

Role of Hormone on Tissue Health

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Abstract

Endocrine system regulating hormonal function is one of the most important system of the body. Dysregulation in which can directly affect the oral cavity. Their systemic involvement also sometimes affects the oral health. Though other than diabetes mellitus and thyroid disorders rest of the hormonal diseases are rare but not non-existent. So a proper knowledge about the clinical presentations should be kept by the dentists to avoid any risks and difficulties regarding their diagnosis. Conditions like burning mouth, dry oral cavity, and altered tastes can also be an after effect of menopause should be ruled out by dentist before coming to a definitive diagnosis. Careful counseling of the patients especially women regarding their conditions should be done by keeping in mind the psychological stress they undergo during that stage of life. So this review circulates around the oral manifestations due to hormonal imbalance in a human body and post menopausal women.

Keywords : *Hyperpituitarism, Acromegaly, Hypothyroidism, menopause,*

Introduction

Metabolism, growth, development, tissue function, sexual function, reproduction, even sleep and mood in a human body are all controlled by a group of glands called endocrine glands collectively can be termed as endocrine system. These are also called a ductless glands because of their ability to directly secrete in blood and interstitial spaces. Diabetes Mellitus and Thyroid Disorders are two of the most common endocrine disorders a dentist faces in day to day practice but apart from that other hormonal disorders though rare can also show oral manifestations which if not given proper care can pose risks and difficulties in diagnosing and treating the patients. Following are various oral and perioral presentations by different endocrine disorders.

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PITUITARY GLAND

Considered to be the Master Gland of Endocrine system. Disorders occur generally in both cases of Hyperpituitarism and Hypopituitarism.

HYPERPITUITARISM : Excessive secretion of one or more hormones produced by the pituitary gland. Excess of growth hormone production results in Gigantism or Acromegaly. When increasing growth hormone production occurs prior to epiphyseal plate fusion Gigantism results but if it happens following to the closure then Acromegaly occurs.

GIGANTISM : Characterized by symmetrical abnormal growth of parts of body. Maxillofacial abnormalities include, Mandible prognathism, frontal bossing, dental malocclusion and interdental spacing etc. Often intraoral radiograph shows radicular hypercementosis.

ACROMEGALY : On the other hand Acromegaly is characterized by enlargement of specific part of body mainly involving face and extremities sometimes specific organs, resulting to systemic manifestations. Some of

the Orofacial Presentations are like glabella protrusion and increase in anterior face height are commonly seen. As a result of excessive growth hormone production deposition in periosteal bone take place which in turn leads to facial abnormalities like Prognathic Mandible and thickening of jaw bones.

Other Oral Manifestations: Interdental spacing, apertognathia, macroglossia sometimes leading to buccal tipping of anteriors^[1], hypertrophy of palatal tissues which may result or initiate sleep apnoea.

RADIOGRAPHIC FINDINGS IN ACROMGALY: Shows Taurodontism characterized by enlarged body and pulp chamber of tooth in expense of root, downward advancement of mandible, commonly found in male. On the contrary female patients show prevalence to anterior crossbites, extension of ascending ramus, downward displacement of mandible, edge to edge bite, bimaxillary alveolar protrusion^[2].

HYPOPITUITARISM

Pituitary dwarfism, a well known condition which is mainly caused due to failure of the body to use the growth hormone secreted by the pituitary gland. Etiology may be congenital or acquired. Deficiency in the hormone production can be the result of less or no synthesis of hormones, or insufficient absorption by the involved tissues^[3].

CRANIO-FACIAL PRESENTATIONS: In comparison to normal, patients suffering from this disorder have much smaller sized maxilla and mandible. Often they suffer from delayed development of root which eventually prolongs the time of eruption of teeth^[1] sometimes there is discrepancy in the shedding time of deciduous teeth also which can be extended for several years too. Dental malocclusion is a very common feature in pituitary dwarfism. Generally due to the smaller size of the jaws little spaces are there to incorporate all the teeth which are normally present in one healthy individual, thus leading to malocclusion^[4]. Absolute absence of wisdom tooth bud is not an uncommon characteristic of this disorder. Apart from that agenesis and single maxillary central incisor can also be seen^[2].

THYROID GLAND DISORDERS:

Disorder can be divided into hypothyroidism and

hyperthyroidism.

ORAL MANIFESTATIONS IN HYPOTHYROIDISM: Dysgeusia or distortion of taste sensation can be seen in children and young patients. They generally come up with complaint of foul or metal like taste sensation. Along with that thick and puffy lips are also reported. Myxedema seen in mainly adult patients where deposition of water and protein takes place resulting in larger lips and macroglossia. Sometimes swelling of face which is usually non-pitting type is also seen in these patients^[5]. Prevalence of periodontal diseases also is there.

ORAL MANIFESTATIONS OF HYPERTHYROIDISM: Acceleration in teeth eruption is one of the common manifestations in children with hyperthyroidism. Apart from that osteoporosis involving both maxilla and mandible, there is increase in caries and periodontal index rate, often complaints associated with burning sensation in tongue. Associated systemic disorders like Sjogren's syndrome and systemic lupus erythematosus is also noted^[6].

DISORDERS OF PARATHYROID GLAND :

Oral manifestation differs mainly on the basis of production of parathyroid hormone from the parathyroid gland. Parathyroid gland regulates the mineralization of hard tissue of human body like bone and teeth by its known action on the metabolism of calcium and phosphorus.

ORAL MANIFESTATIONS IN HYPERPARATHYROIDISM: Commonly found abnormalities with hyperactive parathyroid gland are brown tumor, lessening of bone density, calcification of soft tissue and abnormal dentition which mainly consist of various developmental defects, discrepancies in dental eruption, often migration of teeth leads to malocclusion resulting in considerable spacing which can be considered as a first sign of this disease.

RADIOGRAPHIC INTERPRETATION: Sometimes pseudocystic lesions are also seen as radiographic findings. Often radiolucency at the periapical area of teeth is misdiagnosed as radicular cyst or granuloma many times. Typical medullary trabecular pattern and the radiopaque pattern which often termed as

clear “ground glass” can be seen^[7].

ORAL MANIFESTATIONS IN HYPOPARATHYROIDISM: Hypoparathyroidism is due to the less or absent of parathyroid secretion which results in decrease in serum calcium level and increase in serum phosphorus concentration. Commonly encountered dental abnormalities include enamel hypoplasia, delayed eruption often resulting in absence in eruption of multiple teeth. Common dental features noted in this disease are abnormalities like enamel hypoplasia, shortened tooth roots, hypodontia etc. Developmental delay of dentition, mandibular tori and fungal infections like chronic candidiasis can also be seen. Often paraesthesia of tongue or lip is also found. “Chvostek sign” characterized by twitching of facial muscle around the mouth caused by sharp tapping over the facial nerve in front of the ear is sometimes seen^[8].

ADRENAL GLAND DISORDERS

ADDISON'S DISEASE: Insufficient secretion of glucocorticoid and mineralocorticoid from adrenal cortex leads to adrenal disease or can be called adrenal insufficiency. Appearance of pale brown or deep chocolate pigmentation of the oral mucosa which extends on the angle of the mouth or may develop on gingiva, tongue and lips^[9].

CUSHING SYNDROME: Increased production of glucocorticoids from adrenal cortex results in Cushing syndrome. Stunted development in both skeletal and dental structure can be seen. Often pathological fractures due to decreasing bone density occur. In radiograph often **DISORDERS OF PANCREAS:**

DIABETES MELLITUS: One of the common Endocrine disorders characterized by chronic hyperglycemia affecting the metabolism of carbohydrate, proteins, and lipid.

ORAL MANIFESTATIONS : Dry mouth, prevalence of dental caries, periodontal diseases, gingivitis, oral candidiasis, burning mouth syndrome, Taste disorders, mucormycosis, aspergillosis, oral lichen planus, geographic tongue, fissured tongue and most importantly delayed wound healing and increased rate of infection, salivary dysfunction, benign parotid hypertrophy, some neurosensory disorders leading to

change in taste perception, tooth eruption discrepancy etc^[10].

ORAL HEALTH IN WOMEN UNDERGOING MENOPAUSE :

According to WHO (World Health Organization), Menopause is considered to be one year without flow irrespective of any pregnancy or therapy in women of or more than 40 years of age. Premenopause generally considered within the age of 35 to 39 years when fertility and abundance starts to decrease with the first presentation of ovarian follicle reduction in spite of having no change in menstrual flow. Perimenopause indicates the year immediately before and after menopause^[11].

ROLE OF ESTROGEN ON ORAL CAVITY : Rapid decrease in the level of Estrogen affects the bone greatly since estrogen plays important role in reducing the osteoclastic activity by bringing their apoptosis. Reduction of the level thus decreases the bone density. Since estrogen receptors can be observed in gingiva, salivary gland and buccal mucosa, reduced salivary flow or xerostomia can also be caused by this reduction in estrogen level according to some investigators^[12,13,14].

ORAL MANIFESTATIONS

1. **BURNING MOUTH SYNDROME:** It occurs in more than one oral site. Often patient describes the pain as bilaterally symmetrical. Patient complains having pain mostly in anterior two-third, lateral and dorsum of the tongue, anterior hard palate and mucosa of lower lip, alteration of the taste can also occur. Onset of occurrence is between 3 years to 12 years of menopause. Mucosa characterized by dry and shiny gingiva often can be called as menopausal gingivostomatitis, accompanied by sometimes, reduced salivary flow, taste alteration and burning sensation. Bitter taste generally complained by the patients especially in the tip of the tongue and after it fades away only burning sensation stays. Most commonly lowered estrogen level is thought to be the reason behind burning mouth syndrome though stress and anxiety also have connection with its occurrence^[13,15].

2. **DRY MOUTH (XEROSTOMIA) :** it is nothing but oral dryness sometimes with hyposalivation but not always. According to many studies and researches, 25

to 50% women are more prone to xerostomia than men and cause of that is also estrogen. It is seen that saliva composition and reduced salivary flow is also estrogen dependant so women in perimenopausal to menopausal stage experience dry mouth sometime consequently which is often associated with bitter taste and halitosis or bad breath. The salivary samples of these patients when assessed with their blood samples significant amount of steroid hormones can be found which is mostly estrogen. It has been noted that altered psychological stress has a connection with their oral manifestations which is considered to be one of the prime reasons for the change in salivary flow indicating sympathetic activation on salivary flow [16].

3. PAINFUL MOUTH (STOMATODYNIA): Mostly associated with dry mouth. Presence of mandibular dysfunction, oral ulcerations and diffuse gingival atrophy can also be the reason of painful mouth. Sometime certain nutritional deficiencies, chronic candidiasis, pernicious anemia can also be the cause behind stomatodynia [13].

4. PERIODONTITIS: Often manifests as tooth mobility, abscess, and tooth loss. The symptoms are often insidious until in the later stage of life. Can be considered to be associated with osteoporosis though both of them are bone resorptive disease. Endocrine system especially the hormones like estrogen, progesterone, gonadotropin plays an important role in microcirculatory system. The alteration in hormonal imbalance especially the estrogen affects greatly the gingiva often causing atrophy, changes in keratinization, cellular differentiation.

5. OSTEOPOROSIS: It is as a result of reduced osteoclastic activity of estrogen in bone. Both bone forming cells, osteoblast and bone resorbing cells, osteoclast has estrogen receptor sites. When the estrogen level falls the osteoclast cells by sensing the reduction in the level start to enhance their activity on the other hand the osteoblasts by sensing the paucity in estrogen level starts to decline the level of their activity resulting in unbalanced bone resorption and formation [19]. This affects greatly as the rate of trabecular and cortical bone resorption exceeds the rate of trabecular and cortical bone formation. Thus new formed bone density reduces greatly which often leads to pathological fractures which are often accompanied by pain [17,18].

6. LICHEN PLANUS: No direct correlation has been found with lichen planus and women in menopause but this mucocutaneous disease has its own predilection towards women in the ratio of 3:2 [21].

7. EATING DISORDERS: Characterized by abnormal food intake whether it is very less or excessive. It is believed to be related to the psychological stress of the woman in menopause. Often they indulge in self inducing vomiting or regurgitation of gastric contents. Oral manifestation of these patients include smooth erosion of enamel, their tendency to engage pen or comb to induce vomiting, angular cheilitis, trauma caused by fingers on oral mucosa, erythema [20].

Conclusion

Endocrine system regulating hormonal function is one of the most important system of the body. Dysregulation in which can directly affect the oral cavity. Their systemic involvement also sometimes affects the oral health. Though other than diabetes mellitus and thyroid disorders rest of the hormonal diseases are rare but not non-existent. So a proper knowledge about the clinical presentations should be kept by the dentists to avoid any risks and difficulties in their diagnosis. Conditions like burning mouth, dry oral cavity, and altered tastes can also be an aftereffect of menopause should be ruled out by dentist before coming to a definitive diagnosis. Careful counseling of the patients especially women regarding their conditions should be done by keeping in mind the psychological stress they undergo during that stage of life.

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