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RESEARCH ARTICLE

ORTHODONTIC TOOTH MOVEMENT IN PATIENTS ON MEDICATION

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ABSTRACT

The orthodontic tooth movement occurs by an inflammatory process involving osteoclasts, osteoblasts, neuropeptides, cytokines and alterations in innervation and local vascularization. Bone remodelling activity can be regulated either by local factors, such as the applied forces, or by systemic factors, such as drugs, hormones and vitamins. Following review article is to discuss the effects of drugs and systemic factors capable of affecting bone metabolism and influencing the orthodontic tooth movement during the entire treatment phase. The NSAIDs, bisphosphonates and sex hormones can reduce the tooth movement, while the corticosteroids, relaxin, thyroid hormones, parathyroid hormone and vitamin D can increase the rate of tooth movement. Thus, it is necessary to know patient's history of medical and other conditions which he is on medication for, which might or might not affect tooth movement necessary for successful orthodontic treatment.

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INTRODUCTION

Controlled mechanical forces bring about pressure tension zones surrounding alveolar bone, which in turn results in the tooth movement (NCMH Background Papers, 2005). Bone remodelling and subsequent tooth movement are brought about by the inflammatory cascade induced or activated due to the forces applied during orthodontic treatment which involves osteoclastic, osteoblastic activity, cytokines, and subsequent changes in vascular epithelium (Erika Lira de Oliveira, 2014). Molecular biology studies identified the main mediators involved in the complex process of extravasation, inflammatory cell chemotaxis and recruitment of osteoclast and osteoblast progenitors, responsible for bone remodelling and orthodontic movement.

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What mind doesn't know eyes cannot see. Thus, this review article aims to review all the drugs that affect tooth movement during orthodontic treatment. According to world health organization's research on Burden of Disease in India¹, few of the most common diseases and drugs used in the treatment were listed and are mentioned below as following:

- **Hypertension:** Beta-blockers, Calcium-channel blockers, Thiazides. Atenolol 50 mg or equivalent, Amlodipine 5 mg, Hydrochlorothiazide 25 mg or Indapamide or equivalent, Enalapril 10 mg or equivalent, Losartan 50–100 mg or equivalent. Low dose propranolol inhibits bone remodelling and orthodontic movement (Erika Lira de Oliveira, 2014).
- **Diabetes:** Orthodontic treatment should not be performed in a patient with uncontrolled diabetes. If the patient is not in good metabolic control (HbA1c >9%), every effort should be made to improve blood glucose control. For DM patients with good medical control, all dental procedures

can be performed without special precautions if there are no complications of DM (Luc Bensch, 2003).

- **AIDS/Immunocompromise:** India is on the verge of having the greatest increase in the estimated number of people living with HIV/AIDS (PLWHA) in the world in the coming decades. With over 50 lakh PLWHA, India currently has the world's second largest number of cases. It is highly susceptible to opportunistic infections (NCMH Background Papers, 2005). Orthodontic treatment is to be proceeded after screening of these immunosuppressant diseases.
- **Asthma:** treatment options Use short-course steroid tablets to control acute exacerbations at any stage of treatment; prednisolone— children: 1–2 mg/kg/day for 1–5 days; adults: 30–60 mg/day continued 2 days after recovery. beta-2 agonist inhaler used for control (NCMH Background Papers, 2005).
- **Cardiac issues:** Aspirin, ACE inhibitors, Beta-blockers, Statins, Nitrates. Acetylsalicylic acid and the related compounds, are COX inhibitors, which converts unsaturated fatty acids in the cell membrane to Prostaglandins. Clinical experience shows that orthodontic tooth movement is very slow in patients undergoing long-term acetylsalicylic therapy. Salicylate therapy decreases bone resorption by inhibition of PGs' synthesis and may affect differentiation of osteoclasts from their precursors. Therefore, it is recommended that patients undergoing orthodontic treatment should not be advised to take aspirin and related compounds for longer period during orthodontic treatment (Kamatchi Diravidamani, 2012).
- **Tuberculosis (as patient is on immunosuppressive drugs):** Monoprophylaxis. BCG Chemoprophylaxis: isoniazide (600 mg), rifampicin (450 mg), pyrazinamide (1500 mg) and ethambutol (1200 mg), Duration: 6 months. Patients on immunosuppressant drugs can encounter some difficulty during orthodontic treatment. Drug consumed have side effects which in turn results in severe gingival hyperplasia, making orthodontic treatment and maintenance of oral hygiene difficult. Treatment should be started or resumed after surgical removal of excessive gingival tissues once there is good oral hygiene. Whenever possible, fixed appliances should be kept to a minimum period with brackets and avoiding the use of cemented bands. Removable appliances in these cases are not recommended due to improper fit (Shdayfat, 2011).
- **Epilepsy:** Anticonvulsants drugs used in treatment. Phenytoin It induces gingival hyperplasia due to overgrowth of gingival collagen fibres, which involve the interdental papilla, making application of orthodontic mechanics and maintaining oral hygiene difficult.

If used during pregnancy, it can produce fetal hydantoin syndrome characterized by hypoplastic phalanges, cleft palate, hare lip, and microcephaly (Karsten, 1997). Valproic acid has a potential to induce gingival bleeding even with minor trauma, making orthodontic treatment difficult. Gabapentin produces xerostomia, making oral hygiene maintenance difficult during orthodontic treatment (Krishnan, 2006).

- **Dengue/malaria** treatment options: Analgesics Antipyretics Fluid Replacement Whole blood/platelet/plasma/ replacement (NCMH Background Papers, 2005).
- **Anticancer drugs** These are used for the treatment of childhood cancers. There is every chance of observing disturbances in dental as well as general body growth and development due to the adverse effects of the chemotherapeutic agents. It is clearly stated that patients who had been on chemotherapy with busulfan/ cyclophosphamide belong to the risk group for orthodontic treatment. These drugs are known to produce damage to precursor cells involved in bone remodelling process, thereby complicating tooth movement (Krishnan, 2006).

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