Annals of R.S.C.B., Vol. 24, Issue 1, 2020, pp. 403 - 409
Received 18April2020; accepted 23June2020

A Critical Reviewon Periodontal Therapy For Female Patients

Paarvathi Thenappan, Vijayalakshmi Rajaram, Jaideep Mahendra*, Ambalavanan Namasivayam, BurniceNalina Kumari

Meenakshi Ammal Dental College, Faculty of Dentistry, Meenakshi Academy of Higher Education and Research, Chennai, India

Higher Education and Research, Chennai, India.

drvijaya.perio@madch.edu.in

ABSTRACT

The sex hormones of women evolved in an unexpected way. As a result, the female body reacts in a number of ways to hormonal changes. As a result of these changes, they are more likely to acquire periodontal disease and show periodontal manifestation. Hormonal effects can be found in almost every type of biological tissue, indicating physiological and pathological alterations.Because gingival tissue contains oestrogen and progesterone receptors, it functions as a sex hormone target organ. Ovarian hormones have been demonstrated to increase the sensitivity to local irritants and induce gingival inflammation. Female sex hormones have an impact on the composition of sub-gingival bacterial plaques as well as a woman's immune system.Inadequate dental hygiene and hormonal imbalances prevalent in female patients at different periods of life boost the oral tissues' sensitivity to plaque and other local variables, aggravating the condition.

Keywords: periodontal disease, estrogen, progesterone, hormones

I.Introduction

Females' sex steroid levels rise and fall during their reproductive lives, which begin at menarche and finish with menopause. Despite the fact that sex steroids are chemically identical, their effects are vastly different. Several studies have connected gingival inflammation to female hormonal fluctuations.Scientists have studied the biochemical route that describes this unusual inflammatory disease over the years. Hormonal effects can show up in oral tissues before they show up in other regions of the body, and periodontal tissues can indicate the need for a change in treatment.[1]As a result, it is the clinician's responsibility to know, personalise, and adjust periodontal treatment based on the specific female and her stage of life.

II. Hormones and the types of hormones[2]

Hormones are specialised regulatory molecules that influence reproduction, development and growth, internal environment maintenance, and energy production, consumption, and storage. Physiological/pathological signs of hormonal changes can be seen in practically all types of tissue cells.

III. Hormone classification[3]

Amines, Glycoproteins, Polypeptides, and Steroids

IV. Female hormonal system[2]

Annals of R.S.C.B., Vol. 24, Issue 1, 2020, pp. 403 - 409
Received 18April2020; accepted 23June2020

Gonadotropin releasing hormone (GnRH), Follicle stimulating hormone (FSH) and luteinizing hormone (LH) and Estrogen and progesterone

V. Estrogen[2]

Estradiol is the most potent oestrogen and is produced by the testis, ovary, placenta, and other distant organs. The ovary secretes estrone, which is the primary source in both women and males. In peripheral tissues, they are converted to androstenedione by extragonadal conversion. Estriol is formed when estradiol and estrone are combined, and it is the most easily identifiable form in the urine.

VI. Progesterone[2]

It's made from pregnane-21, a carbon-saturated steroid. The predominant progestational hormone released into the bloodstream is progesterone. The corpus luteum and the placenta produce and secrete it.

VII. Androgen[2]

It is made up of androstane, a 19-carbon tetracyclic hydrocarbon nucleus. Testicular Leydig cells, ovarian thecal cells, and the adrenal cortex synthesise it. Only tissues that contain the enzyme 5-reductase transform testosterone to dihydrotestosterone enzymatically in males' target tissue cells.Androstenedione is the most common plasma androgen in women, and it can be released into the circulation or converted into testosterone or estradiol by the ovary.

VIII. Putative etiology of periodontal endocrinopathies[4]

The impact of sex steroids on bacteria's biology[4,5,1]

In bacterial anaerobic respiration, estradiol and progesterone replace vitamin K molecules as an electron transporter. Sex hormones increase the numbers of formate-producing bacteria (such as P. intermedia), which helps C. rectus, a formate metabolizer, proliferate.*Treponemadenticola, Porphyromonasgingivalis, Aggregatebacter actinomycetemcomitans,* and *Prevotellaintermedia* have all been shown to induce 5-reductase synthesis in human gingival fibroblasts, culminating in the formation of dihydroxytestosterone from testosterone. In the literature, however, there is no indication that testosterone metabolites contribute to bacterial proliferation and virulence.

Periodontal vasculature and the sex steroid hormones[4,5,1]

Oestrogen is the major sex steroid hormone that causes blood vessel alterations in women. The following are some of the hypothesised mechanisms by which oestrogen regulates blood vessel tone: changing sympathetic transmitter release or temperament, influencing alpha-adrenoceptor amount or sensitivity, inhibiting calcium ion transport via voltage sensitive calcium, Estrogens increase capillary permeability by triggering the release of a variety of mediators. The activation of the oestrogen receptor is responsible for nitric oxide-induced vasodilation, re-endothelialization, and angiogenesis, according to recent study.GCF levels in the gingival vasculature have been connected to the presence of female steroid hormones.

Annals of R.S.C.B., Vol. 24, Issue 1, 2020, pp. 403 - 409
Received 18April2020; accepted 23June2020

Progesterone, on the other hand, can have little or no effect on the vasculature. They've been shown to counteract estrogen's effects. (Magness&coworkers, 1992) &In males, testosterone induces a transient, temporary dilatation of the accessory sex organs' arterioles and venules.

Immune system and the sex steroid hormones[4,5,1]

Different autoimmune diseases such as systemic lupus erythematosus have a predilection for gender. Besides the 2007 study by Straub et al, the hormones were able to reduce cytokine and chemotaxis of PMNs by approximately 26.8%. The number of gingival epithelial cells during pregnancy has also been increased.

Oral epithelial cells and the sex steroids[4,5,1]

The fibroblasts, which are the predominant cells in a healthy periodontium, and the gingival epithelium's keratinocytes were found to be the main targets. Androgen and oestrogen have been proven to increase the functions of keratinocytes and fibroblasts, whereas progesterone has been shown to diminish them.

VIII. Stages of a woman's life[4,5,1]

Menopause, puberty, menstrual cycle, pregnancy, and menopause.

IX. Puberty [4,5,1]

In most girls, puberty begins between the ages of 11 and 14. During the reproductive phase, the production of sex hormones increases and then stays rather stable. In addition, the prevalence of gingivitis rises without an increase in plaque accumulation. Gram-negative anaerobes, particularly *Prevotellaintermedia*, have been linked to puberty gingivitis in the past.

Clinical features

Puberty-related gingivitis is marked by an increased sensitivity to local stimuli, as well as erythematous hyperplastic and lobulated gingival tissues. The gingiva may become retractable in chronic situations. Patients in this age category may also suffer from overeating and Perimylosis.

Management

Mild cases can be treated with non-surgical periodontal therapy and oral hygiene regimens, while extreme cases may require bacterial culture, antimicrobial therapy, and local medication delivery.

X. Menstrual cycle [4,5,1,2]

Annals of R.S.C.B., Vol. 24, Issue 1, 2020, pp. 403 - 409
Received 18April2020; accepted 23June2020

They are primarily divided into two phases:

Follicular Phase:

The follicular phase is the first and has been demonstrated to have a higher level of oestrogen.

Luteal Phase:

It's marked by an increase in both oestrogen and progesterone levels.

Clinical features

Increased bleeding on probing and an increased volume of GCF flow characterize the gingival tissues in menstrual cycle associated gingivitis. They may also cause changes in PMN chemotaxis in rare cases. A small percentage of patients may develop the "PRE-MENSTURAL SYNDROME," which is defined by physical and emotional abnormalities that occur during or before the menstrual cycle. Xerostomia and gastric regurgitation are also symptoms of this illness.

Management

Because patients may have increased gag reflex, hoarseness, coughing, and sore throat during the menstrual cycle, it is always best to schedule appointments afterward.

XI. Pregnancy [4,5,1,2,6]

The period during which a woman carries a foetus is known as pregnancy. Hormonal levels are maintained during pregnancy at the same levels as during the luteal phase. Weeks are divided into three trimesters: the first trimester (weeks 1–12), the second trimester (weeks 13–28), and the third trimester (weeks 29–40).

Pregnancy gingivitis

Erythema, edema, hyperplasia, and increased bleeding are all symptoms. The front area of the mouth is more frequently damaged, and interproximal sites are more frequently involved. In severe cases, transitory tooth movement was observed in addition to increasing pocket depths.

Pregnancy granuloma:

Its prevalence ranges from 0.2 to 9.6%. During the second or third trimester, it has been shown to be more common. Pregnancy granulomas are caused by a combination of progesterone's vascular response and estradiol's matrix stimulatory effects, which frequently occur at areas with pre-existing gingivitis. When traumatised, they bleed profusely, thus it's better to wait until after parturition to remove them, when their size has usually shrunk significantly.

Other oral manifestations of pregnancy

Perimylolysis, Xerostomia, Ptyalism or siallorrhoea

Annals of R.S.C.B., Vol. 24, Issue 1, 2020, pp. 403 - 409
Received 18April2020; accepted 23June2020

Dental management of pregnant patients

Only elective dental treatment should be given to pregnant patients during the first and third trimesters of pregnancy; no dental treatment should be given during the second trimester. During pregnancy, especially during the first trimester, no irradiation should be given. Any type of medication should only be taken during pregnancy if the severity of the problem being treated outweighs the risks. Tetracycline, vancomycin, and streptomycin are among the antibiotics that might cause tooth discoloration as well as ototoxic and nephrotoxic effects during the first 4 to 9 months of pregnancy; erythromycin, penicillin, and cephalosporins are safer, although any drug should be given after consultation with the obstetrician.

Chair position of pregnant women

Hypotension and hypoxia can both be caused by lying flat. As a result, arrange the patient in a left lateral position with her head above her feet.

Supine hypotension syndrome

After the fifth month of pregnancy, the uterus compresses the inferior vena cava, causing higher blood volume return to the heart, resulting in lower uterus perfusion and foetal hypoxia. It is possible to avoid this by raising the right hip 10-12 cm. The weight is taken off by the major vessels as a result of this.

Adverse pregnancy outcomes and periodontal disease[3]

If the birth weight is less than 2500g, it is called low, very low is 1500g, and extremely low is 1000g. *Offenbacher and colleagues* were the first to discover a relationship between poor mother periodontal health and poor pregnancy outcomes. Endotoxins produced by gram-negative bacterial infections induce the generation of cytokines and prostaglandins, which may be the biological relationship between periodontal infection and premature birth. Prostaglandins and some cytokines (interleukin-1β, interleukin-6, and tumour necrosis factor-α) have been shown to promote labour in appropriate amounts.

XII. Menopause[4,5,1,7]

The number of oocytes is steadily decreasing, with lower levels of oestrogen and progesterone and higher levels of luteinizing hormone and follicle stimulating hormones.

Oral manifestations

Oral mucosa thinning has been recorded, as well as oral pain, altered taste sensation, and xerostomia. Gingival recession, alveolar bone loss, and alveolar ridge resorption are all examples of periodontal alterations.

Management

Hormone replacement therapy is strongly recommended. Soft tissue augmentation will be used to treat gingival recession. Aside from that, the usage of ultra-thin teeth brushes and

dentrifices with low abrasive compounds should be promoted. Periodontal tissues should be closely monitored and maintained, and a physician should be consulted.

XIII. Oral contraceptives [4,5,1,8]

Contraceptives work by reducing the likelihood of ovulation and implantation by using synthetic gestational hormones (oestrogen and progesterone). Oral contraceptive users had higher levels of various coagulation factors in their blood, which are linked to oestrogen dosage. In the gingiva of hormonal contraception users, less dramatic but equivalent effects to pregnancy have been seen.

Oral manifestations

Mild oedema and erythema to severe inflammation with hyperplastic gingival tissues are all symptoms of inflammation. It has been noted that OC users had more exudate in their irritated gingival tissues.

Management

Patients should be advised about the oral and periodontal side effects of OCs, as well as the importance of meticulous home care and frequent periodontal maintenance, cleaning, and root planing at 6 month intervals.

XIV. Conclusion

As a result, the female body responds to internal hormonal changes in a variety of ways. Dental tissue reactions to plaque and other local causes are exaggerated in female patients at various periods of life due to poor oral hygiene and hormonal imbalances, aggravating the condition. Because treatment over recuperation is favoured, the right steps must be taken as soon as the patient's disease is detected.

References

1. Clinical periodontology, Carranza 10th edition
2. Text book of medical physiology, 11th edition. Guyton and hall.
3. Periodontal medicine. Rose, Genco, Mealey , Cohen
4. Purnima S. Kumar 2013. Sex and the subgingival microbiome: Do female sex steroids affect periodontal bacteria? Perio 2000 vol 61
5. Asha Prabhu et al 2014. Periodontal Therapy in Female Patients – A Review. Journal of Medical and Dental Science Research.
6. Gary C. Armitage 2013. Bi-directional relationship between pregnancy and periodontal disease. Perio 2000 vol 61
7. Marjorie K et al. Post-menopausal bone loss and its relationship to oral bone loss. Periodontology 2000, Vol. 23, 2000, 94–102.

8. Philip M. Preshaw 2013. Oral contraceptives and the periodontium. Perio 2000 vol 61.