

Effects of emotional stress on dental health research proposal

[Health & Medicine](#), [Stress](#)



Abstract

Stress is a dynamic and interactional process involving intricate body systems with formulations and operationalisation of the components at different levels(1). There is growing evidence that there is a positive correlation between emotional stress and oral health. As will be demonstrated from the literature reviewed in this paper emotional stress can be implicated in oral problems such as ulcerative conditions, inflammatory conditions, dental decay, TMD, RAS and others that continue to be linked to stress. Stress has also been found to aggravate some oral conditions such as oral lichen planus. In some of these conditions the precise mechanisms by which stress causes or aggravates them is not clear though definite association has been demonstrated.

However in most conditions stress modifies the local immunological responses, the microbial flora or results in behavioural choices such as excess alcohol consumption, tobacco taking and unhygienic practices that have been implicated in these conditions. Despite the plethora of research on this subject the association of stress and oral health is fairly ignored and very few people are aware of this association because it is not as publicized as the other conditions associated with stress It is therefore important evaluate the effects of emotional stress on dental health and to educate the population on the same particularly because of the impact of the oral disorders on the quality of life. This paper will explore the various oral disoreders that have strongly been associated with stress. The paper shall

comprise of a review, though not exhaustive, of the available literature on the subject attempting (where possible) to assess the mechanisms involved.

Introduction

Background Information

Stress is a naturally occurring phenomenon in the modern society due to the pressures of life. Stress is an interaction of psychological and physiological reactions of an individual encountering changes or demands that are difficult to handle. The demands of life accompanied by very little control or ability to meet those demand conspire to affect the mental state of an individual resulting in such effects as anxiety, depression, panic attacks, lack of sleep associated with irritability and stress. Several factors contribute to stress in the modern society and they include, solitary careers, strife for perfection, economic pressure, career pressure, personality complexes and time pressure(2). It has been established that most if not all people experience different forms and different levels of stress at some point occasioned by internal or/and external factors. From a biological view point stress, though the negative effects are over emphasized, can be a neutral, negative or positive experience. It is important to note that our bodies respond differently to stress and a lot of research has been carried out to establish the pathological responses to stress. The behavioural changes and hormonal modifications induced by stress explain the relationship between stress and disease. Of particular interest to this research paper are the effects of emotional stress on oral health.

A plethora of research has established that there is a significant link between emotional stress and oral health hence implicating anxiety and depression for development of certain oral disorders. Some of the most important oral conditions that have been associated with dental emotional health are bruxism (tooth grinding which may culminate into teeth damage, jaw or facial pain and headaches), canker sores also called aphthous ulcers, dry mouth, burning mouth syndrome, Lichen planus and temporomandibular joint disorders (TMJ). In addition emotional stress has been implicated in contributing to susceptibility to various infections including gum infections (periodontitis)(3). The oral health of individuals with emotional stress is also affected by the fact that they tend to ignore personal hygiene and engage in destructive activities such as smoking and excessive alcohol consumption. Pharmacological studies have also established that some of the drugs administered to treat depression cause dryness of the mouth. Finally in patients with some of the above mentioned oral conditions stress has been shown to cause relapse after treatment.

Research objective

The aim of this study is to assess the influence of the emotional stress on dental health

Justification

All people encounter different forms and levels of stress in life. Stress can be subtle and not easy to identify but often stress manifests as anxiety disorders, depression, panic attacks and lack of sleep culminating in irritability and grogginess. Emotional stress has been recognized as a risk

factor in the aetiology and pathogenesis of several diseases. Chronic inflammatory disorders such as rheumatoid arthritis, multiple sclerosis, psoriasis and inflammatory bowel disease are some of the conditions initiated and exacerbated by emotional stress. A lot of attention has been given to these conditions and the cardiovascular effects of stress. However the association of stress and oral health is fairly ignored and very few people are aware of this association because it is not as publicized as the other conditions associated with stress. Unfortunately the mouth has as much of a probability of being affected by stress as any other part of the bodies and the mind. It is therefore important evaluate the effects of emotional stress on dental health and to educate the population on the same.

Literature Review

Stress is a dynamic and interactional process involving intricate body systems with formulations and operationalisation of the components at different levels(1). Currently stress is defined as physiological and metabolic perturbations brought about by various aggressive agents and the psycho-physiological response of an organism facing challenges or a threat or a perception of the same(1). Several factors contribute to stress in the modern society and they include, solitary careers, strife for perfection, economic pressure, career pressure, personality complexes and time pressure(2). Emotional stress has been recognized as a risk factor in the aetiology and pathogenesis of several diseases.

Emotional stress has been implicated for negatively affecting the immune system and behaviour the two main means by which stress has been shown

to affect health. Research on the effect of stress on mice demonstrated that stress affects the immune system by reducing the tumour necrosis factor and modifying leucocytes responses(4). Similarly human studies have shown that stressful events can affect immune response(5). Research has demonstrated that there is an intricate interaction of psychology, neurology, immunology and endocrinology emphasizing the significance of psychological and physiological vulnerability to face stress(6). As early research by Ringsdorf and Cheraskin (1969) found that mental stress has an impact on lifestyle choice and dental hygiene habits. They showed that stress increases alcohol consumption and tobacco use as well as food habits, findings that have been confirmed by a recent research(7). Therefore there is evidence that stress affects health mainly by influencing the immune system and behavioural choices. Current research indicates that emotional stress is a risk factor in the aetiology and pathogenesis of several diseases as explored in the subsequent sections.

Stress and recurrent aphthous stomatitis

Recurrent aphthous stomatitis (RAS) is the commonest ulcerative disease of the oral mucosa that is associated with painful ulcers (McCullough, Abdel-Hafeth, & Scully, 2007). Albeit its world wide occurrence and the extensive amount of research devoted to the disorder the aetiology of the RAS remains unclear. However multiple factors including nutritional, genetic, infectious and psychological factors have been associated with the condition(8). The disorder contributes to poor quality of life yet the available therapy is inadequate. As earlier stated psychological factors, including stress, have

been associated with exacerbation of RAS. Psychological factors have an effect on the immune system and this effect could be implicated for the disorder(9).

Stress and Temporomandibular disorders

Temporomandibular disorder is a term that collectively describes several clinical syndromes involving the masticatory muscles and/or the temporomandibular joint(10). Symptomatically the condition is associated facial pain resulting from multiple factors including sleep bruxism and other risk factors associated with psychological status. Stress has been associated with TMD with some studies indicating that 50-75% of the TMD patients experienced stressful conditions prior to the onset of the TMD symptoms(11). Research has also implicate increased masticatory muscle activity, leading particularly prolonged and increased muscle tension, associated tor stress for the causation of TMD(12). There are also indications that stress exacerbates sleep bruxism and/or daytime clenching(13). Patients with TMD could benefit from psychotherapy as part of multidisciplinary pain management approach(14).

Stress appears to activate various physiological responses involving the nervous system (both central and peripheral NS). Activation of the sympathetic nerves and release of epinephrine at the sympathetic terminals by stress and anxiety enhances acetylcholine activity at the motor endplate and triggers a cascade of events culminating in decreased threshold at muscle nociceptors and pain(10). There is evidence that psychological factors and physiological responses contribute to the pain but as to whether

they actually cause TMD it is not known. However there are indications that some patients suffering from TMD are more anxious than can be explained by asymptomatic controls.

Stress and orthodontics treatment

A recent study showed that orthodontic tooth movement alone can evoke emotional stress and emotional stress results in increased cellular cementum resorption and particularly to decreased tooth movement(15). This study also demonstrated that progressive chronic emotional and physical stress leads to significant morphological changes in oral dental tissues in rats. The researchers therefore concluded that chronic stress can lead to periodontal pathology, exacerbate the exhaustion of protective immune responses, impair the functioning of the masticatory muscles and affect the growth and development of the dentomaxillomandibular system. The severity of these effects positively correlates with the strength of the stressor and negatively with the tolerance of the individual test animal. Psychological stress influences various immune functions in various ways.

Stress and dental Caries

Dental caries also called dental decay is a preventable infectious disease characterised by erosion of the mineral tissues of teeth caused by organic acids produced by bacterial fermentation of dietary carbohydrates ((16)). It has been rated the most common childhood chronic disease affecting up to 40-50% of British and USA children(17) and 60-90% children in the world in the age bracket of 2 to 11 years(18).

Early childhood caries (ECC) is associated with an interaction of multiple factors including psychological, biological and behavioural factors. Though the association between this condition and stress remain amorphous studies have been conducted to establish the link. One such study investigated psychological stress as a risk factor in the aetiology of ECC by determining and comparing the salivary cortisol levels as a response to stress related events in children with ECC and those without. The study also compared the adaptability of children with ECC and those without to different dental procedures(19).

Research indicates that psychological and biological factors seem to interact in two distinct and interactive ways to influence dental decay. Children from lower SES families appeared to acquire higher levels of cariogenic oral bacterial than their peers from higher SES families. This indicated a strong correlation between SES and counts of Lactobacilli (LB) and oral mutans streptococci (MS) which were therefore implicated for mediating the SES-caries association. Secondly cortisol reactivity to stress and higher production of salivary cortisol undermines local defences and protective microanatomical structures thus compromising dental health. The presence of cariogenic bacteria as well as elevated basal HPA activation was linked to dentition while increased cortisol reactivity was associated with changes in the physical characteristics of dental enamel. The association of cortisol and bacteria with caries agrees with earlier findings that chronic stress can affect sIgA (secretory IgA) secretion(20), that cortisol can affect local mucosal immunity and oral microflora, and that the compromising of the mucosal

immunity encourages bacterial colonization and growth (21). It is important to note that sIgA plays a vital role in regulating the oral microflora and that gluco-corticoids suppress the immune responses through such mechanisms as reducing lymphocytes in circulation, inhibiting the aggregation of immune cells, reducing chemotaxis and degranulation and reducing production of cytokines such as IL-1, IL-2, interferon gamma and tumour necrosis factor. These reports lead to the conclusion that socioeconomic categorization of ECC is a culmination of stress related elevation of cortisol production and the increase in the population of cariogenic bacteria(22).

Stress and Oral lichen planus

Oral lichen planus is a condition that involves the inflammation of the oral mucosa and is characterized by red swollen tissues, open sores and white lacy patches(23). It begins as a small raised swelling that progressively turns into white lacy patches that eventually spread through out the mouth. It is also accompanied by moth pain, sores and blisters, a burning sensation in the mouth, a feeling of rough texture in the mouth and sore gums. The patient may also bleed when brushing his/her teeth and have a metallic taste in the mouth(24).

The precise aetiology of oral lichen planus remains unknown but it seems to be an autoimmune response in which the immune system attacks the oral epithelial cells leading to necrosis. In most cases it occurs unexpectedly thus referred to as idiopathic oral lichen planus. It may also occur due to certain drugs, mechanical trauma, viral infection and contact with allergens. The exact association of oral lichen planus with stress has not been identified

because unlike other stress related oral disorders that have been shown to be caused by suppression of the immune system by stress oral lichen planus is associated with an over reactive immune system. However there is overwhelming evidence that psychological stress exacerbates oral lichen planus by unknown mechanisms(25). Periodontitis, inflammation of the tissues supporting the teeth, is another inflammatory disorder that has been associated with stress. Unlike oral lichen planus, the cause of periodontitis is well known. Periodontitis is caused infectious bacteria. Research indicate that stress modify the microbial flora of the mouth as well as the local immunity thus leading to periodontitis(3).

Conclusion

There is growing evidence that there is a positive correlation between emotional stress and oral health. As has been demonstrated from the literature reviewed in this paper emotional stress can be implicated in oral problems such as ulcerative conditions, inflammatory conditions, dental decay, TMD, RAS and others that continue to be linked to stress. Stress has also been found to aggravate some oral conditions such as oral lichen planus. In some of these conditions the precise mechanisms by which stress causes or aggravates them is not clear though definite association has been demonstrated. However in most conditions stress modifies the local immunological responses, the microbial flora or results in behavioural choices such as excess alcohol consumption, tobacco taking and unhygienic practices that have been implicated in these conditions. It is therefore

advisable to reduce stressful encounters as much as possible and to manage stress effectively.

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