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hygiene

the international C.E. magazine of dental hygiene

1 2012

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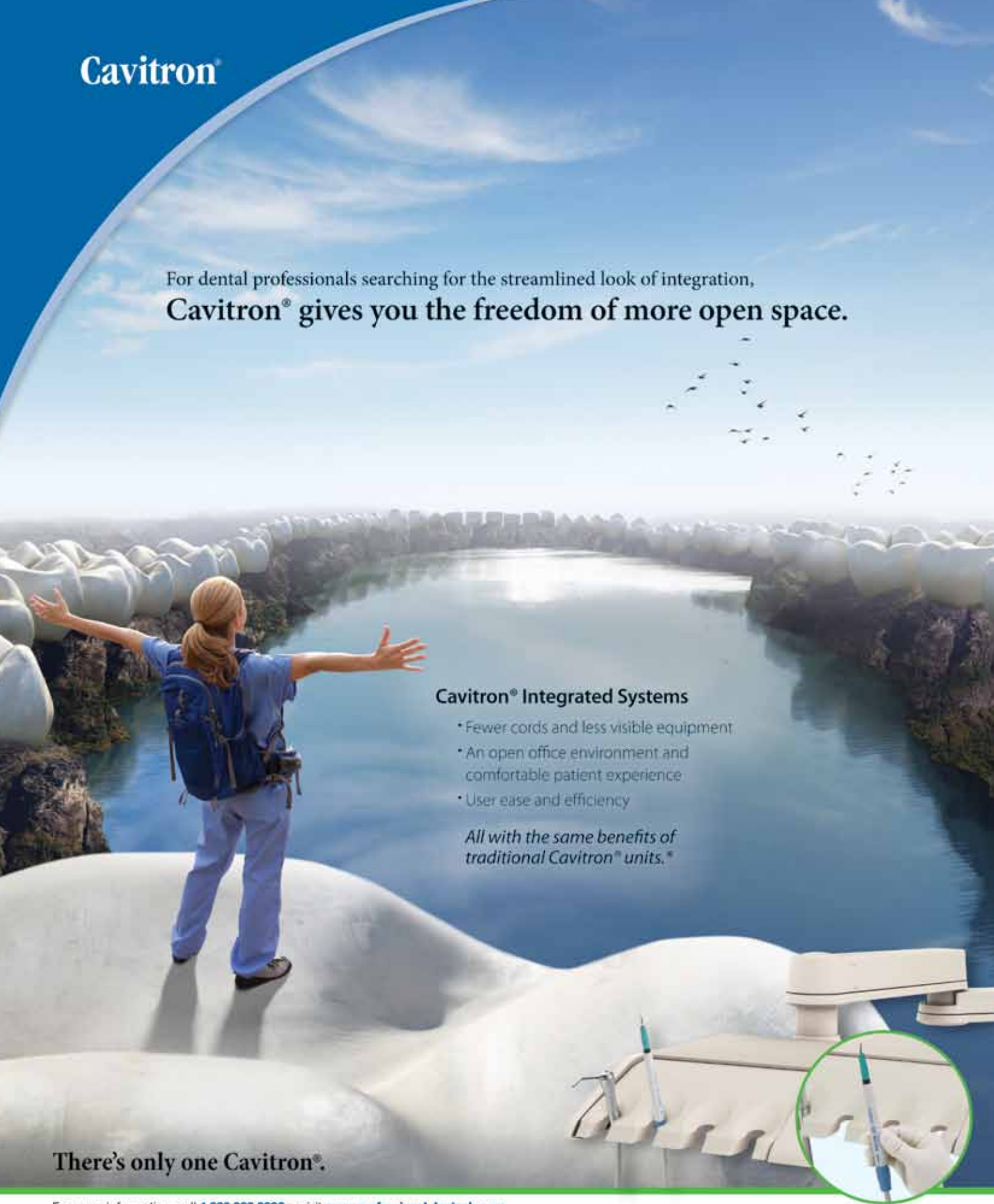

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Welcome to *hygiene*

Torsten Oemus, Publisher
Dental Tribune International

_The goal of this quarterly magazine is twofold. First, it seeks to share practical dental hygiene knowledge that can be put to use in your day-to-day work. Second, it is a vehicle to help you chip away at continuing education requirements.

The amount of new information available in dentistry about products, techniques and research is astounding. It's difficult to find time to catch up on the latest clinical news and product information. Thus, we hope *hygiene* will not only be a welcome respite for those rare chunks of time you can devote to reading, but one that provides a practical return on your investment by providing information that you can put to immediate use.

For this first issue of the North America edition of *hygiene*, we've assembled a collection of articles from a diverse group of contributors, each recognized in the profession as a thought leader and respected peer. One example in this issue is the detailed accounting of how important ergonomically correct seating is for dental professionals, especially for hygienists. Patti DiGangi, RDH, BS, and Judy Bendit, RDH, BS, draw on the world of auto racing and aviation to create a strong argument for the use of checklists to reduce the risk of potential injury associated with your work-related seating.

The ergonomics checklist article is just one of three C.E. articles in this edition. Every issue of *hygiene* magazine will contain C.E. content. That means that by reading the articles in this edition on ergonomics, sleep apnea and medical cross coding, and then taking a short online quiz at *www.DTStudyClub.com*, you can earn one hour of ADA CERP-certified C.E. credit. Because *hygiene* is quarterly, you can chisel four C.E. credits per year out of your already busy life without any lost revenue or time away from work. To learn more about this C.E. opportunity, visit *www.DTStudyClub.com*.

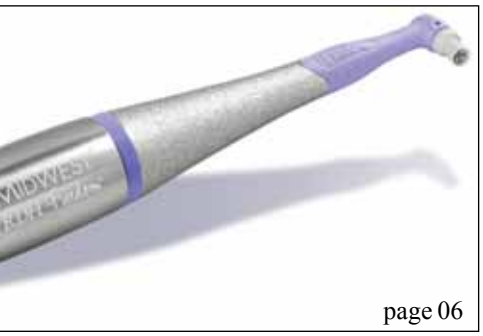
Annual subscribers to the magazine ($50) need only register at the Dental Tribune Study Club website to access the C.E. quizzes free of charge. Non-subscribers may take the C.E. quiz after registering on the DT Study Club website and paying a nominal fee.

If you have a penchant for words, it might also interest you to know that authors of the C.E.-accredited articles receive 15 percent of the fees collected from the non-subscribers who take the C.E. quiz online.

I know that taking time away from work to pursue C.E. credits can be costly in terms of lost revenue and time, and that makes *hygiene* a valuable publication. I hope you enjoy this first issue and that you get the most out of it that you can.

Sincerely,

Torsten Oemus
Publisher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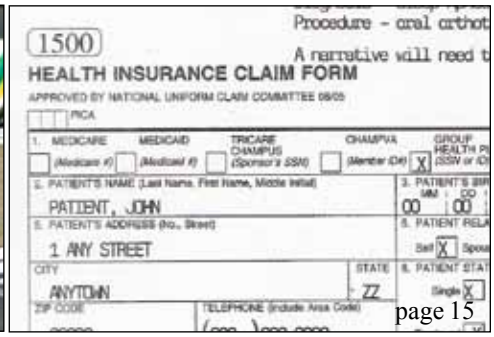

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on the cover

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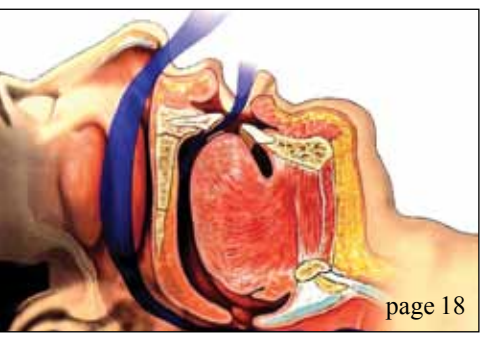
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Handpiece technology: What are you using?

Author_Shirley Branam, RDH, MBA

Fig. 1_In 1996, Midwest introduced the first ever a hygiene specific low-speed handpiece, the Midwest RDH, uniquely designed with the hygienist's needs in mind, and continues to lead the hygiene handpiece market today. (Photos/Provided by Shirley Branam, RDH, MBA)

_George F. Green from Kalamazoo, Mich., patented the first power dental handpiece in 1875.[6] History indicates his handpiece was "too heavy to hold and very expensive to run," only operating at 400 rpm.[2] Many improvements have been made to today's equipment as ergonomists recommend manufacturers "develop new and better ways to optimize the performance of people using technology to perform work more effectively."[3]

Dental hygienists often utilize a low-speed handpiece designed for restorative procedures. Slow-speed handpieces are designed to cut and finish restorations, remove decay and repair appliances. A variety of components are required for the hygienist to convert the low speed to a polishing handpiece. This would include a slow-speed motor, a straight attachment and a contra angle or disposable prophy angle.

Considering the increased length, slimmer diameter, higher speed range, additional weight of the handpiece and cord, the dental handpiece is not ideal for the ergonomic and procedural requirements of dental hygienists (Table 1).

Significant interest has been given to the development and improvement of the hygiene-specific handpiece. Design modifications for hygiene handpieces include reduced length, speed, vibrations, noise, weight and grip size (Table 2). These adjustments are an attempt to improve the hygienists' hand position along with improving the efficiency and effectiveness of the equipment.

The type of handpiece can also affect the procedural outcome for the patient. "Polishing for 30 seconds with a pumice paste may remove as much as 4 µm of outer enamel," which is the fluoride rich surface.[7,8]

An increase in speed will increase the rate of surface abrasion. Tissue trauma and heat may also increase with higher rpm. Hence, it is recommended that the handpiece should operate at a low rpm.[1,4,5,7]

Many dental equipment manufactures offer air-driven dental hygiene handpieces. There is a broad assortment in features between each manufacturer. When choosing a hygiene-specific handpiece, select a comfortable, ergonomic design with features that improve the polishing procedure.

Specifications ergonomists currently advocate in a premium dental hygiene handpiece design include light weight and good balance, to allow for a relaxed grip, and a non-slip surface for ease of control.[3]

It is also highly recommended that the handpiece have a larger diameter to increase the pinch width of the operator to reduce the possibility of cumulative trauma disorders.[3]

A swivel mechanism is another feature to consider. A swivel mechanism in combination with the other features mentioned can reduce the pinching effect and allow the operator to move the handpiece with minimal effort.[3]

The latest advancement in technology includes cordless, battery-operated handpeices. These new designs eliminate the cord and incorporate an electric motor.

These rechargeable motors allow hygienists to polish unrestricted with the same advantages in reduced rpm, weight and balance over the air-driven, slow-speed handpiece.

Another improvement with these handpieces is in sterilization and infection control. The outer sheath is removable for sterilization. The time required to

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Oraqix is indicated for adults who require localized anesthesia during scaling and/or root planing. Oraqix is not for injection. Oraqix is contraindicated in patients with known history of hypersensitivity to local anesthesia of the amide type or to any other component of this product. The most common adverse reactions in clinical studies were application site reactions, headaches and taste perversion. For Oraqix prescribing information, warnings and contraindications, see the product insert on opposing page.

References: 1. Oraqix® Prescribing Information. **2.** van Steenberghe D, Bercy P, De Boever J, et al. Patient evaluation of a novel non-injectable anesthetic gel: a multicenter crossover study comparing the gel to infiltration anesthesia during scaling and root planing. J Periodontol. 2004;75(11):1471-1478.

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INDICATIONS AND USAGE

Oraqix® is indicated for adults who require localized anesthesia in periodontal pockets during scaling and/or root planing.

CONTRAINDICATIONS

Oraqix® is contraindicated in patients with a known history of hypersensitivity to local anesthetics of the amide type or to any other component of the product.

WARNINGS

Prilocaine can cause elevated methemoglobin levels particularly in conjunction with methemoglobin-inducing agents. Methemoglobinemia has also been reported in a few cases in association with lidocaine treatment. Patients with glucose-6-phosphate dehydrogenase deficiency or congenital or idiopathic methemoglobinemia are more susceptible to drug-induced methemoglobinemia. Oraqix® should not be used in those patients with congenital or idiopathic methemoglobinemia and in infants under the age of twelve months who are receiving treatment with methemoglobin-inducing agents. Signs and symptoms of methemoglobinemia may be delayed some hours after exposure. Initial signs and symptoms of methemoglobinemia are characterized by a slate grey cyanosis seen in, e.g., buccal mucous membranes, lips and nail beds. In severe cases symptoms may include central cyanosis, headache, lethargy, dizziness, fatigue, syncope, dyspnea, CNS depression, seizures, dysrhythmia and shock. Methemoglobinemia should be considered if central cyanosis unresponsive to oxygen therapy occurs, especially if metHb-inducing agents have been used. Calculated oxygen saturation and pulse oximetry are inaccurate in the setting of methemoglobinemia. The diagnosis can be confirmed by an elevated methemoglobin level measured with co-oximetry. Normally, metHb levels are <1%, and cyanosis may not be evident until a level of at least 10% is present. The development of methemoglobinemia is generally dose related. The individual maximum level of metHb in blood ranged from 0.8% to 1.7% following administration of the maximum dose of 8.5 g Oraqix®.

Management of Methemoglobinemia: Clinically significant symptoms of methemoglobinemia should be treated with a standard clinical regimen such as a slow intravenous infection of methylene blue at a dosage of 1-2 mg/kg given over a five minute period.

Patients taking drugs associated with drug-induced methemoglobinemia such as sulfonamides, acetaminophen, acetanilide, aniline dyes, benzocaine, chloroquine, dapsone, naphthalene, nitrates and nitrites, nitrofurantoin, nitroglycerin, nitroprusside, pamaquine, para-aminosalicylic acid, phenacetin, phenobarbital, phenytoin, primaquine, and quinine are also at greater risk for developing methemoglobinemia. Treatment with Oraqix® should be avoided in patients with any of the above conditions or with a previous history of problems in connection with prilocaine treatment.

PRECAUTIONS

General: **DO NOT INJECT** Oraqix® should not be used with standard dental syringes. Only use these product with the Oraqix® Dispenser, which is available from DENTSPLY Pharmaceutical.
Allergic and anaphylactic reactions associated with lidocaine or prilocaine can occur. These reactions may be characterized by urticaria, angioedema, bronchospasm, and shock. If these reactions occur they should be managed by conventional means.

Oraqix® coming in contact with the eye should be avoided because animal studies have demonstrated severe eye irritation. A loss of protective reflexes may allow corneal irritation and potential abrasion. If eye contact occurs, immediately rinse the eye with water or saline and protect it until normal sensation returns. In addition, the patient should be evaluated by an ophthalmologist, as indicated.

However, Oraqix® should be used with caution in patients with a history of drug sensitivities, especially if the etiologic agent is uncertain.

Patients with severe hepatic disease are at greater risk of developing toxic plasma concentrations of lidocaine and prilocaine.

Information for Patients: Patients should be cautioned to avoid injury to the treated area, or exposure to extreme hot or cold temperatures, until complete sensation has returned.

Drug Interactions: Oraqix® should be used with caution in combination with dental injection anesthesia, other local anesthetics, or agents structurally related to local anesthetics, e.g., Class 1 antiarrhythmics such as tocainide and mexiletine, as the toxic effects of these drugs are likely to be additive and potentially synergistic.

CARCINOGENESIS, MUTAGENESIS, IMPAIRMENT OF FERTILITY:

Carcinogenesis - Long-term studies in animals have not been performed to evaluate the carcinogenic potential of either lidocaine or prilocaine. Chronic oral toxicity studies of o-toluidine, a metabolite of prilocaine, have shown that this compound is a carcinogen in both mice and rats. The tumors associated with o-toluidine included hepatocarcinomas/ adenomas in female mice, multiple occurrences of hemangiosarcomas/hemangiomas in both sexes of mice, sarcomas of multiple organs, transitional-cell carcinomas/papillomas of urinary bladder in both sexes of rats, subcutaneous fibromas/fibrosarcomas and mesotheliomas in male rats, and mammary gland fibroadenomas/adenomas in female rats. These findings were observed at the lowest tested dose of 150 mg/kg/day or greater over two years (estimated daily exposures in mice and rats were approximately 6 and 12 times, respectively, the estimated exposure to o-toluidine at the maximum recommended human dose of 8.5g of Oraqix® gel on a mg/m2 basis). Complete conversion of prilocaine to its metabolite o-toluidine on a molar basis is assumed. This gives a conversion on a weight basis of about 50% for prilocaine base (dependent on the molecular weights, i.e. 220 for prilocaine base and 107 for o-toluidine).

Mutagenesis - o-Toluidine, metabolite of prilocaine, was positive in Escherichia coli DNA repair and phage-induction assays. Urine concentrates from rats treated orally with 300 mg/kg o-toluidine were mutagenic to Salmonella typhimurium in the presence of metabolic activation. Several other tests on o-toluidine, including reverse mutations in five different Salmonella typhimurium strains with or without metabolic activation, and single strand breaks in DNA of V79 Chinese hamster cells, were negative.

USE IN PREGNANCY:

Teratogenic Effects: Pregnancy Category B
There are no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, Oraqix® should be used during pregnancy only if the benefits outweigh the risks.

Nursing Mothers: Lidocaine and, possibly, prilocaine are excreted in breast milk. Caution should be exercised when Oraqix® is administered to nursing women.

Pediatric Use: Safety and effectiveness in pediatric patients have not been established. Very young children are more susceptible to methemoglobinemia. There have been reports of clinically significant methemoglobinemia in infants and children following excessive applications of lidocaine 2.5% topical cream (See WARNINGS).

Geriatric Use: In general, dose selection for an elderly patient should be cautious, usually starting at the low end of the dosing range, reflecting the greater frequency of decreased hepatic, renal, or cardiac function, and of concomitant disease or other drug therapy.

ADVERSE REACTIONS

A causal relationship between the reported adverse reactions and Oraqix® could neither be established nor ruled out.

Following SRP treatment with Oraqix® in 391 patients, the most frequent adverse events were local reactions in the oral cavity. These events, which occurred in approximately 15% of patients, included pain, soreness, irritation, numbness, vesicles, ulcerations, edema and/or redness in the treated area. Of the 391 patients treated with Oraqix®, five developed ulcerative lesions and two developed vesicles of mild to moderate severity near the site of SRP. In addition, ulcerative lesions in or near the treated area were also reported for three out of 168 patients who received placebo. Other symptoms reported in more than one patient were headache, taste perversion, nausea, fatigue, flu, respiratory infection, musculoskeletal pain and accident/injury.

OVERDOSAGE

Local anesthetic toxicity emergency: If other local anesthetics are administered at the same time as Oraqix, e.g. topically or by injection, the toxic effects are thought to be additive and could result in an overdose with systemic toxic reactions. There is generally an increase in severity of symptoms with increasing plasma concentrations of lidocaine and/or prilocaine. Systemic CNS toxicity may occur over a range of plasma concentrations of local anesthetics. CNS toxicity may typically be found around 5000 ng/mL of lidocaine, however a small number of patients reportedly may show signs of toxicity at approximately 1000 ng/mL. Pharmacological thresholds for prilocaine are poorly defined. Central nervous system (CNS) symptoms usually precede cardiovascular manifestations. The plasma level of lidocaine observed after the maximum recommended dose (5 cartridges) of Oraqix® in 11 patients exposed over 3 hours ranged from 157-552 ng/mL with a mean of 284 ng/mL ± 122 SD. The corresponding figure for prilocaine was 53-181 ng/mL with a mean of 106 ± 45 SD.

Clinical symptoms of systemic toxicity include CNS excitation and/or depression (light-headedness, hyperacusis, visual disturbances, muscular tremors, and general convulsions). Lidocaine and/or prilocaine may cause decreases in cardiac output, total peripheral resistance and mean arterial pressure. These changes may be attributable to direct depressant effects of these local anesthetic agents on the cardiovascular system. Cardiovascular manifestations may include hypotension, bradycardia, arrhythmia, and cardiovascular collapse.

Management of Local Anesthetic Emergencies: Should severe CNS or cardiovascular symptoms occur, these may be treated symptomatically by, for example, the administration of anticonvulsive drugs, respiratory support and/or cardiovascular resuscitation as necessary.

DO NOT FREEZE. Some components of Oraqix® may precipitate if cartridges are frozen. Cartridges should not be used if they contain a precipitate.

Do not use dental cartridge warmers with Oraqix®. The heat will cause the product to gel.

Rx only

Manufactured for: DENTSPLY Pharmaceutical York, PA 17404
By: Recipharm Karlskoga AB Karlskoga Sweden
Rev. 09/2010

sterilize an air-driven handpiece is considerably longer because the entire handpiece takes time to cool down. The advantage of battery-operated handpieces is only the removable sheath is sterilized, so the cool-down time is considerably less.

This is both a time saving and cost saving feature. The hygienist can operate with one handpiece motor and have multiple sheaths to rotate between during patient care.

Today's technology has changed to meet a variety of procedural and ergonomic recommendations. The design features, specifications and dedicated low-speed hygiene handpieces have been modified by manufacturers to meet the unique needs of the RDH. So the question is, "What are you using?"_

Fig. 2_In 2011, Midwest introduced the Midwest RDH Freedom Cordless Prophy System.

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Table 1 **Low-speed dental handpiece**

Features	Specifications
Combined weight (g)	133
Combined length (mm)	146
Diameter (mm)	15.9
Single free speed (rpm)	8,000

Table 2 **Low-speed hygiene handpiece**

Features	Range
Weight (g)	68.5–108.9
Length (mm)	61.7–91.6
Diameter (mm)	16.7–22.8
Free speed (rpm)	2,532–7,459

_about the author

hygiene

Shirley Branham, RDH, MBA, is the central clinical educator for DENTSPLY Professional. She received her bachelor's degree in dental hygiene from the University of Michigan and earned an MBA degree in health care management from the University of Phoenix. Branham's background includes more than 20 years of clinical and educational experience in the dental assistant and dental hygiene professions. While a member of the University of Michigan School of Dentistry, she held various appointments, including hygiene faculty member, staff hygienist in the Graduate Prosthodontic Clinic and research coordinator assistant. Branham's areas of expertise include clinical dental hygiene, biomaterials, implants and local anesthesia. She lectures nationally and internationally for DENTSPLY Professional, covering topics on ultrasonic instrumentation, anesthesia, caries risk assessment and implant maintenance. You may contact her at *shirley.branam@dentsply.com*.