

## Detrimental Effect of Inhalers on Stomatognathic system- A Review

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**Abstract:** Asthma is a chronic inflammatory condition of the airways characterized by hyperresponsiveness and episodic, reversible symptoms of airflow obstruction, that causes the airways to constrict and produce excess mucus, making breathing difficult. Bronchoconstriction led by the contraction of the bronchial smooth muscles, inflammation of the bronchial walls, and increase in mucus secretion are the causes of the airway obstruction in asthma. Current treatment strategy in asthma aims, at control of symptoms, allowing the patient normal life. Antiasthmatic medication is the most important modality to control symptoms. Inhalation therapy has been employed as the mainstay of the treatment in chronic respiratory diseases such as asthma and chronic obstructive pulmonary disease (COPD). Patients taking these inhalational therapy may be at risk of many oral conditions like xerostomia, candidiasis, ulceration, gingivitis, periodontitis. So it is important to provide optimal oral care to the patients receiving inhalational therapy. This review article impacts of the asthma medications on oral health.

**Keywords:** Asthma, dental caries, oral health, dry powder inhaler

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### I. Introduction

Asthma has become one of the most common chronic disease in industrialized country and its prevalence is increasing throughout the world. Asthma affects all age groups, also its prevalence has been increasing since the 1980s across all age, gender, and racial groups and is higher among children than adults<sup>1</sup>. The prevalence of asthma among US children less than 4 years of age increased by 260% from 1980 to 1994, and by 174% from 1980 to 1994 in children 5 to 14 years of age<sup>2</sup>. Mechanism of airway inflammation in asthma involves a cascade of events. Many different cells are involved in asthma: mast cells, macrophages, eosinophils, neutrophils, lymphocytes and platelets. Mast cells are important in initiating the acute responses to allergen and other causative stimuli. Macrophages produce many different products, including a large variety of cytokines that may orchestrate the inflammatory response<sup>3</sup>. At the moment current treatment strategy in these patients is control of the symptoms. Antiasthmatic medication are the most important in controlling these symptoms. Asthma medication comprises bronchodilators, corticosteroids and anticholinergic drugs. Most of these drugs are inhaled using various forms of inhalers or nebulizers<sup>4</sup>.

Inhaled therapy is commonly used treatment in respiratory diseases manifesting with airway obstruction such as asthma and chronic obstructive pulmonary disease (COPD). At present guidelines of asthma management emphasize on the importance of early intervention of symptoms with corticosteroids, especially inhaled corticosteroids, and accepted as first line choice of anti-inflammatory therapy<sup>5</sup>. Haahtela et al (1991, 1994) conducted a study and concluded that for the long term treatment newly detected asthma inhaled corticosteroids are superior to the inhaled sympathomimetics<sup>6</sup>. ICS are typically used daily in moderate to severe asthma. But apart from having the potential to produce dramatic improvement in they also produce equally dramatic adverse effects, they have different effects on different tissues, which are dose dependent. The reason for varied effect of steroids lies in its mechanism of action (Grover 2007)<sup>7</sup>. At present these drugs are prescribed to patient, at larger doses, and for larger periods of time than ever before causing systemic and oral adverse effects.

### Adverse Effect

Local side effect:<sup>8</sup>

- Dysphonia
- The most common complaint is of hoarse voice
- May occur > 50 % of pts using MDI.
- Thrush

- Mouth should be rinsed
- Cough and throat irritation
- accompanied by reflex bronchoconstriction, given via MDIs. rectified by switching to DPI.
- Unusual local complications: perioral dermatitis, tongue hypertrophy, increased thirst.

#### Systemic side effect<sup>9</sup>

- Skeletal effect-Growth deceleration, increased risk of osteoporosis and risk of fracture
- Ocular side effect-Increase risk of glaucoma, Cataracts
- Skin changes and bruising, Infection
- Adrenal suppression
- Behavioral changes

✚ In addition to side effects on general health, asthma has been reported to cause poor oral health

#### Oral adverse effect<sup>10,11,12</sup>:

- Oral mucosal changes – oropharyngeal candidiasis, pseudomembranous lesion
- Xerostomia
- Taste disturbances
- Dental erosion
- Dental caries
- Ulceration
- Halitosis
- Gingivitis and periodontitis
- Bony changes in trabecular pattern of jaw bone, Risk of bone fracture, osteoporosis

#### Measures to minimize side effects:

##### 1. SYSTEMIC SIDE EFFECTS<sup>13</sup>-

- Step down treatment to the lowest possible dose of ICS that maintains symptom control.
- Increase medication frequency while decreasing daily dose .
- Optimize compliance
- Optimize delivery (use spacer in adults, spacer and facemask in children)
- Evaluate and treat for complicating features of asthma .
- Maximize nonpharmacologic treatment (eg, trigger avoidance)

#### Preventive strategies to minimize oral manifestations:

✚ Since some steroids remain in mouth when these inhalers are breathed in some which can be swallowed into stomach and from there absorbed into the blood stream, so mouthwash after use of inhaler should always be advised. Patients should be informed to rinse their mouth thoroughly with mouthwashes with a neutral pH, or sodium bicarbonate, milk or neutral sodium fluoride containing solutions after the use of inhaler.

Selroos and Halme<sup>14</sup> conducted a study to, and proved that plasma cortisol concentrations were significantly lower ( $p=0.007$ ) in patients with rinsing mouth than not rinsing mouth when high dose of budesonide (1,600  $\mu\text{g}$ ) was inhaled using dry powder inhaler (DPI).

✚ Spacer tube can be used with steroid spray. Spacers should always be used with MDIs that deliver inhaled corticosteroids. Spacers can make it easier for medication to reach the lungs, and also mean less medication gets deposited in the mouth and throat, where it can lead to irritation and mild infections.

✚ Antimicrobial mouth rinses such as hexidine mouth rinses should also be advised.

✚ Another method to minimize local adverse effect of inhaled corticosteroids is “immediate diet method”<sup>15</sup>; is a method that having meals immediately after using inhaled corticosteroids. This method is expected to be beneficial for reducing local adverse events of inhaled devices.

✚ Oral hygiene maintenance should be promoted, proper tooth brushing after every meal.

✚ Dental visit frequency can be increased since patients suffering from these systemic conditions need special care, regular dental check up at least every 6 months.

✚ Patient should be educated about the possible adverse effects of asthma medications.

✚ Since these inhalers have acidic pH so immediate brushing of teeth should be avoided, as it may damage the already weakened enamel.

✚ Fluoride varnishes and gels should be recommended.

✚ Measuring bone mineral density can be recommended for patients using inhaled corticosteroids.

## II. Discussion

The prevalence of asthma in the world and in our country has reached to a considerable level, however, it has a tendency to increase in our population..steroid based inhalers are used commonly for the treatment of various respiratory , inflammatory and autoimmune diseases. Although potent and generally effective, they are not without risks for producing serious adverse effects, especially when used in high doses for prolonged periods of time.. A detailed knowledge of these side-effects of corticosteroid agents will assist the physician in making informed judgement on the potential benefits/risk of treatment with these drugs. The appropriate anticipation of these side-effects with timely implementation of evidence-based guidelines has the potential significantly to prevent, minimize and treat common and disabling complications of glucocorticoid therapy. Impacts of the asthma medications on oral health have been suggested in several studies General dental practitioners and pediatricists should have knowledge about the impacts of these medications on oral health and also should educate their patients about the measures that might be taken. Especially, for patients who do not maintain regular dental visits, dental consultation directed by pediatricians is of importance with regard to protect oral health.

## III. Summary

The effect of these drugs on oral health is the subject of debate among dental practitioners. Patients taking asthma medication may be at risk of dental caries, dental erosion, periodontal diseases and oral candidiasis bony trabecular changes. Hence, patients with bronchial asthma on medication should receive special prophylactic attention.

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