

Profound, Needle-Free Anesthesia in Orthodontics

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With a rapid rise in the use of lasers and miniscrews over the past few years, the administration of anesthesia in the orthodontic office has also been on the increase. Fortunately, there are several topical anesthetic agents, more profound than ever, that can provide adequate anesthesia for most procedures, avoiding the need for injections. Also available is a novel method of providing local infiltrative anesthesia without a needle. Both techniques are described in this article.

Topical Anesthetic

Several important criteria must be considered when evaluating the myriad of topical anesthetics that might be used in the orthodontic office. First, the compound needs to be highly viscous, so it will not liquefy and dissipate upon application. Not only is this irritating to the patient, but it reduces the duration of contact of the concentrated anesthetic with the target mucosa. Second, the formulation should include several active anesthetic agents, thus providing a wider spectrum of anesthetic action. Finally, the anesthetic should contain a vasoactive agent, which will lessen systemic absorption while increasing anesthetic duration.

Profound,* a formulation of 10% lidocaine, 10% prilocaine, and 4% tetracaine in an aqueous gel, was originally developed for soft-tissue laser

applications. Even a 5% concentration of lidocaine/prilocaine has been found to be a more profound topical agent than 30% lidocaine.¹ My initial experience with Profound was hit-or-miss, however, probably due to two factors: the viscosity was too low, and there was no vasoactive ingredient.

After I suggested a change in formulation to the compounding pharmacist, an improved version of the product was created: Profound PET (phenylephrine, thick). Profound PET has a much greater viscosity than the original gel, and it contains 2% phenylephrine, a vasoactive agent. The phenylephrine makes the product light-sensitive, with a shelf life of about 90 days.

The topical gel is applied for two minutes before performing a laser technique, miniscrew insertion, band seating, or any other mildly invasive procedure, then thoroughly rinsed. Leaving the anesthetic on the mucosa for longer than two minutes should be avoided, because it may cause minor sloughing. An application of .25g provides 25mg lidocaine/prilocaine and 10mg tetracaine, which is safe for children heavier than 25 pounds. In many cases, the anesthesia will be profound enough that miniscrews can be placed, particularly anterior to the first molars, without any further anesthesia. For those cases where a powerful topical gel alone may be insufficient, there is now a needle-free alternative for local anesthetic delivery.

The MadaJet XL

Originally intended for medical procedures, and only recently introduced to dentistry, the MadaJet XL** uses pneumatic pressure to discharge a local anesthetic below the mucosal surface. The glass chamber is filled with anesthetic, and the



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MadaJet XL is then “cocked” for delivery (Fig. 1). A formulation of 4% articaine with epinephrine 1:100,000 is recommended for optimal profundity of anesthesia.

After a topical anesthetic is applied and rinsed, the MadaJet XL tip is directed toward the underlying bone or dense tissue and “fired” with the press of a button. I normally activate the device twice in each target area to assure adequate anesthesia.

A 2-3mm wheal will be created at the surface of the placement site, corresponding to a 4-6mm wheal at the base of injection, 2-3mm below the surface epithelium. The surface wheal can be used as a guide for miniscrew placement, or for painless needle insertion if necessary. I have found that I can routinely insert miniscrews in anterior areas using only topical anesthetic and the MadaJet XL. Supplemental anesthetic injections are often required in areas of greater tissue coverage, including the mandibular retromolar region and zygomatic buttress.

Conclusion

Every orthodontist who performs minimally invasive adjunctive procedures such as skeletal anchorage and laser treatment wants to provide a pain-free environment. Until recently, profound anesthesia for these procedures could be achieved only with local anesthesia delivered by traditional injections. Today, however, products such as Profound PET topical anesthetic gel and the MadaJet XL needle-free injector promise to open new avenues of treatment for clinicians who have avoided administering injections.



Fig. 1 MadaJet XL needle-free local anesthetic injector.

REFERENCES

1. Woodman, P.J.: Topical lidocaine-prilocaine versus lidocaine for neonatal circumcision: A randomized controlled trial, *Obstet. Gynecol.* 93:775-779, 1999.