Chapter 1

INTRODUCTION

Chronic periodontitis is a complex disease which is chiefly caused by Dental plaque, which as a biofilm that harbors variety of periodontal pathogens\(^1\). This is a commonest cause of tooth loss in adults due to damage of periodontal ligament and the alveolar bone\(^2\). The development of periodontitis and its progression varies from person to person and depends on modifiable and non-modifiable risk factors. The modifiable risk factors include the environmental or behavioral factors whereas the non-modifiable risk factors are intrinsic to the individual and therefore they are very difficult to be changed. Non-modifiable risk factors are also known as determinants. Habits like smoking, diseases like diabetes mellitus and psychological factors are considered as modifiable risk factors\(^3\). Some of the non-modifiable risk factors are genetic factors, host response, and osteoporosis.

Anxiety and depression are common disorders which are commonly diagnosed in the practice of psychiatry\(^4,5\).

**Depressive disorders** are characterized by sadness, loss of interest or pleasure, feelings of guilt or low self–worth, disturbed sleep or appetite, feelings of tiredness, and poor concentration. Depression can be long lasting or recurrent, substantially impairing an individual’s ability to function at work or school or cope with daily life. In its most severe form it can lead to suicide. It has two sub–categories:

- **Major depressive disorder/ depressive episode:** it involves symptoms of depressed mood, loss of interest and enjoyment, and decreased energy: depending on the episodes and severity of symptoms, it can be classified as mild, moderate, or severe.

- **Dysthymia:** this is persistent or chronic form of mild depression and its symptoms are similar to depressive episode, but they are less intense and last longer.

Manic episodes may be also seen in depressed patients. Bipolar affective disorder typically consists of both manic and depressive episodes separated by periods of normal mood. Such patients have not been included in this study.
Anxiety disorders include a group of mental disorders which are characterized by feelings of anxiety and fear including generalized anxiety disorder, panic disorder, social anxiety disorder, obsessive compulsive disorder (OCD) etc. The symptoms of anxiety disorder can also range mild to severe. However, the duration of symptoms experienced in patients with anxiety disorders makes it a chronic disorder rather than episodic one.\textsuperscript{6}

Dental consequences of depression are high and are usually associated with chronic facial pain and bruxism\textsuperscript{7}. There are many studies which describe the causal relationship between the periodontitis and the depression\textsuperscript{8,9,10}. Oral hygiene has been shown to be affected in variety of psychiatric illnesses, especially in depression in which decreased energy, negative views about the life and poor motivation are important factor for maintenance of oral hygiene and they become very important for compliance and outcome of the treatment also\textsuperscript{11,12}. In fact, the psychological factors are important not only for surgical outcome but also for post-operative recovery\textsuperscript{13}. The depressed patient usually have little interest or energy for their basic self-care and day to day activities. Therefore, maintenance of dental health in a depressed patient becomes a complex issue. In a depressed patients the physiological and biological mechanisms are also affected, so the dental health also.

The biological mechanism involves the process by which stress and depression reduce immune system function and facilitate chronic inflammation. These effects are results of mediation through the hypothalamic-pituitary-adrenal axis and the release of cortisol, a glucocorticoaid, which is capable of reducing immuno-competence by inhibiting IgA and IgG and neutrophil function. This leads to increased microbial contents which are loaded with various types of pathologic bacteria and reduced ability to prevent connective tissue invasion. Additionally, after long periods of elevation of cortisol, it loses its ability to inhibit inflammatory responses which are basically initiated by immune reactions and leads to sustained inflammatory destruction within the periodontium. The behavioral mechanism highlights that the people suffering from stress and depression may become ignorant to routine health care and adapt poor health behaviors such as smoking or excessive drinking etc. Recent studies have confirmed positive correlations between depression or stress and periodontal disease by demonstrating a strong linkage between depression and elevated cortisol level, attachment loss, neglect of oral hygiene and periodontal pocket
depth/tooth loss which results due to frequently consuming an unhealthy diet and neglecting their oral hygiene. This leads to increased oral biofilm burden and poor resistance of the periodontium for inflammatory breakdown.

Davis and Jenkins (1962) attempted to determine the correlation between psychological measures of stress and periodontal disease in the human. They found that individuals with high stress levels and depression had tendency to adopt those habits, which were harmful to periodontal health, such as smoking and alcohol consumption, disruption of sleep patterns, neglecting oral hygiene and poor fulfillment, bruxism or teeth grinding and nail biting. The possible mechanisms presented for influence of stress and psycho-social factors on periodontal conditions is the modification of patient’s health behavior. Besides all these factors there is a tendency for too much consumption of oily nutrients due to mental depression, which may cause increased circulating cortisol level leading to suppression of the immune system and thereby progression of periodontitis.

**Origin of research problem: The focused question**

Although the effects of depression on periodontal tissue are damaging but it would be of interest if antidepressants improve the periodontal health of the patients with recovery of the psychotic illness. On the basis of positive benefits of these drugs on mood and behavior of the patient we propose a null hypothesis that antidepressants contribute in the improvement of periodontal health with the recovery of the disease.

This hypothesis is based on the fact that depressed patients neglect oral hygiene and professional regular dental care due to reduced motivation and interest and the major contributing factor is considered to be the medications which are prescribed to overcome the depression.

Thus the focused question to be addressed in this study is that do medications which are prescribed to overcome the depression contribute to better oral hygiene with the recovery disease?

Answering this question, would enable to reform our understanding of the mechanisms underlying depression and drug action related to periodontium.
REFERENCES:


ANTIDEPRESSANT MEDICATIONS AND ORAL PROBLEMS

Inside the central nervous system, the performance and activity of neurons is chiefly predicated on the basis of activity of neurotransmitters acetylcholine and norepinephrine, and many more neurotransmitters. Their precise functions are not well known but at least this is clear that neuron-to-neuron synapses are of two types—the excitatory, and inhibitory\(^1\). For normal functioning of central nervous system this is necessary that balance between these determinants exist. Further, if a neurotransmitter can inhibit the neuronal activity in one area of the brain, the same can excite them in other area. The mechanism involved in this process is that the neurotransmitters bind to and activate a specific class of receptor and sub-receptors. Like receptors, many sub-types of receptors are also found. There are about 14 sub-types of receptors which are well distributed throughout the various brain areas\(^2\). When they are activated by the same neurotransmitter, one sub-type causes excitation and the other one sub-type produces inhibition.

The limbic system of the brain is responsible for supporting many functions, e.g: emotions, behavior, long term memory and the motivational drive. The most of the vegetative functions are taken up by hypothalamus. Thus it controls the functions like anger, thirst, hunger etc. and is considered as a central component of this system. Some other parts of the brain like thalamus, cortex, basal ganglia are responsible for integration of emotional state with many motor and visceral activities.

The biochemical derangement within the limbic system is considered to take place in psychiatric illness. Depression is usually result of deficient levels of dopamine in the brain and it is characterized by a low energy demotivated state. This is in contrast to the intensely painful character of serotonin deficient depression (SDD). These observations are based on established pharmacological action of various anti-depressants and overall reflect our current knowledge in comprehending psychiatric illnesses.

There are many psychotropic drugs which are used in psychiatry practice and they include sedative-anxiolytics, antipsychotics, antidepressants, and the antimanic agents. These drugs have been shown to act by altering the activity of neurotransmitter, even then it is difficult to explain the mechanism of psychiatric illness only on the basis of