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Research Paper

Effects of Menopause on Oral Health

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Abstract: *Oral health can be affected in several ways by a woman's changing hormonal status throughout puberty, menstruation, pregnancy, and menopause. The health of women is negatively impacted by the menopause due to biochemical and endocrine changes, specifically alterations in the production of sex steroid hormones. Oral mucosa has oestrogen receptors, therefore changes in hormone levels have an immediate effect on the mouth. Certain oral problems and disorders tend to be more common after menopause. It is unclear how hormones play a role in the health of oro-dental tissues or how HRT can help improve these disorders. More research is needed, especially randomised controlled studies, before any recommendations can be made for postmenopausal women's dental health. The oral changes that occur during menopause, as well as the dental needs of these women, should be known by a gynaecologist working in a menopause clinic, who can then send their patients to the appropriate dental specialists. However, the woman's menopausal status, her use of hormone replacement therapy (HRT), and her unique preventative and therapeutic dental care needs should all be brought to the dentist's attention.*

Key Words: *Burning mouth syndrome, hormone replacement therapy, menopause, oral health*

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I. INTRODUCTION

Natural menopause is characterised as the autonomous discontinuation of regular menstrual cycles for a continuous duration of 12 months, typically occurring between the ages of 45 and 55 (with an average range of 50 to 52 years). During middle age, women experience changes in circulating sex hormone levels as they go through the climacteric phase. These hormonal fluctuations are known to have various clinical effects that can potentially impact the psychological well-being and overall quality of life of the individual. Moreover, menopause is accompanied by various hormonal alterations, which render the gums more vulnerable to plaque accumulation. Consequently, this heightened susceptibility significantly increases the likelihood of developing gingivitis and advanced periodontitis. Menopause can exert an impact on the skeletal system, leading to a decrease in the jaw's ability to securely hold one's teeth in place. The initial step in preventing irreversible damage is to establish and adhere to a rigorous oral hygiene routine, which includes the regular removal of plaque and tartar from the oral cavity at least twice daily. Hormone therapy (HT) is utilised to address additional adverse symptoms commonly associated with menopause. In the context of the third millennium, hormone therapy (HT) is widely employed as a means of mitigating oral symptoms associated with menopause, with the aim of promoting the overall welfare of the women undergoing treatment.

Many women experiencing menopause commonly report oral discomfort, along with other general symptoms associated with the climacteric phase.

Benign mammary syndrome (BMS) is a prevalent complication observed in women during the menopausal and post-menopausal stages. It has been observed that women exhibit a higher prevalence of xerostomia compared to men. Recent research findings indicate that individuals suffering from xerostomia display varying levels of distress and anxiety concerning their quality of life, which can be attributed to the underlying causes of xerostomia. Nevertheless, Ship et al. (year) found no discernible disparity in flow rates between women who are premenopausal and those who are menopausal. It has been postulated that a diminished rate of salivary flow may contribute to the manifestation of oral symptoms in menopausal individuals. The composition of saliva does not appear to be significantly impacted or modified in various oral and maxillofacial pathologies. There is a substantial body of literature that provides evidence of altered saliva compositions during menopause, specifically in relation to changes in salivary proteins and calcium concentration. Given the aforementioned information, it is of utmost significance for individuals approaching the age of menopause or currently undergoing this physiological transition to comprehend the potential impact of menopause on their oral health, as well as adopt preventive measures to mitigate associated complications such as periodontal disease and dental caries.

ORAL MUCOSA AND FEMALE SEX HORMONES

Menopause exerts similar effects on oral tissues as it does on other bodily systems. Alterations to the oral cavity may manifest because of the natural process of ageing or diminished levels of the hormone oestrogen. The histological characteristics and responsiveness to oestrogens of the oral mucosa exhibit remarkable similarities to those observed in the vaginal mucosa.

ORAL DISCOMFORT-BURNING MOUTH SYNDROME

Prevalent among postmenopausal females, the term "burning mouth syndrome" refers to the perception of a burning sensation in the oral mucosa of individuals who are otherwise in good health. The degree of symptom severity exhibits variability among individuals. Burning mouth syndrome exhibits comparable clinical manifestations to lichen planus, candidiasis, and viral infections, with the exception that the oral mucosa remains unaffected. In their study, Wardrop et al. (year) investigated a sample of 149 women. The findings of their research revealed a statistically significant association between the occurrence of menopause and the presence of mouth discomfort. The prevalence of oral discomfort is reported to be lower among premenopausal women (6%), while postmenopausal women report a significantly higher prevalence (43%). The results of the study also indicated a correlation between psychological distress experienced by menopausal women and the presence of oral discomfort. A strong association was observed between systemic factors and mouth symptoms related to menopause, as indicated by a high odds ratio. The chemical composition of saliva exhibited variations when compared to that of individuals in good health and of younger age.

SALIVA AND XEROSTOMIA

Dry mouth, also known as xerostomia, is a frequent symptom of menopause. It's possible that the quantity of saliva produced by the glands is unrelated to the frequency and intensity of symptoms. Reduced saliva production can promote oral microbial colonisation, which in turn can have an adverse effect on dental health because saliva works as a defence mechanism for preventing caries. The salivary glands secrete sex hormones, and the concentration of these hormones in the saliva has been estimated. The amount of saliva produced by a person is influenced by their oestrogen levels. Saliva flow rates are significantly lower in postmenopausal women compared to women who are menstruation. Salivary flow rates were investigated by Minicucci et al. and compared to those of premenopausal women. Yalcin et al. assessed the oral health issues experienced by 348 women during the menopausal period. The most frequently observed symptom was xerostomia, with a higher incidence among individuals not using hormone replacement therapy (HRT) compared to those who were using HRT. According to a study conducted by Yalcin et al. from Turkey, it was observed that salivary flow rate exhibited a decline during menopause but showed an increase when hormone replacement therapy (HRT) was utilised. However, the study found that salivary pH, electrolyte levels, and calcium concentrations remained unaffected by these factors. The study involved a sample size of 14 menopausal women and an equal number of premenopausal controls. The results obtained by Sewón et al. were in line with this observation. A study conducted in Iran revealed that the average calcium concentration in the saliva of menopausal women differed significantly between two groups, namely cases and controls. The study included a total of 42 participants, with 21 women classified as cases and 21 women classified as controls.[20] A case control study was conducted by the same author and colleagues, wherein a group of 38 menopausal women (ranging in age from 41 to 77) experiencing oral dryness were compared to an equal number of asymptomatic controls. The concentration of beta-estradiol in the saliva of the patients was assessed, revealing a significant decrease in hormone levels compared to the control group. Agha-Hosseini et al. conducted a study involving 60 postmenopausal women to investigate the correlation between dry mouth and bone mineral density (BMD) in the lumbar spine. A negative correlation was observed between bone mineral density and xerostomia. In summary, there exists a dearth of information regarding the influence of menopause on saliva and its potential clinical ramifications, necessitating further research endeavours.

MENOPAUSE AND PERIODONTAL HEALTH

The periodontium encompasses the various tissues that provide support to the teeth, including the gingiva, periodontal ligament, cementum, and alveolar bone. Sex steroid hormones also have an impact on periodontal health. These factors have the potential to influence the production of inflammatory mediators, the permeability of blood vessels, as well as the proliferation and differentiation of fibroblasts. Osteoblasts and fibroblasts present in the periodontium possess oestrogen receptors, and their reactions to fluctuations in hormone levels throughout the menstrual cycle and subsequent periods can exert detrimental effects on periodontal well-being. Postmenopausal women exhibit a higher prevalence and increased severity of periodontal disease. The increasing incidence of diseases can be attributed to various factors. Scardina and Messina conducted a comparative analysis of the oral microcirculation between a group of 27 postmenopausal women and a control group using video capillaroscopy. There exists a correlation between the depletion of

alveolar bone and the presence of systemic osteoporosis. Low bone mineral density (BMD) in the alveolar crest and sub crestal alveolar bone can lead to the loss of attachment and teeth. Kribbs (year) conducted a study which revealed that women diagnosed with severe osteoporosis exhibited a threefold higher likelihood of tooth loss in comparison to women without this health condition. Furthermore, it has been observed that postmenopausal women exhibit a higher degree of residual ridge resorption after dental extraction in comparison to premenopausal women. The assessment of alveolar bone loss was also conducted through the utilisation of oral radiography. The technique of digital X-ray radiogrammetry was employed to assess the degree of systemic bone loss by analysing a radiograph of the patient's hands and wrists. There was no significant correlation observed between clinical attachment loss and alveolar bone loss with bone mineral density (BMD). However, age, years after menopause, and body mass index were found to have a significant correlation with BMD. The researchers reached the determination that menopausal osteopenia serves as an antecedent to periodontal disease. The administration of synthetic hormones as a therapeutic intervention. A literature review was conducted to investigate the use of hormone replacement treatment (HRT) with oestrogens and progestogens for the management of oral symptoms and signs in postmenopausal women. In the Volpe et al. trial, a cohort of postmenopausal women experiencing oral discomfort were administered conjugated oestrogens. Most of the patients exhibited an elevation in both subjective and objective symptoms after the introduction of hormone replacement therapy (HRT). The occurrence of oral discomfort may be specifically linked to the depletion of steroid hormones in certain postmenopausal women. In this subgroup, the administration of oestrogens as part of hormone replacement therapy (HRT) has been found to potentially alleviate the clinical manifestations of oral discomfort. The identification of patients who may derive potential benefits from hormone replacement therapy (HRT) can be facilitated by employing immunohistochemical techniques to detect the presence of oestrogen receptors. Tarkkila et al. conducted a survey involving a sample of 3173 menopausal women to ascertain the frequency at which they experienced symptoms of sore mouth and dry mouth. The study revealed that climacteric symptoms, such as discomfort and dry mouth, were frequently reported. However, hormone replacement therapy (HRT) was found to have no discernible impact on mitigating or resolving these particular symptoms. During menopause, there is a decrease in saliva flow rates and fluctuations in electrolyte levels. There were no significant differences observed in salivary pH and electrolyte levels between postmenopausal women who received hormone replacement therapy (HRT) and those who did not, as determined by the study conducted by Yalcin et al. The administration of hormone treatment, along with alendronate and calcium supplementation, resulted in an increase in saliva flow rate among women experiencing oral complaints. However, it is important to note that these interventions did not have any significant impact on other salivary measures.Tarkkila et al. conducted a two-year investigation to examine the oral health disparities between menopausal women who utilised hormone replacement therapy (HRT) and those who did not. A cohort of 400 female participants was examined, with 200 individuals receiving hormone replacement therapy (HRT) and the remaining 200 not receiving HRT. During both the initial assessment and the subsequent evaluation after a period of 2 years, the patients underwent a thorough clinical examination, measurements of saliva flow, and panoramic tomography of the jaws. There were no significant differences observed in salivary flow rate and other dental parameters between the groups. The study revealed a positive correlation between hormone replacement therapy (HRT) usage among women and their inclination towards prioritising their health. Specifically, it was observed that HRT-using women exhibited a higher likelihood of having undergone dental appointments in the recent past and had a greater number of dental restorations.Giuca et al. conducted a study involving a sample of 95 postmenopausal women to investigate the effectiveness of phytotherapy and oestrogens in alleviating oral cavity symptoms. A comparison between women who underwent hormone replacement therapy (HRT) and a control group revealed that the former exhibited a lower frequency of oral complaints. The similarities in gingivitis, bleeding, and altered taste were observed between the two treatments, while oestrogens exhibited greater efficacy in modifying saliva production. The study conducted by Eliasson et al. examined the impact of estriol on the production of saliva and its buffer capacity in a sample of 18 postmenopausal women, aged between 61 and 76 years. Following the initiation of hormone replacement therapy (HRT), individuals experienced a notable augmentation in salivary secretion and a reduction in symptoms associated with xerostomia. Leimola-Virtanen et al. (year) conducted a study to investigate the influence of hormone replacement therapy (HRT) on the composition of saliva in a sample of 19 postmenopausal and 8 perimenopausal women. The researchers made a significant finding that the production of two protein groups, immunoglobulins, and salivary peroxidase, is dependent on the presence of oestrogen. Ship et al. (year) conducted a study that yielded no empirical evidence supporting the notion that menopause or hormone replacement therapy (HRT) have discernible impacts on the functioning of salivary glands in women who are in good health. López-Marcos et al. (year) conducted a study involving a sample size of 190 women, wherein they arrived at the conclusion that hormone replacement therapy (HRT) did not exhibit any observable influence on periodontal health. Nevertheless, a study conducted on a sample of 330 postmenopausal Japanese women revealed that oestrogen might contribute to the preservation of teeth by enhancing the periodontal

attachment that surrounds them. It is worth noting that this effect was observed without any significant impact on oral bone height or porosity. A strong correlation was observed between the utilisation of oestrogen and the occurrence of tooth loss. Tarkkila et al. conducted a 2-year follow-up study wherein they observed a decrease in the prevalence of periodontal infections, specifically Porphyromonasgingivalis and Tannerella forsythia, after the implementation of hormone replacement therapy (HRT). This study yielded no evidence of a correlation between hormone replacement therapy (HRT) utilisation and periodontal well-being.

The impact of oestrogens on interleukin levels and the acceleration of healing in women with periodontitis can be observed during hormone replacement therapy (HRT). The Women's Health survey, which included a sample of 42,171 postmenopausal women in the United States, revealed a 24% decrease in tooth loss among individuals currently using hormone replacement therapy (HRT) compared to those who did not use HRT. In a study conducted by Meisel et al. in Germany, a comparison was made between males and females of similar age groups. The findings revealed that women who underwent hormone replacement therapy (HRT) exhibited a higher tooth count in comparison to their male counterparts.[43] Tarkkila et al. conducted a study to investigate the relationship between salivary flow rates and dental health in a randomly selected sample of 400 peri- and postmenopausal women. The sample was divided into two groups: 200 women who were using hormone replacement therapy (HRT) and 200 women who were not using HRT. Following a period of two years, a group of researchers conducted a re-evaluation of 161 pairs of case-control subjects, consisting of individuals who had utilised hormone replacement therapy (HRT) and those who had not. During the baseline and follow-up assessments, the dental and periodontal condition of the participants was recorded, and the flow of saliva was measured both during periods of rest and after stimulation. The participants also completed a standardised questionnaire that gathered information regarding their overall health, medication usage, and self-care practises. There were no significant differences observed in dental metrics and salivation rates between the groups. The female participants in the hormone replacement therapy (HRT) group exhibited a higher frequency of dental appointments in the recent past and underwent a greater number of dental restorations during the follow-up period. These findings indicate a greater emphasis on maintaining oral health and a heightened awareness of overall well-being among this group. The diverse outcomes observed in hormone replacement therapy (HRT) research can be attributed to a range of potential host factors. The causes of variance in reaction and tooth loss were investigated by Taguchi et al. It was determined that polymorphisms in the oestrogen receptor and vitamin D genes contribute to this phenomenon. Allen et al. conducted a recent systematic review examining the financial implications of dental treatment among postmenopausal women, both with and without osteoporosis, who utilise hormone replacement therapy (HRT). A comprehensive analysis was conducted on a sample of 13,735 postmenopausal women, encompassing a total of twenty trials.

II. CONCLUSION

Oral and (vdc, 2012)is impacted by menopause for the same reasons as other bodily systems. It is unclear how important sex hormones are for the health of the oral mucosa, teeth, and gums.

Randomised trials are needed to determine the impact of sex hormones on the health of the oral mucosa, saliva, and periodontal tissues. Menopause's effects on oral symptoms have only been studied in modest numbers. To address this question, we need to conduct large, well-powered cross-sectional research. The evidence for HRT's ability to reduce symptoms and boost dental health is again mixed. Menopausal women experiencing oral symptoms require large randomised controlled studies to prove the efficacy of HRT and other treatments. Menopausal women need clear recommendations for maintaining good dental health and making other healthy lifestyle choices.

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