

The WAND™ Local Anesthetic Delivery System

A More Pleasant Experience for Anal Anesthesia

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PURPOSE: The WAND™ is a computer-controlled local anesthetic delivery system. Its use has been proven to be more comfortable for dental patients. The purpose of this study is to explore its applicability to anal procedures. Our hypothesis is that the WAND™ will provide greater comfort during anesthesia delivery while achieving the same anesthetic effect as traditional syringe technique. **METHODS:** Twenty patients with painless anal pathology were randomized to receive anal anesthesia using either the WAND™ or traditional syringe technique to a randomly selected half of the anoderm (right or left). The opposite side was then anesthetized by the alternate method, allowing patients to act as their own control. Objective and subjective pain scores were obtained from the patient after each mode of delivery. An independent observer interpreted the patient's tolerance by giving a subjective pain score. The volume of anesthetic used was recorded. Adequacy of anesthesia was tested by a pinch test. **RESULTS:** Sixteen (80 percent) of the 20 patients preferred the use of the WAND™. Objective and subjective pain scores per the patients and subjective pain scores per the observer were significantly lower for the WAND™ than for traditional syringe technique ($P < 0.05$). The mean volume of local anesthetic used with the WAND™ was 1.7 ml compared with 3.2 ml for traditional syringe technique ($P < 0.005$). Anesthesia achieved with the WAND™ was as good as that achieved with traditional syringe technique when the pinch test was used. **CONCLUSION:** The WAND™ is as effective as the traditional syringe technique in the delivery of anal anesthesia while providing a more comfortable experience for the patient. [Key words: WAND™; Traditional syringe technique; Local anesthesia; Anal block]

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In 1836, G. V. Lafarque of St. Emilion, France,¹ was the first to report in the medical literature the use of a lancet to introduce morphine under the epidermis for analgesia. It was not until 1853 that Alexander

Wood and Charles Pravaz independently introduced the first hollow-needle hypodermic syringe.² Wood used his syringe for management of neuralgic pains, whereas Pravaz's syringe was used for intra-arterial injection in the treatment of aneurysm.³ Syringe design has changed very little since, except for its ability to aspirate and to accept standardized anesthetic cartridges.

The WAND™ local anesthesia system (Milestone Scientific Inc., Livingston, NJ), is the next significant advance in the delivery of local anesthetic (Fig. 1). This computer-automated injection system allows precise delivery of anesthesia at a constant flow rate despite varying tissue resistance. A disposable anesthetic cartridge is placed in a disposable plastic sleeve, which docks with the pump that delivers anesthetic solution through a microintra-venous tubing connected to a penlike handpiece. This handpiece accommodates a Luer lock needle of any size or gauge. A foot pedal controls injection, with two flow-rate settings.

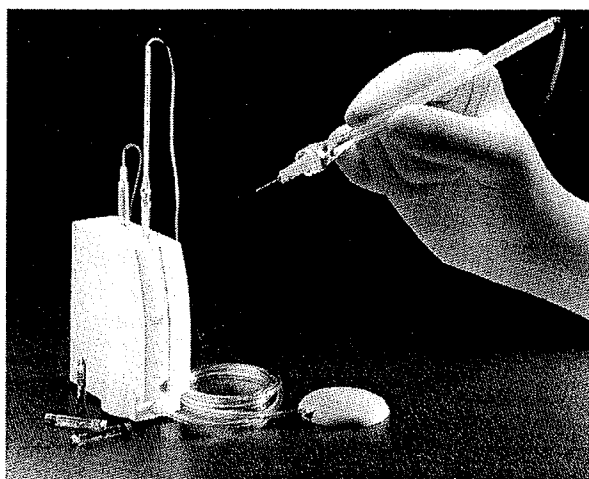


Figure 1. WAND™ anesthetic device.

Funded in part by Milestone Scientific Inc., Jersey, New York. Address correspondence to Dr. Beart: Division of Colon and Rectal Surgery, University of Southern California, 1450 San Pablo St, Suite 5400, Los Angeles, California 90033. No reprints are available.

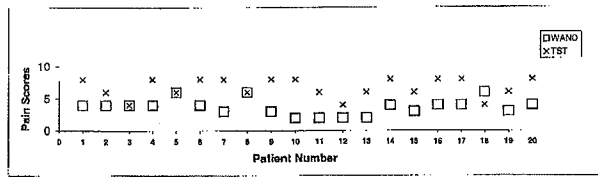


Figure 2. Patient's pain scores (WAND™ vs. traditional syringe technique (TST)).

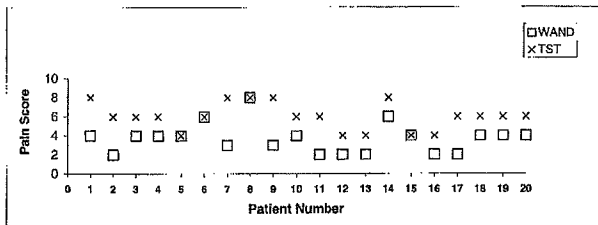


Figure 3. Observer's pain scores (WAND™ vs. traditional syringe technique (TST)).

Table 2.
Patient's Preference for Future Local Anesthetics

	No. of Patients (Percent)
WAND™	16 (80)
Traditional syringe technique	2 (10)
Unsure	2 (10)

1–8; range 1.0–2.5) ml compared with 3.2 (median 2.5; range 1.8–6.0) ml used for TST ($P < 0.0009$).

Overall, 16 patients (80 percent) preferred the WAND™ for subsequent anesthetic delivery, whereas 2 (10 percent) preferred TST (Table 2). There were no complications observed in any of the patients with the use of either local anesthetic delivery technique. An interim analysis after 20 patients had undergone anesthesia concluded that it was improbable that the addition of patients to the study would change the results, and therefore, it was inappropriate to continue the study beyond the current patient accrual.

DISCUSSION

The WAND™ was first introduced to the dental field two years ago. A study by Hochman *et al.*⁴ has shown it to be a less painful method of local anesthetic delivery than traditional syringes. Krochak *et al.*⁵ also showed that fear and anxiety levels associated with subsequent dental injections were reduced by up to 88 percent after a single WAND™ injection.

This study expands the initial findings by Hochman *et al.*⁴ that the WAND™ is more comfortable than TST

in the delivery of local anesthesia to the field of ambulatory anal surgery. Our study reached statistical significance with just 20 patients, with a significant decrease in pain levels perceived by the patients subjectively and objectively. The median visual analog scale score for the WAND™ was half that for TST. The observer confirmed that the patients experienced significantly less pain when the WAND™ was used. As a result, this study was terminated before accruing its initial target number of patients because we considered it unethical not to use the WAND™ exclusively.

The reduced pain levels seen during injection with the WAND™ are most likely due to the precise maintenance of a constant anesthetic delivery rate. The plunger that drives the anesthetic cartridge is set at a constant rate of 1/200 inch per second. This translates to an anesthetic delivery rate of <0.5 ml/second. An in-built microprocessor unit maintains this flow rate despite variation in tissue resistance that may be encountered during the infiltration process. The concept of using a slow injection rate originated to prevent complications from accidental intravascular injection. This slow rate of injection was perceived by patients to be less painful. One hypothesis for this effect is that a low flow rate promotes even distribution of anesthetic solution and less tissue distention and therefore less pain. Jastak *et al.*⁶ recommends a rate of injection <2 ml/min, whereas Malamed⁷ prefers an injection rate of <1 ml/second. The use of a thumb-operated plunger in a traditional syringe makes such precise control of flow rate difficult.

In our experience with the WAND™, we found that once the needle was inserted into the subcutaneous tissue, placement of light pressure on the foot paddle, which produces a slow rate of local anesthetic delivery, was quite comfortable for the patient. Then, slow advancement of the needle allowed the anesthetic solution to be deposited ahead of the needle tip. In this way, pain attributed to the passage of the needle appeared to be minimized. Once the path of the needle was anesthetized, heavier pressure on the foot paddle allowed infiltration of the anesthetic solution at a higher rate into a wider tissue distribution as the needle was withdrawn. The ergonomically designed penlike handpiece has an advantage over its conventional counterparts: it provides better directional control and may be a less threatening sight to patients.

The overall volume of local anesthesia used by WAND™ was half that of TST. From the surgeon's perspective, we found less distortion of tissue planes, thus allowing better visualization during surgery. Four