Passively powered Radio Frequency Identification systems were first developed in the early 1970's but these units were far too large to be considered for implantation. RFID technology and miniaturization developed over the years resulting in transponders of comparable size to a grain of rice with rewritable integrated memory. RFID technology is routinely used in herd management, inventory management, and is even incorporated into passports.

As of 2004, a number of RFID chips have been approved by the US FDA for implantation into humans providing permanent irrefutable proof of identification with little risk of adverse health effect and at most a pencil point sized scar. The use of these chips in humans remains exceedingly rare and controversial. Concerns regarding RFID technology most often cite risk of information theft and illicit tracking. One aspect that is not debated is the safety and ease with which an RFID can be injected.

The Cyberise line of RFID chips are circuits energized and activated only in the presence of an appropriate reader. The Cyberise RFID01 for example can be read by any standard pet reader and provides a unique identifier allowing for numerous access control applications. The NFC01 model offers 880 bytes of memory which can be read or written using not only RFID readers but also NFC compatible smart phones. The RFID02 chip is able to read and transmit body temperature to a reader. All RFID devices sold by Cyberise are encased in biocompatible glass which prevents rejection and facilitates bonding with tissue. This guide is intended for use by body modification artists and medical practitioners and describes a safe method of implanting any of the Cyberise line of RFID devices.

This guide is intended to inform body modification and professionals who are already trained to perform minor surgery about the specifics of RFID implantation. This guide is not sufficient to train a lay person to perform implantation. It is strongly recommended that you have a trained professional perform all body modification. While it is possible to perform the procedure oneself, the results are often sub-optimal and risks are increased. We cannot be held accountable for adverse effects sustained from performing the procedure

**EQUIPMENT AND SUPPLIES**

The Cyberise NFC is provided preloaded in an RFID injector needle. The chip itself and the injector are sterile and packaging should not be opened until the time of injection. A number of other supplies are required for the procedure. This includes Chlorhexidine Gluconate, a skin preparation agent with residual action. Quaternary based surface wipes are needed to disinfect the area on which the procedure will occur. Sterile gloves, gauze and a band aid will also be required These supplies are provided by cyberise with each RFID kit sold.
IMPLANT SITES

The location in which an RFID chip is injected is an important consideration. There are many regions where an injection can be safely performed. Although chips intended to be used as medical identifiers are most often placed beneath the skin on the right upper arm this is a less than ideal location for other purposes. The upper arm is easily scanned by medical personnel but is difficult to reach for other applications such as access control.

Cyberise RFIDs can be safely placed into the posterior of any extremity. Sites must be two centimeters from any joint and twenty millimeters from major nerves or arteries. This guide will focus on two sites which have shown to be both safe and convenient to use. One of these locations is on the posterior forearm. The second location is near the thumb on the posterior of the hand. The non-dominant limb is most commonly chosen. Either of these locations can be safely injected and allow for convenient access with a reader or phone. The following section will describe site preparation and identification for both the hand and forearm.

POSTERIOR FOREARM

Clients are to be instructed to wash implant area for a minimum of two minutes using warm water and unscented soaps or an approved surgical scrub solution prior to marking. Placement of the RFID chip is performed in the distal one third of the posterior forearm and at least two centimeters from the wrist joint. This location has only cutaneous nerve branches and peripheral veins decreasing the risk of adverse outcome. Ease of injection is increased if the skin at the area can be pinched and tented; however a chip can be successfully placed even if this tenting isn’t possible. The placement mark represents where the RFID will be centered. This placement mark should be parallel and half the distance between the ulnar and radial bones. The insertion mark is always fifteen to eighteen millimeters distal to the placement mark. The skin at insertion mark must be devoid of alterations such as scars, birthmarks, or skin tags.

POSTERIOR HAND

Clients are to be instructed to wash implant area for a minimum of two minutes using warm water and unscented soaps or an approved surgical scrub solution prior to marking. For posterior hand placement, begin with the thumb abducted laterally. Mark a point along the webbing halfway between the thumb and the pointer finger preferably using an indelible surgical marker. Palpate at the base of the thumb and place a second mark at the base of the triangle formed by the thumb and the hand. The placement mark, representing where the RFID will be centered, is made at the point halfway between the previous points representing the desired area of placement for the RFID chip. The insertion mark is then made fifteen to eighteen millimeters distal to the desired placement mark. The total length of an RFID injector needle is twenty millimeters and the depth to which the needle will need to be advanced is dependent on each individual’s anatomy.
DISINFECTION AND SITE PREPARATION

After identifying and marking the insertion site, prepare the surface upon which the procedure will be performed using a quaternary disinfecting wipe. Place all supplies and equipment within reach of this disinfected area and open packaging in a manner allowing access but without contacting the sterile areas within. Hands are to be scrubbed for a minimum of two minutes with warm water and unscented soap or an approved surgical scrub. Avoid the use of products containing triclosan. Once hands are dry, don sterile gloves using proper gloving technique. Cleanse the insertion area and the surrounding 20mm of skin using the chlorhexidine gluconate swabs. Begin at the center and apply moderate pressure to swab working outward in a circular motion. Allow the area to dry before proceeding.

IMPLANTATION PROCEDURE

Begin by tenting the skin above the placement mark and gently rolling it back and forth between the fingers to facilitate separation of dermis from the subcutaneous structures. With the bevel down, insert the needle of the injector through the skin at the insertion mark. The needle is to be inserted into the layer beneath the skin but above the muscle. Resistance to advancing the needle may indicate the need to reposition for a shallower approach.

Release the tent of skin and advance the needle 8mm to 10mm beyond the placement mark. Withdraw the injector while simultaneously depressing the plunger in order to position the RFID into the cavity created by the injector device. Just before withdrawing the tip of the needle, place sterile gauze directly over the insertion site and pinch the skin of the insertion site with moderate pressure. Safely dispose of the injector in an approved sharps container and maintain pressure on the insertion site for 5 minutes or until bleeding has stopped. Pinching the skin upon withdrawal ensures the RFID leaves the needle and is retained beneath the skin. Apply the band aid.
INJECTION SITE AFTERCARE

A properly inserted RFID device requires very little aftercare. Take note that the insertion site may be sore or tender for a number of days following injection. If the site begins to bleed, apply moderate pressure with gauze to the site until it stops. Keep the site clean, dry, and covered for twenty four hours following the procedure. Change the band aid if it becomes wet or soiled. No special cleansers or products are required. Avoid any undue irritation from playing with the area or friction from clothing.

Although no reported incidence of infection have occurred following the insertion of an RFID chip, it's important to assess the site daily while healing. Contact your healthcare provider if you notice red streaks near the site, fever, chills, pus, or excessive bleeding.

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