Revisão

THE PHYSIOLOGY OF MENOPAUSE, MEDICAL MANAGEMENT AND DENTAL IMPLICATIONS.

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RESUMO

Muitos dos problemas de saúde da mulher estão ligados ao seu desenvolvimento sexual. As alterações hormonais repercutem-se de forma mais extensa do que no sistema reprodutivo da mulher. Tanto a puberdade como a menstruação, a gravidez ou a menopausa tem influencia na saúde oral.

Um número significativo de mulheres encontra-se numa fase pós-menopausa da vida. Os profissionais de saúde oral que tratem mulheres numa fase de transição menopausa/peri-menopausa devem ter em consideração a fase da vida de grande ansiedade a que estão sujeitas estas pacientes. Também no caso de mulheres menopáusicas que não se encontram submetidas a tratamento hormonal de substituição deve-se ter presente que estas pacientes têm uma maior probabilidade de sofrer um enfarte do miocárdio, acidentes cérebro vasculares, osteoporose ou doença oral. Os sinais clínicos da cavidade oral incluem xerostomia, aumento do numero de cáries dentárias, disestesias, alterações do gosto, gengivite atrófica, periodontite e osteoporose mandibular não susceptível de tratamento protético convencional ou com implantes dentários. As radiografias panorâmicas podem revelar a presença de ateromas calcificados na artéria aorta. Os dentistas conhecedores das consequências psicológicas, médicas e dentárias da menopausa têm a oportunidade de orientar conscientemente estas mulheres sem tratamento ginecológico para uma avaliação da conveniência de tratamento hormonal de substituição e do seu benefício sobre a saúde sistémica e oral.

Palavras-chave: menopausa; complicações pós-menopausa; saúde; mulher.

ABSTRACT

Many important health issues for women are linked to their sexual development. Hormonal fluctuations affect more than a woman's reproductive system. Puberty, menses, pregnancy, and menopause all influence oral health.

An important number of women are in the postmenopausal phase of life. Dentists caring for women entering the menopausal transition need to consider the stressful phase of life that heir patient is experiencing. Also, dentists caring for women who are postmenopausal and not receiving hormone replacement therapy(HRT) need to be aware that these patients have higher risk of suffering myocardial infarct, a stroke, osteoporosis or dental disease. Clinical findings on oral examination may include xerostomia, increased dental caries, and dysesthesia, taste alterations, atrophic gingivitis, periodontitis, and osteoporotic jaws unsuitable for conventional prosthetic devices or dental implants. Panoramic dental radiographs may reveal calcified carotid artery atheromas.

Dentist cognizant of the psychological, medical and dental consequences of menopause have an opportunity to knowledgeably refer women not under the care of a gynecologist for an evaluation of their appropriateness for HRT for both its systemic and oral health benefits.

Key-words: menopause, postmenopausal-complications, women's health.

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INTRODUÇÃO

Analysis of epidemiological and biomedical data comparing women to men indicates that real differences exist in terms of risk of developing certain diseases, in the natural history of many diseases, and, frequently, in treatment response. This dimorphism is influenced greatly by the hormonal fluctuations that women experience and is reflected in the health of their oral tissues[1].

Approximately one-quarter of the women in Spain are in the postmenopausal phase of life. The vast majority of these women experienced spontaneous (natural) cessation of menses between the ages of 47 and 55 when the production of estrogen (specifically, beta-estradiol) decreased because of an inadequate number of functioning follicles within their ovaries. A lesser number of women also entered menopause after surgical removal of both ovaries (ovophorectomy). This procedure is usually performed prophylactically to prevent ovarian cancer in conjunction with a hysterectomy (surgical removal of the uterus) often necessitated due to abnormal bleeding, endometriosis or pelvic inflammatory disease. The physiological changes associated with either spontaneous or surgical menopause cause some women to experience uncomfortable symptoms such as hot flashes, night sweats, and vaginal dryness. In addition, long-term estrogen deprivation arising from menopause in association with age related factors disproportionately increases the risk of cardiovascular disease (myocardial infarct, a stroke), osteoporosis, Alzheimer's disease and dental disease. Hormone replacement therapy/HRT (estrogen or estrogen and progestin) is often prescribed on a short-term basis to alleviate the uncomfortable symptoms associated with menopause deficiency and on a long-term basis to prevent some of the chronic illnesses common to postmenopausal women[2].

The purpose of this article was to review the impact of menopausal transition and menopause on oral health. We analyze the physiology and medical management of a woman's life phase and its relation to oral health.

Menopausal Transition and Menopause

Peak ovarian function occurs prior to age 30 and then gradually declines. The " menopause transition" (climacteric, perimenopause) defined as the months and years surrounding the last menstrual period, is precipitated by a lesser number of functioning follicles and ova, a consequent reduction in the level of estrogen, and an inability to respond to the pituitary gonadotropins, FSH and LH. The initial sign of the transition, which may begin in the 40's, is a reduction in menstrual flow. This is usually followed by missed periods of menstrual flow. Menopause, which is defined as the complete and permanent cessation of menstrual flow (amenorrhea) for one year, occurs at an average age of 48.6 [3]. Women who smoke and women who are thin tend to have an earlier menopause, while those who are overweight have a later menopause because of the availability of estrogen in adipose tissue.

Approximately 75% of women develop uncomfortable symptoms during the menopause transition because of very low levels of estrogen and significant fluctuations in the levels of FSH and LH. The initial symptoms are related to the central nervous system. Estrogen deficiency leads to dysregulation of the hypothalamic temperature control center resulting in vasomotor symptoms- " Hot flashes" occur while awake, begin with headache and then proceed to a flushing of the face with the occasional development of red blotches on the neck, chest, back and arms. This occurs as the arterioles in the skin dilate and the skin temperature rinses several degrees. Hot flashes are further accompanied by sweating, occasional palpitations and dizziness and may be followed by a chill. These episodes can last a few minutes or more than a half hour. "Hot flashes" arise spontaneously or in association with emotional stress or eating certain foods. "Night sweats" occurs while asleep and are associated with drenching perspiration that causes the individual to awaken multiple times during the night and this can lead to fatigue and irritabili-

ty. These vasomotor symptoms usually resolve spontaneously within 2-4 years of the last menses[4]. Alterations in estrogen levels during menopause transition can also induce changes in the limbic system (a site that processes emotions) and result in mood swings, depression (dysphoria), and difficulties with concentration.

These wide variations in hormone levels, can cause many women to experience unpredictable heavy menstrual bleeding with the risk of anemia and endometrial hyperplasia. Pain during sexual intercourse (coitus) may also arise because of a loss of elasticity and lubrication of the vagina and postcoital bleeding can result from the tearing of poorly estrogenized mucosa. Urinary tract infections and urinary frequency and stress incontinence are also frequently reported as is dry, less pliable, and easily damaged skin.

Cardiovascular Disease

Cardiovascular disease (particularly coronary disease and stroke) is the most common cause of death among postmenopausal women[5,6]. In comparison to men, women have a marked advantage in age-specific risk (i.e.: a delayed onset by 10-15 years) of heart disease before menopause. However, after menopause, the risk of a fatal myocardial infarction secondary to atherosclerosis of the coronary vessels doubles even after adjustment for age[7,8]. Similarly, the risk of stroke resulting from atherosclerosis of the carotid artery triples in postmenopausal women[9,10]. Epidemiologic studies have noted that 16% of women will die of a stroke, whereas only 8% of men will die of stroke[11]. These high rates of disease among women have been shown to result from a decrease in the level of estrogen with a consequent increase in atherogenic risk factors[12]. Specifically, there is an increase in total cholesterol, low-density lipoprotein (LDL), cholesterol and lipoprotein(a), a decrease in high-density lipoprotein (HDL) cholesterol, increased thrombic tendency, and the occasional development of insulin resistance[13,14]. The occasional development of insulin resistance is extremely important given that diabetes mellitus is associated with a doubling of the risk for an ischemic stroke, and an eight fold higher risk of coronary artery disease [15,16].

Osteoporosis

Osteoporosis is a metabolic bone disease characterized by low bone mineral density (BMD) and microarchitectural deterioration that leads to fragility and the susceptibility to fracture[17]. Age is strongest correlate to bone mass, all individuals lose bone mass after the age of 35 to 40 years. The second strongest correlate is menopause. The disease affects many Spanish women over age 48 because estrogen receptors on the bone-resorbing osteoclasts recognize the paucity of estrogen and respond by increasing their activity level[18-20]. Estrogen receptors on the bone-forming osteoblasts likewise recognize the paucity of estrogen but they respond by decreasing their activity level[21-24]. Thus, during the skeleton's continuous remodeling process the rate of trabecular (cancellous) and cortical bone resorption exceeds that of trabecular and cortical bone formation. During this postmenopausal osteoporotic process, women lose 30 % to 50% of the trabecular bone and 25% to 35% of the cortical bone mass that were present during the peak bone mass years between the ages of 20 and 30[25-27]. Factors contributing to bone loss include family history, physical inactivity, low body weight, cigarette smoking, inadequate calcium and vitamin D intake, excessive alcohol and caffeine consumption, certain medications (e.g. steroids), and fair complexion (Caucasians and Asians) [28-31]. Bone loss is most rapid in early menopause, followed by a slowing of that rate 8 to 10 years after the last menstrual period. The disease results in more than 40% of postmenopausal women suffering a fractured bone[32]. These women most commonly suffer fractures of the wrist (distal radius/Colles fracture), spine (vertebral compression), proximal humerus and hip (femoral neck and intertrochanteric fractures). The mortality and morbidity associated with hip fractures in this group of individuals is devastating with 20% dying in the first year,

15-25% losing their independence and being confined to long-term facilities, and 50% having long-term loss mobility[33].

Research has shown a direct relationship between systemic bone loss and oral bone loss in both edentulous and dentate individuals. With systemic osteoporosis, the mass and density of the maxilla, mandible, and alveolar ridge may be reduced. Systemic bone loss may also contribute to tooth loss and periodontal disease; it is not a causative/principal factor for periodontal disease but may affect the severity of preexisting periodontitis[34].

Alzheimer's Disease

Alzheimer's disease (AD) is a degenerative brain disorder that develops in mid-to late adult life. Neuropathologically, AD is characterized by presence of senile plaques which form outside the neuron. These plaques are composed of deteriorating neuronal tissues surrounded by deposits of amyloid beta protein. Also present and characteristic of the disease are neurofibrillary tangles which are located within nerve cells and consist of twisted protein fibers. These plaques and tangles decrease cholinergic neuronal transmission (in which acetylcholine acts as the neurotransmitter) in the cerebral cortex and hippocampus and lead to progressive loss of memory and higher intellectual functioning[35]. Observational studies have shown that long-term estrogen deficiency arising from spontaneous or surgically induced menopause seems to be related to a higher risk of developing Alzheimer's disease (AD). The prevalence of AD among women aged 65 years or older is approximately 6% [36,37]. This rate of disease is two to three times greater than that found in men[38]. Women with AD also suffer more severe cognitive impairment than men with AD[39]. These findings may be explained in part by the fact that women with AD have lower levels of endogenous estrogen than those without AD[40], These findings are further elucidated by animal-model study which showed that an ovariectomy impairs memory-related behaviors by causing a decrease in high affinity choline uptake and choline acetyltransferase activity in the hippocampus and frontal cortex [41].

Dental Disease

Menopause is also associated with significant adverse changes in the orofacial complex. Unrelated to any medication effect, postmenopausal women have decreased unstimulated and stimulated submandibular and sublingual salivary gland flow, when compared to premenopausal women[42]. The resulting xerostomia has been implicated as a cause of increased dental caries (recurrent coronal decay and root caries), and may be responsible for the increased prevalence of oral dysesthesia and taste alterations and can affect the fit of dentures[43-45]. Some of these women develop concurrent senile atrophic gingivitis in which there is an abnormal paleness of the gingival tissues. Others develop a condition known as menopausal gingivostomatitis which is characterized by gingival that is very dry and shiny, bleeds easily, and the color ranges from abnormal paleness to extreme erythematous.

Postmenopausal estrogen deficient women with decreased BMD of the spine have shown in experimental studies using dual energy z-ray absorptiometry to have reduced BMD of the jaws[46,47]. Postmenopausal women with osteoporosis and concurrent periodontitis are also likely to exhibit an exaggerated response to plaque as evidenced by increased bleeding on probing, a loss of dentoalveolar bone height, and decreased BMD of the alveolar crestal and subcrestal bone[48]. Further, these women are also at high risk of suffering early loss of posterior teeth because of a loss of BMD[49-52]. The results of animal model studies also imply that postmenopausal women may suffer greater resorption of their residual ridges during the healing process following dental extractions, than do premenopausal women[53]. Loss of bone density, if unchecked, may lead to edentulism and markedly resorbed residual alveolar ridges that are unsuitable for construction of conventional dentures and inadequate sites for dental implants[54].

As the population ages, large numbers of

women who had dental implants placed when they were premenopausal will enter menopause. Insight as to the effects of menopause on continued osseointegration of these implants into the jaw bones has been recently studied using animal models[55]. The study showed that the trabecular bone around previously placed dental implants (free of occlusal stress) undergoes rapid modeling after an animal's ovaries are surgically removed. The subsequent estrogen deficiency caused a decreased in trabecular bone volume around the implants and a decrease in implant-trabecular bone contact. The lack of estrogen however, induced only a slight decrease in cortical bone contact with the implant.

Similarly, large numbers of postmenopausal women will seek initial placement of dental implants. The effects of the paucity of estrogen on the initial osseointegration of these dental implants as also been recently studied using animal models[56,57]. These studies showed that when new implants (without functional occlusion) are placed in previously ovariectomized animals, the trabecular bone volume is markedly decreased in comparison with on-ovariectomized animals. The lack of estrogen however did not induce any change in cortical bone volume around the implant or in cortical bone contact with the implant. Therefore, osteoporotic women with nonfunctional dentures may benefit from implants, there is no contraindication for osseointegrated implant therapy[34].

Oral and Maxillofacial radiologists have recently developed methods of diagnosing postmenopausal women with systemic osteoporosis by use of dental radiographs obtained in clinical practice. One group of researchers have noted patterns of bone trabeculation in the anterior maxilla and posterior mandible as defined by digitized periapical radiographs[58]. Another group of scientists has noted that abnormalities in the width and morphology of the mandibular inferior cortex as imaged on a conventional panoramic radiograph are indicative of postmenopausal systemic osteoporosis [59]. Panoramic dental radiographs are also being used to identity postmenopausal women at risk of a stroke. The routine periapical or panoramic radiographs are useful in diagnosing bone loss until 25% to 40% of bone density is lost [60].

Dental researchers have recently reported that 30% of neurologically asymptomatic women with a mean age of 70 have carotid artery atheromas in the soft tissues of the neck [61].

There also a number of other diseases with dental manifestations whose prevalence increases at or about the time of menopause but whose relationship to deficiencies in estrogen remains under study. Sjogren's syndrome, an autoimmune disease, is characterized by chronic inflammation of the salivary, lacrimal and other secreting glands. The disorder leads xerostomia, dry eye (keratoconjunctivitis sicca), vaginal dryness and pain during intercourse. The xerostomia is thought responsible for an increase in caries, periodontal disease and oral candidiases[62]. Pemphigus vulgaris, an autoimmune disease, is characterized by mucosal and skin erosions and ulcers [63]. The mucosal ulcers are found in the oral cavity (buccal mucosa, palate, lips and gingival), esophagus, vulva, and anus. The vesicobullous like lesions initially weep. And then erode and become painful ulcers. "Burning mouth syndrome", an illness of unknown etiology, is characterized by burning sensation in the anterior aspect of the tongue, the anterior hard palate or the lower lip mucosa. Pain and burning are always present and are more severe later in the day and at night. On clinical and histological examination the oral mucosa appears normal. Individuals with the disorder frequently report xerostomia, diminished taste sensation, severe menopausal symptoms and may have oral candidiasis[64-66]. Although a cause cannot be identified, a nutritional deficiency or fungal infection may be the underlying problem that requires treatment. HRT may improve the clinical symptoms in some women[34].

Trigeminal neuralgia also commonly occurs in post-menopausal women and is usually precipitated by superior cerebellar artery compressing the nerve. The disorder characterized by unilateral electric shock-like pain in the

middle and lower third of the face[67]. Patients may initially believe that the pain is of odontogenic origin and mistakenly attempt to obtain relief by seeking dental therapeutic interventions.

MEDICAL INTERVENTIONS

Hormone Replacement Therapy

Hormone replacement therapy (HRT) to control the symptoms of the menopause transition and to potentially protect against the diseases that arise from chronic estrogen deficiency has been used in Spain sporadically for the past 30 years. In 1993, a study in Lugo among women aged 45 to 5 revealed that 49% knew of HRT and that 39% had visited a gynecologist at least once after menopause. Working women and those with higher educational attainment were the most likely of individuals to have had the gynecologic examination. However, only 4% of the women in the study had received HRT[68]. In 1996, a national survey of Spain women aged 40 to 5 years was undertaken as part of a four country (France, Germany, United Kingdom, and Spain) research initiative[69]. The study revealed that 60% of Spanish women claimed not to have discussed menopause or its symptoms with their doctors and that about half believed that they "knew nothing about HRT". Approximately 18% of Spanish perimenopausal women and 8% of Spanish postmenopausal women claimed to be currently using HRT where as in France theses rates were 55% and 18% respectively. It is assumed that cross-cultural differences in behavior accounted for the variation in HRT usage rates between countries. Although there appears to be an increasing trend toward greater usage of HRT in Spain, the results of these two studies also identified the fact that the vast majority of Spanish women believe that they need more information about the short-term and long-term benefits and risk of HRT and that its use should be a matter of personal choice made with advice from their physician.

The most common regimen of HRT used in Spain is daily oral administration of both estrogen (conjugated estrogen 0.625 mg) and progestin (medroxyprogesterone acetate 2.5 mg). This schedule maintains the absence of monthly menstrual flow. Other women are prescribed a sequential estrogen-progestin regimen which reinstitutes a form of vaginal bleeding known as "withdrawal bleeding " or "spotting".

HRT is usually prescribed in order to ameliorate the symptoms associated with the menopause transition and/or prevent the chronic diseases believed in part to arise because of long-term deficiency of estrogen. Observational studies of postmenopausal women who uses HRT demonstrate that they have 50% lower all-cause mortality rate and gain a 3-year increase in life expectancy when compared to women who do not use hormones[70,71]. However, these statistics may be influenced by healthy user/healthy survivor bias which acknowledges that women who use HRT are of higher socioeconomic status, better educated, younger, thinner, and more likely to exercise and seek medical care on a regular basis than those who do not take hormones[72,73].

Approximately 30% of Spanish women discontinue HRT because of weight gain, headache, rash, breast tenderness, thromboembolic disorders or fear of breast or endometrial cancer. The fear of breast cancer arises from studies conducted in the United States and European countries other than Spain which have shown that long-term use (five years or longer) and current use of estrogen is followed by a slight, though significant, increase in the risk of breast cancer because the hormone causes proliferation of breast epithelium[74-76]. However, a study conducted in Girona did not find a statistically significant association between breast cancer and the use of HRT even though Spanish women are moderate risk of developing the disease from other causes [77,78]. In addition, endometrial cancer may develop in women who have not had a hysterectomy because of estrogen's stimulatory effect on the endometrium[79]. When added to estrogen, progestin has been shown to moderate the risk of both breast and endometrial cancer[80].

Selective Estrogen Receptor Modulators

In view of these concerns, a new class of medications known as selective estrogen modulators

(SERMs) has been approved for use in the United States and Europe. These drugs mimic the effects of estrogen (agonist) in some tissues and act as anti-estrogens (antagonist) in others. The ideal compound, yet to be derived, will function as an estrogen antagonist in the breast and uterus and as an estrogen agonist in the skeleton and cardiovascular and CNS systems.

Tamoxifen, the first SERM approved for use, acts as an estrogen antagonist in breast tissue making it useful for the prevention and treatment of breast cancer. However, the drug also has estrogen-like activity which stimulates proliferation of endometrial tissues causing endometrial hyperplasia and carcinoma on some occasions, while simultaneously improving the lipid profile and BMD.

This has lead to the development of a newer SERM, raloxifene. This medication, approved for the prevention and treatment of postmenopausal osteoporosis, does not stimulate the growth of breast or endometrial tissues, and in fact has been shown to decrease the risk of breast cancer. Raloxifene increases BMD, decreases the incidence of bone fracture, and reduces the blood serum level of atherogenic lipoproteins. However, this medication does not ameliorate the vasomotor symptoms associated with menopause and in fact increases them by about 3%. Use of raloxifene is also associated with an increased risk of thromboembolic events, but not to any greater than with standard HRT. In addition, the medication unlike HRT, does not improve mood and its effects on AD remain unknown. Newer agents with a full spectrum of positive and fewer if any of negative effects of previous SERMs and HRT, are under development[81-84].

EFFECTS OF HRT

Menopausal transition/ Menopause

Approximately 20% of women require HRT to alleviate the vasomotor symptoms. Estrogen diminishes these symptoms in a dose dependent fashion with higher doses required by those with a greater severity of symptoms. Similarly, HRT is frequently prescribed to reverse the effects of estrogen deprivation on the genitourinary tract, and its use successfully leads to resolution of the atrophic process, including vaginal dryness, recurrent urogenital infections and incontinence. HRT is also prescribed for some women with climacteric associated mood disorders[85,86]. The medication is very effective for this indication and works by raising the patient's level of serotonin, a CNS neurotransmitter whose paucity is known to be associated with dysphoria[87].

Cardiovascular disease

In recent years it has been shown that estrogen replacement therapy initiated at the onset of menopause reduces the risk of death by about 40% from myocardial infarction and stroke[88,89]. This occurs because estrogen reduces levels of total cholesterol, LDL cholesterol, lipoprotein(a) and fibrinogen and increases arterial vasodilation and levels of HDL cholesterol[90-94]. In animal models, estrogen has also been credited with inhibiting LDL oxidation, inhibiting cholesterol laden macrophage infiltration of arterial walls and inhibiting myointimal hyperplasia[95]. The addition of progestin enhances the ability of estrogen to reduce or halt of atherosclerosis because it is highly effective in reducing rates of LDL accumulation and degradation in blood vessels [96]. It should be noted however that two recent studies have demonstrated that short-term (3-4 years) administration of HRT (often not initiated for 10 or more years after menopause) does not halt the progression of atheromas in the coronary vessels or forestall a non-fatal myocardial infarct in postmenopausal women with pre-existing coronary artery disease[97-99]. Definitive clinical data relative to all aspects of HRT and heart disease awaits the results of the National Institutes of Health/Women's Health Initiative study that is currently evaluating the effects of HRT on the health of about 30,000 postmenopausal women.

Osteoporosis

HRT initiated at the menopause and continued indefinitely preserves and to a modest

extent augments bone mineral density by increasing osteoblastic activity[100-102]. The addition of progestin further enhances the bone-sparing effects of estrogen[103,104]. Concomitant with HRT, physicians are also likely to prescribe 1500 mg of calcium per day, load-bearing exercise and avoidance of smoking and other deleterious habits[105]. A recent clinical study has demonstrated that older postmenopausal women receiving HRT (estrogen and progestin) for 36 months gained 5% BMD in the spine and 1.7% in the hip[106]. One retrospective study has shown prevention of vertebral fractures with long-term use of estrogen, and a variety of epidemiological studies have indicated that estrogen reduces the risk of hip fracture by 50%[107,108]. The exact mechanism of action of estrogen on the skeleton has not been determined.

Alzheimer's Disease

Recent epidemiological evidence from case-control and prospective cohort studies suggests that long term administration of HRT reduces the relative risk of women developing AD by almost 55% when compared to those who have never used it[109]. HRT may also delay the onset of AD in those women who subsequently develop the disease and it decreases the pace of cognitive decline associated with the disease. These effects are elucidated by the results of in vivo and in vitro studies which have shown that estrogen inhibits the generation and accumulation of amyloid beta protein and protects neurons from hydrogen peroxide and glutamate, each of which has been implicated as a cause of AD. In addition estrogen promotes growth of cholinergic neurons, augments synaptic excitability in the hippocampal neurons, all of which are associated with enhanced learning, memory and attention. HRT has also been shown to increase cerebral blood flow to the hippocampus, parahippocampal gyrus and temporal lobe regions that form a memory circuit[110-113]. In addition, several small clinical trials have shown that short-term administration of HRT improves cognitive function (attention and verbal memory) in postmenopausal women with AD[114,115].

Dental disease

HRT has also been shown to promote oral health by inhibiting gingival inflammation, periodontitis, and the consequent loss of teeth. This probably occurs because estrogen supplementation inhibits pro-inflammatory cytokines (interleukin IL-1, tumor necrosing factor-alfa and IL-6) from mononuclear cells, T-cell mediated inflammation, and bone narrow production of leukocytes[116-118]. Thus, postmenopausal women with osteoporosis or osteopenia of the lumbar spine have been shown to be less likely to suffer tooth loss or need dentures if they are receiving HRT[119-123]. More recently, it has been shown that HRT reduces the extent of menopause-associated mandibular alveolar bone loss and in some instances promotes an increase in BMD in parallel with the dosage of hormone the woman is receiving[124,125]. HTR is also effective in ameliorating oral dysesthesias irrespective of whether the tissues appear atrophic, normal or erythematous[126].

HRT has however, been shown in a number of studies to be statistically related to development of dental disease, specifically temporomandibular disorders (TMD)[127,128]. In a recent major study, postmenopausal women receiving HRT at a large health maintenance organization were 30% more likely to be referred for evaluation and treatment of symptoms of TMD than those not receiving the medication. In addition, there was a dose-response relationship with individuals receiving the medication. In addition, there was a dose-response relationship with individuals receiving greater yearly doses of HRT suffering TMD to a greater extent than those on more modest doses[129]. While the results of these studies do not prove causality, the findings are consistent with the known pattern of this disease which has its onset after puberty and a lowered prevalence rate in the postmenopausal years.

CONCLUSIONS

An important number of women are postmenopausal and they will live on average another 25-30 years in this phase of life.

Therefore, dentists caring for this large number of patients need to be aware of both the systemic and dental diseases that prevail among this group of individuals as well as the stress that may be associated with this phase of their lives. Women not under care of a gynecologist should be referred to one for an evaluation as to the appropriateness of HRT for both its systemic and oral health benefits.

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