

A Review Of Astringents Used In Dentistry

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ABSTRACT

Astringents are any class of chemicals that shrink or compress tissues and dry up secretions. Although astringents have been used for centuries in one form or another, their significance and effectiveness in dentistry and mucosal health are now well understood, and they have evolved from salt water to a number of more modern medications. This page gives experts a thorough explanation of the several classes of medications used as astringents as well as their effects on dental patients and treatment.

INTRODUCTION

Dental pharmacotherapeutics is advancing quickly, therefore doctors must keep up with new medications, drug interactions, and practical therapeutic trends. In prosthodontics, astringents are helpful in controlling bleeding during gingival retraction. Additionally, they contribute to improving the gums' resilience to infections.

Astringents are chemicals that precipitate proteins but do not enter cells, hence solely having an impact on the mucosal surface layer. They lessen exudation and mechanically strengthen the surface to make it tougher. The Latin term *adstringere*, which means "to bind fast," is the root of the English word "astringent." They mainly act as irritants in moderate concentrations and as caustics in high quantities and have a relatively limited cell permeability. [1]

Legumes like beans and lentils are common sources of astringent foods. Other healthy sources are lemon, pomegranate, cranberry, gooseberry, pears, cauliflower, asparagus, and turnip. When consumed, these foods have a trait known as astringency that causes the mouth to pucker and feel dry. Due to the tannins they contain, this is also observed in green tea and wine.

Astringents are used not only to raise the pH level of the skin but also to tighten the skin and increase blood flow. Astringents are mostly used in skin care as toners to remove excess oil and makeup from the skin because of their outstanding shrinking and water absorption qualities. Commercial astringents are made from oak bark, a well-known tannin, for cosmetic and medicinal purposes.

Astringents produce tissue constriction. Small blood arteries are constricted, tissue is drained of water, or protein is precipitated to achieve this. Astringents are frequently used in medical treatments, particularly in dentistry to purify, tighten, and detoxify the gums and eliminate

plaque from the teeth. Before taking impressions or putting Class V or root surface restorations, the dentist may additionally administer astringents to the gingival tissues.

Astringents for Gingival Retraction

The soft tissue must be carefully managed during the entire impression process for fixed prosthodontics. In order to record the finish line, impression material must be sufficiently isolated because it cannot efficiently displace soft tissue, fluids, or detritus.

In order to expose the finish line and produce a suitable environment for the impression materials, a chemimechanical method has been reported in the literature [2,3].

Indicators indicate an elevated heart rate and blood pressure increase after administering epinephrine to a lacerated gingiva. Among the contraindications include a positive history of hyperthyroidism, cardiovascular disease, and those getting Treatment for depression with monoamine oxidase inhibitors [4]

It has been demonstrated that alum (potassium aluminum sulfate) in a 100% concentration is just marginally less effective than epinephrine at shrinking gingival tissues, and it exhibits good tissue regrowth. A 10-minute treatment caused only minor tissue damage, which fully recovered in 10 days [5,6]. Because it is safer and has fewer systemic effects than epinephrine, alum has been suggested for use [7,8].

One of the most widely used astringents is aluminum chloride [9,10]. Aluminum chloride works because it can drain fluid from tissues, precipitate protein, and tighten blood vessels. It is employed in concentrations ranging from 5% to 25%. Although aluminum chloride is the least irritating medication used to impregnate retraction cords, research has revealed that it interferes with the Polyvinyl Siloxane imprint materials' ability to set.

It has been suggested to utilize ferric subsulfate, also known as Monsel's solution, to treat gingival displacement [11-13]. Compared to epinephrine, it has a marginally higher efficacy in gingival displacement. Although the solution is messy to use, tissue healing is good [14]. These characteristics are ascribed to the solution's high acidity (72%) [15].

Recently, it has been revealed that ferric sulfate (13.3%) is used for tissue displacement. It heals the tissue more quickly than aluminum chloride and does so without significantly traumatizing the tissue. Because ferric sulfate solutions over 15% are highly acidic, they can seriously irritate tissues and increase postoperative root sensitivity. Aluminum chloride and ferric sulfate can both be used together, but epinephrine cannot. When combined with epinephrine, a significant amount of blue precipitate forms. Blood must be applied promptly to the injured tissue since ferric sulfate quickly clots it.

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In 8% and 40% solutions, zinc chloride (bitartrate) has been used. The 40% solution is slightly more successful at displacing the gingiva than the 8% solution, which is roughly equivalent to epinephrine. The tissue suffered significant necrosis from the 8% solution,

which took 60 days to recover. Because of how caustic the 40% solution is, it has been designated as a chemical cautery agent.

Although less efficient than epinephrine, tannic acid (20% and 100%) exhibits excellent tissue regeneration. The suggested duration of use is 10 minutes [16]. Tannic acid has very little hemostatic power. A 45% condensation of formaldehyde and metacresol sulfonic acid results in negatol solution. Compared to epinephrine, it offers better retraction. There is little tissue recovery. Because of its strong acidity, it can decalcify teeth in 10% and 100% solutions. It is not advised for gingival displacement and is categorized as a chemical cautery agent [4].

The commonly used gingival displacement medications have high acidity and a pH between 1 and 3 [17,18]. The smear layer may be removed as a result, which could harm the self-etch dentin bonding systems' bonding process [18]. The opening up of the cervical dentinal tubules due to the loss of the smear layer may also result in dentinal hypersensitivity.

Astringents for completely edentulous patients

Butcher and Mitchell noted that prolonged covering of the palatal surface causes the palatal glands to gradually retreat. The palatal glands are reflexively stimulated when the mouth is rinsed with an astringent. The surrounding tissues become turgid as a result of this activity and ductal dilation [19]. The mucous membrane will remain in a better physiological state with regular removal of any repair and cleaning.

Gum astringent

Gum paints are a combination of antiseptics and tanning chemicals that precipitate proteins but do not enter cells, influencing only the superficial layer and strengthening it mechanically while reducing exudation. They have healing, anesthetic, fungicidal, and germicidal effects. They provide a calming, cooling, and astringent impact when administered.

Gum bleeding can be controlled using Zingisol, which contains 2% zinc sulfate. The patient is instructed to massage 3–4 times daily using 3–4 drops on a finger. For the treatment of stomatitis, inflammation, and bleeding gums, Sensoform gum paint (Warren) is applied to the affected area multiple times with a cotton applicator. It contains tannic acid, glycerine, and potassium iodide.

Cetrimide 0.1% w/v, tannic acid 2% w/v, and zinc chloride 1% w/v are the ingredients of Stolin gum paint 15ml. Use the zinc sulfate-based Sensorok gum astringent to massage your gums two to three times each day. Tannic acid makes up 27% of S. G. PAINT, along with potassium iodide, iodine, thymol, menthol, and 72% glycerine. S. G. PAINT contains tannic acid, which has been used as an astringent for throat and oral mucous membranes.

The S. G. PAINT gum paint's ingredients have a cooling, calming, and astringent effect. Similar to this, substances with fungicidal, anesthetic, and therapeutic qualities include potassium iodide and iodine. In addition to having a cooling effect, menthol has local anesthetic properties.

Ayurvedic medicines with astringent properties:

Myrrh (*Commiphora molmol*), which helps to tighten the gums, has antibacterial and astringent effects. It is regarded as one of the best herbs for treating mouth ulcers and bleeding gums, and it aids in the fight against the germs that cause gum disease and tooth decay.

Astringent and antibacterial qualities are present in aloe vera (*Aloe barbadensis* Miller). It is very effective in the treatment of periodontitis and gingivitis, lessens gum bleeding, is particularly antimicrobial in gum pockets, and considerably aids in the treatment of denture stomatitis. *Mahonia* spp., often known as Oregon grape root, has a high concentration of antibacterial components and astringent characteristics, making it an ideal choice for preventing and treating gum issues.

White oak bark (*Quercus alba*), a strong astringent, is useful for healing swollen, tender, and bleeding gums and mucous membranes and has a clotting and antiseptic effect. Sage (*Salvia officinalis*), which has strong astringent properties, is a favorite herb for tightening the gums and soothing a sore mouth.

Alt water's astringent qualities reduce inflammation and cause the tissues to contract, which hastens the healing of wounds. According to a 2003 study in the *British Dental Journal*, the heat of the solution causes a therapeutic increase in blood flow to the affected area that aids in wound healing, and the isotonic (balanced inside and outside the cell) environment it creates prevents the cells from migrating into the area from being destroyed as they attempt to heal the wound [20].

Currently available astringent materials for application to body tissues are made of active chemicals that instantly react with the body tissues upon contact, making them suitable for both intraoral and dermatological applications. The tissues are quickly exposed to an overly large quantity of reactive agent if a practitioner administers an abnormally big quantity of such material to the tissues. The excess astringent compounds may irritate fragile tissues, which could be a problem if this happens. The goal of the invention is to create an astringent composition that delivers an active astringent when needed for contact with body tissues while avoiding overexposure of the sensitive tissues to reactive chemicals that can irritate them.

CONCLUSION

"A physician who performs without knowledge of science is like a sailor who sails a ship without a compass," Leonardo Da Vinci famously observed. He is never certain of his destination. This page offers basic information on numerous astringents, their function, and interactions in dentistry. These insights can help a dentist or prosthodontist achieve optimal gingival and mucosal health without sacrificing the standard of their job.

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