

Topical Corticosteroids: Applications in Dentistry

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ABSTRACT

Topical corticosteroids are used extensively in dentistry in the management of oral mucosal diseases. Like all medications, the success of topical steroids also depends upon the understanding of disease process. This comprises specific diagnosis and clear understanding of the desirable treatment outcome. This paper reviews the use of topical corticosteroids in the treatment of various conditions affecting the oral cavity.

Key Words: *Topical corticosteroids, Oral mucosal diseases, Lichen planus, Pemphigus, Adverse effects.*

INTRODUCTION

Steroids, also referred to as corticosteroids, are substances that are naturally produced in our body. They are produced by the adrenal glands and help to regulate many functions in our body like the way body uses fats, proteins and carbohydrates. They regulate our immune system and the salt-water balance and water in our system. They also help to reduce inflammation.¹

Steroids can be manufactured synthetically as drugs, available in the form of fluid for injections and tablets. There are different types of steroids (Table 1)³ which have several effects on the body. In dentistry, steroids are used as anti-inflammatory drugs to control post-operative inflammation. Corticosteroids also play a crucial role in the treatment of oral mucosal lesions. However, the frequency and severity of the adverse effects associated with the use of systemic corticosteroids have led to the increased use of topical corticosteroids.² Lower potency steroids are used on sensitive areas such as the face, eyelids and groin, while drugs with higher potency are used on thicker skinned areas such as the palms and soles. Topical steroids are available in cream, ointment, gel and liquid vehicles. Steroids that are used on the oral mucosa are prepared in orabase. Based on the potency, various topical steroids can be used (Table 2).³

PHYSIOLOGY

There are three groups of steroid hormones produced in adrenal cortex: the androgens, the mineralocorticoids and the glucocorticoids. Glucocorticoids have widespread effect on the metabolism of carbohydrate and protein.⁴

The zona fasciculata secretes glucocorticoids, cortisol and corticosterone as well as small amount of adrenal androgen and estrogens. The secretion of these cells is controlled by hypothalamic pituitary axis (HPA) via adrenocorticotropic hormone (ACTH).⁵

MODE OF ACTION

Topical corticosteroids act by binding to a specific receptor in the cellular cytoplasm and modulating the transcription of multiple genes. This leads to the suppression of the production of inflammatory substances such as prostaglandins and leukotrienes, in addition to inhibition of the recruitment of inflammatory cells into the skin.⁶ They decrease the production of cytokines, chemokines, and eicosanoids and enhance the production of macrophage migration inhibitory factor.⁷

PROTOCOLS FOR TOPICAL CORTICOSTEROID USE

The basic protocol for a prescribed topical corticosteroid, with a forecast of prolonged use, is to administer drug of an appropriate potency, in accordance to the severity of clinical symptoms, at the lowest possible concentration in compatibility with the effectiveness of the treatment, in a vehicle that minimizes the area exposed to the drug. It should always be kept in mind that corticosteroids do not cure the disease per se but control or relieve the symptoms.⁸

The specific diagnosis, the severity of the oral disease, the presence or absence of extra-oral lesions, and the medical history of the patient are the key factors that determine the selection of a topical or systemic treatment.⁹ In addition, these factors also influence the choice of drug, specific formulation, and treatment regimen.¹⁰

ROLE IN ORAL MUCOSAL LESIONS

Topical corticosteroids are frequently used in the management of many oral mucosal lesions. Their use should be based on detailed medical history, current intake of any medication and accurate diagnosis of the oral lesion. One of the factors that play a major role in determining the success of the treatment with a topical corticosteroid is the amount of time the drug comes in direct contact with the lesion which basically depends on the means used for applying the topical

corticosteroid. The mode of application most often used in oral pathology are adhesive ointments and aqueous solutions. Among adhesive ointments, the orabase ointment is one of the most commonly used agents.

ORAL LICHEN PLANUS (OLP)

Lichen planus is a chronic systemic disease of known immune-mediated pathogenesis. It commonly involves the mucosa of the oral cavity, but can involve other sites, namely skin, vulvar and vaginal mucosa. In mild to moderate cases of erosive lichen planus topical steroids have been proved to be quite effective. The erosive or ulcerative lesions of lichen planus can be treated with high potency topical steroids such as flucinonide (0.5%) ointment or triamcinolone acetonide (0.1%) applied in an adhesive base. A gingival tray can also be used to deliver 0.05% clobetasol propionate with 1,00,000 IU/ml of nystatin in orabase.¹⁷

ERYTHEMA MULTIFORME

It is an acute, self-limiting, inflammatory mucocutaneous disease, manifesting on the skin and mucosal surfaces namely oral mucosa and genitalia. Erythema multiforme is considered as a hypersensitivity reaction, most common factors being HSV infection or drug reactions to NSAIDs or anticonvulsants.¹¹ Mild cases of Erythema Multiforme do not require treatment. Oral topical steroids may be used to provide symptom relief.¹² Lozada-Nur and Zhong Huang (1994) reported that an adhesive paste (Orabase) form of clobetasol propionate, the most potent topical corticosteroid, safe and effective alternative to systemic therapy in erosive oral lesions.¹³

RECURRENT APTHOUS ULCER

RAS is a disorder characterized by recurring ulcers confined to the oral mucosa in patients with no other signs of disease. It is classified according to clinical characteristics as minor, major and herpetiform. Medication prescribed in RAS are based upon the severity of the disease. In minor lesions, relief can be obtained with the use of topical anaesthetic agents whereas in severe cases use of high potency topical corticosteroids such as flucinonide, triamcinolone acetonide 0.1% paste is applied to the site of lesion 4 times daily, betamethasone used as a mouth rinse thrice daily or clobetasol 0.05% applied 3-4 times daily has been found to be effective in reducing the size of ulcer and shortening of the healing time.^{11, 18}

PEMPHIGUS

Pemphigus refers to a group of autoimmune, chronic mucocutaneous diseases that cause blisters and erosions of the skin and mucous membranes caused by intra epidermal acantholytic structures. Oral mucosal lesions in pemphigus are common and predominantly appear as buccal erosions in the occlusal line, which is most exposed to trauma and also on the palate, gingival

and tongue. Topical corticosteroid therapy is used in cases where the pemphigus vulgaris is not extensive and lesions are limited to the oral cavity. Corticosteroids can be prescribed in the form of a paste, an ointment or a mouthwash administered as monotherapy or as adjunctive therapy with a systemic treatment. In patients with no progressing oral lesions, moderate to high potency topical corticosteroids are recommended, applied 2-3 times a day, such as 0.5% fluocinonide acetonide or 0.05% clobetasol propionate.¹⁴

BULLOUS PEMPFIGOID

It is one of the most common autoimmune sub epithelial blistering diseases occurring mainly in adults over 60 years of age. The disease is characterised by the production of autoantibodies directed against components of the basement membrane. Oral involvement occurs in 30-50% of patients. Desquamative gingivitis is the most common oral manifestation and gingiva may be the only site of oral involvement. Patients with localized oral lesion may be treated with high potency topical corticosteroids such as 0.05% clobetasol or betamethasone.¹¹

MUCOUS MEMBRANE PEMPFIGOID

It is a chronic, autoimmune sub epithelial disease that primarily affects the mucous membrane of patients over the age of 50, resulting in blistering, ulceration and subsequent scarring. Topical corticosteroids and intralesional steroid injections are the main treatment modalities in mild oral disease. Potent fluorinated steroids such as fluocinonide 0.5% or clobetasol propionate 0.05% (2-3 applications daily for 9-24 weeks) in an adhesive medium or used in a vacuum-formed customised tray or veneer for oral mucosal lesions are usually required.¹⁵

ADVERSE EFFECTS

Although topical corticosteroids are considered relatively safe but they can produce local and systemic adverse effects when used injudiciously. Systemic effects of topical steroids depend on several factors such as the amount of steroid applied, surface area covered, the site treated, the nature of the skin/mucosal problem (inflammation or other disease processes in the skin or mucosa increases percutaneous absorption), application frequency, time of application and potency of the steroid.³ Systemic adverse effects are uncommon and are mostly associated with the use of high potency topical steroids leading to reversible suppression of the hypothalamic-pituitary-adrenal axis has been described. Other systemic effects include Cushing's syndrome, diabetes mellitus and hyperglycaemia.⁶ Local side effects unlike systemic ones are relatively frequent and becoming even more so with the introduction of the ultra-high potency topical steroids. The most common adverse effect due to the

use of oral topical corticosteroids is oral candidiasis in either erythematous or pseudomembranous forms and has been reported in 25 - 55% of the patients.¹⁶ Other common local effects are mucosal atrophy, striae, telangiectasia, perioral dermatitis, acne from eruptions and hypersensitivity reactions. Less frequent local adverse effects include hypopigmentation, delayed wound healing and glaucoma when corticosteroids are applied around the eye.

Table 1:

Classification of Corticosteroids	
1. Glucocorticoids	
a. Short-acting (biological half-life < 12 hours)	
<ul style="list-style-type: none"> • Hydrocortisone • Cortisone 	
b. Intermediate acting (biological half-life 12-36 hours)	
<ul style="list-style-type: none"> • Prednisolone • Methyl prednisolone • Triamcinolone 	
c. Long-acting (biological half-life > 36 hour)	
<ul style="list-style-type: none"> • Paramethasone • Dexamethasone • Betamethasone 	
2. Mineralocorticoids	
a. Desoxycorticosterone acetate	
b. Fludrocortisone	
c. Aldosterone	

Table 2:

Potency	Drug
Low	Fluocinolone Acetonide 0.01%
	Hydrocortisone 0.25%, 0.5%, 1%, 2.5%
Medium	Betamethasone Benzoate 0.025%
	Dexamethasone 0.1%
	Flucocinolone 0.025%
	Triamcinolone 0.025%
Medium High	Betamethasone Valerate 0.1%
	Dexamethasone Elixir 0.5%
	Triamcinolone 0.1%
High	Flucocinolone 0.5%
	Triamcinolone 0.5%
Super High	Betamethasone Dipropionate Augmented 0.05%
	Clobetasol 0.05%
	Halobetasol Propionate 0.05%

CONCLUSION

Steroids are considered as the drug of choice in treating many oral mucosal disorders. They themselves do not cure but alleviate or control the symptoms by anti-inflammatory action and immunosuppression. But their judicious use is of paramount importance as they are considered as double edged weapons. Their thorough knowledge is very important as the risks associated with steroids are equivalent to their therapeutic benefits.

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