

# The effect of antisialogogues in dentistry

## A systematic review with a focus on bond failure in orthodontics

**Mette A.R. Kuijpers, DDS MSc; Arjan Vissink, DDS, MD, PhD; Yijin Ren, DDS, MSc, PhD; Anne M. Kuijpers-Jagtman, DDS, PhD**

**S**uccessful bonding of orthodontic brackets is a necessary part of orthodontic treatment. Bonding failures can be caused by patient-related factors such as an inability to open the mouth properly, too much saliva and insufficient swallowing. Successful bonding, however, is influenced primarily by operator factors. A significant factor in unsuccessful bonding is moisture contamination, especially with oral fluid. Adequate moisture control is crucial for many dental procedures, from endodontic and restorative treatments to orthodontics. Whereas teeth can be isolated during endodontic and restorative treatment, in orthodontic bonding a larger surface area needs to remain dry and free from saliva contamination. For example, brackets have to be placed on most of the teeth in a dental arch. Moisture contamination is especially difficult to avoid in patients who produce a lot of saliva or do not swallow it in a timely manner. The materials used for bonding are mainly those that will not bond (or that bond insufficiently) when the etched surface is wet. Even though there are hydrophilic materials on the market, the best bond strength still is achieved only when the sur-

### ABSTRACT



**Background.** The authors conducted a literature review to assess whether there is a reduction of salivation with the use of antisialogogues, whether the use of antisialogogues reduces the chair time needed for dental procedures and whether the use of antisialogogues reduces bond failure in orthodontics.

**Methods.** The authors conducted a search for original articles published from 1950 to April 2010 by using the following databases: Cochrane Collaboration, PubMed, Scopus, EMBASE and ISI Web of Knowledge. They included in their review only human studies in which antisialogogues were used. They validated methodological quality and evidence grade.

**Results.** Twenty-six studies met the inclusion criteria. Twenty-five of these studies were related to the effect of antisialogogues on salivation, and one study to bond failure. The authors found that there is evidence that antisialogogues work, inconclusive evidence that they reduce bond failure, and no evidence that they reduce chair time for dental procedures.

**Clinical Implications.** Taking into account the systemic effects of antisialogogues, which exceed the time needed for bracket bonding, the use of antisialogogues for dental procedures in general is questionable.

**Key Words.** Antisialogogues; anticholinergics; dental bonding; bond failure; orthodontic appliances; dentistry.

*JADA 2010;141(8):954-965.*

Dr. Kuijpers is a postgraduate orthodontic resident, Division d'orthodontie, Faculté de Médecine Dentaire, Université de Genève, 19, rue Barthélemy-Menn, 1211 Genève 4, Switzerland, e-mail "mette.kuijpers@unige.ch". Address reprint requests to Dr. Kuijpers.

Dr. Vissink is a professor in Oral Medicine, Department of Oral and Maxillofacial Surgery, University Medical Center Groningen and University of Groningen, Netherlands.

Dr. Ren is a professor and the chair, Department of Orthodontics, University Medical Center Groningen and University of Groningen, Netherlands.

Dr. Kuijpers-Jagtman is a professor and the chair, Department of Orthodontics and Oral Biology at the Radboud University Nijmegen Medical Center, Netherlands.

TABLE 1

## Indications and effects of parasympatholytic agents with an antisialogogue action.\*

DRUG TYPE	DOSE FOR SALIVARY REDUCTION (ADULT DOSE†)	THERAPEUTIC USES	DRUG PROPERTIES	CONTRAINDICATIONS	INTERACTIONS
<b>Atropine</b>	0.4-1.6 milligrams	Parkinson disease; antidote for rapid mushroom poisoning and anticholinesterase intoxication; control of first-degree heart block; ophthalmology: mydriasis and cycloplegia	Blocking/inhibiting acetylcholine action; effects are dose dependent: low dose—depresses salivary, lachrymal, bronchial and sweat secretion, brachycardia; larger dose—dilatation of pupils, photophobia, tachycardia, flushing skin, reduction in tone and mobility of gastrointestinal tract and urinary retention Sedative effect‡	Glaucoma, prostate hypertrophy, myasthenia gravis, obstructive disease of gastrointestinal tract, asthma, allergy to the drug and possibly pregnancy	Antihistamines, tricyclic antidepressants, monoamine oxidase inhibitors and phenothiazine tranquilizers
<b>Scopolamine</b>	0.3-0.6 mg	Sedation and amnesia; motion sickness			
<b>Hyoscyamine</b>	0.125-0.75 mg	Control of bradycardia; reduction of salivation and the secretion of gastric acid during general anesthesia; antidote for rapid mushroom poisoning and anticholinesterase intoxication			
<b>Methantheline</b>	50-100 mg	Peptic ulcers			
<b>Propantheline</b>	15-30 mg	Peptic ulcers			
<b>Glycopyrrolate</b>	1-2 mg	Control of bradycardia; reduction of salivation and the secretion of gastric acid during general anesthesia			

\* Sources: Ponduri and colleagues,<sup>8</sup> Rinchuse and colleagues,<sup>9</sup> Rinchuse and Rinchuse,<sup>10</sup> Sweetman and Martindale,<sup>11</sup> Arzneimittel-kompendium der Schweiz,<sup>12</sup> Sapkos<sup>13</sup> and Yagiela.<sup>14,15</sup>  
† Pediatric dosage is lower (per kilogram).  
‡ Scopolamine.

face of the tooth is dry during bonding.<sup>1-5</sup>

Reductions in the time needed for dental procedures, bonding appliances and procedures performed to maintain a dry working area can make the bonding procedure less cumbersome for the dental practitioner and the patient. Cotton rolls, saliva ejectors, soft-tissue and tongue retractors, and high vacuum suction can be used to help keep the operating field as dry as possible when bonding brackets. However, if a dry operation field is required to bond brackets successfully and to decrease the chair time for bonding, reducing or even stopping salivary flow may be an option. There are several ways to block or reduce salivary flow, including the use of botulinum toxin and the injection and rerouting of the submandibular ducts. These techniques, however, primarily are long-lasting treatments for patients who experi-

ence uncontrollable drooling.<sup>6,7</sup> For a short, temporary reduction of salivary flow, the remaining options are either prescribing an antisialogogue (a drug that reduces, slows or prevents the flow of saliva) or temporarily blocking the main excretory ducts (for example, with cotton rolls). Antisialogogues have been used in dentistry for many years to reduce salivary flow.<sup>8</sup> They usually are administered one hour before bonding takes place or a submucosal injection is administered. The most common antisialogogues are antimuscarinic and anticholinergic agents. Such agents have an effect on the central nervous system, but also on

**ABBREVIATION KEY.** **ADA:** American Dental Association. **GCF:** Gingival crevicular fluid. **IM:** Intramuscular. **IV:** Intravenous. **RCT:** Randomized controlled trial.

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