

Anesthesia Delivery with Syringe Adapter for miraDry®

(Modified Technique)

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Overview

The miraDry® System uses microwave energy to provide patients with a significant reduction of sweat and hair in the axillae. When used for the reduction of sweat and hair, patients may also experience a reduction in odor. miraDry has a high efficacy rate and patients are extremely satisfied in as little as one treatment.

The miraDry procedure requires 3 simple steps: determine the treatment size using the hair bearing area, anesthetize the treatment area and deliver energy with the given miraDry hand piece. Determining the treatment size and delivering energy are straight forward and easy to perform and can often be delegated to a physician extender. Administering the anesthesia can be challenging and can take 20 minutes or longer to administer. Generally, physician extenders are not comfortable performing this portion of the treatment and frequently the physician is personally required to dedicate time to perform this step.

The current miraDry anesthesia protocol recommends the use of high volume tumescent anesthesia (a mixture of saline, lidocaine, sodium bicarbonate, and epinephrine). The tumescent is injected with a tumescent infiltrative cannula or a 22g needle that may vary from 1.5 to 2.75 inches in length. The fanning technique is the recommended method to administer the tumescent solution to obtain adequate coverage and pain management. The fanning technique requires an accurate depth of infiltration (3 - 4mm underneath the skin at the dermal-fat interface) and moving the needle anterograde and retrograde in a fanning pattern, while simultaneously injecting the solution in a uniform manner. The use of the needle and the fanning technique is significantly technique dependent and based on the background and experience of the clinician. It can be challenging to deliver the tumescent solution uniformly within the treatment area while staying consistent with the miraDry anesthesia volume recommendations. Anatomy and patient positioning also contributes to the difficulty of maneuvering the needle across the axilla.

With different states having different medical laws and recommendations, it can be a challenge to teach the fanning technique to all levels of clinicians. Additionally, when seen, the long needle can cause high anxiety among patients. The fanning technique and the maneuvering of the long needle can cause uneasiness for some clinicians. This factor can affect the successful administration of anesthesia, whether it's improper depth or insufficient delivery of the tumescent across the treatment area. In these cases, intense heat or pain can be felt by the patient during the miraDry procedure, leading to additional administration of anesthesia in the middle of the procedure. The need for additional anesthetic injections requires re-prepping the area for additional injections which prolongs the procedure time and influences the overall patient experience.

Syringe Adapter for Anesthesia Delivery

To eliminate the challenges of administering high volume anesthesia, syringe adapters were put into practice for delivering the recommended tumescent anesthesia into the axilla. The syringe adapters consist of 5 or 7 small needles and have a number of configurations to include various gauges and lengths. To cause minimal damage to the skin during insertion, the 30 gauge size is recommended. The optimal needle length is 4mm to ensure that the solution is delivered at the recommended depth of 3-4mm. See Figures 1 and 2.

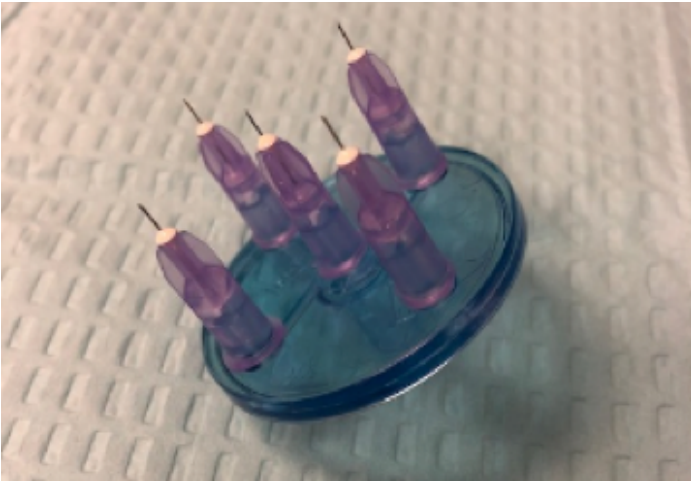


Figure 1: Syringe Adapter w/ 5 needles (30g, 4mm)

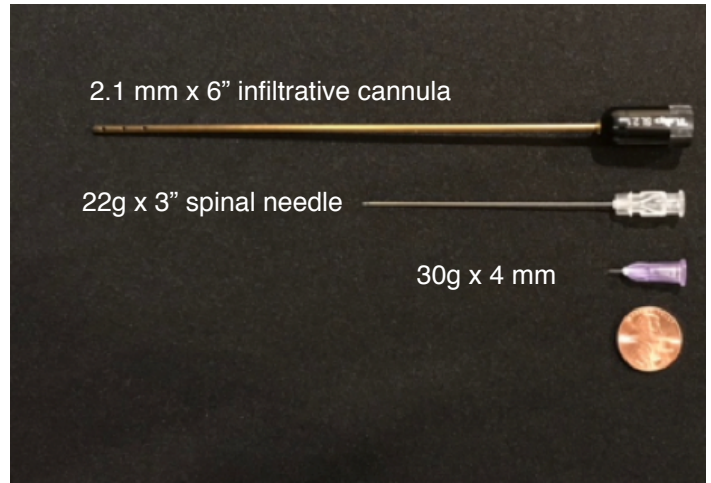


Figure 2: Needle size comparison

The use of small tubing connecting the syringe adapter to a 20cc syringe is recommended for easy delivery of the fluid. See Figure 3 and 4. If a 20cc syringe is directly attached to the syringe adapter, this may cause over-insertion of the needles and deeper than intended tumescent infiltration.



Figure 3: Tube connected to syringe



Figure 4: Tube connecting syringe and adapter

Over 80 miraDry patients were successfully anesthetized utilizing the syringe adapter. Various syringe adapter placement patterns were conducted for the different grid treatment sizes. Additionally, varying volumes of anesthesia per syringe adapter placement were evaluated with strict compliance to the miraDry total recommended tumescent volume for a given treatment grid size. The protocol was optimized for maximum patient comfort, ease of delivery and reduction of delivery time. Instructions for the syringe adapter anesthesia protocol can be found in Appendix A.

With the syringe adapter anesthesia delivery protocol, a small study of 20 patients and 4 clinicians was conducted at two sites: Gerrish MedEsthetics (Scott Gerrish, D.O.) and Diehl Plastic Surgery (Cynthia Diehl, MD). The objective of this study was to determine patient and clinician preference for anesthesia delivery and the pain rating during anesthesia delivery by the patients. Prior to receiving the miraDry treatment, patients were informed of the two different anesthesia delivery methods and asked to choose which method was preferred. After anesthesia delivery, patients were asked to rate the level of pain during delivery, with a pain rating of “1” being no pain and “10” being extremely painful. Patients and clinicians filled out the respective questionnaires and the results can be found in Table 1.

Table 1: Preference and Pain Ratings

	Syringe Adapter
Delivery method chosen by patient	19/20
Average Pain Rating “1” being no pain, “10” being extremely painful	1.8/10
Delivery method preferred by clinician	4/4

The results of this study revealed that both the patient and the clinician overwhelmingly favored the syringe adapter as the preferred method for delivering high volume tumescent anesthesia. Because of the small needle size, patients were very comfortable and less anxious during anesthesia delivery. Clinicians also preferred the use of the syringe adapter for the ease of delivery, the correct depth of penetration and the uniform delivery of anesthesia across the treatment area. On average, the tumescent process was 7 to 8 minutes for both underarms and was less demanding and technique dependent in obtaining reliable and consistent anesthesia results. This delivery method provided adequate pain management during energy delivery and all patients remained comfortable throughout the procedure.

Conclusion

The current anesthesia protocol for the miraDry procedure is cumbersome, heavily technique dependent, intimidating for both patient and clinician, and time consuming. Replacing the long needles and fanning technique with the syringe adapter eliminates the challenges involved with anesthesia administration for the patient and the clinician and dramatically decreases procedure time without compromising patient comfort.

Appendix A

Instructions for Syringe Adapter Anesthesia Delivery

Prepare the anesthesia solution as recommended for the miraDry procedure:

- 250ml NS, Injection, USP
- 12.5cc 2% lidocaine with epinephrine (1:100,000)
- 2.5cc sodium bicarbonate if desired for buffering
- Fill appropriate number of 20cc syringes

Prior to administering anesthesia, inform the patients that if they feel a shooting pain down the elbow and/or to the hands, they should inform the clinician immediately. Do not inject anesthesia and remove the syringe adapter. Reposition and continue.

Although not a sterile procedure, maintain a clean technique throughout the entire procedure.

Step 1

Clean the underarm with alcohol. Based on the hair bearing area of the axilla, outline the treatment area using a marker. When needed, the sizing tool can be used to assist in outlining the treatment area. An approximate length and width of the treatment area will help determine the needed volume for anesthesia administration.



Step 1: Outline treatment area

Step 2

To prepare for anesthesia administration, apply Hibiclens® (chlorhexidine) or Betadine® (povidone-iodine) in and around the treatment area. Starting in the center of the treatment area, place the syringe adapter evenly across the skin and insert all needles at the same time.



Step 2: Insert evenly in center of treatment area

Step 3

Starting in the center of the axilla, administer a 20cc bolus of solution. The swelling and blanching of the skin will give an indication of the spread of anesthesia.

NOTE: Clean the area prior to every injection with Hibiclens® or Betadine®. Avoid touching the treatment area at all times during anesthesia administration.



Helpful Hint:

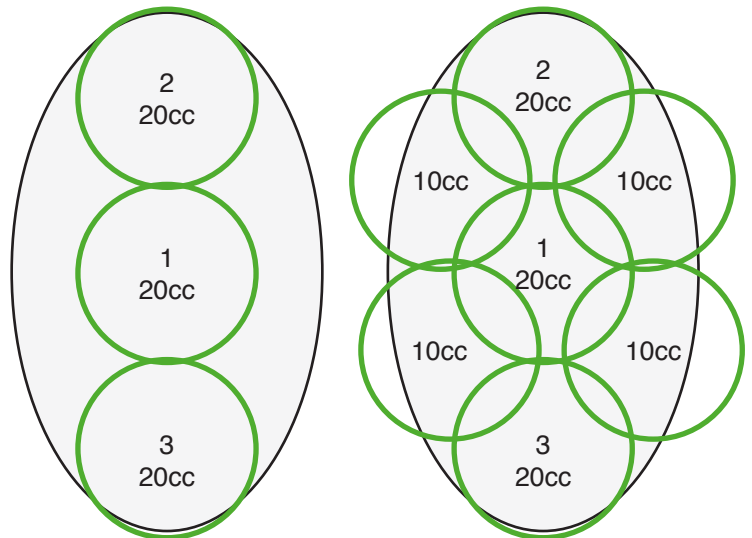
If the syringe delivery pressure is significant, the table can be used to leverage the delivery pressure as seen here.



Step 4

The next 2 placements for delivery should be the superior midline and inferior midline portion of the treatment area, injecting 20cc's of solution for each placement. Thereafter, the syringe adapter can be placed in the lateral and anterior portions of the treatment area, injecting approximately 10cc's for each placement.

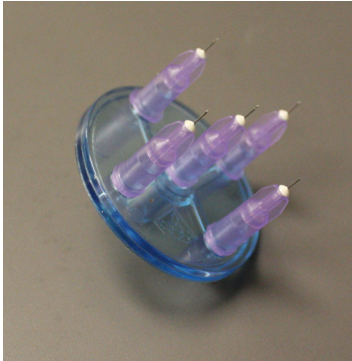
Always follow the total recommended volume for a given treatment size.



Step 5

Clean the area with Hibiclens® or Betadine® prior to sizing and templating the treatment area as recommended for the miraDry procedure. Administer miraDry.

NOTE: Prophylactic antibiotic may aid in post procedure recovery. Patient follow up 24 – 48 hours post procedure and an office visit at one week is recommended. Patients are encouraged to send in photos at 1, 3, and 5 days to assess recovery.



**Gerrish Technique
Syringe Adapter**

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