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Pharmacology In Prosthodontics For Prosthodontics Practitioners And Prescribers

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Abstract
The science of medications is called pharmacology. The primary active ingredient in a medication used for diagnosis, treatment, or prevention is called a drug. The study concerning the way chemicals (drugs) given exogenously interact with living organisms is known as pharmacology. The two primary areas of concern are how pharmaceuticals affect biological systems and how biological systems affect the effectiveness and metabolism of drugs. As a dental specialty that treats patients of all ages, especially the geriatric population, prosthodontics emphasizes the importance of understanding the local and systemic effects as well as the adverse effects of medications. The purpose of this article is to impart drug-related knowledge which is crucial while prescribing medications in a more knowledgeable way. In prosthodontics, pharmacology is one of the most overlooked areas and is usually ignored by general practitioners; consequently, more research and studies must be performed in this domain.

Key words: *pharmacology, retraction cord, salivary substitute, xerostomia*

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I. Introduction

Medications are a major factor in enhancing the patient's responses during the pre- and post-treatment stages. In dentistry, drugs serve as both a mainstay of treatment and an enabler for dental therapies. Pharmacology has become more and more vital for all dentists due to the incredible expansion of knowledge regarding the mechanism of action and therapeutic applications of drugs as well as the swift launch of new pharmaceuticals. A clinical procedure's success or failure frequently depends on how effectively the pharmacologic principles of locally acting medicines are implemented. A solid foundation in fundamental pharmacology and up-to-date knowledge of the most recent developments in pharmaceuticals are essential for the successful and legitimate practitioner.[1]according to the world health organization (who, 1996), a medication is any material or product that is used or meant to be utilized to alter or examine physiological systems or pathological conditions to benefit the patient.[2]this article provides a brief overview of medications used in implant prostheses, fixed partial dentures, and removable dentures to help prosthodontists choose the most appropriate medications for their patients.

Drugs implicated in removable complete and partial prostheses

The use of removable prostheses in the mouth, whether full or partial, alters the oral environment significantly and may be detrimental to the health of the oral tissues. The process of denture wear-related discomfort may be accelerated by the use of certain dental materials in the oral cavity. Wearing removable full or partial dentures can have a consequential effect on the mouth, resulting in mucosal reactions, oral galvanic currents, burning mouth syndrome, gagging, residual ridge reduction, periodontal disease, and abutment caries.[1,2]

Candida associated denture stomatitis

Nystatin, also known as mycostatin, is the medication most frequently used in dentistry to manage fungal infections of the oral cavity. A variety of fungi, including candida albicans, are susceptible to the dose-dependent fungistatic or fungicidal effects of nystatin. In addition to causing oral moniliasis, or thrush, candida albicans can infect prosthetic devices. Tablets containing nystatin are often held in the mouth for many minutes until they dissolve since it is not absorbed. Dentures with colonies can be handled by immersing them in a nystatin solution. The fungistatic drug clotrimazole (mycelex) is useful in treating candida albicans-related infections of the mouth, skin, and vagina. For 14 days, a troche containing 10 mg is dissolved five times daily in the mouth. Clotrimazole has very few adverse interactions as it is not absorbed. Triazoles are a class of broad-spectrum antifungal medications, comprises of fluconazole (diflucan) and itraconazole (sporanox). After oral treatment, fluconazole is rapidly absorbed into bodily fluids, such as saliva and cerebrospinal fluid. 50 to 100 mg of fluconazole per day

works well against oropharyngeal candidiasis; 100 to 200 milligrams per day is usually required for esophageal candidiasis. Although there aren't many negative effects from fluconazole, nausea, and vomiting are frequently experienced when dosages exceed 200 mg daily. Itraconazole is useful for managing esophageal and oropharyngeal candidiasis, it is currently more commonly advertised by companies for treating onychomycosis.[3]

Mouth rinses containing local antiinfective agents

A wide range of other components, such as flavorings, sweeteners, colors, preservatives, and wetting agents, are also present in the mouth wash which consists of local antiinfective agents. Many mouth rinses contain ethanol, and the majority have an acidic ph range of 4.2 to 8.2. In several over-the-counter mouth cleans, ethanol serves as the primary local anti-infective agent. Thymol and other phenolic derivative-containing preparations are unappealing to taste and have limited use. Although it has little to no antibacterial activity, hydrogen oxide, an old but newly popular agent, may be able to remove material by the physical action of oxygen generated during its breakdown.

Surface-active agent cetylpyridinium is a derivative of quaternary ammonium with a minor bacteriostatic effect. The aftertaste of cetyl pyridinium is acrid and animose. Povidone-iodine is an iodophore that combines a surface-active agent with a halogen-releasing molecule. Out of all the components used in over-the-counter remedies, it is most likely the antibacterial agent with the most effectiveness. The iodophores taste horrible but they never sting or discolor like iodine solutions do. The council on dental therapeutics approves povidone-iodine to be utilized as a surgical scrub at concentrations between 7.5% and 10%. The biguanide chlorhexidine is also used as a surgical scrub; in fact, the council on dental therapeutics has approved its usage at concentrations within 2% and 4%.

It works best against gram-positive organisms, is ineffective against viruses and spores, and is not as efficient towards gram-negative organisms and fungi. At doses of 0.12%, chlorhexidine digluconate was officially recognized for the amelioration of gingivitis and ceasing of plaque development. One of the most desirable properties of chlorhexidine for controlling plaque is its gradual discharge after binding to both hard and soft tissue as well as salivary protein. Paste; if laid on abraded tissue, it may cause local irritation. A recent research examined the medicinal benefits of chlorhexidine in general dental care as well as for particular prosthodontic issues. Mouth rinses containing chlorhexidine are helpful supplements that may hasten up the healing process following denture insertion[3].

Hyposalivation is typically, but not always, linked to xerostomia, an innate sense of dry mouth. Several conditions can cause xerostomia, including radiation therapy, rheumatoid arthritis, diabetes insipidus, pernicious anemia, and adverse effects from a wide range of medications. It can also arrive from aging gradually. A burning tongue, stomatitis, difficulty speaking and swallowing, periodontal disease, rampant caries, and difficulty speaking can all result from the condition and can shorten the time spent wearing dentures[4]. Increasing salivary flow by activating the parasympathetic nervous system's muscarinic cholinergic receptors is the rationale behind the therapy. Salagen and cevimeline hydrochloride, which are used to treat cholinergic salivary glands, cause a brief (3-hour) spike in salivary flow without causing any side effects. This suggests that the drugs may have some selectivity at these receptors. Citric acid has been observed to help alleviate some of the xerostomia caused by antidepressant drugs. Certain direct-acting cholinergic agonists have a degree of salivary gland selectivity, such as anethole trithione and bromhexine. Artificially produced sweeteners, preservatives, and salts including fluoride or chloride, as well as hydroxyethyl or carboxymethyl cellulose, are used as lubricants in salivary substitutes. Xerolube, salivart, orex, and other over-the-counter alternatives are options. Due to their superior lubricating and wetting qualities, preparations containing mucin are the subject of ongoing research. In spray, lozenge, and solution form, they are available.[1-2-3-4]

Saliva substitutes

A range of artificial sweeteners, preservatives, and fluoride or chloride salts are present in most saliva substitutes, along with lubricants such as hydroxyethylcellulose or carboxymethylcellulose. The council for dental therapeutics only accepts products that contain carboxymethylcellulose. Mucin-containing preparations outperform carboxymethylcellulose or hydroxyethylcellulose in terms of wetting and lubricating qualities. Considering the brief duration of action of all commercially available preparations, regular application is required. Moreover, some patients have temporary alleviation, but not all do, and compliance remains a significant issue. [1-2-3].

Gagging

Hyperactive gag reflex, often known as gagging, is typically observed during the prosthesis insertion or impression phase of treatment. Clinical and psychological treatments are supplemented by pharmacological measures of care. If various non-pharmacological techniques are ineffective in reducing the hyperactive gag

reflex, peripherally acting medications like local anesthetics and centrally acting medications including antihistamines, sedatives, tranquilizers, parasympatholytics, and cns depressants are recommended.[4,5]

Traumatic ulcers

The force of friction between the denture's tissue surface and the mucosa may be the reason for trauma in denture users. The first line of treatment is to stop wearing dentures and apply topical benzalkonium hexachloride (20%) and mucopain or dolo gel the latter additionally incorporates salicylates to feed antibacterial action. Triamcinolone acetonide (0.1%)-containing kenacort gel is recommended in the event of severe inflammation.

Antisialogogues

Cholinergic antagonists, which inhibit the same receptors that cholinergic agonists (sialagogues) activate, are the agents used to reduce salivary production. Their potential utility in prosthetic dentistry is intriguing. Methantheline, propantheline, and scopolamine are a couple of synthetic compounds of atropine that are employed. The oral injection of atropine, scopolamine, methantheline, or propantheline should occur one to two hours, half an hour to an hour, or half an hour before the clinical procedure to achieve the intended reduction in salivary flow. Fortunately, because salivary glands respond well to the medicines' blocking activity and because the intended effect may be achieved at modest doses, antisialogogue side effects are uncommon in dentistry. Geriatric patients would have more adverse effects since they already suffering from xerostomia.[1,6]

Drugs implicated in implant prosthesis

Implant prostheses are the focal point of the emerging field of dentistry. The avoidance of infection in and around the dental implants is fundamental to the successful completion of implant therapy, which is often a two-stage process that consists of a surgery and a prosthetic phase.[1,2,3,4,7]

First phase or surgical phase

Antibiotics

Regardless of whether the implant is immediate-loaded or delayed-loaded, antibiotic coverage is crucial during implant implantation. Instead of randomly administering a broadspectrum medication in the hopes of eliminating the offending organism, the clinician would be better advised to consider whether antibiotics are even necessary in the initial instance. Along with dosage, frequency, and time frame for treatment, patient compliance is the key to success. Preventative steps are taken. Standard protocol: 3.0 g of amoxicillin taken orally one hour before the procedure; 1.5 g six hours later. Individuals who are allergic to penicillin or amoxicillin should take 800 mg of erythromycin ethyl succinate or 1.0 g of erythromycin stearate orally two hours before the surgery and then cut the dose in half six hours later. Clindamycin 300 mg was taken orally one hour before surgery and 150 mg six hours following the first dosage. The lessened dosage levels are utilized for the most widely prescribed antibiotics in preventive regimens. Before beginning the three-day course of treatment, the patient is typically given a combination of amoxicillin and dicloxacillin or amoxicillin and clavulanic acid[7]

Analgesics

Prosthodontics does not typically employ analgesics, except for the implant procedure. During the surgical stage of implant implantation, nonsteroidal anti-inflammatory medications (nsaids) are a major factor in pain control. The most widely used nsaid combinations are aceclofenac and paracetamol, diclofenac and paracetamol, or ibuprofen and paracetamol. Other nsaids have not been as widely used, either because of the extra cost or additional adverse reactions. Most people don't utilize opioids[8].

Steroids

The council on dental therapeutics only approves hydrocortisone and triamcinolone as topical steroid formulations for the treatment of inflammation. Although the specific processes by which corticosteroids suppress inflammation are unknown, an array of immune system domains have been attributed to the drug. Although the benefits of preoperative corticosteroid treatment to reduce postoperative edema and trismus problems are unknown. Some medical professionals have utilized dexamethasone to lessen postoperative edema following implant placement.[9]

Antianxiety agents

In clinical dentistry, antianxiety medications are probably best suited for patients who exhibit unusually elevated levels of anxiety in response to upcoming surgery. Benzodiazepines are without a doubt the most well-liked and safest medications for these kinds of therapeutic settings. While most benzodiazepines are thought to have similar pharmacodynamic features, some may have special pharmacologic characteristics (perhaps due to

the various benzodiazepine-receptor subtypes that have been mentioned). For instance, alprazolam works well both as an antianxiety medication and as a treatment for some types of depression.[10,11]

Maintenance phase

Patients are encouraged to use mouthwash to keep their implants in good condition. At doses of 0.12%, chlorhexidine digluconate has been recommended for the management of gingivitis and the inhibition of plaque development. Mouthwashes with chlorhexidine are helpful supplements that accelerate healing following implant placement.

Implication of drugs in fixed prosthesis

When the marginal gingival tissue moves away from a tooth, this is known as gingival retraction. For the operator to get a precise recreation of the margins in the prepared teeth, the procedure is important. The primary medications recommended for use with gingival retraction cords are ferrous sulfate, zinc chloride, aluminum potassium sulfate, aluminum sulfate, and aluminum chloride. They regulate the amount of gingival crevicular fluid and help maintain hemostasis. Some concerns about the utilization of epinephrine as a vasoconstrictor agent suggest that the patient's medical history should be thoroughly obtained by the operator before administering epinephrine[12,13]

Nowadays, aluminum chloride is the most widely utilized agent because it serves as an astringent by precipitating proteins and, in certain situations, by desiccating them. The primary drawback is that at concentrations higher than 10%, it may result in local tissue damage and tissue irritation.

Local anesthetics are medications that, when applied topically or injected locally, produce a temporary lack of sensory perception—particularly pain perception—in a specific region of the body. Without local anesthetics, fixed prosthodontics cannot be practiced today. Therefore, having accurate information on the anesthetics that are accessible is crucial. A general classification divides them into two groups: esters and amides.

Antioxidants such as sodium bisulfate and metabisulfite are commonly used as preservatives in drugs that constrict blood vessels and can trigger allergic responses. The allergic antimicrobial preservative methylparaben is now offered in multiple-dose vials including local anesthetics. Higher doses of the local anesthetic and a range of substances are included in topical anesthetic preparations to improve its tolerability for topical administration. Overdosing or accidental intravascular injection are typically the causes of hazardous responses to local anesthetics.[14]

Pharmacotherapeutic agents used in temporomandibular disorders

According to iasp (1979), pain is an unpleasant sensory and emotional experience that is linked to or defined in terms of actual or probable tissue damage. Pain control should be adequately planned for both acute and chronic pain, taking into account the patient's systemic and psychological conditions as well as the origin, progression, and course of the pain. Pharmacotherapy can be used as a monotherapy or in conjunction with other therapeutic options, including physiotherapy, behavioral therapy, appliance use, and surgical procedures, for tmd, just as it is for any other form of pain. Pharmacological treatments for tmds include corticosteroids, myorelaxants, anti-anxiety medications, anti-convulsants, tricyclic antidepressants, and analgesics (nsaids, opioids).[15,16]

II. Conclusion

It is of the utmost importance to comprehend the role of pharmacology in prosthodontics because, even though many dental patients have systemic diseases that must be treated before beginning dental treatment, this area of research is one of the most ignored. The prosthodontist might have to handle a medical emergency that arises while they are in the dental chair, which is another major factor. The correct use of the pharmacologic principles that underlie locally acting medications can make the difference between a therapeutic procedure's success and failure. Therefore, a solid foundation in basic pharmacology, familiarity with pharmacotherapeutics, and an up-to-date understanding of the most recent developments in medicinal agents are essential for a competent and effective practitioner.

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