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Review Article

## Pharmacotherapeutics In Prosthodontics – An Overview

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### ABSTRACT

Pharmacology is the science of drugs. Drug is the single active chemical entity present in a medicine that is used for diagnosis, prevention, treatment of a disease. Pharmacology deals with interaction of exogenously administered chemical molecules (drugs) with living systems. The two main aspects of concern are the effects of drugs on biological systems and the effect of biological systems on efficacy and metabolism of drugs. Drugs play an important role in improving the response of the patient in both pre-treatment and post-treatment phases. Drugs in dentistry act as a primary treatment modality as well as facilitator of dental procedures. With phenomenal growth of information on the mechanism of action and clinical application of drugs as well as rapid introduction of new drugs, pharmacology has become increasingly important to all dentists. Prosthodontics is that speciality of dentistry which deals with patients of all ages, hence making it more important to know about the local and systemic effects of drugs and their side effects.

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### INTRODUCTION

WHO (1996) has defined drug as any substance or product that is used or intended to be used to modify or explore physiological systems or pathological states for the benefit of the patient. Drugs in dentistry act as a primary treatment modality as well as facilitator of dental procedures. Success or failure of a clinical procedure often hinges on the proper application of pharmacologic principles of locally acting drugs. The competent and successful practitioner must therefore have a good background in basic pharmacology, be knowledgeable of pharmacotherapeutics, and keep abreast of the latest advances in medicinal agents.<sup>[1]</sup> This article gives a brief description of drugs used in various aspects of removable, fixed and implant prosthesis is given to aid the prosthodontist in selection of appropriate drugs for his/her patients.

### Discussion

#### Drugs Implicated in Removable Complete and Partial Prosthesis

Use of removable prosthesis whether partial or complete in the oral cavity produces profound changes of the oral environment that may have an undesirable effect on the integrity of the oral tissues. The use of different types of dental materials in the oral cavity may further accelerate the irritation process associated with wearing of dentures. Some of the direct effects caused by wearing removable complete or partial dentures are mucosal reactions, oral galvanic currents, burning mouth syndrome, gagging, residual ridge reduction, periodontal disease, and caries of the abutments

#### *Candida* Associated Denture Stomatitis

*Candida* associated denture stomatitis antifungal drugs play a major role in treatment of *Candida albicans* which causes

oral moniliasis (thrush) and can also infect prosthetic devices. Local therapy with nystatin, amphotericin B, miconazole, or clotrimazole should be preferred to systemic therapy with ketoconazole or fluconazole because resistance of *Candida* species occurs with them regularly. Treatment should continue for a minimum of 4 weeks along with meticulous oral hygiene maintenance.

The most common drug used in dentistry to treat fungal infections of the oral cavity is nystatin. Nystatin has a dose-dependent fungistatic or fungicidal effect on several fungi, including *C. albicans*. Because nystatin is not absorbed, tablets are usually held in the mouth for several minutes until they dissolve. Colonized dentures can be treated by soaking them in a solution of nystatin. Clotrimazole, a fungistatic, is an effective treatment for infections caused by *C. albicans*. A 10 mg troche is dissolved in the mouth five times a day for 14 days. Clotrimazole is not absorbed and causes minimal side effects

Xerostomia is the subjective sensation of oral dryness, usually, but not invariably, associated with hyposalivation. The treatment rationale is to activate muscarinic cholinergic receptors of the parasympathetic nervous system to increase salivary flow. Pilocarpine hydrochloride (Salagen) and Cevimeline hydrochloride (Evoxac) produce a short-duration (3 h) increase in salivary flow without the accompanying side effects, suggesting that they may possess some degree of selectivity at salivary gland cholinergic receptors. Some relief of antidepressant drug-induced xerostomia has been reported with the use of citric acid. Anethole trithione and bromhexine are direct-acting cholinergic agonists with a degree of salivary gland selectivity<sup>[2,3]</sup>

Salivary substitutes contain either carboxymethylcellulose or hydroxyethylcellulose as lubricants and a variety of artificial sweeteners, preservatives, and chloride or fluoride salts. A few over-the-counter substitutes are Orex, Salivart, Xero-lube, etc. Research is going on for mucin containing preparations as they have better wetting and lubricating properties. They are available in spray form, lozenge form, and solution form.

Gagging or hyperactive gag reflex is normally seen during the impression phase of treatment or during the insertion of the prosthesis. Pharmacological means of management act as an adjunct to clinical procedures and psychological methods. Peripherally acting drugs such as local anesthetics and centrally acting drugs such as antihistamines, sedatives, tranquilizers, parasympatholytics, and CNS depressants are indicated if other non-pharmacological methods fail in controlling the hyperactive gag reflex.

Traumatic ulcers may be caused in the denture wearers due to friction between the tissue surface of the denture and mucosa. Primary line of treatment includes discontinuation in wearing dentures and application of topical benzocaine 20% and benzocaine hexachloride, available as mucopain or dologel (also contains salicylates for antibacterial action). In cases of severe inflammation, kenacort gel (containing triamcinolone acetonide 0.1%) is indicated<sup>[4,5]</sup>

Antisialogogues are the agents used to control hypersalivation. Atropine and its synthetic derivatives are

used such as methantheline, propantheline, and scopolamine<sup>[6]</sup>

### Drugs Implicated in Implant Prosthesis

The upcoming field of dentistry is all about the implant prosthesis. The implant therapy is usually a two-stage procedure which involves the surgical and a prosthetic phase, and the success of the therapy involves the prevention of the infection in and around the implants.

#### First Phase or surgical Phase

##### Antibiotics

The antibiotic coverage is essential during the placement of the implant whether it is an immediate-loaded or a delayed loading implant. Therapeutically, the practitioner would be wise to question the need for antibiotic use at all rather than indiscriminately prescribing a broad-spectrum agent with the hope of attacking the offending organism. Patient compliance is as important as the dose, frequency, and duration of treatment. The prophylactic measures are followed.<sup>[7]</sup> Standard regimen: Amoxicillin 3.0 g orally 1 h before procedure; then 1.5 g 6 h after the initial dose. Patients allergic to amoxicillin/penicillin: Erythromycin ethyl succinate 800 mg or erythromycin stearate 1.0 g orally 2 h before the procedure; then half the dose 6 h after the initial dose. Clindamycin 300 mg orally 1 hour before the procedure and 150 mg 6 h after the initial dose. The most commonly used antibiotics for prophylactic regimens are used with the lower dosage levels. The patient is usually given amoxicillin and dicloxacillin combination or amoxicillin with clavulanic acid combination before the start of the therapy which is to be continued for three days.

##### Analgesics

Analgesics are not commonly used in prosthodontics except for the implant part. The nonsteroidal anti-inflammatory drugs (NSAIDs) play a main role in the pain management during the surgical phase of the implant placement. The most commonly used NSAIDs are ibuprofen combined with paracetamol, or diclofenac with paracetamol, or aceclofenac with paracetamol combination. Other NSAIDs are not much commonly used either due to their higher cost or other adverse effects. Opioids are not generally used<sup>[8]</sup>

##### Steroids

Only two steroid preparations are accepted by the Council on Dental Therapeutics, and both are limited to topical application for inflammation: hydrocortisone and triamcinolone. Mechanisms by which corticosteroids reduce inflammation are not clear, but several sites within the immune system have been implicated. Corticosteroids have been preoperatively used to diminish postoperative complications of edema and trismus, but the benefit of this use is unclear. Dexamethasone has been used by some practitioners to reduce the postoperative swelling after the implant placement.

##### Maintenance phase

The patients are advised with the mouthwash in order to properly maintain the implants. Chlorhexidine digluconate, at concentrations of 0.12%, has been approved for the treatment of gingivitis and suppression of the formation of

plaque. Chlorhexidine-containing mouth rinses are useful adjuncts that may facilitate healing after insertion of the

### Implication of drugs in Fixed Prosthesis

Gingival retraction is the displacement of marginal gingival away from a tooth. This is a procedure which is indispensable if the operator wants to achieve a proper impression of the margins on the prepared teeth. The main medicaments indicated for use with gingival retraction cords are epinephrine, aluminum potassium sulfate, aluminum sulfate and aluminum chloride, ferrous sulfate, and zinc chloride. They aid in hemostasis and control the level of gingival crevicular fluid. There are certain issues pertaining to the use of epinephrine as a vasoconstrictor agent, which indicate that the operator should take proper medical history of the patient before using epinephrine.<sup>[9]</sup>

**Aluminum chloride** is the most commonly used agent now as it also acts as an astringent by precipitating protein and in some cases by its desiccating effect. The main disadvantage is that it causes irritation to the tissues and may cause local tissue damage in concentrations more than 10%.

**Local anesthetics** are drugs which upon topical application or local injection cause reversible loss of sensory perception, especially of pain, in a restricted area of the body. Current practice of fixed prosthodontics is inconceivable without local anesthesia. Hence, correct knowledge of the available anesthetics is very important. They are broadly classified into two groups: amides and esters. Sodium bisulfate and metabisulfite are the antioxidants that are used as preservatives in preparations that contain vasoconstrictor agents and may cause allergic reactions. Methylparaben, an antibacterial preservative, is allergenic but is now available in multiple-dose vials of local anesthetics. Topical anesthetic preparations contain higher concentrations of the local anesthetic and a variety of ingredients to enhance acceptability for topical application. Toxic reactions to the local anesthetics are generally the result of overdose or inadvertent intravascular injection.<sup>[10]</sup>

implant dentures.

### CONCLUSION

Understanding the role of pharmacology in prosthodontics is imperative because this is one of the most neglected parts of research even though there are a large number of dental patients suffering from systemic diseases which have to be taken care of before the commencement of dental treatment. Another main reason is that the prosthodontist may have to deal with a medical emergency arising on the dental chair. Drugs that aid in prosthodontics treatment include astringents, vasoconstrictors, hemostatic agents, sialogogues, anti-sialogogues, denture cleansers, gum paints, denture cleansers, denture adhesives, ORAL protective agents and demulcents.

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