

## **GENERAL PRACTICE**

### **CLINICAL STUDIES, TEXTBOOK REFERENCES, PUBLISHED ARTICLES, and PROFESSIONAL EVALUATIONS on THE WAND/COMPUDENT/STA**

#### **Clinical Studies, Articles:**

##### **Hochman M et al. Computerized Local Anesthetic Delivery vs. Traditional Syringe Technique. Subjective Pain Response. New York State Dental Journal 1997: 24-29**

Fifty dentists were given contra-lateral palatal injections. One side was injected with the Wand, using a computer-controlled flow rate. The control side was injected with a standard manual syringe, with an operator-dependent flow rate and pressure, which cannot be controlled accurately. The dentists rated the Wand two to three times less painful than the manual injection. Forty-eight of the fifty subjects said that the Wand injector was more comfortable. Eighty-two percent of the dentists in the Wand injection group perceived no pain or “minimal pain” with the Wand. The utilization of a computer-controlled delivery system offers benefits and new enhancements that were previously unobtainable with the standard dental syringe. This is the first published clinical study to demonstrate that an optimal flow rate, below the patient’s pain threshold, does exist in the administration of local anesthetics.

##### **Friedman M, Hochman M. A 21<sup>st</sup> Century Computerized Injection System for Local Pain Control. Compendium 1997 October; 18 (10): 995-1003**

A computer-controlled local anesthesia system (The Wand) represents a contemporary alternative to the traditional syringe. The system generates a precisely controlled anesthetic flow rate that eliminates the need for the operator to use thumb pressure to administer the injection. The lightweight pen-grasp handle results in greater tactile feedback, precision, operator ease, and patient comfort. In the maxillary arch, the AMSA injection offers clinical advantages over traditional anesthesia techniques. In the mandibular arch, a safe and predictable PDL injection technique may replace the need for an inferior alveolar block in numerous clinical situations.

##### **Krochak M, Friedman N. Using a Precision-Metered Injection System to Minimize Dental Injection Anxiety. Compendium 1998; 19 (2): 137-148**

In this study, 90 % of dental patients reported being at least mildly anxious about receiving dental injections. According to survey results, fear levels decreased significantly when the new technology (The Wand) was used.

##### **Friedman M, Hochman M. The AMSA injection: A new concept for local anesthesia of maxillary teeth using a computer-controlled injection system. Quintessence International 1998; 29 (5): 297-303**

Because palatal injections can now be administered with operator ease and complete patient comfort, a new palatal-approach anterior, middle superior alveolar block injection has been described. Profound pulpal anesthesia of the maxillary central incisor through the second premolar and the buccal and palatal tissue in the region can be obtained from 0.9 – 1.4 ml of local anesthetic solution without any numbness of the lips, face, or muscles of expression. The AMSA injection represents a practical and efficacious new concept for local anesthesia of maxillary teeth.

**Lackey Arlen E. An Advancement in the Delivery of Local Anesthesia. Practical Periodontics & Aesthetic Dentistry 1998 November/December**

The computer-regulated anesthetic delivery system out-performs traditional syringes for the majority of injections. This new system generates a precisely controlled anesthetic flow rate that eliminates the manual pressure required of the operator to administer the injection. The lightweight handle results in greater tactile feedback, precision, operator ease, and patient comfort. Its greatest advantage may be in the novel techniques that it is capable of performing. The AMSA and P-ASA injections are often able to anesthetize the teeth targeted for treatment without the complications of facial numbness. In addition, traditional inferior alveolar blocks are completed more accurately and often faster with the computer-controlled system than with a traditional syringe. The computer-regulated anesthetic delivery system is a viable alternative to traditional local anesthetic administration that reduces the fear and anxiety of dental patients, as well as offering an exciting advantage in technology and technique for local pain control.

**Friedman M, Hochman M. P-ASA Block Injection: A New Palatal Technique to Anesthetize Maxillary Anterior Teeth. Journal of Esthetic Dentistry 1999; 11 (2): 63-71**

This technique article presents a new local anesthetic injection that is reported to produce anesthesia of the six maxillary teeth, the anterior third of the palate, and the facial gingival from a single-site injection. The 0.9 to 1.4 ml dosage recommendation for this block injection is significantly less than for a traditional suprapariosteal approach. The primary advantages of this injection is that it allows the dentist to anesthetize the teeth and gingival without collateral anesthesia to the lip, face, or muscles of facial expression. Therefore, the smile line is not distorted during the operative phase of an appointment, and the patient is more comfortable postoperatively.

**Nup Caroline et al. Evaluation of the Wand as a primary injection device using an intraligamental injection of local anesthesia. Abstract 1999 December.**

The intraligamental injection is often used as a supplemental injection after an inferior alveolar block. In this clinical evaluation, the Wand was used to deliver an intraligamental injection as primary means of anesthesia prior to the endodontic treatment of vital mandibular molars with acute pulpitis. Eighty percent of the patients were successfully treated with this technique. A second dose was successful on two of the four patients who felt pain after the initial intraligamental injection. The implications of using this alternative system are increased precision and reduced stress for the dentist and the patient. There is a learning curve involved when transitioning from a traditional syringe to the Wand and the operator must use good preparatory communication with the patient. The Slow-Flow technology means that most injections will be more comfortable and may take more time to deliver, but the overall procedure time should be less if fewer injections are required and more predictable anesthesia is achieved. The use of the Wand allows dentists to have another technique in their armamentarium, which would preclude the necessity for anesthetizing an entire quadrant.

**Friedman M, Hochman M. The AMSA Injection: Anesthetize the Teeth, Not the Face. Contemporary Esthetics and Restorative Practice 2000 January**

The AMSA is an exciting addition to the local anesthetic armamentarium. It can be administered with a traditional syringe or a computer-controlled device. If the dosage is delivered over 3 to 4 minutes, it should not displace the palatal tissue and should be virtually pain-free with little, if any postoperative discomfort. The injection technique still requires further clinical studies to determine specific safety

and efficacy recommendation. In the meantime, many dentists and patients have already enjoyed the benefits of this innovative approach to local anesthesia of the maxilla.

**Hochman M, Friedman M, In vitro study of needle deflection: A linear insertion technique versus a bidirectional rotation insertion technique. Quintessence International 2000; 31 (1): 33-39**

Needle deflection is a major contributing factor to anesthetic failures. A new insertion technique, the bi-directional rotation insertion, produced greater accuracy in an in vitro model. Increased accuracy may lead to greater success in obtaining local anesthesia.

**Lipton Lawrence. Using Computer-Controlled Technology to Alleviate Stress & Reduce Discomfort During Local-Anesthetic Delivery in a Pediatric Practice. Journal Of The Southeastern Society Of Pediatric Dentistry 2000; 6 (4)**

This system has been found to minimize patient discomfort and has reduced past management difficulties during local anesthesia injection procedures. As a result, the patients and their parents perceive a cumulatively pleasant, positive dental experience and in return visits, the patients show greater cooperation than in the past. The computer-controlled anesthesia delivery system minimizes negative behaviors associated with anesthetic injection techniques.

**Friedman M et al. Technology Forum: New Advances in Local Anesthesia. Compendium 2000 May; 21 (5): 432-440**

The Wand is the primary device on the market aimed at decreasing the discomfort associated with dental injections, and it also has been used to expand the types of injections that can be administered. Anesthetizing the teeth and associated soft tissue while sparing the muscles of expression can be beneficial for cosmetic dentistry and certain periodontal procedures.

**Froum et al. Histologic Response to Intraligament Injections Using a Computerized Local Anesthetic Delivery System. A Pilot Study in Mini-Swine. J Periodontol 2000 September; 71 (9): 1453-1459**

Within the limits of this study, the histologic results showed that tissue responses following intraligament injections using a CCLADS (The Wand) demonstrated limited inflammatory responses within the first 24 hours, which abated by 7 days postinjection. Similar migrations of the junctional epithelium was seen in test and control specimens and was attributed to subgingival notching of the teeth. No apparent histologic changes occurred in the latter time periods of the experiment. Therefore, we concluded that there were no lasting histological changes following the injections.

**Gibson Rex S. et al. The Wand vs. traditional injection: A comparison of pain related behaviors. Journal of Pediatric Dentistry 2000 November-December; 22 (6): 458-462**

Wand injections can deliver proper anesthesia, utilizing one palatal injection site, while significantly reducing the likelihood of disruptive behaviors during the initial moments of an injection. Pediatric dental patients were five times less disruptive when given a palatal injection with the Wand than a syringe injection.

**Nicholson JW et al. Pain perception and utility: a comparison of the syringe and computerized local injection techniques. Gen Dent 2001 March-April; 49 (2): 167-173**

Mean injection discomfort ratings with the Wand were lower than with the syringe but were not statistically significant. Reduced postoperative discomfort using the Wand for the inferior alveolar

nerve block was significant. Both of the dentists in the study and those patients who stated a preference favored the Wand system. More patients rated the Wand as completely and/or minimally uncomfortable compared to the syringe injection. With experience, the dentists increasingly preferred the Wand system to the syringe system. Several categories of inquiry such as onset time and profoundness of anesthesia did not show any difference between the two devices.

**Shepherd PA. et al. Measurement of intraosseous pressure generated by the Wand, high pressure periodontal ligament syringe, and the Stabident system. Journal of Endodontics 2001 June; 27 (6): 381-384. Abstract**

Results showed average of 8,3 mm Hg pressure from the Wand, 16,3 mm Hg with the high-pressure PDL syringe and 43,7 mm Hg from the Stabident system. Results were corroborated with data from three human cadaver mandibles.

**Williams W. A new perspective on local anaesthesia: part I. Dentistry 2001**

The introduction of the concept of computer-controlled local anaesthetic delivery has created an opportunity for us to reexamine many of the well describe techniques but also the severe limitations we have been faced with by using the “traditional hand-held syringe” for the past 147 years. The introduction of techniques such as the AMSA and the P-ASA has helped create an exciting new perspective, based on anatomy, for anaesthesia in the maxilla. The Modified Inferior Alveolar Block and the Modified PDL injection have similarly created a new perspective for anaesthesia in the mandible.

**Williams W. A new perspective on local anaesthesia: part II. Dentistry 2001**

This article looks at the clinical techniques and advantages with computer-controlled technology for local anesthetic delivery. The introduction of a computer-controlled drug delivery system (The Wand) and the associated development of injection techniques that can be used with this unit have initiated an international interest among clinicians, scientific researchers and academics to re-examine many of the concepts related to local anesthesia in dentistry. By combining the monumental advantages being made in computer technology with sound clinical application of our knowledge of human anatomy and physiology and drug pharmacology – we may well be able to create a new perspective on local anesthesia in dentistry that will ultimately benefit our patients.

**Hochman M, Friedman M. An in vitro study of needle force penetration comparing a standard linear insertion to the new bidirectional rotation insertion technique. Quintessence International 2001; 32 (10): 789-796**

The bi-directional rotation insertion produced greater efficiency during needle penetrations. The reduction in force (the bidirectional rotation insertion technique required two to three times less force than did a standard linear insertion technique) needed to penetrate tissues may lead to a more comfortable injection experience for patients.

**Allen KD. et al. Comparison of a computerized anesthesia device with a traditional syringe in preschool children. Pediatric Dentistry 2002 July-August; 24 (4): 315-320. Abstract** These results demonstrate that the Wand can significantly reduce disruptive behaviors in a population of young children who are traditionally more difficult to manage and may be one method of creating a more positive experience for the young child and the practitioner.

**Rosenberg E. S. A Computer-Controlled Anesthetic Delivery System in a Periodontal Practice: Patient satisfaction and Acceptance. Journal of Esthetic and Restorative Dentistry 2002; 13: 39-46**

Overall, 71.4 % of patients reported the experience to be superlative, positive, or somewhat positive. Results indicate that the system was highly preferred to traditional injection techniques, regardless of the arch and quadrant receiving the injection. Several factors may have contributed to this preference, including increased patient comfort, the nonthreatening appearance of the instrument, and the lack of residual numbness commonly associated with oral anesthetic injections.

**Ran D, Peretz B. Assessing the pain reaction of children receiving periodontal ligament anesthesia using a computerized device (Wand). Journal of Clinical Pediatric Dentistry 2003 Spring; 24 (3): 247-250. Abstract**

More children reacted negatively, namely crying, facial expressions and eyes squeezed while receiving the conventional infiltrative injection, whereas children who received the anesthetic solution using the Wand reacted more positively. This difference was statistically significant. No significant difference regarding the efficacy of the anesthesia was observed in either technique. Eighty of the children who received the conventional buccal infiltration scratched the nose or upper lip after the treatment, while none of the children, who received the Modified PDL, showed signs of discomfort. Children displayed better behavior when they received local anesthesia with the Wand rather than with the conventional infiltration. Children did not show signs of discomfort after treatment with the Wand, whereas they did while receiving conventional injections.

**Perry Dorothy A, Loomer Peter M. Pain Control – The AMSA Injection can provide anesthesia with fewer injections and less pain. Dimensions of Dental Hygiene 2003 April/May**

The AMSA injection delivered by a computer-controlled delivery device possesses two potential advantages over conventional syringes. It permits attaining maxillary anesthesia with fewer injections, two per half mouth compared to four or five for conventional syringe techniques, and is generally less painful than palatal injections delivered by conventional syringe techniques. In addition, the AMSA injection can facilitate placement of cosmetic anterior restorations because it does not anesthetize the maxillary lip, and by extension, provide a convenience for any dental patient not wishing to have a numb and immobile lip when leaving the dental office. Data from three clinical studies indicate that patients generally find the palatal computer-controlled local anesthetic injections to be less painful than those delivered by conventional syringe.

**Fukayama H et al. Efficacy of anterior and middle superior alveolar (AMSA) anesthesia using a new injection system: the Wand. Quintessence International 2003 July-August; 34 (7): 537-541**

The present examination reveals AMSA (Anterior and Middle Superior Alveolar) injection using a new anesthetic system, the Wand, prevents severe puncture and injection pain and is very effective in anesthetizing lateral incisors, canines, and first and second molars in the maxilla by one injection. The new system provides comfortable anesthesia for patients and can be a good alternative for a conventional manual syringe injection. Also, AMSA injections caused less pain even on the palate.

**Anderson ZN et al. Patient satisfaction during the administration of local anesthesia using a computer controlled local anesthetic delivery system. Dermatology Nursing 2003 August; 15 (4): 329-330, 392**

These data reveal that patients with a normal to low tolerance to pain rated their pain far less using the CCLADS, the Wand, than what was experienced with prior injections or the control group using hypodermic syringes. Using the CCLADS equipment reduces patient fear and anxiety of future needlesticks and the pain associated with the injection. Based on our experience, the CCLADS equipment can benefit both the patient and the practice. This new method of controlling pain may increase patient satisfaction and generate referrals to the practice.

**Kasaj A. et al. Evaluation of a new anesthesia technique for nonsurgical periodontal therapy. IADR/AADR/CADR 82<sup>nd</sup> General Session 2004. Abstract**

Local anesthesia with the AMSA-technique showed a statistically significant lower level of pain compared to the conventional palatal anesthesia. Moreover, the AMSA-technique resulted in a complete anesthesia of the vestibular gingival in the area delineated by the upper first incisor and first molars. Patient acceptance was significantly higher with the AMSA-technique than with conventional local anesthesia. The present data indicate that the AMSA-technique is a suitable method for local anesthesia in performing non-surgical periodontal therapy in the upper arch.

**Loomer Peter M. Perry Dorothy A. Computer-controlled delivery versus syringe delivery of local anesthetic injections for therapeutic scaling and root planing. Journal of American Dental Association 2004; 13: 358-365**

The two anesthetic delivery techniques were therapeutically equivalent for mandibular injections. The AMSA delivered by the computer-controlled device had clinically significant advantages for maxillary injections (scores on written and verbal pain via a visual analog scale and a verbal rating scale for AMSA were significantly lower for computer-controlled delivery when compared with nasopalatine injections and combined maxillary injections and with greater palatine injections and combined maxillary injections). Anesthesia of sufficient depth and duration was achieved to allow therapeutic periodontal scaling and root planing. The time required for providing the injections to achieve half-mouth anesthesia was similar for both techniques, but fewer injections were needed when using the computer-controlled device.

**Hutter et al. Anesthetic Efficacy of the Periodontal Ligament Injection Using the Wand vs. the Intra-osseous Injection Using Stabident. Journal of Endodontics (submitted for publication). Abstract**

This study showed that the Wand administered PDL injection is an effective alternative to the traditional PDL injection, compares favorably to the more invasive Stabident system injection, and provides the following benefits: The Wand PDL is more successful and is a valid alternative to the Mandibular Block as a primary injection, The non-invasive Wand PDL provides consistently successful, profound anesthesia, comparable to the more invasive Stabident system, The Wand provides greater patient comfort, control and other safety features than traditional techniques.

**Textbook References:**

**Stanley F. Malamed. Handbook of Local Anesthesia. Fifth Edition. 2004.**

“New local anesthetic delivery systems have been introduced over the years. The past decade has seen a significant increase in interest in computer-controlled local anesthetic delivery (CCLAD) systems. Designed to overcome the inherent clumsiness associated with the delivery of local anesthetic with the traditional hand-held dental syringe (whose hand hasn’t shaken during injection, on occasion), CCLAD systems have increased the ability of doctors to guarantee the pain-free

delivery of local anesthesia to their patients. In this fifth edition...two new techniques, the anterior middle superior alveolar nerve block (AMSA) and the palatal approach to the anterior superior alveolar nerve block (P-ASA), are described.” 61 references to the Wand.

### **Published Articles:**

#### **Kehoe B, Levato C. In search of the painless injection/Giving the Wand a shot. Dental Practice & Finance 1998**

A great benefit the Wand offers is its potential to change patients' perceptions of the dental office – one primary reason many people do not seek dental care is fear. Moreover there are sound clinical reasons to use the instrument. “I have found far less need to use topical anesthetic and nitrous oxide, even with anxious patients. I have also found the instrument particularly useful when administration of PDL injections for single restorations on the mandibular arch. Using the Wand in these situations, I have almost eliminated the use of the inferior alveolar nerve block. I find that the profoundness of the anesthetic using the Wand and a PDL injection is significantly increased over the use of a traditional syringe for the same injection. The Wand has also proved useful in administering anterior middle superior alveolar (AMSA) injections.”

#### **Lieberman W. H. The Wand. American Academy of Pediatric Dentistry 1999; 21 (2): 124**

“We are pleased to present our clinical impressions, which at this point are quite favorable. Since The Wand is so unique in appearance, the patients do not relate it to their previous experiences or preconceived ideas. It has been our experience that an overwhelming percentage of patients who verbally express fear of the “shot”, seem greatly reassured that we will use The Wand instead. This aspect of improving patient relations alone has greatly improved our ability to handle difficult patients. However, the added ability of improvement in the anesthesia technique itself has also proved itself beneficial.”

#### **Sculean, A.; Kasaj, A.; Berakdar, M.; Willershausen, B.A Comparison of the Traditional Injection and a New Anesthesia Technique (The Wand®) for Non-surgical Periodontal Therapy; J.Perio 4/2004 (12.01.2005) Page 363-368**

The purpose of this study was to compare conventional local anesthesia with a newly developed anesthesia technique, called Anterior Middle Superior Alveolar nerve block (AMSA) for non-surgical periodontal therapy (scaling, root planing). Twenty patients with chronic periodontitis (8 females, 12 males; mean age:  $45 \pm 8.5$  years) with good general health received non-surgical periodontal therapy in the upper jaw under local anesthesia. The local anesthesia was performed according to a split-mouth design with either AMSA or with the conventional palatal infiltration technique. Pain response was recorded and evaluated with a standardized visual analogue scale (VAS) ranging from 0–10. The results of the present study showed a statistically significant lower level of pain ( $p < 0.001$ ) for local anesthesia with the AMSA-technique, compared to conventional palatal anesthesia. Moreover, the AMSA-technique resulted in a complete anesthesia of the vestibular gingiva in the area delineated by the upper first incisors and first molars. Patient acceptance was significantly higher with the AMSA-technique than with conventional local anesthesia. No adverse side effects such as necrosis, swelling or wound-healing complications, which could be related to the local anesthesia, were observed.

### **Professional Evaluations:**

#### **The Wand. Local Anesthesia, Automated delivery. CRA 1998; 22 (11)**

CRA confirms The Wand useful. 48 users reported main advantages of The Wand were: (1) Reduction of injection pain. (2) Reduction in fear of injection. (3) Better control during injection.

#### **Editors' Choice – The Wand +++. The Dental Advisor 1998; 15**

The Wand is an anesthetic system highly recommended for administering traditional infiltrations and block injections plus additional modified injection techniques. Consultants evaluating The Wand all agreed that its major advantage over traditional syringe was patient comfort. This was especially noted for periodontal ligament and palatal injections. The lightweight handpiece is held with a pen grasp, which provides precise control and visibility of needle placement.

#### **Reality's Choice, Four Star Award – Wand. Reality 1999**

#### **The Wand ++++ P-ASA Injection Technique. The Dental Advisor 1999; 16**

The Wand is highly recommended for use in the palatal approach Anterior Superior Alveolar (P-ASA) injection technique for select anterior preparations. Benefits of the P-ASA injection technique with The Wand are bilateral anesthesia of multiple teeth from a single injection, comfort, no labial numbness, quick acting and less anesthetic required. With apprehensive patients, the AMSA injection technique was effective in providing supplemental anesthesia with comfort.

#### **CompuDent (The Wand) 4½+. The Dental Advisor 2001; 18 (9)**

CompuDent (The Wand) is highly recommended. The majority of consultants appreciated the advances CompuDent had to offer in local anesthetic administration. They reported that the patients' comfort level was superior to that of traditional syringes. It reduced their anxiety and also resulted in decreased stress for the operator. The design and weight of the handpiece afford a more comfortable and accurate mode of anesthetic delivery, which produces quicker and more profound anesthesia. Palatal injections especially were found to be more comfortable to the patient than with traditional syringes. The auditory tones are a great help in providing a quick way of knowing how much anesthetic solutions is being delivered.

#### **CRA Dental Product Buying Guide 2002 January; 26 (1)**

Anesthetics: Wand Plus. One of the products that performed best & received highest ratings in the rigorous clinical & lab tests of CRA in 2001.

#### **The Wand - ADA Accepted. Council on Scientific Affairs, American Dental Association. Dental Product Spotlight: Local Anesthetic delivery system. Journal of American Dental Association 2002; 133: 106**

The Wand - ADA (American Dental Association) Accepted. The Wand local anesthetic delivery system is accepted as a device that has been shown to safely and effectively deliver anesthetic solution when used by an appropriately qualified professional.

#### **CompuDent (The Wand). Best of 2003. Preferred Products. The Dental Advisor 2004**

Anesthetic delivery: CompuDent (The Wand). Producer: Milestone Scientific.



