syringe housing and the push-top of the plunger assembly, blocking the plunger from being depressed. Remove this clip during equipment preparation.

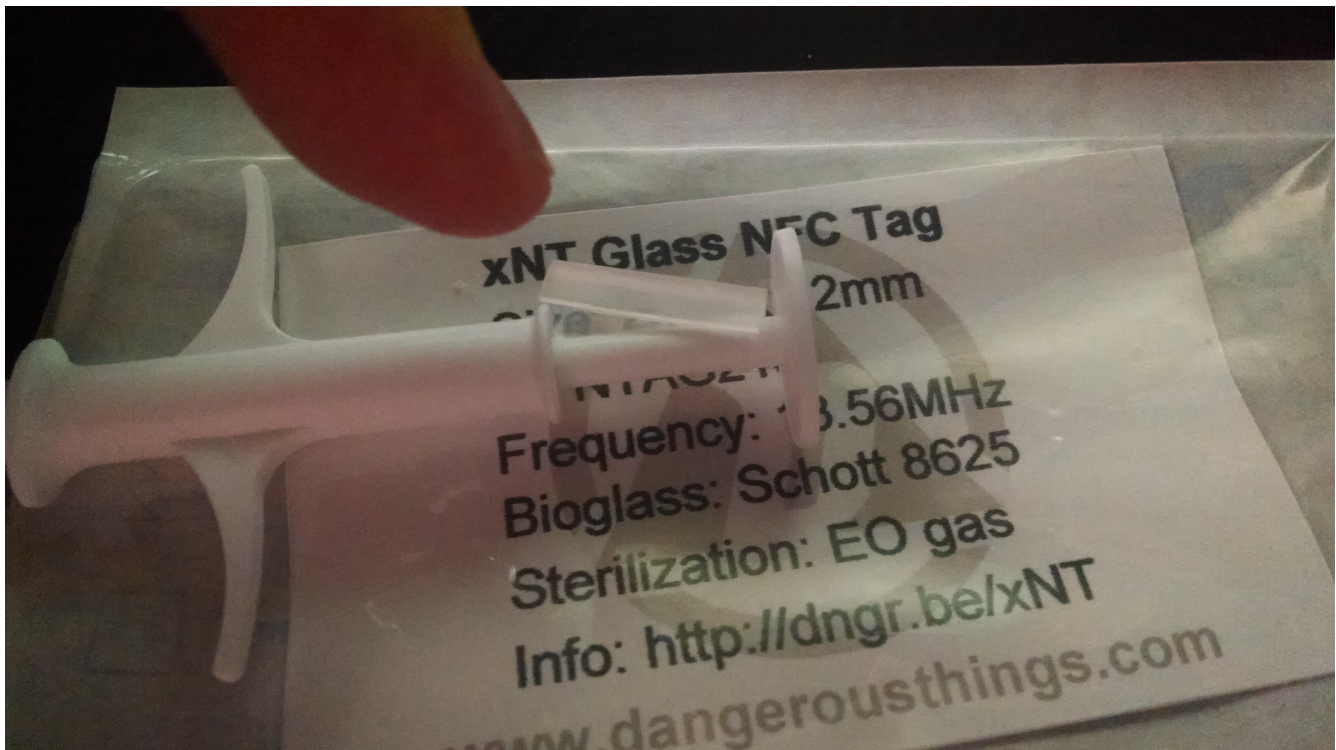


Figure 1 - Remove plunger safety cap

Step 2) Measure and mark metacarpal bone of the index finger

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 halve 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.

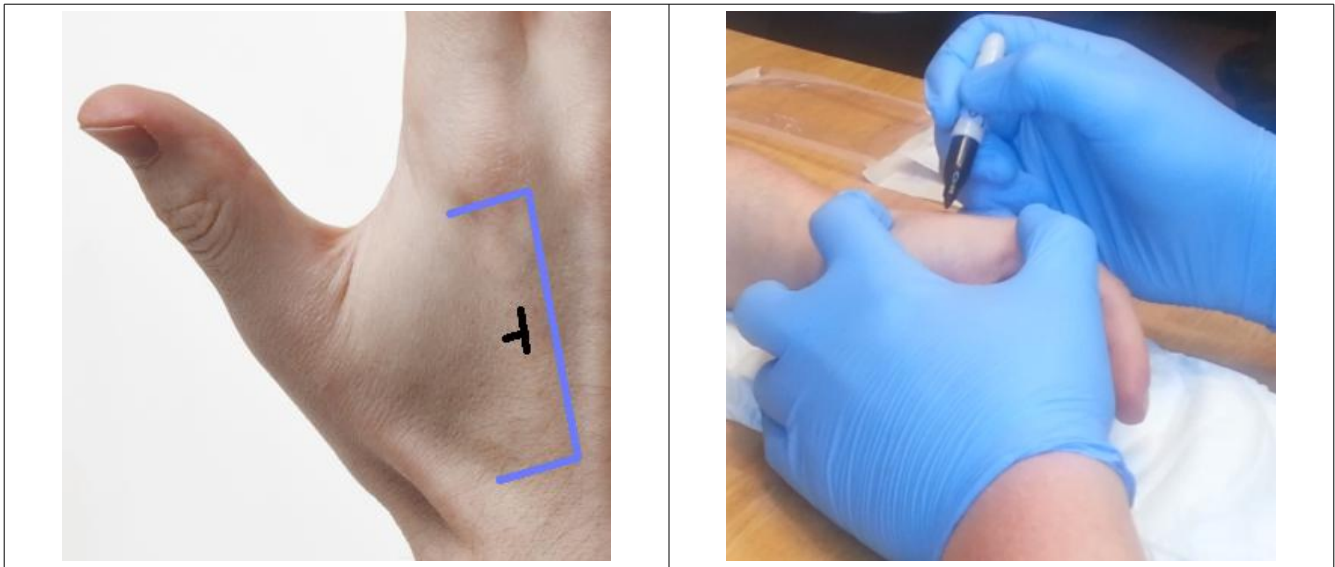


Figure 2 - Marking a T above the index metacarpal

Step 3) Mark the top of “the hump”

Adduct the thumb to the neutral position. When adducted to where the thumb is sitting parallel to and firmly against the index finger, the adductor pollicis, adductor pollicis brevis, and opponens pollicis muscles will form a small hump of tissue that protrudes slightly from the posterior of the hand between the metacarpals of the index finger and thumb. The curved shape, much like a dome, should allow you to easily identify and mark the top of this area with a dot that is directly adjacent to the leg of the T mark you made early. This mark will typically denote the approximate center of the “transponder triangle”.

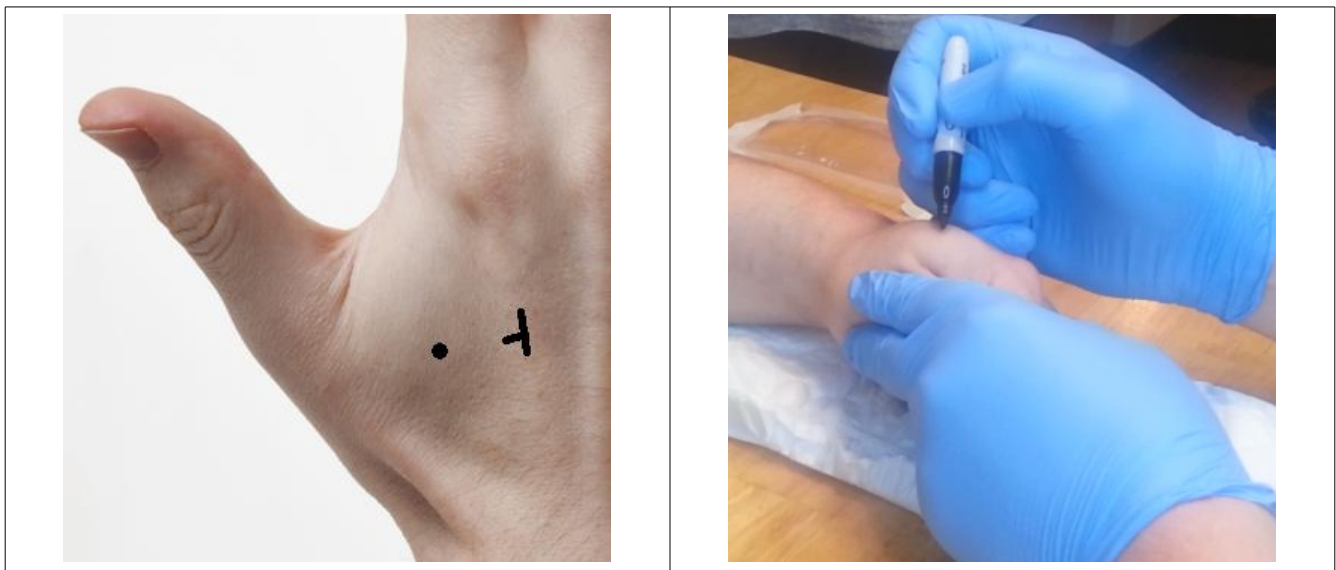


Figure 3 - Marking the hump, center of the triangle

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) Roll and tent the skin

Grip the skin just around the central mark and pull it up to tent it away from muscle tissue. Roll the skin to try to detect and dislodge any large blood vessels.



Figure 4 - Rolling and tenting the skin

Step 5) Pick a site at least 15mm forward of the central mark

The glass transponder is 12mm long, so you will want to pick a site that is far enough forward from the central mark to ensure there is enough space between the target location and the incision site. Also, during the healing process, the transponder typically moves back toward the incision site anywhere from 4mm to 6mm.



Figure 5 - Pick an incision site forward of the central mark

Step 6) Insert needle into fascia between dermis and muscle tissue

As you press the needle into the skin, be sure to keep 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 transponder will need to be deposited subdermally, in the fascia layer, no deeper.



Figure 6 - Make incision with the needle

Step 7) Reach the central mark and deposit the transponder

Once the trailing needle bevel is under the skin, gently guide the needle in until you assess the needle has made it's way under the central mark. If necessary, loosen your grip on the tented skin slightly and continue to insert the needle at least 10mm past the central mark. Depress the plunger slowly until you can see the glass transponder begin to come out of the needle end. The transponder will produce a slight protrusion of the skin as it moves out of the needle tip and should be easily seen. Slowly continue to depress the plunger as you gently retract the needle at about the same rate. This will neatly deposit the transponder into the channel created by the needle.



Figure 7 - Deposit transponder

Once the plunger has been fully depressed, you should feel and possibly hear a slight click. At this point gently remove the needle, immediately cover the wound with sterile gauze, and apply pressure for 2 to 5 minutes until all bleeding has stopped.

ATTENTION: Retracting the needle while depositing the transponder is critical.

The needle makes a clean channel under the skin lifting and separating dermis from muscle tissue and creating a path through the fascia tissue for the transponder to rest in. If you do not retract the needle when depressing the plunger to deposit the glass transponder, the transponder will force its own path through unseparated fascia, and chances are good that this could lead to a resting position that is not parallel to the metacarpal bone of the index finger. This is not an ideal resting position for the transponder.



Figure 8 - Rotated transponder due to improper deposition