Plus
Computer Controlled Anaesthetic Delivery System

Operating Manual
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INTRODUCTION

INTRODUCTION TO the Wand Plus SYSTEM
Congratulations on purchasing the patented Wand® Plus Computer Controlled Local Anesthetic Delivery System. You now have an opportunity to use the first major technological advancement in a local anaesthetic syringe since it was invented nearly one hundred and fifty years ago. It represents a state-of-the-art method to consistently and comfortably administer local anaesthesia to your patients. The Wand Pius will prove to be one of the most important and powerful additions to enhance your dental practice. It will have a significant and positive impact on the way in which you practice for years to come.

The Wand™ Plus can be used to administer all traditional local anaesthetic injections, including supraperiosteal and block injections in either arch. Two new palatal injections have been developed to anesthetize maxillary teeth without affecting the lips or face. A modified PDL with The Wand™ Plus improves success and can be used for reliable primary anaesthesia. Other technique improvements are continually evolving. The Wand™ Plus accommodates any local anaesthetic cartridge and a variety of needle sizes. The onboard microprocessor helps you to deliver all of these injections in an effortless, consistent and virtually imperceptible manner. Patients who have experienced a Wand™ injection are amazed at how comfortable it can be. One study found that fear and anxiety levels associated with dental injections were dramatically reduced from just one Wand injection. Significantly, if patient stresses and anxiety are reduced, the operator immediately benefits as well. The Wand™ Plus will open the door to an expanded group of modified injection techniques which will positively influence patient safety, patient comfort and office productivity.

The core technology of The Wand™ Plus is the computer controlled delivery of anesthetic solution at a constant flow rate, regardless of variations in tissue resistance. Even in tissues of high density, such as the palate or periodontal ligament, The Wand™ Plus delivers an anaesthetic drip, which precedes the needle, creating an anaesthetic pathway. This combination of an anaesthetic pathway and a controlled flow rate results in an effective and often pain-free injection.

The delicate tactile control made possible by the slim, pen grasp handpiece allows for an unprecedented level of visibility and fingertip accuracy. This disposable handpiece is linked to the anaesthetic cartridge via a feather-light plastic Micro Tubing. The Wand™ Plus outperforms all traditional syringes in precision, accuracy and comfort.

It is well established that more than 50% of adult patients fear injections(1)(4) and certain injections have traditionally been associated with a significant degree of discomfort. The Wand™ Plus not only offers you and your patients an alternative to the traditional syringe, but to traditional injection techniques as well. This system helps you to achieve profound pulpal anaesthesia often without the annoying side effects of facial numbness. This is accomplished through site-specific injections, which target the teeth instead of the lips, face and muscles of expression.
One of the major advantages of The Wand™ Plus is that it simplifies local anaesthesia. The intraligamentary or periodontal ligament injection (PDL) is an excellent technique for ultra-rapid pulpal anaesthesia. This injection can often be used in lieu of a traditional inferior alveolar block and it does not create collateral anaesthesia to the lips, tongue and face. The Wand™ Plus makes the PDL injection technique more consistent and predictable. The newest and most exciting injection for the maxilla are palatal approach Anterior Middle Superior Alveolar (AMSA)(3)(6) nerve block and the Palatal Anterior Superior Alveolar (P-ASA)(5) These new blocks are possible because The Wand™ Plus helps the operator deliver anaesthetic often below the threshold of pain, making even palatal injections virtually imperceptible.” The AMSA requires one cartridge of anaesthetic which is usually sufficient to completely anesthetize the maxillary central incisor through the second premolar and the palatal tissue associated with these teeth. Therefore 1 ½ to 2 cartridges of anaesthetic is usually sufficient to profoundly anesthetize second premolar to second premolar and the majority of the palatal tissue from a bilateral AMSA nerve field block. The P-ASA injection produces bilateral anaesthesia of the maxillary incisors and usually the canines from a single needle penetration. Profound pulpal anaesthesia without numbness of the face and lips is achieved that has a duration of 60 minutes or more.” In addition to pulpal anaesthesia, profound palatal anaesthesia of the gingiva and mucoperiosteum as well as moderate anaesthesia of the facial gingiva associated with the anterior teeth is achieved. The recommended dosage is from 3/4 to 1 cartridge of anaesthetic with an expected duration of approximately 60 minutes. The lack of any facial sensation of anaesthesia has positive ramifications for both esthetic assessment procedures as well as patient comfort. More importantly, the anaesthesia is achieved for multiple teeth, bilaterally, with a greatly reduced dose of anaesthetic and with a single needle penetration.

Only the PDL, AMSA and P-ASA injections are addressed above, however The WAND can be used for ALL dental injections with unique advantages and benefits.

The Wand™ Plus takes the fear and anxiety out of dental injections, offers an exciting new technology for local pain control, plus enhanced and expanded procedures. This manual explains the various components of the system and how they operate. Clinical techniques are briefly reviewed with an emphasis on how the operator can best use The Wand™ Plus for maximum performance and effectiveness.

SPECIAL NOTE: ALTHOUGH The Wand™ PLUS SYSTEM IS EASY TO USE. IT IS UNLIKE THE TRADITIONAL SYRINGE YOU ARE ACCUSTOMED TO USING. THEREFORE IT IS STRONGLY RECOMMENDED THAT YOU THOROUGHLY REVIEW AND STUDY THE QUICK START VIDEO AND CHAIR-SIDE CARDS ENCLOSED WITH THIS SYSTEM KIT.

Footnotes:
FEATURES

1. Drive Unit
2. Power Switch (@ back of drive unit)
3. Aspirate/Reset Button
4. Power indicator Light
5. Aspirate Indicator Light
6. Cartridge Volume Indicator Light
7. Anesthetic Cartridge Holder
8. Micro Tubing
9. Handpiece
10. Cartridge Holder Socket
11. Handpiece Receptacle
12. Plunger with O-Ring
13. Foot Control
   with Air Hose

Figure 1
COMPONENTS

Drive Unit
Power Switch
Press Power Switch to turn Drive Unit On/Off.

Reset Button
Fig. 2. The Aspirate/Reset button is used for five different operations:

1. Aspiration Mode: Aspiration is automatically ON after purge cycle is completed. See aspiration section on pg. 11. Button is used to turn OFF aspiration function. NOTE: Light ON = Aspiration ON. Light OFF = Aspiration OFF. (Fig. 2)

2. Cleaning Mode: To extend the plunger fully for cleaning and lubrication. See cleaning section on pg. 12 for details. (Fig. 3)

3. Reset Mode: To retract plunger to home down position, press and hold 4 seconds. Plunger retracts. (Fig. 4)

4. Button is also used in reprogramming of sounds and volumes. See reprogramming pg. 14 for details.

5. Button is used to adjust volume of sound tones. See pg. 14 for details.

Indicator Lights
There are 7 Indicator Lights on the front panel of the Drive Unit.

Power Light
The red Power Light is illuminated when the Power Switch is turned ‘On’

Aspirate Light
The yellow Aspirate Light is illuminated and the Aspirate function is activated when the unit is turned on and the purge cycle is performed. Aspiration function and light can be turned off by pressing Aspirate button.
COMPONENTS

Anaesthetic Cartridge Volume Indicator Lights
There are 5 Cartridge Volume Indicator Lights that illuminate to show the volume of anaesthetic solution delivered. Light goes off to indicate amount delivered. (ie. 2nd light goes out = 1/4 delivered. 3rd light goes out = ½ delivered. See Fig. 5.

![Volume Indicator Lights](image)

Full/Ready 1/4 delivered 1/2 delivered 3/4 delivered Empty

Disposable Components
Note: Wand disposables do not contain latex.

Wand™ Assembly (Handpiece, tubing and cartridge holder)
Is prepackaged sterile and designed for single use only.

Wand™ Plus Handpiece (Feature #9 on Fig. 1, Pg. 3)
The Wand™ Plus Handpiece is a pen-like handle that is attached to the Micro Tubing and holds the disposable needle.

Anaesthetic Cartridge Holder (Feature #7 on Fig. 1, Pg. 3)
The Cartridge Holder holds the Cartridge in proper position for dispensing anaesthetic solution and is secured to the Drive Unit with a twist-lock flange.

Micro Tubing (Feature #8 on Fig. 1, Pg. 3)
The anaesthetic solution passes through the Micro Tubing from the Cartridge to The Wand™ Plus Handpiece and needle.

Needles
Sterile disposable Luer Lock needles are available in a wide variety of gauges and lengths. See 'Reorder Information' at the back of the manual.

CONCEPTS AND BACKGROUND

TERMS AND FEATURES TO BE FAMILIAR WITH
Before proceeding with this manual or with setup and operations it is important that you have a basic understanding of various terms and functions that will be discussed in the context of operation and use.

DELIVERY SPEEDS
The WAND Plus unit is designed to deliver anaesthetic at 2 controlled rates of delivery. It is necessary to understand this concept before proceeding.
1. **Slow Speed**: Approximately 1 drop (0.005 mi/sec) every other second used during needle penetration and insertion for ALL INJECTIONS. Use only slow speed for injections in the palate and the periodontal ligament space.

2. **Fast Speed**: Approximately 1.4 coin 60 seconds (0.030 ml/sec) used to inject at a faster controlled rate once the final site is reached such as for an Inferior Alveolar Nerve Block or a Supraperiosteal Infiltration.

The speeds are controlled by the foot control. Slight pressure = slow speed. Strong pressure = fast speed. Release of pressure activates the aspiration cycle (unless it is manually turned off). See Foot Control section below.

**SOUND TYPES**: Audible beeps, chimes, gongs etc. that indicate delivery speeds, aspiration cycle, purge cycle and quantity delivered. There are three different Sound Types to select from. Optional SOUND TYPES can be selected to announce the cruise control window. Sound volume can also be adjusted to 4 levels.

**VOICE PROMPTS**: There are voice messages preset to indicate the cruise control function window, and time to lubricate. There are additional messages that can be activated to indicate quantity delivered as desired by the operator.

**PURGE CYCLE**: Once the unit is set up and ready for operation, the first time you step on the foot control, the unit will purge any air from the line and needle. A small amount of anaesthetic will also be expressed.

**ASPIRATION CYCLE**: If aspiration is turned on, (unit defaults to ON position when first turned on) the unit will automatically perform an aspiration cycle when you remove your foot from the foot control. This 5-second cycle allows verification that the needle is not in a blood vessel.

**CRUISE CONTROL**: Available on slow speed only. This function allows you to remove your foot from the foot control during longer procedures such as PDL and palatal injections. The unit temporarily locks in the slow speed until you re-step on the foot control. (See pg. 10 and 11 for usage instructions)

**SELECTION MENU/ REPRORAMMING FUNCTION**: The Wand™ Plus unit has several functions that can be adjusted or added. One must access the Selection Menu to reprogram or add functions. See pg. 14 for Reprogramming information.

**VOICE AND AUDIBLE TONES - PURPOSE / FUNCTION / SETTING**

The Wand™ Plus comes with a pre-set selection of audible tones and voice call-outs. These tones and voices are your guide to the functions being performed by The Wand™ Plus unit. These selections may be varied and additional functions added at your discretion. See Reprogramming Section on pg. 14 for details on options and reprogramming. The voices and sound types are preset as follows on your unit as delivered from the factory and the operation instructions in this manual are written to conform to the preset functions:
**OPERATION**

<table>
<thead>
<tr>
<th>FEATURE</th>
<th>PRESET TO</th>
<th>OPTIONS</th>
<th>TO REPROGRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound Type Volume</td>
<td>Medium Low</td>
<td>4 Levels</td>
<td>Aspirate Button</td>
</tr>
<tr>
<td>Selection Cruise Control Voice</td>
<td>ON</td>
<td>#1 Type</td>
<td>See pg. 14</td>
</tr>
<tr>
<td>Voice Volume</td>
<td>Medium Low</td>
<td>#2 Type</td>
<td>See pg. 14</td>
</tr>
<tr>
<td>Quantity Delivered</td>
<td>Sound Tone At ¼, ½, ¾</td>
<td>#3 Type</td>
<td>See pg. 14</td>
</tr>
<tr>
<td>Lubricate &quot;0&quot; Ring</td>
<td>ON (Activates after Every 25th cycle)</td>
<td>OFF Defaults to Sound Tone Low Medium Low Medium High High Voice At ¼, ½, ¾ Voice Milliliters</td>
<td>See pg. 14</td>
</tr>
</tbody>
</table>

**Set Up**

Connect Foot Control hose to front outlet on Drive Unit. Hand tighten snugly.

Position Drive Unit on flat, level surface within 3 feet of patient. The Wand™ Plus Micro Tubing is 5 feet long from the Drive Unit to the Handpiece.

Plug the Drive Unit electrical cord into a power outlet.

**Note:** Do not place The Wand™ unit within 12 inches of other electrical devices such as electro-surgery units as they may cause interference.

**Power 'On/Off', See fig. 1**

Push Power Switch ON, on the back of the Drive Unit to turn system power 'On' and 'Off'. Plunger will automatically retract to 'Home' position when unit is turned 'On'. When the Foot Control is first depressed, the Drive Unit automatically extends the plunger a preset distance to purge air from the micro tubing and the needle.

**Attaching Handpiece**

Turn unit on. Remove Sterile Wand Plus Handpiece from package. Exercise caution to maintain sterility.
Note: Do Not Re-use Handpiece

The use of this device, as with any syringe, opens a fluid pathway directly to the patient. Therefore, Regulations mandate single use only. Regulations distinguish between “reusable” and “disposable”. These terms are mutually exclusive. The individually sterilized Wand™ Plus Handpiece is clearly labeled disposable. It is designed for one time single use only. It may not be re-sterilized and must not be used on successive patients or the same patient at a later visit, regardless of whether or not aspiration was employed during the previous injection. REUSING THE HANDPIECE PLACES THE PATIENT AT RISK. FOR THE SAME REASON, THE ANESTHETIC CARTRIDGE MUST NOT BE REUSED ON SUCCESSIVE PATIENTS.

Attaching Needle, See Fig. 6
Caution: Maintain sterile conditions.
Remove needle from sterile packaging. Hold Wand™ Plus Handpiece firmly. Place Luer Lock end of needle into open end of Wand™ Plus Handpiece and rotate needle approximately 1/4 turn. It is critical that the needle is firmly secured to the Wand™ Plus Handpiece.

Note: The Wand™ Plus Handpiece, can be bent to properly orient the needle for injection. Bend very slowly. Or, The Wand™ Plus Handpiece can be broken to create a short, very easily controlled needle handle for injections into tight areas.

Store Handpiece and needle in receptacle on top of Drive Unit until ready for use. See fig. 9.

One Handed Needle Recapping Technique
(1) After needle is attached to the handpiece, place needle cap into holder on top of The WAND Plus unit. See Fig. 9.

(2) Hold needle cap firmly with one hand, remove the needle from the cap with the other hand by pulling straight out from the cap. Do not twist. (Cap remains in receptacle on unit top).
(3) Lightly set the needle back into the cap. Do not press into the cap. This is a temporary holding dock for the needle.
(4) When ready to use the handpiece and needle, simply remove the handpiece and needle from the cap. Return the needle to the cap during periods of non-use.
(5) When the procedure is completed, firmly press the needle into the cap on the top of The Wand™ Plus unit. When locked in place and keeping your hands behind needle point, remove the cap with the attached needle from the unit, remove the needle from the handpiece and discard in an approved manner.

NOTE: Recap needle when medically necessary or when no other alternative exists.

**Loading Anaesthetic. Fig. 10**

Slide diaphragm end of cartridge (with metal band) into Cartridge Holder, push cartridge firmly and completely into holder until you feel the spike penetrate the rubber diaphragm. Place open, flange end of Cartridge Holder into the Cartridge Holder socket on top of unit, and rotate counter clockwise 1/4 turn until white triangle on holder aligns with seam on unit.

**Caution:** Always make sure Cartridge Holder is perpendicular to unit. Inserting at an angle may cause cartridge breakage. Be sure the plastic spike in Cartridge Holder punctures the diaphragm in the cartridge and the plunger and the O-Ring are properly positioned in the end of cartridge.

NOTE: If you experience difficulty puncturing a cartridge it may be due to variations in the rubber diaphragm material with various brands of cartridges and can vary within a lot, even within a box of cartridges. Try these four solutions to correct the situation:

1. Place the cartridge into the holder, gently rotate the cartridge stopper 360 degrees against the spike two or three times. Then press firmly into the holder, puncturing the cartridge. A slight twisting motion as you puncture may also help.
2. Place cartridge into cartridge holder. Place cartridge against a firm surface - counter top - and press quickly and firmly down.
3. Swab rubber diaphragm with alcohol, which acts as a lubricant.
4. Place the cartridge into the holder. Press firmly against spike, stretching the rubber diaphragm for 5-6 seconds. Release and immediately re-push rapidly and firmly against spike.

**Caution:** Each time a new anaesthetic cartridge is loaded into the holder, the purge cycle must be activated by momentarily depressing and releasing the foot control. It is important that you allow the cycle to complete prior to initiating or resuming an injection. Once the cycle completes all lights come on. Unit automatically defaults to aspirate on mode when changing cartridges. For injections not requiring aspiration, deactivate Aspirate Mode.
Attention: This device will accept 1.8 ml cartridges only.
Note: It should be noted that approximately 0.25 cc of anaesthetic is expelled during the purge cycle and that 0.12 cc is the residual amount remaining after the cartridge is emptied. The injection volume per cartridge is approx. 1.4 ml.

Foot Control Operation/Cruise Control, See Fig. 11, 12 & 13
The foot Control supplied with The Wand™ Plus System is an air activated switch. Slight pressure = slow speed. Strong pressure = fast speed. Always be certain that the foot control hose is firmly attached to the unit. Any air leaks will degrade operation. Practice using the foot control to become comfortable with the operation and pressure required to activate the slow and fast speeds.

1. PURGE CYCLE: Immediately after anaesthetic cartridge is loaded and Cartridge Holder is attached to Drive Unit, depress and release foot pedal to initiate air purge cycle. See Fig. 11

2. SLOW SPEED: Position 1, 'Slow Speed' - When the Foot Control is slightly or partially depressed The Wand™ Plus System will operate at slow speed. See Fig. 12. Slow audible beeps and blinking lights will be observed.

3. FAST SPEED: Position 2, 'Fast Speed' - When the Foot Control is firmly or fully depressed The Wand™ Plus System will operate at fast speed. See Fig. 13. Fast beeps and blinking lights will be observed.

4. ASPIRATION: The Aspiration Mode is ON when the unit is turned on. After purge cycle, to activate aspiration simply remove your foot from Foot Control. Unit will go into aspiration cycle immediately. NOTE: Always perform aspiration pre-test described on pg. 11.

5. CRUISE CONTROL FUNCTION: This feature allows the operator to let the unit maintain the slow flow rate (slow speed) without continuous contact with the Foot control. This is ideal for longer injections such as PDL and palatal injections. This feature is available on the slow speed only.
   * The calculated priming volume (air to be displaced) is 0.17 cc.
To use Cruise Control:
2. After approximately 8 beeps a voice will say HOLD (See note below). This opens a 3 second window during which you can activate the cruise control.
3. Immediately remove foot from Foot Control. Cruise Control is engaged. Voice will say SET.
4. If you do not want to engage Cruise Control, do not remove foot from Foot Control during this window.
5. To disengage Cruise Control, step on Foot Control and release or press firmly to fast speed.

NOTE: To change from Voice Prompt to a sound tone (beep) prompt see Reprogramming Section on pg. 14.

Plunger Operation
As plunger is extended, dispensing anaesthetic, the Volume Indicator Lights will be illuminated to show the amount of anaesthetic delivered. As plunger is fully extended, a rapid audible beep is sounded. This indicates that the Cartridge is empty. Press Aspirate/Reset Button, hold for 4 seconds to retract plunger to ‘Home’ position.

Removal of Cartridge
Insure plunger is fully retracted. Release Cartridge Holder from socket in Drive Unit by rotating Cartridge Holder clockwise 1/4 turn. Remove cartridge by pushing with finger placed into slots in side of holder. If continuing injection procedure, remove and discard empty cartridge, insert full cartridge, install in Drive Unit, perform purge cycle before resuming. See Fig. 14.

Proper Disposal
The following is a general guideline for proper disposal of Handpiece, needle and cartridge.

NEEDLE: Recap needle, remove from Handpiece, and place into sharps container. This operation should be performed only after the needle has been securely recapped and taking care not to dislodge the cap from the needle with resulting risk of needle stick injury.

HANDPIECE: Separate from the needle. If aspiration has not been conducted and no visible contaminates are present, discard as normal waste. If aspiration has been conducted, or if any visible contaminates are present discard as medical regulated waste.

CARTRIDGE: Discard in the same fashion you discard cartridges now.

Aspiration and Aspiration Pretest
1. TO TURN ON ASPIRATION: Aspiration is automatically turned on after the purge cycle is completed. To turn off before or during a procedure, press the Aspirate/Reset Button.
2. TO ASPIRATE: Be sure Aspiration Mode is activated, indicator light on. Aspiration is initiated by lifting foot from the Foot Control at slow or fast speed. Positive aspiration will show blood in the tubing contained in the handpiece. When the Aspiration function occurs, the plunger is retracted a preset distance, then automatically returns to its original position.

WARNING: When the Aspirate/Reset Button is pressed and held down and the power is turned ‘On’ the plunger will automatically fully extend. See Plunger Changing and Sterilizing, page 12-13.
3. **TO TURN ASPIRATION OFF:** Press the Aspirate/Reset Button once. The indicator light will go off.

4. **IMPORTANT ASPIRATION PRETEST**
   It is recommended that an aspiration pretest be performed prior to any injection requiring aspiration. This simple pretest will confirm that the disposable handpiece, anaesthetic cartridge and attached needle are free from air leaks which might compromise aspiration efficiency.

   Once the Wand™ unit purge cycle is completed, orient the needle **horizontally with the bevel down** or to the side. **Pretest will not work if needle bevel is in the up position.**

   Express anaesthetic solution extra-orally at the slow flow rate (slow speed). Release the foot control and observe the drop of anaesthetic at the end of the needle. If a drop is retracted and returns to the needle tip at the end of the aspiration cycle, about 5 seconds, aspiration is functioning properly.

   If droplet does not retract, do the following in descending order:
   1. Retighten Luer Lock needle hub and retest
   2. Replace cartridge and retest
   3. Replace Wand™ Handpieces and retest
   4. Lubricate O-Ring and retest
   5. Replace O-Ring and retest

   This test should be repeated with each new anaesthetic cartridge when aspiration is to be used. Rubber stopper movement can also be monitored during aspiration as a further assurance.

**Maintenance and Care**

1. **CLEANING DRIVE UNIT**
   After each use the unit should be disinfected. Spray disinfectant on a soft towel and wipe the unit. Do not spray directly onto unit. A barrier system can also be used over the drive unit.

2. **"0" RING AND PLUNGER MAINTENANCE AND LUBRICATION**
   A properly maintained and lubricated "0" Ring is necessary for effective functioning of the Aspiration Cycle. We recommend that the following procedure be initiated:
   1. Check "0" Ring for cracks, deterioration, or lack of lubrication daily.
   2. If cracked or deteriorated, replace at once.
   3. If dry or not lubricated, lubricate with silicone gel provided in Handpiece box.
   4. While plunger is extended, lightly lubricate plunger shaft with silicone gel. This will enhance smooth performance.

   **NOTE:** Unit will automatically remind you to lubricate after every 25 cycles.

3. **PLUNGER AND "0" RING CHANGING AND STERILIZING**
   Plunger and O-Ring Assembly may be removed for sterilization or replacement. **Do not activate cleaning mode with cartridge in place.**
Removal of Plunger and O-Ring Assembly (Cleaning Mode)

Turn ‘Off’ the Drive Unit. Remove Cartridge Holder from Socket if present. Press and hold Aspirate/Reset Button and simultaneously turn the Power Switch 'ON'. The Drive Unit will automatically extend the Plunger and O-Ring Assembly for removal. Unscrew the Plunger from the Drive Unit by rotating it counterclockwise. A recommended autoclave procedure is as follows:

1. Remove plunger from The Wand™ drive unit.
2. Manually clean with a soft brush, taking care to remove all lubricant and debris.
3. Rinse and dry plunger. Inspect for corrosion or other damage.
4. Place plunger in an autoclave bag and seal.
5. Sterilize using steam autoclave (moist heat steam under pressure). Following manufacturer's instructions for sterilization of steel surgical instruments. Typical parameters are: • Time 15-30 minutes. Temperature 250° F (121°C), pressure 15psi.
6. Prior to use, install new O-Ring, apply silicone lubricant, and affix plunger to Wand™ drive unit.

Installation of Plunger and O-Ring Assembly:

Carefully slide O-Ring onto O-Ring groove at end of Plunger. Screw Plunger threaded end into Drive Unit and rotate Plunger clockwise until properly secured in Drive Unit.

Note: Apply a small amount of silicone lubricant to the O-Ring weekly or after every 25 cycles. Inspect O-Ring daily for signs of deterioration.

4. CARTRIDGE BREAKAGE

Occasionally, a cartridge may break during insertion or operation. If a cartridge breaks it is important that all glass and fluid be removed from around the plunger and cartridge holder receptacle in the unit. Failure to remove glass particles can cause jamming and malfunction of the plunger. Failure to remove excess spilled anaesthetic fluid can allow fluid to seep into unit. This can lead to an electrical malfunction or jamming of parts due to residue from evaporated fluid.

If cartridge breaks:

1. Remove cartridge holder and cartridge.
2. Turn unit over and remove any glass particles or fluid.
3. Using high volume suction, or compressed air, clean out cartridge holder receptacle on top of unit to remove fluid and glass particles.
4. Inspect for remaining glass particles and remove.
5. Remove plunger. Clean and autoclave before re-use. Discard O-Ring and replace with a new one.
RE-PROGRAMMING AND ADJUSTMENTS

The following functions may be altered, adjusted, activated or deactivated on The Wand™ Plus. 1. Sound Type Volume (4 choices) 2. Sound Type Selection (3 choices) 3. Cruise Control Voice call-out 4. Voice Volume (4 choices) 5. Quantity delivered (4 choices).

SOUND VOLUME:
The audible Sound Type on The Wand™ Plus unit can be set at 4 different sound volumes.

To change volume setting:
A. Turn unit on. DO NOT press foot control.
B. Aspirate light should be off.
C. Hold Aspirate Button until beeping is heard.
D. Continue to hold button down. Unit will cycle through 4 sound volume levels.
E. When desired volume level is attained, release button. Unit will maintain set level.

NOTE: TO ADJUST FEATURES 2 THRU 5 ABOVE YOU MUST ACCESS THE SELECTION MENU FIRST.

TO ACTIVATE SELECTION MENU & GENERAL GUIDELINES FOR CHANGES
A. With unit off, hold Foot Control down and press aspirate button simultaneously. While holding, turn unit on (switch on back). Hold in this position for approximately 8 seconds.
B. When unit Voice announces SELECTION MENU, release foot control.
C. Depress and release Foot Control to scroll through the 4 controllable options (2 thru 5 above).
D. Within each controllable option, move through selection by depressing Aspirate button. When desired option is selected, press foot control to save to memory.
E. Wait and unit will automatically move to next menu category.
F. When finished, turn unit off and restart. All saved selections will be activated.

SOUND TYPE SELECTION
A. Scroll thru menu and stop at Sound Type Selection. There are 3 Sound Types to select from.
B. Press Aspirate button to scroll through three types.
C. Press Foot Control to save Sound Type selected.
D. Wait for next category or turn off.

CRUISE CONTROL MESSAGE (Deactivates voice call out for Cruise Control. If deactivated, unit defaults to beep tone message)
A. Press Aspirate button to select on or off for this function.
B. Press Foot Control to save selection
C. Wait for next category or turn off

VOICE VOLUME (4 volumes to select from)
A. Press Aspirate button to scroll through 4 volume levels.
B. Press Foot Control to save selection
C. Wait for next category or turn unit off

DISPENSED QUANTITY MESSAGE This function is set to sound tone upon delivery. Select from 1.) Sound Tone (on/off) or 2.) Voice that indicates 1/4, 1/2, 3/4 delivered, or 3.) Voice indicating milliliters delivered.
A. Press Aspirate button to scroll through selections
B. Press Foot Control to save selection
C. Wait for next category or turn unit off
<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CAUSE</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Power Indicator Light</td>
<td>Switch Is &quot;OFF&quot;</td>
<td>Turn Switch to ‘ON’</td>
</tr>
<tr>
<td></td>
<td>No power at power outlet</td>
<td>Check fuse or circuit breaker</td>
</tr>
<tr>
<td>No Aspirate Indicator Light</td>
<td>Not in Aspirate Mode</td>
<td>Press reset once</td>
</tr>
<tr>
<td>Cartridge Volume Indicator Lights show empty</td>
<td>Cartridge is empty</td>
<td>Replace the Cartridge</td>
</tr>
<tr>
<td>When pressing Foot Control. Drive Unit stops and Warning Lights flash</td>
<td>Dirty Plunger</td>
<td>Remove, clean, lubricate and reinstall plunger</td>
</tr>
<tr>
<td></td>
<td>Improper installation of the Plunger</td>
<td>Install Plunger properly see pg. 13</td>
</tr>
<tr>
<td></td>
<td>Improper installation of the O-Ring.</td>
<td>Install O-Ring properly see pg. 12</td>
</tr>
<tr>
<td></td>
<td>Micro Tubing is kinked, pinched, or bent.</td>
<td>Replace Wand Handpiece</td>
</tr>
<tr>
<td></td>
<td>Cartridge Holder or Handpiece is bent or blocked.</td>
<td>Replace Wand Handpiece</td>
</tr>
<tr>
<td></td>
<td>Needle is bent or blocked</td>
<td>Replace Needle</td>
</tr>
<tr>
<td>Drive Unit does not respond to Foot Pedal activation</td>
<td>Foot Control Tubing is bent, pinched, or blocked.</td>
<td>Unblock Foot Control air hose.</td>
</tr>
<tr>
<td></td>
<td>Tubing not securely attached</td>
<td>Retighten air hose connection</td>
</tr>
<tr>
<td></td>
<td>Leaking Foot Pedal</td>
<td>Replace Foot Pedal</td>
</tr>
<tr>
<td>Anaesthetic not flowing properly</td>
<td>Check for air gap between plunger and Cartridge</td>
<td>Replace Cartridge</td>
</tr>
<tr>
<td></td>
<td>Check for spike properly puncturing Cartridge</td>
<td>Replace Cartridge</td>
</tr>
<tr>
<td></td>
<td>Blocked needle or disposable</td>
<td>Push to puncture or replace Handpiece assembly. See pg. 9 for proper puncture technique</td>
</tr>
<tr>
<td>Aspiration Inadequate</td>
<td>Worn or dry O-Ring</td>
<td>Replace needle and/or Handpiece</td>
</tr>
<tr>
<td></td>
<td>Replace or lubricate O-Ring</td>
<td>Replace or lubricate O-Ring</td>
</tr>
<tr>
<td>Needle Is leaking at Luer Lock interface</td>
<td>Luer Lock not tight</td>
<td>Tighten Luer Lock</td>
</tr>
<tr>
<td>SYMPTOM</td>
<td>CAUSE</td>
<td>SOLUTION</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Cartridge is not pierced (does not fully seat into holder).</td>
<td>Inconsistent rubber diaphragm in cartridge</td>
<td>See pg.9 for proper puncture technique.</td>
</tr>
<tr>
<td>Tabs break off Cartridge during initial use.</td>
<td>Not fully rotated into locked position</td>
<td>Make sure Cartridge Holder is twisted counter clockwise until it stops.</td>
</tr>
<tr>
<td></td>
<td>Blocked fluid path. No fluid flow</td>
<td>Change Handpiece Set and needle. Check cartridge piercing.</td>
</tr>
<tr>
<td>Glass Cartridge breakage.</td>
<td>Cartridge Holder not fully Rotated</td>
<td>Tighten securely</td>
</tr>
<tr>
<td></td>
<td>Cartridge installed at improper angle</td>
<td>Always install cartridge in perpendicular position.</td>
</tr>
<tr>
<td></td>
<td>Cartridge not pierced</td>
<td>See above on piercing</td>
</tr>
<tr>
<td></td>
<td>Blocked needle or disposable</td>
<td>Replace needle and/or Disposable</td>
</tr>
<tr>
<td>Top light blinks and unit.</td>
<td>Computer malfunction</td>
<td>Turn unit off and restart</td>
</tr>
<tr>
<td></td>
<td>Blocked needle or disposable</td>
<td>Replace needle and/or disposable</td>
</tr>
<tr>
<td></td>
<td>Dirty plunger</td>
<td>Remove, clean, lubricate and reinstall plunger</td>
</tr>
<tr>
<td>Plunger does not retract.</td>
<td>Computer malfunction</td>
<td>Turn unit off and restart</td>
</tr>
<tr>
<td></td>
<td>Dirty plunger</td>
<td>Remove, clean, lubricate and reinstall plunger</td>
</tr>
<tr>
<td>Aspiration mode on, but aspiration does not function.</td>
<td>Loose Luer Lock needle</td>
<td>Tighten needle securely and retest</td>
</tr>
<tr>
<td></td>
<td>Dried out, cracked or worn O-Ring</td>
<td>1. Lubricate and retest. 2. Replace and retest.</td>
</tr>
<tr>
<td>Unit fails to operate and a long beep sequence of fast short audible</td>
<td>Computer malfunction</td>
<td>1. Press and hold aspirate button for 2 seconds. 2. Turn unit OFF, wait 15 seconds and restart. 3. Call Technical Service for assistance.</td>
</tr>
<tr>
<td>tones is heard. Various combinations of lights (on and off) are</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If any other symptoms occur call DPS on: 01438 820550 OR FAX: 01438 821425</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16
INJECTION DYNAMICS

Introduction to The WAND Injection

1. Your First Injection

The Wand™ Plus has some distinct differences compared to a conventional syringe. You should practice a few injections at the "bench" to become accustomed to differences between The Wand™ Plus and a conventional syringe.

The conventional syringe has been an integral part of your professional career and it feels very natural and comfortable. However, it requires muscles of the wrist, forearm and shoulder to administer an injection. These muscles are not designed for refined, delicate movements. When pressure from the thumb is applied to the syringe plunger, the hand becomes contorted and muscles are strained. Fine antagonistic movements are virtually impossible. In sharp contrast, The Wand™ Plus Handpiece is ultra light and allows for refined, precise fingertip movements.

2. Foot Control vs Thumb Control

The most significant difference between a Wand™ Plus injection and a conventional syringe is that your thumb is no longer the "motor". A foot control is used to start and stop the injection of anaesthetic solution. Since your thumb is not moving the anaesthetic, you can focus your complete attention on the delicate precision with which you can position and control the needle.

3. General Considerations

The Wand™ Plus can comfortably be used for all types of injections. Topical anaesthetic is often unnecessary when using The Wand™ Plus, however, it can certainly be used if the operator desires. Remember you create an "anaesthetic pathway" by initiating the slow flow rate upon needle penetration and by advancing the needle very slowly. This produces a very comfortable injection experience. Prepare the patient for a slow, gentle injection by advising them that the injection is computer controlled and takes longer to administer than previous methods (possibly more than 3 minutes with the palatal injections).

With practice, you will find that the PDL, P-ASA*, and AMSA* injections are ideal substitutes for traditional mandibular and maxillary anaesthesia techniques. They can minimize anaesthetic dosage requirement, provide a rapid onset of anaesthesia, minimize the risk of accidental intravascular injection and eliminate collateral numbness of the face and lips. This results in benefits for you, your patients and your practice productivity.

* Anecdotal technique defined by FriedMan M.J. (former clinical consultant to Milestone Scientific), Hochman M.N. (Milestone Scientific Clinical Consultant). Full independent clinical studies in progress.

1. Always observe the toxic threshold values of the medication used.
2. Practice several times before using The Wand™ Plus on a patient.
3. Prepare the patient for a slow, but comfortable injection.
4. Always use the slow flow rate during needle penetration.
5. Maintain the slow flow rate for injections in tissues of increased density.
6. Topical can be used if desired.

Dynamics of the Injection*

1. Components of the injection

The Wand Plus offers both physical and psychological advantages.

There are three (3) physical components to any injection which play a role in what the patient may experience during the injection process; 1. The initial penetration of the needle into tissue, 2. The advancement of the needle through the tissue, and 3. The deposition of anaesthetic fluid in the tissue. The delicate pen-grasp and the ultra-light Wand Plus Handpiece allows the operator to manipulate the needle with unparalleled accuracy and precision. The Wand Plus does not resemble a syringe and does not look "threatening" in appearance. If anticipatory anxiety is reduced and patient confidence is increased, the entire injection experience is likely to be a more positive one for the patient and the operator.

2. Microprocessor Controlled "Sloflow~" and the Anesthetic Pathway

Many patients believe that the needle insertion is what causes discomfort, when in fact most of the pain is caused by the flow of the anaesthetic. When injected too quickly, traditional anaesthetics create a burning sensation. Experts in anaesthesia agree that a controlled slow rate of injection is ideal.** The Wand™ Plus flow rates are preset at 2 rates (slow and fast) and are automatically delivered regardless of tissue density. These patented controlled flow rates result in an injection experience that is typically below the threshold of pain.

It is speculated that during needle insertion, a continuous positive solution pressure delivers an anaesthetic drip that can precede the needle path. This anaesthetic path-way is believed to assist in virtually eliminating discomfort as the needle penetrates through the tissue.

Injections with The Wand™ Plus take longer, but the onset of anaesthesia is often faster and typically the overall experience is much more comfortable.

* Hochman, Mark, Friedman, Mark., Technique Article: Injection Dynamics For a Comfortable Palatal Injection. Manuscript in review.
** Malamed S.F., Handbook of Local Anesthesia Fourth Edition Mosby, St. Louis, MO. Pg. 140-141.
INJECTION DYNAMICS

Mandibular Block Injections

<table>
<thead>
<tr>
<th></th>
<th>Traditional Syringe</th>
<th>The Wand™ Plus*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approx. Injection Time</td>
<td>20-120 seconds</td>
<td>60-90 seconds</td>
</tr>
<tr>
<td>Approx. Onset of Anesthesia</td>
<td>7-10 min.</td>
<td>3-5 min.</td>
</tr>
<tr>
<td>Approx. Total Time</td>
<td>7:20-12:00</td>
<td>4:00-6:30</td>
</tr>
</tbody>
</table>

Maxillary Teeth (2nd premolar to 2nd premolar)

<table>
<thead>
<tr>
<th></th>
<th>Traditional Syringe</th>
<th>The Wand™ Plus*</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Injections</td>
<td>6-8 Infiltrations</td>
<td>2 Injections (AMSA).</td>
</tr>
<tr>
<td>Amount of Anesthetic</td>
<td>3-5 Cartridges</td>
<td>2 Cartridges</td>
</tr>
<tr>
<td>Approx. Injection Time</td>
<td>(5.4 ml-9.0 ml)</td>
<td>(3.6 ml)+</td>
</tr>
<tr>
<td></td>
<td>6 min.</td>
<td>6 min.</td>
</tr>
<tr>
<td>Approx. Onset of Anesthesia</td>
<td>10-15 min.</td>
<td>5-8 min.</td>
</tr>
<tr>
<td>Approx. Total Time to Anesthesia</td>
<td>16-21 min</td>
<td>11-14 min</td>
</tr>
</tbody>
</table>

* All times are approximate and are based on anecdotal experience. University studies are in process.
+ Approximately 0.4 ml loss occurs in handpiece tubing and purge cycle.

3. Slow Needle Advancement Creates Anesthetic Pathway

Advance the needle very slowly. To effectively create an anaesthetic path it is necessary to pause (approx. 4 beeps) between each 2 mm of advancement. Needle is advanced approximately 1 mm during active rotation, (see rotation section 4 below) pause for anaesthetic flow, continue advancement. Rapid advancement of the needle will defeat the advantage of the anaesthetic pathway.

4. Hand Control and Rotational Needle Insertion Methods

The most obvious difference between a syringe and The Wand™ Plus is the delicate manner in which it can be held and manipulated. Weighing only a few grams, the ultra-light handpiece promotes precise movements with unsurpassed tactile feed-back. Since the needle can be rotated between thumb and finger, new insertion methods are possible. Always move the needle forward very SLOWLY with The Wand™ Plus activated on the slow flow rate to generate an anaesthetic pathway.

There are three (3) distinct needle insertion methods:

- **Slight rotation for insertion into mucosa**
  Insert the needle with a deliberate rotation at the moment it enters the mucosa. This will enhance penetration by reducing the forward force necessary for puncturing the tissue. With a mono bevel needle, rotation brings the sharp needle surfaces into contact with a greater area of the tissue during puncture and initial penetration. Once the needle is through the surface, axial or bi-directional rotation (See pg. 20) can be performed to move the needle forward. Insure that all forward movement is slow while The Wand™ Plus’ slow flow rate is activated.

- **Bi-directional rotation to prevent needle deflection***(180°)**
  In certain injections, such as the inferior alveolar block, accurate targeting is intimately related to clinical success. Needle insertion that penetrates greater than 10 mm can cause needle deflection regardless of needle gauge. This is due to the forces acting upon the mono-bevel needle. A bi-directional rotation of 180° in either direction will cancel deflection and should markedly increase accuracy.
Bi-directional rotation (180° right and left) is performed by rotating the needle back and forth between the thumb and forefinger. The rotation is maintained along the axis of the needle path until the site is reached. Insure that The Wand™ Plus handpiece is not bent or distorted because this will reduce the efficiency of rotation. The rotation movement itself should be performed at a rate of about one second in either direction. The operator will find that the rotational movement will also promote needle penetration without a conscious effort to move the needle forward. When mastered, this technique should greatly reduce anaesthesia onset time and missed blocks.

- **Axial Rotation for insertion into palatal tissue (45°)**

  This needle movement has the effect of bringing the sharp edges of the mono bevel needle into contact with the entire penetration site. It is particularly effective in the dense connective tissue of the palate and should be used in conjunction with the pre-puncture technique described on page 22. Axial rotation (45° right and left) is performed by rotating the needle back and forth between the thumb and forefinger. The rotation is maintained along the axis of the needle path until bone is reached. Gently rotate the needle and move forward about 1-2 mm, stop for 4 seconds then proceed forward. This allows the anaesthetic pathway to form. The rotation movement itself should be performed at a rate of about one second in either direction. The operator will find that the rotational movement will promote needle penetration without a conscious effort to move the needle forward.


**SPECIAL NOTE ON NEEDLE DEFLECTION AND ROTATIONAL TECHNIQUE**

Needle deflection has long been recognized as altering the straight path of needle insertion. This can negatively impact the accuracy and predictability of the inferior alveolar block injection resulting in "missed blocks" and inadequate mandibular anaesthesia. This may be due to the fact that, when using a traditional syringe, the insertion of the needle is linear, making it subject to deflection forces (Diagram A)

**New Bi-directional Rotational Insertion¹**

Since The Wand™ Plus disposable handpiece is held in a pen grasp, it can be rotated continuously during insertion. A recent investigation has demonstrated that a bi-directional rotational insertion technique (Diagram B) will alter the vector forces responsible for needle deflection, regardless of the needle gauge¹ These findings have numerous clinical implications, the most obvious of which is accurate needle tracking to the target site.

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**Diagram A.**

The needle is inserted using the traditional Linear technique. **Note deflection.**

**Diagram B.**

The needle is rotated 180° in a back-and-forth motion, continuously during insertion using thumb and forefinger. Rotation defeats deflection.
**Needle Rotation and Force Reduction**

Needle rotation also assists the cutting efficiency of the needle, helping to reduce the force needed to move the needle forward, so insertion is easier and smoother. In force tests using a digital scale, the force of the needle without rotation registers over 70 grams. With rotation of the needle, the force is dramatically reduced to just over 30 grams. This force reduction is very important in dense palatal tissue to achieve a comfortable injection. Also, with less force needed for penetration, the handpiece can be held with a light, delicate touch that maximizes tactile feel and control.

¹ In vitro study of needle deflection: A linear insertion technique versus a bi-directional rotation insertion technique; Hochman, Mark N., DDS; Friedman, Mark J., DDS; Quintessence Int. 2000:30:33:39

**Benefits for the Patient and Operator**

Potential benefits of the technique include:

1. Fewer "missed" mandibular block injections.¹
2. Fewer re-injections of anaesthetic.
3. More rapid onset of local anaesthesia.
4. Reduced volume of anaesthetic necessary to achieve anaesthesia.
5. Reduced post operative discomfort (e.g. trismus) from fewer injection

**References**

1. In vitro study of needle deflection: A linear insertion technique versus a bi-directional rotation insertion technique; Hochman, Mark N., DDS; Friedman, Mark J., DDS; Quintessence Int. 2000:30:33:39

5. **Pre-Puncture Technique* for Palatal Injections**

The palatal tissue is an area that requires careful attention to insure the most comfortable injection experience. The pre-puncture is a method that should significantly reduce the sensation of needle penetration. It relies on the torque of The Wand™ Plus motor that can generate a high fluid pressure at low volume. The technique is as follows:

- Place the needle bevel against the palate, but do not puncture.
- Place the sterile cotton tip applicator on the back of the bevel and apply pressure (a).
- Activate The Wand™ Plus on slow for 6 - 8 beeps to force anaesthetic into the tissue.
- Continue to apply pressure from the applicator and slowly start bi-axial rotation.
- The pressure from the cotton tip applicator is used to assist the needle puncture.
- Continue axial rotation for 2 beeps moving forward 1-2 mm, followed by a brief pause for 4 beeps (b).
- Repeat previous step of rotation, forward movement, pause, until contact with bone is made.
- Once bone is reached stop axial rotation, but continue the slow flow rate.
- Use the cotton tip applicator to catch drips as needle is withdrawn

6. **New Injection Dynamics with The Wand™ Plus**

Timing the exact moment that a drop of anaesthetic is going to be expressed from The Wand™ Plus takes some practice. It is recommended that a cotton tip applicator be placed close to the site of injection to absorb any anaesthetic solution which is expressed from the needle prior to penetration into the tissue and when the needle is removed from the tissue. The transition from using a traditional syringe to using The Wand™ Plus requires some adjustments; it also makes some new injections possible. The pen-like grip allows for precise needle movement, but needs
to be coordinated with the foot control. Once this is mastered, the following outline will assist
the operator with maximizing the benefits of using these new injection dynamics.

* Hochman, Mark, Friedman, Mark., Technique Article: Injection Dynamics For a Comfortable Palatal Injection. Manuscript in
review.

The slow rate is used during the initial stage of all injections. Maintaining the slow anaesthetic
drip during careful, slow penetration of the needle helps to create an anaesthetic path within
the tissue. This should be done even if penetration is only a few millimeters. In denser tissues
such as the palate or periodontal ligament space, the slow rate of injection should be maintained
through the entire injection process. Other injections such as the inferior alveolar nerve block or
maxillary mucobuccal fold infiltration are initiated with a slow penetration and slow rate. Once
the needle reaches the target landmark, aspiration is initiated and if negative, the fast rate of
injection can be employed. Aspiration can be repeated at any time during the injection by
releasing pressure from the foot control.

NOTE: In some procedures, such as a PDL injection, the Aspiration Mode is turned off by
depressing the Aspirate/Reset button on the front panel of The Wand™ Plus Drive Unit.

7. Review of Injection Dynamics*

1. Prepare the patient for a slow and gentle injection.
2. Topical anaesthetic is applied, (if desired)
3. Place a cotton tip applicator near injection site to absorb anaesthetic solution which may
be expressed prior to needle penetration.
4. Use pre-puncture technique on palatal injections.
5. Initiate the slow (first foot control position) anaesthetic drip as the needle gently
penetrates the tissue. Use rotational insertion technique.
6. Advance the needle very slowly to insure that there is a continuous slow drip to
create an anaesthetic pathway. Continue rotational insertion technique.
7. If indicated initiate the Aspiration Mode by releasing pressure on foot control.
8. The slow or fast flow rate (second foot control position) can be initiated and/or
maintained as necessary.22
9. For traditional infiltration or block injection, start with the slow rate, aspirate,
then proceed to the fast rate of injection.
10. For PDL or palatal injection the slow flow rate is maintained throughout the
injection.

* Hochman, Mark. Friedman, Mark., Technique Article: Injection Dynamics For a Comfortable Palatal Injection. Manuscript in
review.

CLINICAL TECHNIQUES TRADITIONAL

Introduction to Clinical Techniques

The Wand™ Plus Local Anesthetic Delivery System is recommended for the administration of
all traditional and non-traditional (newly defined) local anaesthesia techniques used in
dentistry. The practitioner can choose from a variety of needle gauges and lengths to
accommodate the particular requirements of the injection and needs of the patient. This manual
is intended to provide the practitioner with basic concepts and techniques that can be employed
with The Wand™ Plus technology. It is not intended to represent a comprehensive resource on
the subject of local anaesthesia, but rather a guide to clinical techniques. As additional
innovative methods of local anaesthesia with The Wand™ Plus are discovered through
research and development, supplements to this manual will be issued.
Traditional Infiltration Technique

The Wand™ Plus is ideally suited for the administration of traditional injections. A Maxillary Mucobuccal Fold infiltration is initiated with The Wand™ Plus with the slow rate - first position on the foot control. The needle is advanced slowly until it reaches the intended target site. Aspiration is initiated if required (release foot control pressure) and if negative the fast flow rate (second foot control position) can be initiated.

A Posterior Superior Alveolar Block injection (PSA) can be performed in a similar manner.

Palatal infiltration can also be performed consistently and comfortably with The Wand™ Plus. However, it is critical that the slow flow rate be used exclusively. Never use the fast flow rate for palatal injections.

Review of Traditional Maxillary Mucobuccal Fold Infiltration Technique:
1. Perform an aspiration pre-test (as described on pg. 11).
2. Initiate the slow (first foot control position) flow rate.
3. Slight needle rotation at the moment of mucosa puncture facilitates penetration of the surface tissue.
4. Penetrate mucosa with a slow, gentle advancement of the needle to create an "anaesthetic pathway".
5. When the needle reaches the target site, aspiration can be initiated if required (release foot control).
6. Aspiration is repeated until negative aspiration is observed.
7. When aspiration is negative, initiate the fast (second foot control position) flow rate.
8. Monitor the LED panel to determine the volume of anaesthetic delivered.
9. When the cartridge is emptied (audio and visual signal), reload, purge and continue as required.

Inferior Alveolar (Mandibular) Nerve Block

The most common approach to mandibular anaesthesia is the Inferior Alveolar Nerve Block injection. The Wand™ Plus enables the operator to concentrate on accurate needle placement and provides unprecedented control and tactile feel during this injection. The rotational insertion technique described on pg. 19 reduces needle deflection and missed blocks and facilitates more rapid onset of anaesthesia.

The Wand™ Plus Aspiration Mode should be turned on prior to initiating the injection. Topical anaesthetic can be applied to the intended injection site. However, it may not be required to achieve a comfortable penetration. The slow flow rate is initiated prior to needle penetration of the mucosa. Rotate The Wand™ Plus Handpiece slightly at the commencement of the injection to reduce pressure required for needle penetration. Advance the needle slowly using a continuous rotation technique described on pg. 19 to reduce needle deflection to the intended target site. Initiate aspiration by releasing the foot control. If positive, reposition the needle and resume the slow flow rate and repeat aspiration. If aspiration is negative the fast flow rates can be initiated.

For buccal anaesthesia of the soft tissue and periosteum of the mandibular molars, administer a long buccal nerve block.

Other mandibular injections can be performed in a similar manner (Mental, Incisive, Gow Gates, Vazirani-Akinosi and Long Buccal.)
Review of Traditional Inferior Alveolar (Mandibular) Block Technique:
1. Perform an aspiration pretest (as described on pg. 11)
2. Initiate the slow (first foot control position) flow rate
3. Penetrate mucosa with a slow, gentle advancement of the needle to create an "anaesthetic pathway"
4. Slight needle rotation at the moment of mucosa puncture facilitates penetration
5. Use needle rotation technique during entire insertion to reduce needle deflection
6. When the needle reaches the target site, aspiration is initiated (release foot control)
7. If blood is observed in handpiece tubing, reposition and repeat aspiration
8. When aspiration is negative, initiate the fast (second foot control position) flow rate
9. Monitor the LED panel to determine the volume of anaesthetic delivered
10. When the cartridge is emptied (audio and visual signal), reload, purge and continue as required.

All traditional injections in the maxilla and the mandible are performed following the steps outlined above. When not required, the aspiration mode can be turned off by briefly depressing the aspirate mode button. Light will be turned off.

CLINICAL TECHNIQUES PDL

Traditional Periodontal Ligament (PDL) Injection Technique
The Periodontal Ligament Injection has long been advocated for a rapid, site-specific technique to anesthetize a specific tooth and the adjacent periodontal tissue. Some of the literature suggests that due to the pressure required to administer this injection in the traditional method with the conventional syringe or other mechanical device, it may be contraindicated in primary teeth and teeth with active periodontal infection or suppuration. The traditional PDL technique, utilizing 4 injection sites with approximately 0.3 ml of anaesthetic delivered at each site, can be administered with The Wand™ Plus. However, due to The Wand Plus’ innovative technology, a modified technique has been advocated to increase success with the PDL Injection.

MODIFIED PDL - The Wand™ Modified PDL employs only two injection sites:
1. The mesiolingual line angle and the distolingual line angle are the most effective for mandibular teeth.
2. On the maxillary teeth the mesiobuccal and distalbuccal line angles are utilized.
3. In some instances, the distolingual site alone may provide adequate pulpal anaesthesia.

Prior to the injection, place a gauze pad or cotton roll on the lingual area adjacent to the injection site. This will be used to absorb any anaesthetic which is inadvertently expressed before needle penetration and during withdrawal. Prepare the patient for a slow injection experience.

Utilize a 30 gauge extra-short needle with the bevel oriented toward the tooth. The needle bevel should face the tooth surface and be orientated parallel with its long axis. The Wand™ Plus handle can be bent to accommodate proper positioning. The Wand™ Plus Handpiece can also be broken off to create a very short, easy to control needle holder. See page 8. The injection is initiated by activating the slow flow rate followed by a slow penetration of the needle into the periodontal ligament space.
The moment that the needle enters the tissue, the foot control is activated on the slow flow rate. **Use the slow flow rate only.** The needle is advanced following the natural contour of the intrasulcular anatomy of the tooth until it will advance no further. If no resistance is encountered, the needle may not be within the PDL space. Moderate pressure is maintained to ensure the adequate "seal" of the needle track. **Activate cruise control at this time if desired.**

If two sites are utilized, the slow rate of flow is maintained until approximately 0.9 ml of solution has been administered at each site. (A molar may take 1.8 ml. A central incisor or premolar slightly less). You should note a significant degree of blanching which encompasses the facial and lingual gingiva. Stop flow and wait 6 seconds to dissipate pressure. Slowly remove the needle making sure that any excess anaesthetic solution expressed is removed. Repeat the procedure on the mesiolingual aspect of the tooth.

Note: It is important to avoid injection directly into the interdental papilla. It is also important to avoid the last rate of flow. It is recommended to use a concentration of vasopressor of 1:100,000 or 1:200,000. Caution should be exercised if using 1:50,000 concentration of vasopressor as excessive ischemia can result in soft tissue damage.

**FOOTNOTE:** See Technical Bulletin #1 or PDL video clip for further discussion of WAND administered modified PDL injection.

**CLINICAL TECHNIQUES PDL**

![Diagram of Periodontal Ligament Injection Technique](image)

Periodontal Ligament Injection Technique

**REVIEW OF MODIFIED PDL TECHNIQUE**

1. Place a gauze pad or cotton roll at the site of injection.
2. Prepare the patient for a slow injection.
3. The distolingual and mesiolingual line angles are the primary injection sites on mandibular teeth (on maxillary teeth distobuccal and mesiobuccal).
4. Caution should be exercised if using this injection for primary teeth or teeth with active suppuration,
5. Orient a 30 or 27 gauge extra-short needle with the bevel against the tooth. Approach the tooth at a 45° angle. Slide the needle into the sulcus between the tooth and the bone in the periodontal ligament space. Maintain slight pressure.
6. Advance the needle in the periodontal ligament space until it will advance no further. If no resistance is encountered, re-position the needle to ensure it is within the PDL space.

7. Initiate the slow flow rate at the moment of penetration and maintain the slow rate continuously.

8. Activate the cruise control if desired.

9. Continue the slow flow rate until approx. 0.9 ml is deposited (per site) for a molar tooth. Less anaesthetic is required for premolars and anterior teeth.

10. Repeat on the mesiolingual line angle.

Important note: On all PDL injections there is residual fluid pressure even when the foot control is released. Wait 5 - 7 seconds before removing the needle from the injection site to allow pressure to dissipate. This reduces unwanted flow of anaesthetic solution into the oral cavity.

**CLINICAL TECHNIQUES AMSA**

**Anterior Middle Superior Alveolar (AMSA) Injection Technique**

The AMSA is an exciting addition to local anaesthesia techniques. It will allow the operator to achieve pulpal anaesthesia from the maxillary central incisor through the second premolar including the palatal tissue and mucoperiosteum from a single needle penetration. The recommended dosage is from ¾ to 1 cartridge of anaesthetic and the expected duration of anaesthesia is approximately 60 minutes. A bilateral AMSA anesthetizes 10 maxillary teeth extending from the second premolar to the opposite second premolar and the associated palatal tissue from just 1 ½ to 2 cartridges of anaesthetic. The lips, face and muscles of expression are not anesthetized with the AMSA resulting in greater patient comfort operatively and post operatively. In addition, esthetic smile-line assessments are not hampered by facial distortion associated with traditional mucobuccal fold injections. To enhance buccal soft tissue anaesthesia a small volume of anaesthetic is administered within the surface mucosa of the mucobuccal fold.

The AMSA is easily administered, requiring up to 4 minutes to complete. Anesthesia is achieved within approximately 5 - 7 minutes of injection. The patient should be prepared for the extra time required to administer an AMSA and advised they will likely experience only a minor sensation from the injection. They will appreciate the lack of numbness to the face and lips.

A 30 gauge extra-short needle is recommended. It is inserted in a position that bisects the premolars and is approximately halfway between the mid-palatine suture and the free gingival margin. On patients with either a flat or excessively high palatal vault, the landmark is adjusted closer to the mid-line. If desired, topical anaesthetic may be applied. The needle bevel is initially oriented parallel to the palatal tissue. A sterile cotton tip applicator is employed to apply pressure on the needle to "seal" the bevel to the tissue for the "pre-puncture" phase of the insertion. (see pre-puncture section) The foot control is depressed slightly to activate the slow flow rate for 4 - 6 beeps prior to slow needle insertion. The cotton tip will help catch any anaesthetic drips that occur before the bevel is completely within the tissue. The needle movements are extremely slow and gentle during penetration while the slow flow rate is maintained. The needle is reoriented to a 45° angle as it is advanced until it contacts the bone. Perform aspiration. Maintain contact on bone and deliver the required dosage of ¾ to 1 * cartridge. Activate cruise control if desired. Significant blanching of the palate will be observed (with anaesthetics containing vasopressor) and care should be taken upon needle removal to reduce anaesthetic solution from dripping down the posterior palate.
Note: It is critical that only the slow rate be used for this injection. Using the fast rate of flow may cause excessive ischemia and tissue damage. It is recommended that anaesthetic containing vasopressor concentration of 1:100,000 or 1:200,000 be used. Caution should be exercised with 1:50,000 concentration of vasopressor. Excessive ischemia can result in soft tissue damage.

* Dosage requirement for adequate anaesthesia and duration may vary from one patient to another.
** Anecdotal technique defined by Friedman M.J., Hochman IVI.N. (Milestone Scientific Clinical Consultants)
Full independent clinical studies in progress.

AMSA TECHNIQUE

REVIEW OF THE AMSA INJECTION TECHNIQUE

1. Prepare the patient for a slow injection experience.
2. Place topical anaesthetic on the palatal tissue if desired.
3. Orient a 30 gauge extra-short needle, bevel parallel to the palatal tissue at the landmark which bisects the premolars and is midway between the free gingival margin and the mid palatine suture.
4. Place a sterile cotton tip applicator to absorb any anaesthetic drip prior to needle penetration.
5. Perform pre-puncture technique.
6. Rotate needle slightly upon entering tissue and during movement to final site.
7. Initiate the slow flow rate at the moment that the needle enters the palatal tissue and maintain this rate continuously. Reorient needle to 45° and advance the needle very slowly until it contacts bone.
8. Perform aspiration.
9. Cruise control can be activated if desired.
10. Continue to inject until approx. 3/4 to 1 full cartridge has been deposited.
11. Remove the needle slowly and try to avoid any excess anaesthetic dripping.
12. Repeat on the contralateral side if required.
The Palatal Anterior Superior Alveolar (P-ASA)**

The P-ASA is another modified injection for the anterior maxilla. It will allow the operator to achieve bilateral anaesthesia of the maxillary incisors and usually the canines from a single needle penetration. In addition, to pulpal anaesthesia, profound palatal anaesthesia of the gingiva and mucoperiosteum as well as moderate anaesthesia of the facial gingiva associated with the teeth is achieved. The recommended dosage is from 3/4 to 1 cartridge of anaesthetic with the expected duration of anaesthesia of approximately 60 minutes. Of significant benefit is that the lips, face and muscles of expression are not anesthetized with the P-ASA. This results in greater patient comfort operatively and post operatively. In addition, esthetic smile-line assessments are not hampered by facial distortion associated with traditional mucobuccal fold injections in this region.

The P-ASA is easily administered, requiring from 2 - 4 minutes to complete. Anesthesia is achieved within approximately 2 minutes of injection. The patient should be prepared for the extra time required to administer the P-ASA and advised they will likely experience only a minor sensation during the injection. They will appreciate the lack of numbness to the face and lips.

A 30 gauge extra-short needle is recommended. It is inserted adjacent to the incisive papilla. If desired, topical anaesthetic may be applied. The needle bevel is initially oriented as parallel to the palatal tissue as possible. A sterile cotton tip applicator is employed to apply pressure on the needle to "seal" the bevel to the tissue for the "pre-puncture" phase of the insertion, (see pre-puncture section) The foot control is depressed slightly to activate the slow flow rate for 8 - 10 beeps prior to slow needle insertion. The cotton tip will help catch any anaesthetic drips that occur before the bevel is completely within the tissue. The needle movements are extremely slow and gentle during penetration while the slow flow rate is maintained. After penetration into the papilla, insertion is continued until significant blanching of the papilla is observed. The needle is then reoriented to gain entrance into the nasopalatine canal and advanced very slowly no more than 1 cm (approximately the depth of a ½ " needle). Maintain contact on bony wall of the canal and then aspirate. Deliver the required dosage of 3/4 to 1* cartridge. Activate cruise control if desired. Significant blanching of the palate tissue and often the facial tissue will be observed (with anaesthetics containing vasopressor). Care should be taken upon needle removal to reduce anaesthetic solution dripping down the palate. Do not advance the needle beyond ½ " (1 cm) since the floor of the nose can be penetrated which may lead to an infection.

** Anecdotal technique defined by Friedman MJ., Hochman M.N. (Milestone Scientific Clinical Consultants). Full independent clinical studies in progress.

* Dosage requirement for adequate anaesthesia and duration may vary from one patient to another.

Note: It is critical that only the slow rate be used for this injection. Using the fast rate of flow may cause excessive ischemia and tissue damage. It is recommended that anaesthetic containing vasopressor concentration of 1:100,000 or 1:200,000 be used. Caution should be exercised with 1:50,000 concentration of vasopressor. Excessive ischemia can result in soft tissue damage.
P-ASA TECHNIQUE

1. Initiate P-ASA

2. Re-orient P-ASA

REVIEW OF THE P-ASA INJECTION TECHNIQUE

1. Prepare the patient for a slow injection experience.
2. Place topical anaesthetic on the incisive papilla if desired.
3. Orient a 30 gauge extra-short needle in the groove just lateral to the incisive papilla.
4. Use a sterile cotton tip applicator for the pre-puncture technique.
5. Initiate the slow flow rate and maintain this rate throughout the injection.
6. After 8 - 10 beeps initiate axial rotation and VERY SLOW forward movement but continue slow flow rate.
7. Once the needle bevel enters below the papilla, pause movement for 5 – 6 seconds.
8. After papilla is blanched, re-orient the needle vertically to gain entrance to the nasopalatine canal with slow axial rotation.
9. When the needle is in the canal and contacting the inner bony wall, stop movement and aspirate. DO NOT EXCEED 1 cm (length of ½” needle) penetration into the canal.
10. If aspiration is negative, maintain position and deliver ¾ - 1 cartridge of anaesthetic at the slow rate.
11. Cruise control can be activated if desired.
12. Remove needle slowly to avoid excess dripping into the mouth.
WARRANTY INFORMATION

The Wand™ Plus COMPUTER CONTROLLED LOCAL ANESTHETIC DELIVERY SYSTEM
LIMITED WARRANTY USA

The Wand™ Plus System is warranted for a period of one year from date of purchase against manufacturing defects in materials and workmanship, and any claims under this warranty must be made and received before the end of such one-year period. Repairs or replacement will be made by Milestone Scientific or its authorized agents at the sole discretion of Milestone Scientific. This warranty shall be limited to replacement or repair of the unit or its parts and shall not include any other claims, including but not limited to loss of profit, cost of removal or replacement or special, incidental, or consequential damages or other similar claims arising from the use of this product.

Damages to the product resulting from acts of God, faulty installation, misuse, tampering, accident, abuse, negligence, or unauthorized repairs or alterations unrelated to problems with materials and workmanship are not covered by this warranty.

Milestone Scientific specifically disclaims all other warranties, expressed or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose.

This warranty gives you specific legal rights, and you may have other rights, which may vary from state to state.

WARRANTY REGISTRATION

You must return the Warranty Registration Card to be eligible for the above warranty. Upon proper registration, Milestone Scientific will send to you all new information on The Wand™ Plus including technical articles and information on product enhancements as they become available.

Warranty service will not be provided unless The Wand™ Plus System Is registered. Warranty service is to be handled through Milestone Scientific. If you are experiencing a problem, please call Milestone Scientific for technical support prior to returning the unit. When returning please provide adequate and protective packaging. Include your name, address, phone number and a thorough description of the operating problem. After repairing or replacing this product Milestone Scientific will return it directly to you.
PRODUCT SAFETY INFORMATION

This unit is defined as a Class IIA device per Rule 11 of the Medical Directive. The enclosure is suitable for an ordinary location. The function of this unit defines it as Type B. This equipment is not suitable for use in the presence of a flammable anaesthetic mixture with air or oxygen or nitrous oxide. This unit is a Class I earthed device.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.