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IMPACT OF YOGA ON PERIODONTAL HEALTH

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Abstract

Yoga is a form of physical therapy that involves a mind body connection with coordination of muscular activity and awareness of the self. Yoga has been proven to have a positive impact on stress, anxiety and other psychological disorders as well as an increase in the immunity. Stress is a known risk factor for periodontal diseases as it increases inflammatory destruction of supporting structures of the teeth. Periodontal diseases having a high global prevalence are a major public health concern. Thus, yoga apart from having a positive effect on oral health can also improve the lifestyle of the individual thereby protecting them from other systemic diseases. The purpose of this review is to evaluate the relationship between periodontal health and regular practice of yoga.

Keywords-periodontal health, yoga, stress, cortisol

Introduction

Periodontitis is the inflammatory disease of the supporting structures of the teeth resulting in resorption of alveolar bone and clinical attachment loss.¹ Periodontal diseases are one of the major diseases affecting the oral cavity and have a high prevalence rate. WHO data reports a prevalence rate of 19-32% of severe periodontitis in India.² The most common form of periodontal diseases is gingivitis which is the inflammation of gingiva without any alveolar bone resorption and clinical attachment loss. A systematic review and meta-analysis on prevalence of periodontal disease among adults in India reports a prevalence rate of 51% for periodontal disease and 46.6% for gingivitis. Mild to moderate periodontitis has a prevalence rate of 26.2% and severe periodontitis a rate of 19%. This suggests that the burden of periodontal disease is high in majority of individuals in India.²

Yogic practices are scientifically proven to improve the lifestyle of the individual and promote a healthy life.³ Yoga involves inculcating the right attitude and reconditioning of neuromuscular systems. Periodontal diseases are multifactorial in nature and the disease progression is affected by modifiable and non-modifiable risk factors. Yoga extends to all disciplines of life including lifestyle, food habits, personal habits and hygiene which has a direct and indirect effect on oral health. Yoga has a positive impact on some of these modifiable risk factors which is the hypothesis of how yoga influences periodontal and gingival health. These risk factors include microbiota or habitat of the gingival sulcus or periodontal pocket, habits such as tobacco chewing, stress, obesity and presence of systemic disease.⁴

Yoga- a way of life

Yoga is essentially a spiritual discipline that focuses on bringing coordination between the mind and the body. The word yoga is derived from the Sanskrit word 'yuj' meaning 'to join' or 'to yoke' or 'to unite'.⁵ The science of yoga has been reported to originate thousands of years ago long before the first religion or belief systems were born. Historical evidence of yogic existence were seen in the pre-vedic period dating back to 2700 B.C. Yogic literature has been observed in the Vedas, Upanishads, Smritis, teachings of Buddhism, Jainism, Panini, Epics, Puranas etc. Patanjali who has gathered the information related to yoga from these various scriptures into what he called as "yoga sutras of Patanjali". He has described 8 limbs of yoga in his scriptures that includes 1. yama (social behaviour) 2. Niyama (inner discipline) 3. Asana (yoga postures) 4. Pranayama (control of breath) 5. pratyahara (control over human sense) 6. Dharana (concentration) 7. Dhyana (meditation) and 8. Samadhi (bliss).⁵

Stress, periodontal disease and yoga

Stress, which is a psychological response of an individual to a perceived challenge or threat, is directly correlated to increased incidence of periodontal disease.⁶ Although dental plaque is considered as the primary etiological factor for the causation of periodontal disease, other factors like stress, smoking, genetic factors, presence of systemic disease etc can have an impact on the progression of periodontal disease.

Stress pathway affects two major systems- the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system. A stressful event leads to stimulation of the HPA axis through the hypothalamus which leads to the secretion of corticotrophin releasing hormone and vasopressin which in turn lead to secretion of adrenocorticotrophic hormone by the pituitary gland. When the autonomic nervous system gets activated because of stress, there is secretion of catecholamine (adrenaline/nor adrenaline) and chromogranin A. This affects the immune system resulting in reduced effectiveness of the response and release of cytokines.⁷

Effect of yoga on risk factors for periodontal disease⁴

Oral hygiene and host defense

The first limb of Ashtanga yoga is niyama i.e. saucha standing for individual ethics on external and internal cleanliness. This includes oral hygiene measures which prevent the formation of dental plaque which is considered as the primary etiological factor for initiation of gingival inflammation. Yoga sessions have reported to increase the levels of antimicrobial peptide in the saliva of patients and also salivary flow rate increase, thus contributing to the defense mechanism of the gingiva. A decrease in the inflammatory markers such as IL-6, IL-8, TNF and CRP has been reported to decrease substantially after sessions of yoga, pranayama and meditation. A change in genetic expression of apoptotic function of gingival cells was observed.

Smoking

Smoking is one of the environmental risk factors identified to increase the susceptibility to periodontal disease. The gingiva in smokers shows certain changes such as reduced blood flow and reduced clinical signs of inflammation. Immune system changes such as reduced neutrophil, t-lymphocyte and macrophage function, reduce lymphocyte proliferation, increase in neutrophil collagenases and elastases, altered fibroblast attachment and function. Along with these changes, there are inflammatory changes such as increased levels of cytokines, matrix metalloproteinases and interleukins, altered RANKL/OPG ratio. These changes make the individual more prone to develop periodontal disease and increase the severity of existing periodontal disease. Yoga and meditative therapy improves cognitive control reducing the response to smoking cues and nicotine withdrawal. This improves the quality of life as the individuals start respecting their own bodies.

Systemic diseases

Yoga leads to reduction in blood pressure, maintaining a balanced lipid profile thereby reducing the chances of hypertension and other cardiovascular disorders. Yoga also shows a positive change in diabetic patients by increasing the sensitivity of B cells of pancreas to glucose signalling.

Obesity

Body mass index (BMI) ≥ 30 kg/m² is manifested as excessive deposition of fat in the adipose tissue. The fat deposition leads to oxidative stress leading to increased secretion of pro-inflammatory cytokines such as IL-1, IL-6 and TNF- α enhancing the susceptibility to periodontitis and other systemic diseases. Obesity is also recognized as a risk factor for periodontal disease. Studies have shown that yoga along with certain diet restrictions leads to weight reduction with effective reductions in BMI and cholesterol levels. The levels of inflammation are also reduced in the body with yoga as evidenced by the levels of inflammatory markers such as C-reactive protein.

Osteoporosis

It is characterised by decreased bone mineral density (BMD) involving the mandible and maxilla leading to crestal alveolar bone loss. This is caused by stoppage of estrogen secretion. Hormone replacement therapy (HRT) carries the risk of uterine cancer, breast cancer and cardiovascular disease with it. Yoga asanas cause tensile, compressive and isometric forces on the bone which leads to activation of osteocytes leading to bone formation. This has been observed by dual energy x-ray absorptiometric scans showing raised BMD in femur and spine of osteoporotic patients reversing the bone loss to some extent. Yoga also causes opposition of one group of muscles against another which physically stimulates the osteoblasts to form new bone.

Evidence in periodontal literature

Pandey et al 2021 conducted a study to assess the effect of yoga on the quality of life of dental professionals. It was found that integrating yoga in daily curriculum does enhance the quality of life of oral healthcare professionals in the current COVID 19 Pandemic.⁸

Kalburgi V et al 2021 conducted a meta-analysis and systematic review on the effect of yoga on periodontal health and they concluded that yoga, an ancient practice, has a favourable impact on human body in stress control, henceforth maintaining the periodontal health.⁹

Rajhans N et al 2018 conducted a study to assess the effects of yoga on psychological stress, serum cortisol level and periodontal diseases in adult Indian population. Results of the study suggested that yoga plays an important role in the reduction of stress, serum cortisol level and severity of periodontal disease. It can improve treatment outcomes of periodontal disease and can be added in the line of treatment.¹⁰

Sudhanshu A et al 2016 conducted a study to understand and analyze the possibilities of employing yogic practices in the treatment of periodontal disease along with conventional dental therapy, (2) to understand the effect of stress on periodontal treatment outcome, (3) to evaluate the efficacy of yoga in the management of periodontal disease with reference to stress. The author concluded that although yoga does not play a direct role in improving periodontal disease, it accelerates the treatment outcomes by combating the stress which is a major factor affecting the treatment of periodontal disease.¹¹

Shankarapillai R et al 2012 conducted a study to assess the efficacy of yoga in reducing the state trait anxiety of dental students before their first periodontal surgery performance. This study concluded that Yogic breathing has a significant effect on the reduction of state trait anxiety level of dental students.¹²

Woodyard C et al 2011 assessed the findings of certain selected articles regarding the therapeutic effects of yoga and to provide a comprehensive review of the benefits of regular yoga practice. Results from this study show that yogic practices enhance muscular strength and body flexibility, promote and improve respiratory and cardiovascular function, promote recovery from and treatment of addiction, reduce stress, anxiety, depression, and chronic pain, improve sleep patterns, and enhance overall well-being and quality of life.¹³

Parshad O et al 2004 concluded that physiological benefits which follow, help yoga practitioners become more resilient to stressful conditions and reduce a variety of important risk factors for various diseases.¹⁴

Conclusion

Although the research work on the practice of yoga and periodontal health is very minimal, yoga can still be considered as a tool to improve the oral health of individuals due to its effects on all the systems of the body such as immune system and nervous system. The risk factors for periodontal disease can be modified with yogic techniques which will indirectly lower the risk of periodontal disease development of the individual. The effects of yoga on stress are well known and are scientifically established. Thus, periodontists can utilize the benefits of yoga to improve the quality of life of their patients.

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