



Journal Homepage: -[www.journalijar.com](http://www.journalijar.com)  
**INTERNATIONAL JOURNAL OF  
 ADVANCED RESEARCH (IJAR)**

Article DOI:10.21474/IJAR01/6688  
 DOI URL: <http://dx.doi.org/10.21474/IJAR01/6688>



### RESEARCH ARTICLE

#### THE PERIODONTAL DISEASE AND ITS RELATIONSHIP WITH PSYCHONEUROIMMUNOLOGY - A LITERATURE REVIEW.

Jaqueline Alves do Nascimento<sup>1</sup>, Severino Alexandre Barbosa da Silva<sup>1</sup>, Janykelle Gonçalves de Lima<sup>1</sup>, Meirilândia Ribeiro da Costa<sup>2</sup>, Rayanne Maria Melo de Matos<sup>2</sup>, Jefferson David Melo de Matos<sup>3</sup>, Jozely Francisca Mello Lima<sup>4</sup>, Daniel Sartorelli Marques de Castro<sup>5</sup> and John Eversong Lucena de Vasconcelos<sup>6</sup>.

1. School of Dentistry, Centro Universitário UNILEÃO, Juazeiro do Norte – CE, Brazil.
2. Graduated in Dentistry, Centro Universitário UNILEÃO, Juazeiro do Norte – CE, Brazil.
3. Post Graduate Student - Masters Degree Program, Department of Prosthodontics Department, Universidade Estadual Paulista Júlio de Mesquita Filho UNESP, São José dos Campos - SP, Brazil.
4. Professor of Dental Prosthetics, Department of Dentistry, Faculdade Paulo Picanço, Fortaleza – CE, Brazil.
5. Professor of Dental Prosthetics, Department of Dentistry, Centro Universitário Christus - UNICHRISTUS, Fortaleza – CE, Brazil.
6. Professor of Oral Implantology, Department of Dentistry, Centro Cariense de Pós-Graduação CECAP, Juazeiro do Norte – CE, Brazil.

#### Manuscript Info

##### Manuscript History

Received: 07 January 2018  
 Final Accepted: 09 February 2018  
 Published: March 2018

##### Keywords:-

Periodontal Diseases, Dental Stress Analysis, Psychoneuroimmunology, Emotion.

#### Abstract

**Aim:** This work aims to show the relationship of periodontal disease with emotional and mental factors, with stress, personality and behavior and how these factors interfere in the body's response to this disease. **Methodology:** It used the main databases: PUBMED, ScIELO, Google Scholar, Researchgate, with the following descriptors: Periodontal Disease, Dental Stress Analysis, Psiconeuroimunology, Emotion. **Results:** It was verified that emotional stress, personality, behavior and depression made possible a decrease in the production of immunoglobulin-A (IgA), alteration in the synthesis of cortisol and other glucocorticoids, which would make the individual more susceptible to a tissue destruction by substrates of bacterial order, and impaired immune system. **Conclusion:** Emotional and mental disorders, personality, behavior and depression are risk factors for the progression and installation of periodontal disease; since, once there are alterations in hormone synthesis, vascular alteration, bone metabolism with local factors associated with disease, the individual will be predisposed to it.

Copy Right, IJAR, 2018,. All rights reserved.

#### Introduction:-

Periodontal disease increasingly plagues the world's population. Emotional and mental disorders, alterations of genetic orders interconnected with secretions of hormones and neurotransmitters can provoke a physiological imbalance or in the homeostasis of the individual. Currently, studies indicate that stress, depression, behavior and personality of the individual and the negative effects of life have influence in periodontal disease by altering functions of the immune system response<sup>1</sup>.

**Corresponding Author:- Jaqueline Alves do Nascimento.**

Address:- School of Dentistry, Centro Universitário UNILEÃO, Juazeiro do Norte – CE, Brazil.

Psychoneuroimmunology is a scientific field that studies the relation of the immune systems interconnected to the nervous system, to the behavior and the personality, and of how these alterations affect the illnesses and the health of the individual. That is, the functionality of immunocompetence (both NK, macrophages, neutrophils, dendritic cells and complement system) and acquired immune system (lymphocytes and antibodies) is reduced by psychosocial stressors linked to emotional and mental state, intensity and frequency of stress, the quality of the relationships and the personal interrelations and personality of the individual, being able to cause pathogenic infections and lead to tissue destruction of the periodontium<sup>2</sup>.

The reactions of stress and behavior in the brain responses gain more and more space in the contemporaneity, since the challenges and life events impacting on the health of the individual assume a position of interpretation by the individual himself and how he creates strategies of stress modulation, reduced modulation of the immune response, controlled by the Central Nervous System, the release of hormones, such as cortisol, and behavioral change<sup>3</sup>.

“When habitual modes of resistance” are overcome by external and internal factors somatization occurs by the individual, who in turn will have avenues of expression in the behavior, character, functionality of the organism by inactivation of the immune system, being propitious to the appearance of physical illness<sup>4</sup>.

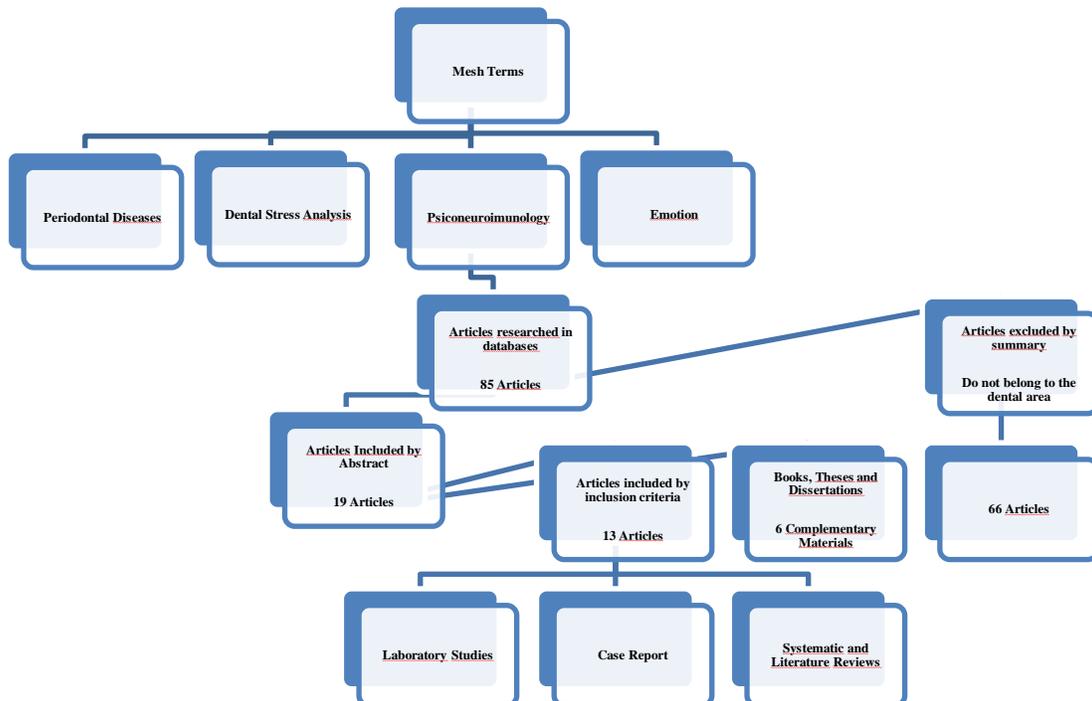
There is evidence that introverted subjects are more likely to have periodontal disease and subjects with a tendency toward discouragement, pessimistic style, those who repress or deny the emotions have a considerably less effective immune response, individuals who are with high levels of cortisol in saliva tend to have impaired bone loss due to inhibition of type 1 collagen synthesis by cortisol<sup>5</sup>.

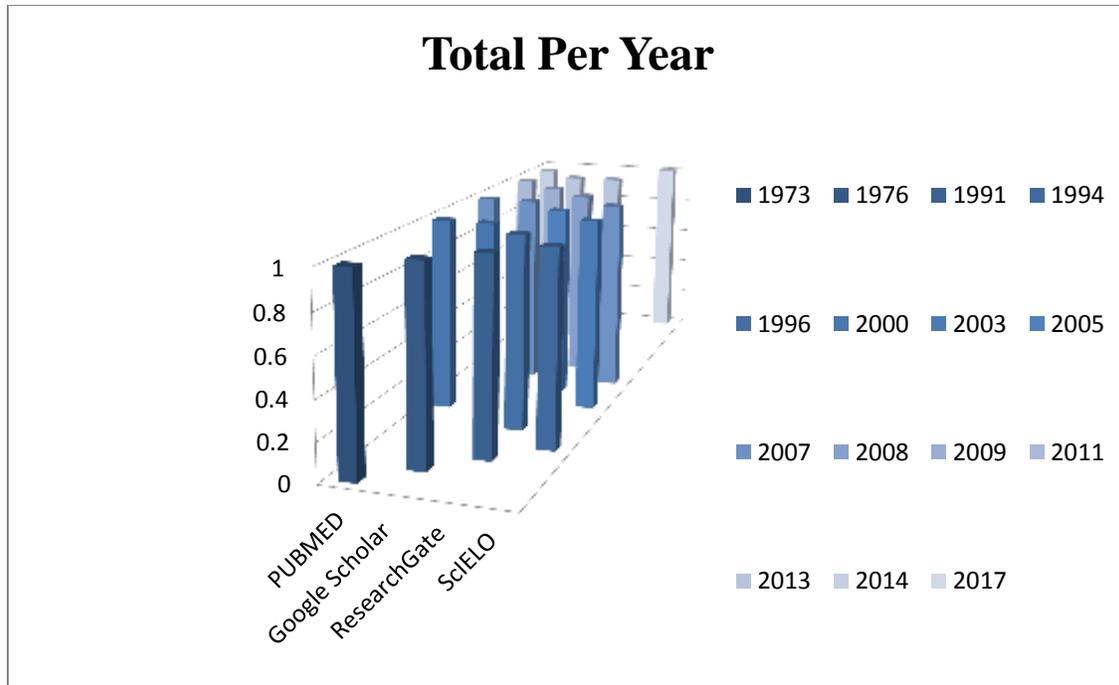
This work of literature review aims to show the relationship of periodontal disease with emotional and mental, behavioral, personality and stress factors and how these factors interfere in the body's response to the disease.

**Methodology:-**

It used the main databases PUBMED ([www.pubmed.gov](http://www.pubmed.gov)); ScIELO ([www.scielo.org](http://www.scielo.org)) , Google Scholar ([www.scholar.google.com.br](http://www.scholar.google.com.br)) , ResearchGate ([www.researchgate.net](http://www.researchgate.net)) no período de 1973 a 2018. with the following descriptors: Periodontal Disease, Dental Stress Analysis, Psiconeuroimmunology, Emotion. We selected 19 articles that fit into the inclusion criteria: Systematic reviews, literature review, clinical case, articles that address the study variables (FLOWCHART.1 and GRAPH.1).

**lowchart. 1:-** Flowchart of the criterion of inclusion of articles.





**Graph 1:-** Cumulative Graph.

### Results:-

It was verified that periodontal disease increased considerably in this contemporaneity due to elevation of life expectancy, as well as emotional and mental disorders, alterations of genetic orders interconnected with secretions of hormones and neurotransmitters, with stress, depression, behavior and (NK, macrophages, neutrophils, dendritic cells and complement system) and acquired (lymphocytes and antibodies), altering the establishment and progression of the disease periodontal<sup>6</sup>.

The human body is formed largely by collagen type 1 and the periodontal tissues are also part of this arrangement. One of the important hormones that inhibit the synthesis of collagen type 1 is cortisol. People with chronic levels of cortisol have a marked loss of periodontal tissues, facilitating the progression of periodontitis, either chronic or aggressive, accentuating a depth of probing and loss of insertion between 5 mm and 7 mm, and bone loss verified radiographically<sup>7</sup>.

Psychological disorders activate the hypothalamic-pituitary-adrenal axis and glucocorticoids are released into the bloodstream, among them, cortisol, which inhibits the immune and inflammatory response, as well as relationships with protein catabolism, increasing plasma glucose indices, which may lead to skeletal muscle weakness and tiredness, which could lead the individual to neglect their oral hygiene and possibly to develop a chronic periodontitis<sup>8</sup>.

Immunoglobulins play a role in the lubrication and maintenance of gingival fluid, acting as a barrier to the installation and absorption of foreign bodies, among immunoglobulins secreted by the body, immunoglobulin-A (IgA) has a higher rate of its synthesis, predominantly on mucosal surfaces oral, neutralizing pathogens and preventing their penetration into the deeper tissues. Studies indicate that individuals with decreased levels of IgA synthesis may develop or have an evolved condition of chronic or aggressive periodontitis<sup>9</sup>.

As for the personality, individuals with personality traits such as anguish, frequent irritability, stress, especially in the phases of resistance and exhaustion, rigidity, pessimism, non-sociability, intolerance are more likely to develop some periodontal disease or its progression, since the immune system will be compromised and altered cortisol rates in saliva tend to have marked bone loss due to cortisol inhibition and type 1 collagen synthesis, in addition to the change in behavior that will lead to changes in oral hygiene<sup>10</sup>.

**Discussion:-**

Mental disorders and emotional changes, stress, depression, behavior as well as personality possess states that are often consciously perceived by the individual generating subjectively sensations that will be transmitted to the body<sup>11</sup>. The individual being a psychic, organic and social unit, adentrante of the social environment subject to the emergence of the ego, coming from the id in its original instance, having conscious and unconscious mediations. It can be inferred that as physical functions are derived from the psychic, organic and social unit, such as emotions, social interaction, behaviors, personality among other factors that would lead open without neuroendocrine and immune system predisporary or individual to periodontal disease<sup>12</sup>.

Stress is formed as stimuli that trigger responses to the brain from the Hypophysis-Hypothalamic-Adrenal axis and a physiological response of the body, which can generate harmful consequences when the stress is chronic and endures, when it is in the resistance and exhaustion phase<sup>13</sup>. When assessing the individual is a potentially dangerous threat, there is release of glucocorticoids that would affect the individual's immunity, leaving the periodontal tissues exposed to bacterial materials that alter local functions, with large amounts of substrates from macrophages and T lymphocytes, favoring conjunctive and alveolar bone degradation<sup>14</sup>.

Depression is a disease that affects a large part of the world's population. It is estimated that 340 million people worldwide are suffering from the disease, Brazil being the third most depressed country. The clinical pictures presented by a depressive individual are: insomnia, lack of appetite, guilt, lack of energy and concentration, etc. Depression increases salivary cortisol levels and shortens the inflammatory response for a short period of time, being a direct influence on periodontal disease, independent of the hygienic habits of the individuals<sup>15</sup>.

Behavior is a risk factor for the development of periodontal disease such as poor oral hygiene, consumption of drugs such as alcohol, smoking and others. A recent study with adolescents pointed out that adolescents who consumed alcohol had greater gingival bleeding and less calculus and periodontal pocket, however, sedentary adolescents presented higher calculus and greater gingival bleeding and less periodontal pocket<sup>16</sup>.

Personality is the product of an individual's relationships through interactions with others and with himself, determining the individual's personal and social uniqueness. The type C and D personality would be related to the development and aggravation of periodontal disease, since they present reactions to stress, suppression of feelings and social inhibition, influencing an immunological and behavioral response that would lead to the development of a periodontal disease<sup>17</sup>. A group with 22 computer science that is divided into 11 that is responding to periodontal treatment and 11 that does not respond to periodontal treatment, the group that did not respond to periodontal treatment presented as more rigid with negative life events and past stressful situations, justifying that personality may be a predisposing factor to periodontal disease. Through frustrations, conflicts and threats, and through body physiology, the individual feels stressed. What was learned in new ways of diminishing and even reducing this tension would lead to the formation of a personality to cope with life<sup>18-19</sup>.

**Conclusion:-****It can be concluded from this study that:-**

Mental and emotional disorders are: stress, behavior and personality traits; depression has influence on the etiology and progression of periodontal disease, since there are changes in the immune system that lead to a drop in resistance, hormonal changes with cortisol that inhibit the synthesis of collagen type 1; affecting the periodontal, humoral and behavioral ligaments with changes in oral hygiene. Although the field of psychoneuroimmunology has a greater extension of research, more studies are needed, especially regarding the molecular, chemical and electrical interactions between mental and emotional changes, personality, behavior and stress in the health of the human being.

**Conflict of Interests:-**

The authors declare they do not have any conflict of interests.

**References:-**

1. Peruzzo DC, Benatti BB, Ambrosano GM, Nogueira-Filho GR, Sallum EA, Casati MZ, Nociti FH Jr. A systematic review of stress and psychological factors as possible risk factors for periodontal disease. *J Periodontol*. 2007; 78(8):1491-504.
2. Warren KR, Postolache TT, Groer ME, Pinjari O, Kelly DL, Reynolds MA. Role of chronic stress and depression in periodontal diseases. *Periodontol 2000*. 2014; 64(1):127-38.
3. Persson GR, Persson RE, MacEntee CI, Wyatt CC, Hollender LG, Kiyak HA. Periodontitis and perceived risk for periodontitis in elders with evidence of depression. *J. Clin. Periodontol* 2003;30(8):691-6.
4. McDougall J, Rondon, PHB. Teatros do corpo: o psicossoma em psicanálise. Martins Fontes, 1996.
5. Cunha, Fabiano Araújo; de oliveira costa, Fernando; neves, Fernando Silva. A depressão como fator de risco para periodontite–revisão de literatura. *Braz J Periodontol-March*. 2013; 23(01).
6. Saletu A, Pirker H, Saletu F, Linzmayer L, Anderer P, Matejka M. Controlled clinical and psychometric studies on the relation between periodontitis and depressive mood. *J. Clin. Periodontol* 2005; 32(12): 1219-25.
7. Hall JE. Guyton E Hall Tratado De Fisiologia Médica. Elsevier Brasil. 2017
8. Almeida LSB, Pereira ALA, Pereira ADFV, Coêlho CM, Alves FFL, Guerra RNM. Influência da iga nas doenças periodontais. 2007; 17(03): 30-34.
9. Newman MG; Carranza FM. Periodontia clínica. Elsevier Brasil, 2007.
10. Hilgard, E.R. Teorias da aprendizagem. São Paulo, E.P.U. Editora Pedagógica e Universitária Ltda. 1973: 692.
11. Hall CS, Lindzey G, Campbell JB. Teorias da personalidade. Artmed Editora, 2000.
12. Cohen S. Psychosocial influences on Immunity and infectious disease in humans. In R. Glaser & J. Kiecolt-Glaser (Eds.), *Handbook of human stress and immunity*. New York: Academic Press. 1994: 301-320.
13. Kamen-Siegel L, Robin J, Seligman MEP, Dwyer J. Explanatory style and cell-mediated immunity in elderly men and women. *Health Psychology*. 1991; 10: 229-235.
14. Romão AP. O impacto da ansiedade e da depressão na qualidade de vida de mulheres com dor pélvica crônica. Ribeirão Preto : Faculdade de Medicina de Ribeirão Preto da Universidade de São Paulo. Dissertação de mestrado. 2008.
15. Freud S. O ego e o id (Edição Standard Brasileira das Obras Psicológicas Completas de Sigmund Freud). 1976: 19.
16. Bromet E, Andrade LH, Hwang I, Sampson NA, Alonso J, Girolamo G et al. Cross-national epidemiology of DSM-IV major depressive episode. *BMC Medicine*. 2011; 9:90.
17. Rosania AE, Low KG, Mc Cormick CM, Rosania DA. Stress, depression, cortisol and periodontal disease. *J Periodontol* 2009; 80:260-66.
18. Denollet J. Tipo D: um fator de risco potencial refinado. *Journal of psychosomatic research*. 2000; 49(4):255-266.
19. Carvalho SPM, Trovisqueira AM. A personalidade na etiologia e progressão da doença física; Monografia final. 2013.