research was found to exist with respect to coaxial alignment, so a survey was undertaken to allow clinicians who use loupes to be tested to determine if they were misaligned and to be given the opportunity to have their surgical loupes adjusted.

METHODS

Researchers used an in-person survey and a measurement tool to assess coaxial alignment of participants' surgical loupes. The participants were recruited through posters and e-mails at the University of British Columbia Faculty of Dentistry and e-mails to all members of the British Columbia Dental Association and British Columbia Dental Hygienists' Association. Ninety-seven dental professionals agreed to participate.

RESULTS

Of the 97 individuals, 54 used TTL surgical loupes and 43 used FLM surgical loupes. Among the FLM users, 32 used FLM plus FVA surgical loupes and 11 used FLM plus LVA surgical loupes. Only 17 (18%) were using coaxially aligned surgical loupes. The remaining 82% were using coaxially misaligned surgical loupes and experiencing a visual discrepancy (Figure 2). The prevalence of misalignment was high in all 3 types of surgical loupes.

The severity of the discrepancy being experienced would correspond to the entire working length of a dental instrument. In some cases, the visual discrepancy was equivalent to a patient's maximum oral opening. Twenty-six of the 80 participants using coaxially misaligned surgical loupes consented to have their devices adjusted. Eighteen achieved full coaxial alignment after the adjustment, accounting for 17 using FLM plus FVA loupes and 1 using a TTL loupe. Eight experienced 0.5 through 3.0 units of reduction in misalignment, but their surgical loupes were unable to reach full coaxial alignment. FLM plus FVA loupes were significantly more likely to be adjusted to full coaxial alignment than were FLM plus LVA or TTL loupes.

Clinical Significance

Wearing misaligned surgical loupes can not only affect the quality of care dental professionals deliver to their patients, but can also affect the clinician's health. With misaligned loupes, clinicians can suffer eyestrain, headaches, and vertigo. In addition, repeatedly moving the neck, shoulder, upper arm, and wrist to line-up the instruments and achieve better vision can create repetitive strain injuries or aggravate existing symptoms in the neck and shoulder area. Coaxial misalignment may also coincide with poor declination angles, causing the clinician to bend the neck unnecessarily to look through the magnifying lenses. Unbalanced postures might be assumed and impose tension on the neck muscles, compromise blood circulation, and increase pain, discomfort, and functionality. Spinal injury may also result. If clinicians use correctly aligned surgical loupes, these problems may not develop and musculoskeletal health may even be improved.

DISCUSSION

A high prevalence of coaxial misalignment was discovered among surgical loupe users. The loupes most able to achieve coaxial alignment were the FLM plus FVA loupes. Neither FLM plus LVA or TTL loupes were likely to be adjustable to full coaxial alignment.

Wen W, Kanji Z, Laronde D, et al: Out of the loupe: The prevalence of coaxial misalignment of surgical loupes among dental professionals. *J Am Dent Assoc* 150:49-57, 2019*Reprints available from* W Wen, 1460 Broadway, Flr 12, New York, NY 10036; email: Maggie.wen@alumni.ubc.ca

NONRESTORATIVE TREATMENTS

Clinical practice guidelines for managing noncavitated and cavitated carious lesions

Check for updates

BACKGROUND

Preventing the caries process from beginning should be the primary goal of any caries management plan. However, once the disease is present, clinicians must determine the best approach to stop the process from continuing by applying interventions at the patient level and managing any disease manifestations at the lesion level. Patient-level interventions are designed to reestablish the balance between demineralization and remineralization. Lesion-level interventions can be nonrestorative or nonsurgical and restorative or minimally invasive or invasive. Noncavitated

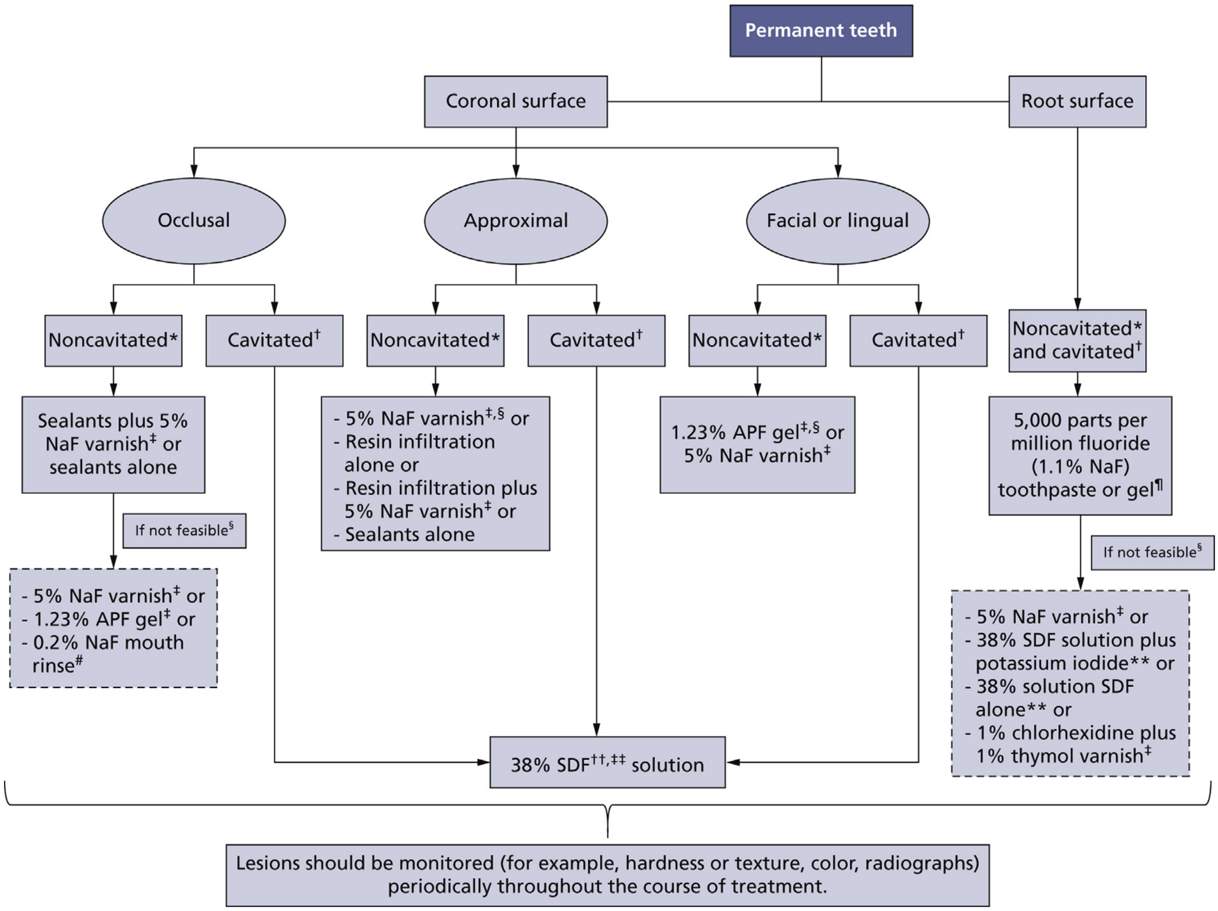

Figure 2. Clinical pathway for the nonrestorative treatment of noncavitated and cavitated carious lesions on permanent teeth. *APF,* Acidulated phosphate fluoride; *NaF,* sodium fluoride; *SDF,* silver diamine fluoride. *Defined as ICDAS 12. †Defined as ICDAS 5-6. ‡Application every 3 to 6 months. §The order of treatments included in this recommendation represents a ranking of priority defined by the panel when accounting for treatment effectiveness, feasibility, patients' values and preferences, and resource utilization. Considerations such as a particular patient's values and preferences, special needs, or insurance status should inform clinical decision making. #At-home use once per week. ††Biannual application. ¶At-home use at least once per day. **Annual application. ‡‡In keeping with the concept of informed consent, all nonsurgical and restorative treatment options and their potential side effects (such as blackened tooth surfaces treated with SDF) should be offered and explained to all patients. (Courtesy of Slayton RL, Urquhart O, Araujo MWB, et al: Evidence-based clinical practice guideline on nonrestorative treatments for carious lesions: A report from the American Dental Association. *J Am Dent Assoc* 149:837-849, 2018.)

carious lesions are surfaces that appear intact macroscopically, showing no clinical evidence of cavitation. They have the potential to reverse if chemical interventions are instituted or to arrest through either chemical or mechanical interventions. A clinical practice guideline was developed to help clinicians determine the treatments or interventions that should be used to arrest or reverse existing noncavitated and cavitated carious lesions in adults and children.

METHODS

A systematic search was conducted of the literature in MEDLINE and Embase via Ovid, Cochrane CENTRAL, and Cochrane database of systematic reviews. The goal was to identify randomized controlled trials that reported nonrestorative treatments for noncavitated and cavitated carious lesions.

RESULTS

Eleven recommendations were formulated, with each specific to the type of lesion involved, the tooth surface, and the dentition (Figure 2).

Cavitated Coronal Carious Lesions in Primary or Permanent Teeth

Four studies in 7 reports including 2115 participants were used to formulate the recommendations. To arrest advanced cavitated carious lesions on coronal surfaces of primary or permanent teeth, clinicians are advised to select 38% silver diamine fluoride (SDF) solution in biannual applications over 5% sodium fluoride (NaF) varnish, which is applied once a week for 3 weeks. Data suggest that SDF may be more effective on anterior teeth than on posterior teeth. Parents and patients should be advised that

SDF stains the lesions black, which may be unacceptable in some cases.

Noncavitated Coronal Carious Lesions on Primary or Permanent Teeth

Eight studies, covering 726 participants, provided information regarding the treatment of noncavitated lesions on occlusal surfaces. To arrest or reverse these lesions on occlusal surfaces in primary teeth, clinicians should prioritize sealants plus 5% NaF varnish applied every 3 to 6 months or sealants alone over 5% NaF varnish alone, 1.23% acidulated phosphate fluoride (APF) gel applied every 3 to 6 months, resin infiltration plus 5% NaF varnish applied every 3 to 6 months, or 0.2% NaF mouth rinse once a week. The recommendations for the treatment of occlusal lesions in permanent teeth are the same but do not include the use of resin infiltration plus 5% NaF varnish as a treatment option. It's essential to maintain a dry field and use proper technique for the sealants to be effective and retained. If the clinician can't guarantee that a dry field will be maintained, a hydrophilic sealant may be preferable to a resin-based one. When the quality of sealant application can't be guaranteed, other treatments may be selected. The 0.2% NaF mouth rinses are not appropriate for uncooperative children who can't control swallowing. If in-office gels are used, suction should be provided to minimize swallowing, especially for pediatric patients.

For noncavitated lesions on approximal surfaces, 13 studies in 14 reports, which included 2516 participants, informed the recommendations. Clinicians are advised to use 5% NaF varnish every 3 to 6 months, resin infiltration alone, resin infiltration plus 5% NaF varnish, or sealants alone whether the primary or permanent dentition is involved. The treatments are given in order of priority. Clinicians should rely on radiographic examination to diagnose the lesion as noncavitated or cavitated. Approximal lesions that appear to be limited to the enamel and outer third of the dentin are most likely noncavitated, and nonrestorative interventions would be appropriate.

For noncavitated lesions on facial or lingual surfaces, 5 studies, which included 584 participants, informed the recommendations. Clinicians should select 1.23% APF gel every 3 to 6 months or 5% NaF varnish. These recommendations cover both the primary and permanent dentitions. Again, in-office gel use requires the use of suction to minimize swallowing, especially for uncooperative children.

For noncavitated lesions on any coronal tooth surface, 7 studies with 2365 participants informed the recommendations. Clinicians should not use 10% casein phosphopeptide–amorphous calcium phosphate (CPP-ACP) if any other fluoride interventions, sealants, or resin infiltration is available. CPP-ACP should not be used as a substitute for fluoride products.

Root Carious Lesions on Permanent Teeth

The recommendations for treatment of cavitated and noncavitated lesions on root surfaces were based on 8 studies that included 584 participants. Clinicians are advised to select as their first choice the use of 5000 ppm fluoride toothpaste or gel at least once a day over 5% NaF varnish every 3 to 6 months, 38% SDF plus potassium iodide solution annually, 38% SDF solution annually, or 1% chlorhexidine plus 1% thymol varnish every 3 to 6 months. All of the studies supporting this recommendation were conducted in adult or older adult patients, who are predominantly affected by root caries. Patient adherence to the regimen of using 5000 ppm fluoride toothpaste or gel is required. Because this adherence is integral to success, this intervention may not be feasible for populations living in nursing homes or those with special needs. In addition, health insurance may not cover this treatment.

DISCUSSION

Arresting or reversing noncavitated carious lesions will require the clinician to prioritize the use of sealants plus 5% NaF varnish on occlusal surfaces, 5% NaF varnish on approximal surfaces, and 1.23% APF gel or 5% NaF varnish alone on facial or lingual surfaces. The use of 5000 ppm fluoride is the best choice for root surface lesions in permanent teeth. For the coronal surfaces of primary teeth, 38% SDF solution biannually is the best approach and could also be used for permanent teeth. Advanced cavitated lesions may be addressed using biannual applications of 38% SDF if access to care is limited, if the patient is uncooperative, or if general anesthesia is not recommended.

Clinical Significance

The clinical practice guideline recommendations should be accompanied by instructions to clinicians to actively monitor both noncavitated and cavitated lesions during the course of nonrestorative treatment to ensure that the treatment is successful in arresting or reversing the problem. Clinicians can gently probe the surface or use radiographs to seek evidence of arrest or reversal. If these signs aren't present, additional or alternative treatments may be tried. Nonrestorative treatments should also be accompanied by a diet low in sugar.

Slayton RL, Urquhart O, Araujo MWB, et al: Evidence-based clinical practice guideline on nonrestorative treatments for carious lesions: A report from the American Dental Association. *J Am Dent Assoc* 149:837-849, 2018

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