

RELATIONSHIP BETWEEN PSYCHOLOGICAL FACTORS AND SYMPTOMS OF TMD IN UNIVERSITY UNDERGRADUATE STUDENTS

Aldiéris A. Pesqueira, Paulo R. J. Zuim, Douglas R. Monteiro,
Paula Do Prado Ribeiro, Alicia R. Garcia

Department of Dental Materials and Prosthodontics, Araçatuba Dental School,
São Paulo State University, SP, Brazil.

ABSTRACT

Temporomandibular disorders is a collective term used to describe a number of related disorders involving the temporomandibular joints, masticatory muscles and occlusion with common symptoms such as pain, restricted movement, muscle tenderness and intermittent joint sounds. The multifactorial TMD etiology is related to emotional tension, occlusal interferences, tooth loss, postural deviation, masticatory muscular dysfunction, internal and external changes in TMJ structure and the various associations of these factors. The aim of this study was to evaluate the prevalence of the relationship between signs of psychological distress and temporomandibular disorder in university students. A total 150 volunteers participated in this study. They attended different courses in the field of human science at one public university and four private universities. TMD was assessed by the Research Diagnostic Cri-

teria (RDC) questionnaire. Anxiety was measured by means of a self-evaluative questionnaire, Spielberger's Trait-State anxiety inventory, to evaluate students' state and trait anxiety. The results of the two questionnaires were compared to determine the relationship between anxiety levels and severity degrees of chronic TMD pain by means of the chi-square test. The significance level was set at 5%. The statistical analysis showed that the TMD degree has a positive association with state-anxiety ($p=0.008$; $p<0.05$) and negative with trait-anxiety ($p=0.619$; $p<0.05$). Moreover, a high TMD rate was observed among the students (40%). This study concluded that there is a positive association between TMD and anxiety.

Key words: temporomandibular joint disorders, epidemiology, questionnaires, prevalence, anxiety, depression.

RELAÇÃO ENTRE FATORES PSICOLÓGICOS E SINTOMAS DE DTM EM ESTUDANTES UNIVERSITÁRIOS

RESUMO

Disfunção temporomandibular é o termo usado para descrever uma série de distúrbios envolvendo as articulações temporomandibulares, músculos da mastigação e oclusão, com sintomas comuns como dor, restrição de movimento, sensibilidade muscular e ruído articular intermitente. A etiologia da DTM é multifatorial e está relacionada à tensão emocional, interferências oclusais, perda de dentes, desvio postural, disfunção muscular mastigatória, mudanças internas e externas na estrutura da ATM, e a diferentes associações entre esses fatores. O objetivo deste estudo foi avaliar a relação entre estresse psicológico e sinais de desordem temporomandibular em estudantes universitários. Um total de 150 voluntários participaram deste estudo sendo alunos de uma universidade pública e quatro universidades privadas de diferentes cursos da área de ciências

humanas. A avaliação da DTM foi realizada por meio do questionário Research Diagnostic Criteria (RDC). Para a avaliação da ansiedade foi aplicado o questionário Ansiedade Traço-Estado de Spielberger. Os resultados dos níveis de ansiedade e dos graus de DTM dos dois questionários foram comparados pelo teste do qui-quadrado, com nível de significância de 5%. A análise estatística mostrou que o grau de DTM tem relação positiva para a Ansiedade-Estado ($p = 0,008$, $p < 0,05$) e negativa para a ansiedade-traço ($p = 0,619$, $p < 0,05$), além disso, foi observado alto índice de DTM entre os estudantes (40%). Por meio dos resultados obtidos e analisados neste estudo, concluiu-se que havia uma associação positiva entre DTM e ansiedade.

Palavras chave: desordem temporomandibular, epidemiologia, questionário, prevalência, ansiedade e depressão.

INTRODUCTION

Temporomandibular disorder (TMD) is the most common noninfective pain condition of the orofacial region¹. The term TMD has been described as a cluster of disorders characterized by pain in the preauricular area, temporomandibular joint (TMJ) or masticatory muscles; limitation or deviations in mandibular range of motion; and clicking in the TMJ during mandibular function, unrelated to growth or development disorders, systematic diseases, or macrotrauma²⁻⁶.

Approximately 60-70% of the general population has at least one sign of such disorder at some stage in their life, however, only about 5% actually seeks treatment⁷. The most prevalent clinical signs of TMD are TMJ sounds (upon palpation), limitation of mandibular movements, TMJ and muscle tenderness^{4,8}. With regard to subjective symptoms, headache, TMJ sounds, bruxism, difficulty in opening the mouth, jaw pain, and facial pain are found².

The etiology of TMD has both structural and psychological concepts. Structural concepts include

conditions related to the TMJ itself (functional, structural, morphopathological, e.g., micro-/macro-trauma), conditions related to the muscles of mastication (muscle spasm, e.g., parafunctional habits) or occlusal factors (e.g., bruxism). Recent studies have shown that occlusal factors were not found to be directly involved with TMD; nevertheless they may contribute with other factors or aggravate an existing condition⁹. Psychological concepts include stressful life events, post-traumatic stress disorder, psychiatric illness (anxiety and depression)^{3,5,10-21}, somatoform disorders, personality disorders (e.g., obsessive-compulsive disorder), hypochondriasis, paranoia, and schizophrenia^{15,17}. In support of the above theory, a higher degree of psychological distress and altered personality traits have been observed in TMD patients⁹.

Over the years, several studies have called attention to the relationship between major life stressors and temporomandibular disorders (TMDs)^{22,23}. The information regarding signs and symptoms of TMD has been collected by clinical examination and questionnaires in some studies or interview in others^{1,3,24,25}. A number of authors around the world have found variables associated with TMD^{12,26,5}, anxiety, and stress^{5,9,12-14,18,19,27-29}.

Moreover, anxiety in the school environment is a sufficiently interesting aspect of study, as it may influence student performance. It involves aspects related to identification of the sources that cause tension in students, what its effect on learning is, which students are most affected, and the forms of treatment; beyond which studies demonstrate that patients with TMD have high anxiety levels^{3,30}.

Clinicians may confuse the problem by concentrating on examination of the physical component (location and severity of pain, TMJ, and related muscles) and disregard the psychosocial and behavioral factors. The introduction of Research Diagnostic Criteria (RDC) for TMD by Dworkin and LeResche³¹ at the University of Washington, established a proper diagnostic criterion for this condition; this dual-axis system may be superior to other instruments since it can be used to classify and quantify both physical and psychosocial components of TMD^{15,20,32,33}.

Research involving the psychological factors in TMD has serious deficiencies, not only derived from the diagnostic problems implicit in TMD, but also the lack of psychological instruments with a minimum guarantee of psychometric measurement^{34,35}.

To sum up, current research on psychological factors and TMD shows differences between the diagnostic groups in some psychological variables, such as distress and personality. On the other hand, the effect that the disorder has on the patient depends on some psychological factors, such as degrees of coping. Therefore, the aim of this paper was to seek differences in the anxiety levels associated with the group diagnosed with TMD, among Brazilian university students.

MATERIAL AND METHODS

Volunteers

A total 150 volunteers participated in this study, with ages ranging from 17 to 30 years. The students were randomly selected from different courses in the field of human science at one public university and four private universities located in the cities of Bauru and Araçatuba, São Paulo, Brazil, respectively.

All the volunteers were informed of the objectives of the study, and signed a formal consent of participation approved by the Research Ethics Committee.

Questionnaire

Assessment of anxiety: the self-evaluative questionnaire, Spielberger's state-trait anxiety inventory³⁶ was used to evaluate students' state and trait anxiety. This inventory is made up of two questionnaires: trait-anxiety and state-anxiety. Each consists of 20 statements. The state-anxiety questionnaire assesses how the students feel at a particular times, and the trait-anxiety questionnaire assesses how they generally feel. Two subscales were scored separately with a maximum possible score of 80 for each.

The results of the scores were compared to the questionnaire's predetermined scores, determining the anxiety levels, as follows: (a) low anxiety (20 to 34 points); (b) moderate anxiety (35 to 49 points); (c) high or serious anxiety (50 to 64 points) and (d) Panic (65 to 80 points).

The same volunteers were also asked some questions from the Research Diagnostic Criteria (RDC)³¹. The RDC/TMD is divided into 2 axes. Axis I involves the clinical TMD conditions, and axis II involves the pain-related disability and psychological status. As RDC/TMD is an internationally recognized and widely adopted tool for TMD research, its thirteen first questions from axis II were used in this study to classify the chronic pain of the students with TMD. According to the answers, chronic pain was classified into four different degrees: 0, 1, 2 and 3.

Data analysis

The results of the two questionnaires were compared between anxiety levels and severity degrees of chronic TMD pain by the chi-square test. The significance level was set at 5%.

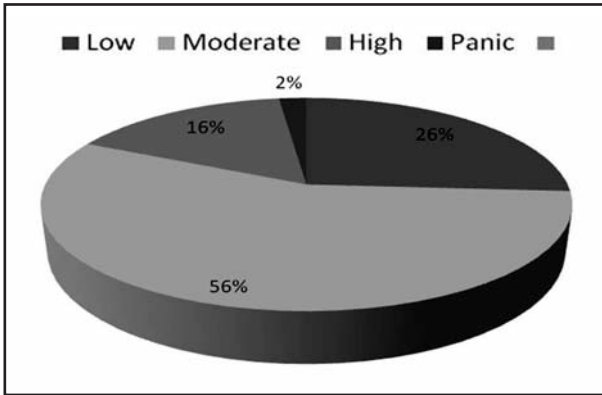


Fig. 1: Frequency distribution (%) of the trait-anxiety inventory (n=150).

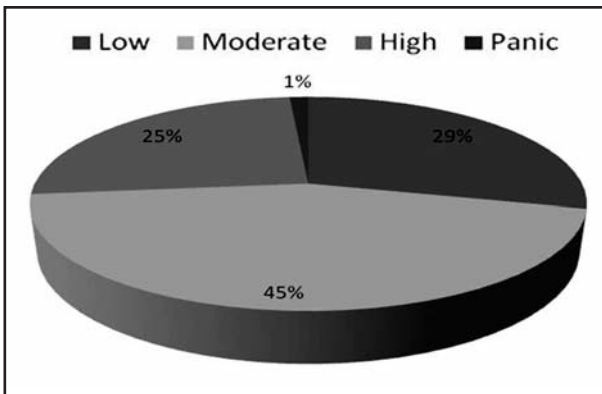


Fig. 2: Frequency distribution (%) of the state-anxiety inventory (n=150).

RESULTS

The results obtained from Spielberger’s trait-anxiety inventory (36) showed that 39 students (26%) had low anxiety, 24 (48.70%) had moderate anxiety, 24 (16%) high or serious anxiety and 3 (2%) had panic anxiety (Fig 1).

The results of the state-anxiety inventory showed that 43 students (28.7%) had low anxiety, 67 (44.7%) had moderate anxiety, 38 (25.3%) high or serious anxiety and 2 (1.3%) panic (Fig. 2).

According to RDC/TMD (24), the prevalence of TMD was 61 students (40.7%), while 89 students (59.3%) did not have TMD (Fig 3).

The correlation between trait-anxiety scores and chronic pain degrees was not significant and negative ($p=0.619$; $p<0.05$) (Fig 4). However, a significant correlation was revealed in relation to state-anxiety scores and chronic pain degrees ($p=0.008$; $p<0.05$) (Fig 5).

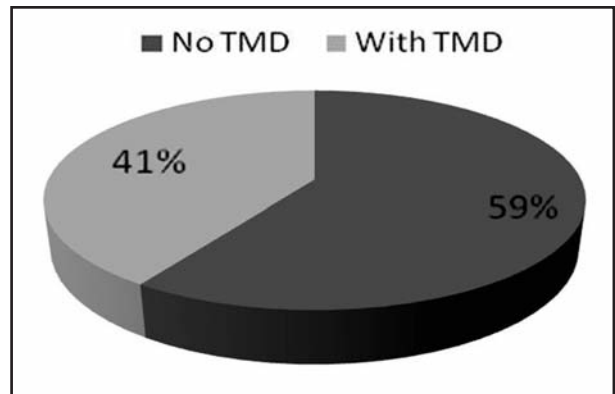


Fig. 3: Frequency distribution (%) according to presence or absence of TMD (n=150).

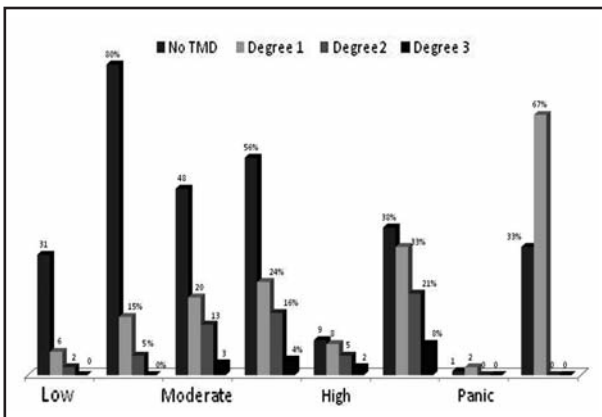


Fig. 4: Frequency distribution according to trait-anxiety scores and chronic pain degrees.

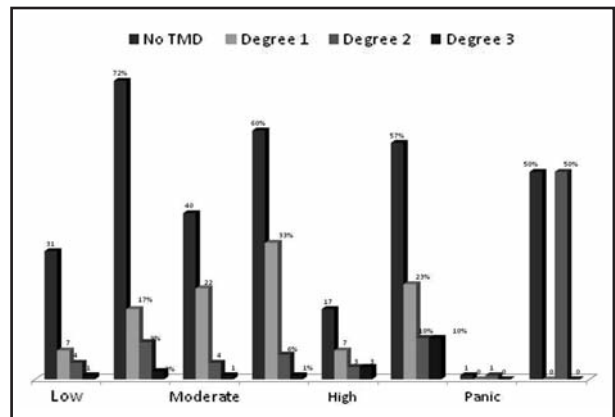


Fig. 5: Frequency distribution according to state-anxiety scores and chronic pain degrees.

DISCUSSION

The aim of this study was to evaluate the relationship between signs of psychological distress and temporomandibular disorder in Brazilian university students through the frequency distribution of the data obtained from a questionnaire.

The etiology of TMD has been considered to be one of the most controversial issues in clinical dentistry. Currently, TMD is considered not a single entity, but a group of several varying diseases².

Figures 1 and 2 show that the greatest percentage of students had moderate anxiety according to both the trait-anxiety questionnaire (56%) and the state-anxiety questionnaire (44.7%).

Literature reports on academic stress and its repercussion on the health of university students^{3,37,38}. Anxiety and depression are the most frequent clinical disorders in the general population, and are also significantly present among university students^{39,40}. Their start, development and duration may be related to multiple factors, both situational and psychological. The importance of psychological factors in the etiology of TMD has often been emphasized, and they are believed to predispose the individual to chronicity^{3,11,15-17,20,21}.

Weitzman et al.⁴¹, 2004, believe that the university is a critical context for studying the mental health of youth. According to Read et al.⁴², 2002, university students are often undergoing role transitions such as moving away from the family home for the first time, residing with other students, and experiencing reduced adult supervision. These changes may increase the risk of depression.

In this study, 61 (40.7 %) of the university students had TMD. This value is slightly lower than that reported by Shiau and Chang⁴³, 1992 (42.9%), Garcia et al.⁴⁴, 1997 (61%), and Conti et al.⁴⁵, 2003 (68%), all of whom used the same

questionnaire to evaluate TMD in university students.

Psychological factors provided some very interesting data in our study. Of the two anxiety questionnaires (Trait, State) tested, one (State) provided significant results in relation to TMD (Figures 3 and 4). These outcomes are in agreement with Bonjardim et al.¹¹, 2005, Mazzetto et al.⁴⁶, 2001, who asserted that anxiety plays an important role in TMD, acting as a predisposing or aggravating factor.

It is well accepted that psychological factors play a role in the etiology and maintenance of temporomandibular disorders (TMDs)^{5,9,10,12,14,18,27-29,47}. In particular, a high incidence of exposure to stressful life events¹⁰ and elevated levels of anxiety and stress-related somatic symptoms have been reported in TMD patients. Findings regarding depression have been less consistent. Some investigators have reported elevated levels of depression^{9,12,13,19,48} whereas others have found no differences between TMD patients and normal controls⁴⁹.

TMD is often associated with somatic and psychological complaints, including fatigue, sleep disturbances, anxiety, and depression^{11,20}. Thus, considering that stress is associated with psychological disturbances such as anxiety and depression⁵⁰, we can say that there appears to be a relationship between stress and degree of TMD in our study. It is difficult to measure a variable as subjective as anxiety, and although an effort has been made to validate the questionnaires, variables such as sex, age, race, climate, time, and social condition all arise as factors that may or may not influence anxiety⁵.

CONCLUSIONS

According to the results, it was concluded that there is a positive, statistically significant association between DTM and anxiety.

ACKNOWLEDGEMENTS

The authors wish to thank Maria Lúcia Marçal Mazza Sundefeld for the statistical analysis.

CORRESPONDENCE

Aldiéris Alves Pesqueira

Department of Dental Materials and Prosthodontics
Araçatuba Dental School, São Paulo State University
José Bonifácio, 1193,

Araçatuba, SP, Brazil 16015-050

E-mail: aldiodonto@uol.com.br

REFERENCES

1. Farsi NMA (2003) Symptoms and signs of temporomandibular disorders and oral parafunctions among Saudi children. *J Oral Rehabil* 30:1200-1208.
2. Bonjardim LR, Gavião MBD, Pereira LJ, Castelo PM, Garcia RCMR. Signs and symptoms of temporomandibular disorders in adolescents. *Braz Oral Res* 2005;19:93-98.
3. Bonjardim LR, Lopes-Filho RJ, Amado G, Albuquerque RL Jr, Goncalves SR. Association between symptoms of temporomandibular disorders and gender, morphological occlusion, and psychological factors in a group of university students. *Indian J Dent Res.* 2009;20:190-194.
4. Carvalho CM, de Lacerda JA, Dos Santos Neto FP, Cangusu MC, Marques AM, Pinheiro AL. Wavelength effect in temporomandibular joint pain: a clinical experience. *Lasers Med Sci.* 2010;25:229-232
5. Casanova-Rosado JF, Medina-Solís CE, Vallejos-Sánchez AA, Casanova-Rosado AJ, Hernández-Prado B, Avila-Burgos L. Prevalence and associated factors for temporomandibular disorders in a group of Mexican adolescents and youth adults. *Clin Oral Investig.* 2006 Mar;10:42-49.
6. Thilander B, Rubio G, Pena L, de Mayorga C. Prevalence of temporomandibular dysfunction and its association with malocclusion in children and adolescents: na epidemiologic study related to specified stages of dental development. *Angle Orthod* 2002;72:146-154.
7. Macfarlane TV, Gray RJM, Kinsey J, Worthington HV. Factors associated with the temporomandibular disorder, pain dysfunction syndrome (PDS): Manchester case±control study. *Oral Diseases* 2001;7,321-330.
8. Sonmez H, Sari S, Oksak Oray G, Camdeviren H. Prevalence of temporomandibular dysfunction in Turkish children with mixed and permanent dentition. *J Oral Rehabil* 2001;28:280-285.
9. Pallegama RW, Ranasinghe AW, Weerasinghe VS, Sitheequ MAM. Anxiety and personality traits in patients with muscle related temporomandibular disorders. *J Oral Rehabil* 2005;32:701-707.
10. Alamoudi N. Correlation between oral parafunction and temporomandibular disorders and emotional status among Saudi children. *J Clin Pediatr Dent* 2001;26:71-80.
11. Bonjardim LR, Gavião MB, Pereira LJ, Castelo PM. Anxiety and depression in adolescents and their relationship with signs and symptoms of temporomandibular disorders. *Int J Prosthodont* 2005;18:347-352.
12. Carlson CR, Reid KI, Curran SL, Studts J, Okeson JP, Falace D et al Psychological and physiological parameters of masticatory muscle pain. *Pain* 1998;76:297-307.
13. Glaros AG, Karen W, Leonard L. The role of parafunctions, emotions and stress in predicting facial pain. *J Am Dent Assoc* 2005;136:451-458.
14. Grossi ML, Goldberg MB, Locker D, Tenenbaum HC. Reduced neuropsychologic measures as predictors of treatment outcome in patients with temporomandibular disorders. *J Orofac Pain.* 2001;15:329-339.
15. Jerjes W, Madland G, Feinmann C, Hopper C, Kumar M, Upile T, Kudari M, Newman S. A psychological comparison of temporomandibular disorder and chronic daily headache: are there targets for therapeutic interventions?. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2007;103:367-373.
16. Kino K, Sugisaki M, Ishikawa T, Shibuya T, Amagasa T, Miyaoaka H. Preliminary psychologic survey of orofacial outpatients: Part 1, Predictors of anxiety or depression. *J Orofac Pain* 2001;15:235-244.
17. Oliveira AS, Dias EM, Contato RG, Berzin F. Prevalence study of signs and symptoms of temporomandibular disorder in Brazilian college students. *Braz Oral Res* 2006;20:3-7.
18. Phillips JM, Gatchel RJ, Wesley AL, Ellis E. III Clinical implications of sex in acute temporomandibular disorders. *J Am Dent Assoc* 2001;132:49-57.
19. Velly AM, Philippe P, Gornitsky M. Heterogeneity of temporomandibular disorders: cluster and case-control analyses. *J Oral Rehabil* 2002;29:969-979.
20. Yap AU, Dworkin SF, Chau EK, List T, Tan BC, Tan HH. Prevalence of temporomandibular disorder subtypes, psychologic distress, and psychosocial dysfunction in Asian patients. *J Orofac Pain.* 2003;17:21-28.
21. Yap AU, Tan KB, Hoe JK, Yap RH, Jaffar J. On-line computerized diagnosis of pain-related disability and psychological status of TMD patients:A pilot study. *J Oral Rehabil* 2001;28:78-87.
22. De Leeuw R, Bertoli E, Schmidt JE, Carlson CR. Prevalence of Traumatic Stressors in Patients With Temporomandibular Disorders. *J Oral Maxillofac Surg* 2005;63:42-50.
23. Korszun A. Facial pain, depression and stress - Connections and directions. *J Oral Pathol Med* 2002;31:615-619.
24. Gavish A, Halachmi M, Winocur E, Gazit E. Oral habits and their association with signs and symptoms of temporomandibular disorders in adolescent girls. *J Oral Rehabil* 2000;27:22-32.
25. Sari S, Sonmez H. Investigation of the relationship between oral parafunctions and temporomandibular joint dysfunction in Turkish children with mixed and permanent dentition. *J Oral Rehabil* 2002;29:108-112.
26. Plesh O, Sinisi SE, Crawford PB, Gansky SA Diagnoses based on the Research Diagnostic Criteria for Temporomandibular Disorders in a biracial population of young women. *J Orofac Pain* 2005;19:65-75.
27. Tsai CM, Chou SL, Gale EN, McCall WD Jr. Human masticatory muscle activity and jaw position under experimental stress. *J Oral Rehabil* 2002;29:44-51.
28. Uhac I, Kovac Z, Valentic-Peruzovic M, Juretic M, Moro LJ, Grzic R. The influence of war stress on the prevalence of signs and symptoms of temporomandibular disorders. *J Oral Rehabil* 2003;30:211-217.
29. Velly AM, Gornitsky M, Philippe P. Contributing factors to chronic myofascial pain: a case-control study. *Pain* 2003;104:491-499.
30. Marchiori AV, Garcia AR, Zuim PRJ, Fernandes AUR, Cunha LDP. Relação entre a disfunção tempomandibular e a ansiedade em estudantes do ensino fundamental. *Pesq Brás Odontoped Clin Integr* 2007;7:37-42.
31. Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. *J Craniomandib Disord* 1992;6:301-355.
32. Ahmad M, Hollender L, Anderson Q, Kartha K, Ohrbach R, Truelove EL, John MT, Schiffman EL. Research diagnostic criteria for temporomandibular disorders (RDC/

- TMD): development of image analysis criteria and examiner reliability for image analysis. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009;107:844-860.
33. Lee LTK, Yeung RWK, Wong MCM, Mcmillan AS. Diagnostic sub-types, psychological distress and psychosocial dysfunction in southern Chinese people with temporomandibular disorders. *J Oral Rehabil* 2008;35:184-190.
 34. Callahan CD. Stress, coping and personality hardiness in patients with temporomandibular disorders. *Rehabil Psychol* 2000;45:38-48.
 35. Ferrando M, Andreu Y, Galdo MJ, Dura E, Poveda R, Baga JV. Psychological variables and temporomandibular disorders: Distress, coping, and personality. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2004;98:153-60.
 36. Manual for the state-trait anxiety inventory. Spielberger CD, Gorsuch RL, Lushene RE. 1970. Consulting Psychologists Press, Inc.
 37. Pellicer O, Salvador A, y Benet I.A., Efectos de un estresor académico sobre las respuestas psicológica e inmune en jóvenes. *Psicothema*. 2002;14:317-322.
 38. Martín IM. Estrés académico en estudiantes universitarios. *Apuntes Psicol* 2007;25:87-99.
 39. Perales A., Sogi C. y Morales R., Estudio comparativo de salud mental en estudiantes de medicina de dos universidades estatales peruanas. *An Fac Med Univ Nac Mayor San Marcos*. 2003;64:239-246.
 40. Riveros M, Hernández H. y Rivera J. Niveles de depresión y ansiedad en estudiantes universitarios de Lima Metropolitana. *Rev Inv Psicol*. 2007;10:92-102.
 41. Weitzman E.R. Poor mental health, depression, and associations with alcohol consumption, harm, and abuse in a national sample of young adults in college. *J Nerv Ment Dis* 2004;192:269-277.
 42. Read J.P., Wood M.D., Davidoff O.J., McLacken J., Campbell J.F. Making the transition from high school to college: the role of alcohol-related social influence factors in students' drinking. *Subst Abuse* 2002;23:53-65.
 43. Shiau Y, Chang C. An epidemiological study of temporomandibular disorders in university students of Taiwan. *Community Dent Oral Epidemiol* 1992;20:43-47.
 44. Garcia AL, Lacerda NJ, Pereira SLS. Grau de Disfunção da ATM e dos movimentos mandibulares em adultos jovens. *Rev APCD* 1997;51:46-51.
 45. Conti A, Freitas M, Conti P, Henriques J, Janson G. Relationship between signs and symptoms of temporomandibular disorders and orthodontic treatment: A cross-sectional study. *Angle Orthod* 2003;73:411-417.
 46. Mazzetto MO. Alterações psicossociais em sujeitos com desordens crânio craniomandibulares. *J Bras Oclusão, ATM & Dor Orofacial* 2001;1:223-243.
 47. Lindroth JE, Schmidt JE, Carlson CR. A comparison between masticatory muscle pain patients and intracapsular pain patients on behavioral and psychosocial domains. *J Orofac Pain*. 2002;16:277-283.
 48. Auerbach SM, Laskin DM, Frantsve LME, Orr T. Depression, Pain, Exposure to Stressful Life Events, and Long-Term Outcomes in Temporomandibular Disorder Patients. *J Oral Maxillofac Surg* 2001;59:628-633.
 49. Marbach JJ. The 'temporomandibular pain dysfunction syndrome' personality: fact or fiction? *J Oral Rehabil*. 1992;19:545-560.
 50. Gameiro GH, da Silva Andrade A, Nouer DF, Ferraz de Arruda Veiga MC. How may stressful experiences contribute to the development of temporomandibular disorders? *Clin Oral Investig* 2006;10:261-268.