



Corticosteroids: A Double-Edged Sword in Dentistry

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ABSTRACT: Corticosteroids are one of the extensively used drugs in dentistry. It is regarded as a double-edged sword. On one side it is extensively used because of its excellent anti-inflammatory and immunosuppressive properties whereas on the other side it has certain contraindications. The current manuscript gives an insight view of its diverse usages, side-effects, and contraindications in the oral and maxillofacial region.

KEYWORDS: Anti-inflammatory, corticosteroids, dentistry, immunosuppressive.

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I. INTRODUCTION:

Steroids are one of the most widely advised drugs in health sciences. In 1950, Kendall, Reichstein and Hench were awarded Nobel Prize in Medicine for its early acknowledgement and clinical examination. Owing to its anti-inflammatory and immunosuppressive functions, corticosteroids have been comprehensively used by dental practitioners in treating devastating diseases of maxillofacial region however, it require discrete attention as it may shows adverse effects as well.¹ Hydrocortisone, dexamethasone, methyl prednisolone, prednisolone etc. are some of the most commonly used steroids.

PHYSIOLOGY OF CORTICOSTEROIDS: Chemically, corticosteroids shows similar functions as endogenous cortisol in protein, carbohydrate, and fat metabolism, regularity of vascular reactivity, and adaptability to body stress.^{2,3} On an average, the production of cortisol by adrenal gland is 24-30 mg normally and up to 300 mg during immense stress. The regulation of secretion of cortisol is done by circadian rhythm, a stress-related response, and a negative feedback mechanism between hypothalamus, adrenals and pituitary. Researchers have stated that the suppression of hypothalamic-pituitary-adrenal axis has been observed on giving supra physiologic doses of corticosteroids (>30 mg cortisol equivalent) for over 14 days, and may perhaps even takes upto 12 months for the recovery, on the contrary the response of functional ability to stress, has been shown to come back within 2 weeks to 1 month.^{4,5}

In humans, there are two principal corticoids:

- 1) Hydrocortisone: 10-20 mg daily (nearly half of this is in the few morning hours).
- 2) Aldosterone: 0.125 mg daily.

PHARMACOLOGY OF CORTICOSTEROIDS: Corticosteroids are classified as hydrocortisone, prednisone, triamcinolone, dexamethasone, clobetasol and mometasone actions. It plays a vital role in regulating fluid electrolytes and functions of cardiovascular, skeletal muscles and nervous system. Their mode of action is broadly classified as⁶:

- 1) Glucocorticoids: Maintenance of carbohydrate, protein, and fat metabolism.
- 2) Mineralocorticoids: Maintenance of Na⁺, K⁺, and fluid balance.

APPLICATIONS IN MAXILLOFACIAL REGION:

Owing to their anti-inflammatory and suppressive actions, corticosteroids play therapeutic role in treating various oral diseases such as:

1) **Postoperative operations:** Steroids are frequently used to reduce postoperative inflammation. Researchers stated that recently, the combination of hydrocortisone with oxytetracycline is used for the prevention of dry socket and by using dexamethasone along with analgesic agent dipyrene, postoperative lingual and inferior alveolar nerve hypersensitivity can be cured following third molar extractions.^{7,8}

2) **As prophylactic Drugs:** In various surgical procedures such as sagittal split osteotomy, vestibuloplasty procedure, preprosthetic surgery, 3rd molar surgery, an excoriation and ulceration due to retraction of lips, corticosteroids are given for prophylactic measures as it reduces edema, trismus, pain and hospitalization time.^{9,10}

3) **Recurrent aphthous stomatitis:**

Topical: Most commonly used drugs for recurrent aphthous stomatitis (RAS) are triamcinolone acetonide available in the form of adhesive paste containing 0.1% of the steroid. These are available in the form of gels, pellets, and pastes which can be easily applied directly to the lesion pre or post meals and at bedtime twice or thrice a day as per needed.¹¹

Systemic: In severe cases, prednisone therapy 40 mg/day for 1 week is usually adequate to manage the outbreak. For large major RAS cases, intralesional steroids can also be given.¹²

4) **Oral Submucous Fibrosis:**

Intralesional: Injections of dexamethasone (4 mg/ml) combined with two parts of hyaluronidase (200 USP unit/ml) diluted in 1 ml of 2% lignocaine by means of a 27 gauge dental needle, not more than 0.2 ml solution/site biweekly for a period of 12 weeks is recommended.¹³

5) **Oral Lichen Planus:**

Topical: For treating mild to moderate symptomatic lesions, topical application reduces inflammation and pain. It includes most commonly 0.05% clobetasol propionate gel, 0.1-0.05% betamethasone valerate gel, 0.1% triamcinolone acetonide ointment.

Intralesional: For severe and recalcitrant lesions, 0.2-0.4 ml of a 10 mg/ml solution of triamcinolone acetonide bi-weekly injections or 3-4 times a week.¹⁴

Systemic: In cases of ineffective topical therapies i.e. for recalcitrant erosive or erythematous lichen planus, 40-80 mg for 5-7 days which can be used to control the inflammation and ulcers.¹⁵

6) **TMJ Disorders:**

Intra-articular: Glucocorticosteroids (beta-methasone—3 mg/ml) are injected oftenly with a local anesthetic agent to reduce several local adverse effects such as pain and inflammation in inflammatory diseases of TMJ disorders.¹⁶

7) **Erythema multiforme:**

Topical: For symptomatic relief clobetasol propionate mouthwashes are recommended. The main advantage of using this mouthwash is it can reach to all the lesional areas.¹⁷

Systemic: For moderate-to-severe cases, prednisone may be used in such patients with a dosage of 40-80 mg/day for 1-2 weeks then tapered rapidly.¹⁸

8) **Pemphigus:**

Topical: Recommended as monotherapy or along with systemic treatment as paste, ointment, or mouthwash. In moderate to high cases, it should be applied twice or thrice a day, such as 0.05% fluocinolone acetonide or 0.05% clobetasol propionate.¹⁹

Systemic: For severe cases, the first drug of choice is prednisolone. It should be given with the initial dose of 100-200 mg daily till it decline clinically. Furthermore, it can be reduced to a maintenance level of 40-50 mg daily.²⁰

Intralesional: For treating persistent lesions, it should be given biweekly to the patient. Its treatment should be terminated if there is no improvement observed. The only drawback present is scarring of cutaneous or atrophied mucosa.²¹

9) **Bell's palsy:** Depending upon the prognosis and severity, prednisone should be administered as early as possible probably within 72 hours at 1 mg/kg/day (maximum dosage of 80 mg) for the 1st week and tapered over the following week.²²

10) **Ramsay Hunt syndrome:** Its definitive treatment is antiviral therapy but it often includes steroids as a part of adjuvant therapy.²³

11) **Emergency Drug:** Owing to its slow action, it is used as a second drug of choice for managing allergic reactions and the prevention of acute recurrent anaphylactic shock after the epinephrine and histamine blocker.²⁴

12) **Applications in restorative dentistry:** Corticosteroid can be used as a dressing agent in cases of pulpal inflammation which depends upon its concentration, potency, and ability to diffuse into the connective tissue.²⁵

CONTRAINDICATIONS OF STEROIDS: ²⁶

Steroids are double edged sword. As it has shown various indications in dentistry, it has certain contraindications too.

It should be avoided in patients with:

- Primary bacterial infection
- Hypersensitivity
- Peptic ulcer
- Diabetes mellitus
- Hypertension
- Pregnancy
- Osteoporosis
- Herpes simplex infections
- Psychosis
- Epilepsy
- Congestive heart failure
- Renal failure.

SIDE EFFECTS: Cushing's habitus, skin atrophy, precipitation of diabetic myopathy, susceptibility to infection, delayed healing of wounds, peptic ulcers, osteoporosis, osteonecrosis, suppression of hypothalamic- pituitary- adrenal axis, hypertension, malignancy.²⁷

II. CONCLUSION:

Corticosteroids are recommended in the forms of intralesional, topical, and systemic. On one hand it shows "life protecting" nature due to its anti-inflammatory and immuno-modulatory properties but also has certain adverse effects which could be "life threatening" too. Henceforth, it plays a vital role in the management of lesions affecting the maxillofacial region.

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