Prevalence of Musculoskeletal Symptoms Related to Work in Dental Surgeons: A Wide Review of Current Medical Literature

Alan Mesquita Santos[1], Flavia Martão Flório[2], Éber Coelho Paraguassu[2], José Pedro Gomes Moura[1], Thamilly Joaquina Picanço da Silva[1] Moacir de Azevedo Bentes Monteiro Neto[1]

1 - Health Sciences Department - Federal University of Amapá - Macapá, Amapá, Brazil

2 - Department of Dental Sciences - São Leopoldo Mandic College - Campinas - São Paulo – Brazil

Corresponding Author: Alan Mesquita Santos (paraguassu84@yahoo.com.br)

ABSTRACT

Introduction*: Repetitive Strain Injury (RSI) and Work-Related Musculoskeletal Disorders (WMSD) are considered a public health problem because of their high prevalence in various professions, including dental professionals. Because of poor posture and organization at work, for example, dental surgeons occupy the top spot on sick leave due to temporary or permanent disability, accounting for approximately 30% of the causes of premature abandonment between medical activities.*

Objectives*: To identify the prevalence of musculoskeletal symptoms and their relationship with dentist activity and to evaluate the relationship between symptomatology and laboratory test results.*

Methodology: *A scan was performed, but Scopus, Web of Sciences and Google Scholar indexing databases were used to unite musculoskeletal disorders, dental surgeons, prevalence, laboratory tests. We found 15,000 articles, of which 56 were selected based on the best h index score or Qualis rating on the Sucupira platform.*

Conclusion: *The relationship between musculoskeletal pain and dentist activity is strong and in some cases these disorders can be detected on laboratory tests.*

Keywords: Musculoskeletal disorders, dentists, prevalence, laboratory tests.

INTRODUCTION

Repetitive Strain Injury (RSI) and Work-Related Musculoskeletal Disorders (WRMSD) have been a major public health problem in many industrialized countries because of their high prevalence in various occupations (VERONESI-JÚNIOR JR, 2008). According to Mascarenhas and Miranda (2011), the symptoms caused by musculoskeletal disorders are important work-related problems worldwide, being observed in individuals with different occupations, including health professionals. Because of poor posture and organization at work, for example, dental surgeons (CD) occupy the top spot on sick leave due to temporary or permanent disability, accounting for approximately 30% of the causes of premature abandonment between medical activities. (RASIA; DENISE, 2004).

Injuries caused by these disorders can lead to changes in the performance of daily activities, being a common cause of absence from work and with significant financial consequences due to workers' compensation and medical expenses, as well as prejudice to society and quality of life (VITTA). et al., 2007). Muscle pain, tiredness, difficulty sleeping, poor concentration, decreased production, dissatisfaction, discouragement are some of the symptoms. The most frequent disorders are tendonitis, low back pain and myalgia. Studies show that this group of injuries affects the quality of life of affected workers as they are limited to perform their daily activities, such as work, leisure, domestic activities and daily life, in addition to the various problems they face in the workplace. social and family life (SCHNEIDER, E. and IRASTORZA, X., 2010). This reality, however, remains underestimated and the lack of concern with prevention, the delay and the difficulty in identification is one of the biggest challenges to change this situation.

HISTORY, CONCEPTS AND USE OF THE TERM READ / DORT.

Repetitive work has been around for a long time, with reports from the mid-1700s. Japan was one of the first countries to recognize this pathology as a result of the work. Around the 1980s, the first cases of RSI began to appear in Brazil, and they were linked to the profession of typists (BRASIL, 2001).

The first name used in Brazil was the term Repetitive Strain Injury (RSI), translated from the English name Repetitive Strain Injuries, and thus recognized by the National Institute of Social Security (INSS) of the Ministry of Social Security and Welfare (MPAS).

Work-related musculoskeletal disorders (WRMS) were initially referred to as repetitive strain injuries (RSI) because they present a casual factor related to the higher speed and repetition of movements performed during the workday (BRASIL, 2012).

However, this term suggested that this group of diseases encompass only those generated by repetitions of cumulative movements, not including other aspects involved, such as vibration, improper postures, pressure on the work tool or static overload. In addition, RSI are not always related to work practices (PARAGUASSU e LACERDA, 2019) .

Due to these considerations, a name change occurred in 1998 for Work-Related Musculoskeletal Disorders (WMSD).

The term was changed because most workers with symptoms in the musculoskeletal system have no evidence of injury in any structure; and also because in addition to repetitive stress (dynamic overload), other factors at work may be harmful to the worker such as static overload (use of muscle contraction for prolonged periods to maintain posture); excess force employed to perform tasks; use of instruments that transmit excessive vibration; works performed with inappropriate postures (BRASIL, 2003).

On August 5, 1998, the Ministry of Welfare and Social Assistance (MPAS) issued Work Order 606 - Standard for Disability Assessment for Social Security Benefits - which uses the acronym DORT (Work-Related Musculoskeletal Disorders). rather than the acronym RSI (Repetitive Strain Injury), to “prevent defined causes from being named” (BRASIL, 2012).

According to the National Institute of Social Security (INSS, 2003), conceptually, it can be understood: WMSD as a work-related syndrome, characterized by the occurrence of various concomitant or not

concomitant symptoms, such as: pain, paraesthesia, heaviness , fatigue, insidious onset, usually in the upper limbs, but may affect lower limbs. In addition to physical symptoms, there is the emergence of psychological impairment, reflected in stress and the emergence of psychosomatic problems.

Garbin et al. (2001) defines them as disorders of muscles, tendons, synovias, nerves, fascias and ligaments, isolated or combined, with or without tissue degeneration. They mainly reach the upper limbs, and the scapular and cervical region. It has an occupational origin, resulting from the repeated and excessive use of certain muscles and the maintenance of inadequate posture.

According to the National Institute for Occupational Safety and Health (NIOSH) (1997), the term work-related musculoskeletal disorders refers to conditions involving the nerves, tendons, muscles, and support structures of the body; which are not caused by an acute event, but rather by chronic deviation, where work environment and performance contribute to these symptoms.

For Veronesi Junior (2008) such injuries are defined as a work-related syndrome, characterized by the occurrence of several concomitant symptoms or not, such as pain, paraesthesia, heaviness and fatigue of insidious appearance usually in the upper limbs, but may also affect lower members.

The definition applied by Helfenstein and Feldman (2001) represents the scenario in a didactic way, as follows: repetitive strain injuries (RSI) are not a disease or a nosological entity. In fact, RSI represent a heterogeneous set of musculoskeletal system disorders that are related to the work environment. There is a broad nomenclature in the literature to name RSI: Cumulative Trauma Disorders or Disorders, Occupational Overload Syndrome, Repetitive Stress Syndrome, Occupational Musculoskeletal Disorders, Upper Arm Syndrome, Occupational Cervicobrachial Syndrome, Hypersolicitation Syndrome, Chronic Upper Limb Pain Syndrome, Repetitive Injuries, Occupational Overload Injuries, Repetitive Stress Occupational Injuries, Work-Related Upper Limb Disorders.

According to Gonzalez LR et al. (2008) the term RSI / WMSD should not be used as a diagnosis since it refers to a group of musculoskeletal disorders, already described in the medical literature. In using the term, one must not forget to mention the diagnostic hypothesis. It is good practice to cite the diagnosis and, in addition, the designation RSI / WRMSD. Examples include RSI / WRMD-compatible right spinal tendonitis, RSI / WRD-compatible right carpal tunnel syndrome.

DIAGNOSIS.

RSI / WMSD are pathologies that are difficult to diagnose since they depend on the subjective report of those who have them, as well as on psychological aspects and individual susceptibility (BRASIL, 2001).

The diagnosis of RSI / WRMSD involves complicated aspects because it addresses the conduct that must be taken, not only in the clinical area, but also in the social security, labor, civil liability and sometimes even criminal areas. The first complicating aspect stems from the characteristics of the clinical picture and the multiple factors that trigger it. In the case of RSI / WRMSD, the clinical picture is heterogeneous, with multiple faces. The cause-effect relationship is not direct (BRASIL, 2001).

Individual susceptibility to musculoskeletal system disorders can be discussed by variables such as age, gender, anatomical differences, tissue type, alcoholism and smoking, personality, psychiatric disorders,

general inflammatory diseases, neuromuscular diseases, metabolic diseases, and neoplasms (BRAZIL, 2001).

There may be predisposing conditions for RSI WMSD cases, but it is important to emphasize that the labor factor does not decrease, it only reminds us that the symptoms may be the result of factors other than labor. (BRAZIL, 2001)

It is important to investigate in all cases in clinical investigation of RSI / WMSD the possibility of other diagnoses. It is crucial to recognize that many of these individuals may not have musculoskeletal injuries. A considerable proportion of these patients may have other diseases, and delayed diagnosis leads to major costs for the patient and society. (GONZALEZ, et al., 2008)

Depending on the stage of the disease, the additional tests requested may be within normal limits.

For example: tendonitis or spinal degeneration in early or late phase of tendon regeneration (GONZALEZ LR. ET AL, 2008).

Complementary exams should be ordered according to their diagnostic hypothesis and the need to establish possible differential diagnoses, as well as for the correct establishment of the causal link with the work (GONZALEZ L.R. et al, 2008).

Occupational psychosocial factors such as a pleasant working environment, good interpersonal relationships, and job satisfaction tend to minimize the onset of these organic changes regardless of one's personality profile, while stress, depression, anxiety, and excessive worry are related to a higher frequency of disease development (MEDEIROS and SEGATTO, 2012)

It is worth mentioning that the epidemiological data deserves to be researched. Since there are many other workers performing the same activity with similar complaints in that sector of the company, this data will be of great value when sustaining the nexus with work.

First, however, consideration should be given to establishing a work-related etiological diagnosis. Therefore, it is important to know not only the work environment, but how your patient relates to his or her work.

RISK FACTORS

According to the Ministry of Health Normative Instruction No. 98 of December 5, 2003: the development of RSI / WRMSD is multi-causal, and it is important to analyze the risk factors directly or indirectly involved. The term "risk factor" generally means work factors related to RSI / WRMSD. Factors were established in most cases through empirical observations and then confirmed with epidemiological studies. Risk factors are not independent. In practice, there is the interaction of these factors in the workplace. In identifying risk factors, the various information should be integrated.

In characterizing exposure to risk factors, some elements are important, among others:

a) the anatomical region exposed to risk factors;

b) the intensity of the risk factors;

c) the temporal organization of the activity (for example, the duration of the work cycle, the breakdown of breaks or the timetable structure);

d) the time of exposure to risk factors.

The risk factor groups of RSI can be related to (Kuorinka and Forcier, 1995):

a) the degree of suitability of the workplace to the attention zone and vision. The size of the workplace may force individuals to adopt postures or work methods that cause or aggravate musculoskeletal injuries;

b) the cold, the vibrations and the local pressures on the tissues. Localized mechanical pressure is caused by the physical contact of straight or pointed corners of an object or tools with body soft tissue and nerve pathways;

c) inappropriate postures. Regarding posture there are three mechanisms that can cause RSI:

c.1) the limits of joint amplitude;

c.2) the force of gravity providing an extra load on the joints and muscles;

c.3) mechanical injuries to different tissues;

d) the musculoskeletal load. Musculoskeletal load can be understood as the mechanical load resulting from:

d.1) a tension (for example, the biceps tension);

d.2) a pressure (for example, the pressure on the carpal canal);

d.3) of a friction (for example, the friction of a tendon over its sheath);

d.4) of an irritation (for example, irritation of a nerve).

Among the factors that influence musculoskeletal load, we found: strength, repeatability, duration of load, type of grip, wrist posture and working method;

e) the static charge. Static loading is present when a limb is held in a position that goes against gravity. In such cases, muscle activity cannot revert to zero (static effort). Three aspects serve to characterize the presence of static postures: the observed postural fixation, the tensions related to the work, its organization and content;

f) the invariability of the task. The invariability of the task implies physiological and / or psychological monotony;

g) cognitive requirements. Cognitive demands can play a role in the onset of RSI, either causing increased muscle tension or causing a more general stress reaction;

h) work-related organizational and psychosocial factors. The psychosocial factors of work are the subjective perceptions that the worker has of the factors of work organization. As an example of psychosocial factors we can cite: considerations regarding career, workload and pace and the social and technical environment of work. The individual's psychological "perception" of the demands of work is the result of the physical characteristics of the workload, the personality of the individual, previous experiences, and the social situation of the work.

READ / DORT AND THE ACTIVITIES OF DENTAL SURGEON.

Dentistry has been considered a profession often associated with occupational diseases (Alexandre et al, 2011), with a direct relationship between high stress and physical pain indices and irregular ergonomic aspects, which is expressed through inadequate postures, tiredness. as well as pathological conditions such as WRMSD and stress-acquired diseases (MIYAMOTO et al, 1999).

Musculoskeletal disorders are common and prominent complaints among the DCs and reveal the close relationship between dental practice and the development of RSI / WRMSD due to the physical and

psychological distress to which the professional is subjected in his daily work (MEDEIROS and SEGATTO, 2012).

The practice of repetitive movements in performing dental procedures has been documented as a strong risk factor for different types of pain. Time constraints and environmental issues are aggravating to professional stress. Mental overload and possible pre-existing conditions may contribute to these conditions (RISING DW, 2005).

The dental practice provides the exposure of professionals to the risk of contracting occupational diseases, because the discomfort and inadequate posture of dentists during work, performing repetitive movements, and the existence of prolonged working hours associated with stress and fatigue. , are some of the determining factors for the appearance of musculoskeletal disorders and diseases (BERNARDI and LOPES, 2016).

Bernardi and Lopes (2016) reinforce that the dentist belongs to a professional group exposed to a considerable risk of acquiring some type of RSI, provided that certain factors inherent to the performed tasks are present, such as: excessive force, incorrect postures, repetition of the same movement and mechanical compression of the tissues. They also point out that dental surgeons end up adopting inappropriate or vicious positions, which may cause harm to their health and that the lack of in-depth knowledge about RSI / WMSD leads the professional not to seek medical assistance in face of symptoms related to the position of the patient. job.

For Barbosa et al (2004), the physical discomfort and poor posture of the dental professional are determining factors for the appearance of occupational injuries, bothering and sometimes incapacitating the professional to perform his task.

According to Finsen, Christensen and Bakke (1998), the clinical activity of dentists has as its peculiarity the execution of their craft in an area restricted to a few tens of millimeters: the oral cavity. This fact demands that these professionals require postural invariability which can generate unhealthy working conditions.

The sitting position, which is the main one adopted by this professional class, in turn, is defined as the situation in which the body weight is transferred to the seat of the chair through the sciatic tuberosity, the soft tissues of the gluteal region and the thigh. as well as to the ground through the feet (PYNT; HIGGS; MACKEY, 2001). Thus, maintaining this posture for prolonged periods may lead to biomechanical changes, such as mechanical compression of these regions, muscle imbalance between trunk extensor and flexor force and decreased stability and mobility of the lumbar-pelvis-hip complex, thus contributing to the onset. of musculoskeletal symptoms in these regions (BARROS; ANGELO; UCHÔA, 2011).

Dentistry is a profession in which its clinical performance is restricted to a specific area, the mouth, and requires repeated applications of precise force. These situations require a fixed posture that can create occupational hazards for both dentists and dental students. In addition, technological advances have led to a higher workload and although such technologies simplify and improve dental care, optimal handling is often overlooked (GARBIN et al. 2001).

An interaction of several factors is necessary to trigger these disorders, especially those related to the lack of ergonomics, orientation or lack of attention in their use, such as anatomical and physiological fatigue (due to muscle tension), wrong work posture, repetitive movements, poorly designed workstations, and

long hours of work. Once the risks are identified, steps should be taken to decrease the likelihood of this disease manifesting. (Carvalho et al., 2009)

The traditional dentistry job market has undergone radical changes that would make the profession stressful and often associated with certain health problems (KOTLIARENKO, 2005).

For Freitas (2004), there was a significant increase of dentists in the public service network due to the growing demand. Also according to the author, there were changes in the dental labor market from the 90's, where the public sector began to have relevance to dentists.

Santos, F. and Barreto S. (2001) point out that systematic studies on musculoskeletal disorders in dentists (DCs) have been carried out since the 1950s and are responsible for the first proposals for changes in the work process of dentists, including the shift from work from standing to sitting. However, knowledge about these problems is still incipient, leaving gaps in the understanding of the natural history of clinical conditions.

According to Regis Filho (2006), only a few authors in the last three decades have related dental procedures with the emergence of RSI / WMSDs in dental surgeons and dental hygienists.

Corroborating this information, Medeiros and Segatto (2012) state that in the literature there are few studies related to musculoskeletal disorders related to dental work, as well as their prevention. For Ferreira et al (2018), however, dental professionals are very susceptible to these pathologies and there is a need to inform and raise awareness.

1.5 OCCUPATIONAL RISKS OF ODONTOLOGICAL PRACTICE.

In their literature review work, Nogueira, Bastos and Costa (2010) present as main occupational risks of dental practice:

- Physical Hazard: noise, vibration, ionizing and non-ionizing radiation, extreme temperatures, poor or excessive lighting and humidity.
- Chemical Risk: dust, mists, vapors, gases, mercury, chemicals in general, among others.
- Ergonomic Risk: incorrect posture; absence of the assistant professional, or lack of training; lack of planning; excessive work rate; repetitive acts; among others.
- Biological Risk: bacteria, fungi, bacilli, parasites, protozoa, viruses, among others that, due to their nature, concentration or intensity of exposure, are capable of causing damage to the health of the worker. Accidents can occur causing the transmission of these agents through direct contact with the lesion, secretions or blood, or aerosols, needles or scalpels and inadequately sterilized instruments.

For Barbosa, G. et al (2000), the risk factors considered for RSI / WRMSD are repetitive movements, the use of non-ergonomic appliances, inadequate work posture, the use of excessive force in procedures, insufficient rest, lack of physical fitness, psychological pressure for results and productivity goals, among others.

Rossetitni (1986) points out that "… the details of the dental surgeon's clinical act require permanent attention and constant alertness, making this professional often work under emotional stress and increased stress.

And Matias (2004), states that stress usually translates into somatic manifestations such as body aches mainly in the hands and arms and also, general physical tiredness. Souza (1998) adds that in addition to the

tensions of the clinical environment within the office, stressors of modern life contribute as an emotional overload.

EPIDEMIOLOGY

Musculoskeletal conditions affect lifelong people in all regions of the world and were the leading cause of disability in four of the six World Health Organization (WHO) regions in 2017 (second in the Eastern Mediterranean region and third in the region of Africa).

The Global Burden of Disease (CGD) study provides evidence of the impact of musculoskeletal conditions, highlighting the significant disability burden associated with these conditions. In the 2017 CGD study, musculoskeletal conditions were the second largest contributor to global disability (representing 16% of all disability years), and low back pain has remained the leading cause of disability since it was measured in 1990. James , SL (2018). Although the prevalence of musculoskeletal conditions varies by age and diagnosis, between 20% and 33% of people worldwide live with a painful musculoskeletal conditions (PARAGUASSU et al., 2019) .

Repetitive Strain Injury (RSI) and Work-Related Musculoskeletal Disorders (WRMSD) are the diseases that most affect Brazilian workers. The finding is from the Health Brazil 2018 study, from the Ministry of Health. Using data from the Notification Disease Information System (Sinan), the survey points out that between 2007 and 2016, 67,599 cases of RSI / WRMSD were reported to the folder. In this period, the total of registrations grew 184%. Both the volume and the increase in cases in this period signal warning regarding the health of workers (LEMOS, DUQUE e MACHADO, 2019).

Regarding dental professionals, one of the most affected classes with RSI / WRMSD, La Rochelle (2017) conducted in the United States, a study with 1000 generalist dentists and 2300 orthodontists using a 33-question assessment instrument addressing general demographics, volume and work habits, physical activity, and prevalence and severity of WMSDs. As for the prevalence of WMSD, the results were significantly different between the two specialties. For general dentists, 64% reported at least one symptom, compared to 41% of orthodontists, but reported similar rates of WRMD in each area except the shoulder, which was significantly lower in generalist dentists than in orthodontists (38% vs. 79%, respectively) (ARADA e PEREZ, 2019) .

In a survey of public service dentists in the cities of Dammam and Riyadh in Saudi Arabia, of the 140 dentists who answered the adapted “Nordic Musculoskeletal Questionnaire” (QNSO), 82.9% of dentists (63 men and 77 women) presented one or more symptoms in the musculoskeletal system, which include pain (59.3%) as the most severe symptom in the neck and shoulders region followed by headache (28.6%), then weakness (15.7%). Dentists had a significantly higher frequency of pain, headache, and weakness than their male counterparts. Eighty-three dentists (59%) had pain and discomfort in different parts of the locomotor system in the last 12 months. The highest percentage of dentists had neck pain and discomfort (67.9%), followed by the lumbar region (52.1%). Symptoms were more pronounced among female dentists. Dentists who reported symptoms in the last seven days had a higher frequency of pain and discomfort in the neck, shoulders, lower back and / or headache. (ABDULJABBAR, T.A., 2008).

The QNSO modified by the Taiwan Institute of Occupational Safety and Health was also answered by 197 dentists, 146 men and 51 women, members of three groups: the Association of Oral and Maxillofacial Surgeons, the Family Dentistry Association and the County Dental Association. from Taichung. The reported symptoms compared using the chi-square test had the following results: More than half of respondents had symptoms in the shoulders (75%), neck (72%) and lower back (66%) in the year prior to the survey. . The three body parts with the lowest prevalence (13 and 15%) of disorder were hips / thighs / buttocks, knees and ankles / feet. Seven percent of respondents indicated no problems anywhere in their bodies. (LIN, T-H., 2012)

The same questionnaire when used to determine the prevalence of musculoskeletal symptoms in 73 dentists in a city in southern Andhra Pradesh, India, revealed that seventy-eight percent (78%) had a prevalence of at least one symptom in the last twelve months. . The most common areas affected in order of magnitude were neck (52%), lumbar region (41%), shoulders (29%) and wrist (26%). One third of practitioners (40%) required sick leave during the previous twelve months. The conclusion was that the high prevalence of musculoskeletal symptoms affects the daily practice of more than one third of these professionals. (Muralidharan, Fareed, and Shanthi., 2013).

Using another protocol called "Socio / Sanitary Survey" adapted from Lech and Hoefel, which also aims to investigate the manifestations related to RSI / WRMS, as well as the socioeconomic profile, Regis Filho (2006) after research with 771 Santa dentists Catarina reached the following results: When asked if they had any painful manifestation in the upper limbs, shoulder girdle or neck, due to the repetition of the same movement pattern in the profession, 437 (56.68%) answered yes , and 334 (43.32%) had negative answers. Values similar to those found by Santos Filho (1998), with 58% of dentists complaining of musculoskeletal pain in one or more regions of the upper body segment. Kosmann (2000) found 81.51% of these professionals complaining of some kind of physical pain or discomfort.

In São Bernardo do Campo, using QSNO with a sample of 100 public dentists, Bachiega, J.C. (2009), obtained in their results 97% of professionals reporting some type of sign or symptom of WMSD such as pain, discomfort or numbness. Regarding the anatomical location of the musculoskeletal symptom, the most reported region was the neck (81%), followed by the lumbar region (78%), shoulders (70%), wrist (67%), dorsal region (65%), hips (51%), arms (53%), forearm (36%) and elbows (33%).

In the Midwest region of Santa Catarina State, the QNSO, together with the SRQ-20 "Self-Reported Questionnaire" that characterizes the mental health of respondents, were answered by 153 dentists. Of the total dental surgeons interviewed, 142 (93%) reported having had musculoskeletal disorders in at least one body part in the last year as a result of their professional activity. The most prevalent regions reported by professionals were cervical spine and shoulder pain, affecting 107 (70%) and 99 (65%) of professionals, respectively. (KOTLIARENKO et al, 2009)

In a survey conducted by the Regional Council of Dentistry of Roraima with dental surgeons, in the 12 months prior to the survey, only 20% reported no pain, 34% of respondents did not seek help, 20% had a diagnosis of low back pain, 13% received Dort diagnosis, 7% percent with herniated disc and 6% had not yet completed a diagnosis.

In a study by Pereira et al. (2004), both general dentists (40.71%) and specialists (43.57%) reported the presence of WMSD.

In the study by Santos, L. et al (2013) conducted with 44 dentists of the Pernambuco Military Police, the majority (84.1%) said they felt some pain and among those who were in pain the most mentioned regions were, back (75.7%), neck (45.9%), hand (40.5%) and shoulder (40.5%) and approximately half (51.4%) had moderate pain and 45.9% had pain Light.

Studies conducted in several countries converge to a strong relationship between the activity of the dentist and the symptoms of RSI / WRMSD. According to Casarin (2008), 60% of dentists present some type of musculoskeletal pain in the workplace, with the neck, back, shoulders and upper limbs being the most referred sites of pain.

BIBLIOGRAPHIC REFERENCES

ABDULJABBAR, T.A. Musculoskeletal Disorders among Dentists in Saudi Arabia. **Pakistan Oral & Dental Journal** Vol 28, No. 1, 2008.

ALENCAR MCB, OTA NH**.** O afastamento do trabalho por LER/DORT: repercussões na saúde mental**.** **Revista de Terapia Ocupacional**, 22(1):60-7, 2011.

ALEXANDRE PC, SILVA IC, SOUZA LM, MAGALHAES CÂMARA V, PALÁCIOS M, MEYER A. Musculoskeletal disorders among Brazilian dentists. **Arch Environ Occup Health.**, 66(4):231-5, 2011.

ARADA, Juan Marques Garcia, PEREZ, Zenon Coimbra. Phytotherapy in dentistry: survey of products of plant origin for health oral. Brazilian Journal of Implantology and Health Sciences. v.1, n.3, p. 35-40, 2019. DOI: https://doi.org/10.36557/2674-8169.2019v1n3p35

BACHIEGA, JOANNA CAROLINA. **Sintomas de distúrbios osteomusculares relacionados à atividade de cirurgiões-dentistas brasileiros**. 36 f. Dissertação - Universidade Nove de Julho - UNINOVE, São Paulo, 2009.

BARBOSA ECS, SOUZA FMB, CAVALCANTI AL. Prevalência de distúrbios osteomusculares em cirurgiões-dentistas de Campina Grande – PB. **Pesqbrasodontopedclinintegr**. 4(1):19-24, Jan/Abr. 2004.

BARBOSA MSA, SANTOS RM, TREZZA MCSF. A vida do trabalhador antes e após a Lesão por Esforço Repetitivo (LER) e Doença Osteomuscular Relacionada ao Trabalho (DORT). **Revista Brasileira de Enfermagem**., 60(5):491-6, 2007.

BARBOSA, G. et al. Atualização na clínica odontológica. In: Feller, Christa, Gorab, Riad. **Atualização na clínica odontológica: modelos de atualização. São Paulo, Artes Médicas**, p 511-33, ilus., 2000.

BARROS, S.S.; ÂNGELO, R.C.O.; UCHÔA, E.P.B.L. Lombalgia ocupacional e a postura sentada. **Revista Dor**, v.12, n.3, p.226-30, 2011.

BERNARDI, M.A.; LOPES, A.R. Prevalência de DORT e Análise do Risco Ergonômico em Odontólogos de Foz do Iguaçu. **Pleiade**, 10(19): 76-83, Jan./Jun., 2016.

BRASIL. Ministério da saúde. Departamento de Ações Programáticas e Estratégicas Área Técnica de Saúde do Trabalhador. Lesões Por Esforços Repetitivos (Ler) Distúrbios Osteomusculares Relacionados Ao Trabalho (Dort) Série A. Normas e Manuais Técnicos, n.°103; Brasília – DF; Fevereiro, 2001.

BRASIL. Ministério da Previdência Social, **Instrução Normativa Nº 98, De 5 de Dezembro De 2003.** Aprova Norma Técnica sobre Lesões por Esforços Repetitivos-LER ou Distúrbios Osteomusculares Relacionados ao Trabalho DORT. Brasília, 2003.

BRASIL. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Vigilância em Saúde Ambiental e Saúde do Trabalhador. Dor relacionada ao trabalho: lesões por esforços repetitivos (LER): distúrbios osteomusculares relacionados ao trabalho (Dort). 68 p.: il. Série A. Normas e Manuais Técnicos, 10. Protocolos de Complexidade Diferenciada. Editora do Ministério da Saúde, Brasília – DF, 2012.

CASARIN, C. A. S., CARIA, P. H. F. Comportamento muscular durante diferentes práticas odontológicas. **Cienc. Odontol. Bras**., 11 (2): 64-70, 2008.

CONSELHO REGIONAL DE ODONTOLOGIA – RR. **Indicadores de Dort nos cirurgiões-dentistas de Boa Vista-Roraima**. Disponível em http:www.carvalho.odo.br. Acesso em: 21/10/2011.

Dhanya Muralidharan, Nusrath Fareed, and M. Shanthi. Musculoskeletal Disorders among Dental Practitioners: Does It Affect Practice? **Epidemiology Research International**. Volume 2013.

FERREIRA, M.L.G. et al. Revisão sistematizada das orientações sobre prevenção de distúrbios osteomusculares relacionados à Odontologia. **Arch Health Invest.** 7(5):164-167, 2018.

FINSEN, L.; CHRISTENSEN, H.; BAKKE, M. Musculoskeletal disorders among dentists and variation in dental work. **Appl Ergon.**, v.29, n.2, p.119–25, 1998.

GARBIN AJÍ, GARBIN CAS, DINIZ DG, YARID SD. Dental students' knowledge of ergonomic postural requirements and their application during clinical care. **Eur J Dent Educ.**,15(1):31-5, 2011.

GASPARINI, S.M.; BARRETO, S.M.; ASSUNÇÃO, A.A. O professor, as condições de trabalho e os efeitos sobre sua saúde. **Educação e Pesquisa**, v.31, n.2, p.189-99, 2005.

GOBBI, GB. **Sintomas músculo-esqueléticos relacionados ao trabalho em cirurgiões dentistas.** [Dissertação de Mestrado]. Campinas, São Paulo: Faculdade de Ciências Médicas da Universidade Estadual de Campinas; 2003.

GONZALEZ LR et al. Contribuições para a investigação de lesões por esforços repetitivos – distúrbios ósteomusculares relacionados com o trabalho em membros superiores. **RevSocBraClinMed.**, 6(2): 72-78, 2008.

KOTLIARENKO, A. **Prevalência de distúrbios osteomusculares nos cirurgiões dentistas do Meio Oeste Catarinense.** [Dissertação] - Universidade do Oeste de Santa Catarina. Joaçaba: UNOESC; 2005.

KOLTLIARENKO, A. Prevalência de distúrbios osteomusculares nos cirurgiões dentistas do Meio Oeste Catarinense. **Rev. odonto ciênc**., 24(2):173-179, 2009.

KOSMANN C. **Dor e desconforto no trabalho do dentista** – contribuições da ergonomia [dissertação]. Faculdade de Engenharia da Produção da UFSC; 2000.

KUORINKA I, FORCIER L (ORG). Work related musculoskeletal disorders (WMSDs): **a reference book for prevention**. Taylor&Francis Ltd; London, 1995.

LANGOSKI LA. **Um enfoque preventivo de referente aos fatores de risco das LERs\DORTs** – O caso de cirurgiões-dentistas. [Dissertação] – Universidade Federal de Santa Catarina, Florianópolis: UFSC; 2001.

LEMOS, Pedro Gabriel Silva, DUQUE, Antônio Moraes, MACHADO, Carla Nery. Componentes que afetam o medo no tratamento dentário em adultos: um estudo seccional. Brazilian Journal of Implantology and Health Sciences. v.1, n.4, p. 41-54, 2019. DOI: https://doi.org/10.36557/2674-8169.2019v1n4p41

LIN, T-H. Prevalence of and risk factors for musculoskeletal complaints among Taiwanese dentists. **Journal of Dental Sciences**. 7, 65e71, Feb. 2012.

MACEDO RAB. **Estudo da prevalência de lesões músculo- esqueléticas relacionadas com o trabalho (LMERT) em médicos dentistas e proposta de um programa de ginástica laboral.** [Dissertação] - Faculdade de Desporto da Universidade do Porto. Porto; 2008.

MASCARENHAS, C. H. M.; MIRANDA, P. S. Sintomas de distúrbios osteomusculares relacionados ao exercício da assistência fisioterapêutica. **Rev. ConscientiaeSaúde**, v.9, n.3, p.476-85, 2011.

MEDEIROS UV, SEGATTO GG. Lesões por esforços repetitivos (LER) e distúrbios osteomusculares (Dort) em dentistas **Rev. bras. odontol.**, Rio de Janeiro, v. 69, n. 1, p. 49-54, jan./jun. 2012.

MERLO ARC et al. O trabalho entre prazer, sofrimento e adoecimento: a realidade dos portadores de lesões por esforços repetitivos. **Psicol Soc**.,15:117-136, 2003.

MIYAMOTO ST, SALMASO C, MEHANNA A, BATISTELA AE, SATO T, GREGO ML. Fisioterapia preventiva atuando na ergonomia e no stress no trabalho. **Rev. Fisioter Univ São Paulo.**, 6(1):83-91, 1999.

NATALIE RIVARD LA ROCHELLE. **Work-Related Musculoskeletal Disorders Among Dentists And Orthodontists.** A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Dentistry at Virginia Commonwealth University. Virginia, May. 2017.

NATIONAL INSTITUTE OF SAFETY AND HEALT (NIOSHI). **Musculoskeletal disorders and workplace factores**. Pub. 97B141, Cincinnati, Jul. 1997.

OLIVEIRA, C. R. Lesão por esforços repetitivos (LER). **Rev. Bras. Saúde Ocup.**,19 (73): 59-85,1991.

NOGUEIRA SA, BASTOS LF, COSTA ICC**.** Riscos Ocupacionais em Odontologia: Revisão da Literatura / **UNOPAR Cient., Ciênc. Biol. Saúde**. 12(3):11-20, 2010.

Matias KK. Ambiente profissional e percepção do estresse pelo cirurgião-dentista. Goiânia: UCG; 2004

PARAGUASSU, Éber Coelho; LACERDA, Jamille dos Passos. Oral health of the elderly in Brazil: Systematic review. Brazilian Journal of Implantology and Health Sciences, v.1, n.2, p. 25-33, 2019. DOI: https://doi.org/10.36557/2674-8169.2019v1n2p25

PARAGUASSU, Éber Coelho et al. Qualidade de vida e satisfação em usuários de prótese total no estado do Amapá, Brasil. Revista Eletrônica Acervo Saúde, n. 27, p. e876-e876, 2019

PEREIRA, F. T. F., LOPES, F. F., OLIVEIRA, A. E. F. et al. Distúrbios osteomusculares relacionados ao trabalho entre os cirurgiões-dentistas especialistas e generalistas. **Revista Brasileira de Odontologia**. 61 (3/4): 213-6, 2004.

PINHEIRO, F.; TRÓCCOLI, B.; CARVALHO, C. Validação do Questionário Nórdico de Sintomas Osteomusculares como medida de morbidade. **Rev. saúde pública**, v.36, n.3, p. 307-12, 2002.

PYNT, J.; HIGGS, J.; MACKEY, M. Seeking the optimal posture of the seated lumbar spine. **Physiother Theory Pract**. v.17, n.1, p.5-21, 2001.

RAJIB BISWAS, PH.D. ET AL. Musculoskeletal Disorders and Ergonomic Risk. **Indian Journal of Dental Sciences**. Issue:1; Vol.4, March 2012.

RASIA, D. **Quando a dor é do dentista! Custo humano do trabalho de endodontistas e Indicadores de DORT.** [Dissertação de Mestrado]. Brasília, Distrito Federal: Universidade de Brasília; 2004.

RÉGIS FILHO, G. I., MICHELS, G., SELL, I. Lesões por esforços repetitivos/distúrbios osteomusculares relacionados ao trabalho em cirurgiões-dentistas. **Rev. Bras. Epidemiol.,** 9 (3), 2006.

RÉGIS-FILHO GI. **Lesões por Esforços Repetitivos em Cirurgiões-Dentistas: Aspectos Epidemiológicos, Biomecânicos e Clínicos - Uma Abordagem Ergonômica**. [Tese] - Programa de Pós-Graduação em Engenharia de Produção, Centro Tecnológico, Florianópolis: UFSC; 2000.

RISING DW, BENNETT BC, HURSHK, PLESH O. Reports of body pain in a dental student population. **J Am Dent Assoc**.,136(1):81-6, 2005.

Santos Filho SB. **Prevalência de dor osteomuscular de membros superiores em cirurgiões-dentistas do serviço público de Belo Horizonte: contribuição no debate sobre os distúrbios osteomusculares relacionados ao trabalho (DORT)** [dissertação]. Belo horizonte: Faculdade de Saúde Públic da UFMG; 1998.

SANTOS FS, BARRETO S. Atividade ocupacional e prevalência de dor osteomuscular em cirurgiões-dentistas de Belo Horizonte, Minas Gerais, Brasil: contribuição ao debate sobre os distúrbios osteomusculares relacionados ao trabalho. **Caderno Saúde Pública**.;17:181-93, 2001.

SANTOS HH. Abordagem clínica e psicossocial das lesões por esforços repetitivos LER / DORT. **Rev bras saúde ocup**., 28(105-106):105-15, 2003.

SANTOS, R.L.X. et al. Lesão por esforços repetitivos (LER/DORT) em cirurgiões dentistas da Clínica Odontológica da Polícia Militar de Pernambuco. **Odontol. Clín.-Cient.**, Recife, 12 (3) 177-187, jul./set., 2013.

SCHNEIDER E, IRASTORZA X. OSH in figures: Workrelated Musculoskeletal Disorders in The EU – facts and figures. **European Agency for Safety and Health at Work**; Luxembourg, 2010.

SOUZA HMMR. **Análise experimental dos níveis de ruído produzido por peça de mão de alta rotação em consultórios odontológicos: possibilidade de humanização do posto de trabalho do cirurgião-dentista**. Rio de Janeiro: Fundação Oswaldo Cruz, Escola Nacional de Saúde Pública; 1998

VERONESI-JÚNIOR JR. Fisioterapia do Trabalho: Cuidando da Saúde Funcional do Trabalhador. São Paulo: Andreoli; 1ª Ed. 358p. 2008.

VITTA, A. et al. Desconfortos musculoesqueléticos percebidos em trabalhadores de diferentes faixas etárias, gêneros e ocupações. **Fisioter. mov**., v.20, n.1, p. 29-36, 2007.