

## Study of the relationship between the presence of musculoskeletal disorders and length of work in dental surgeons



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### ABSTRACT

**Introduction:** Dentists are among the professional classes with the highest frequency of musculoskeletal pain and discomfort, justified by the characteristics of work in a restricted area that is the mouth and aggravated by postural adaptations maintained for a long period of stay, usually without breaks or breaks. These complaints accompany the increase in pain, demotivation, stress and finally incapacitation and withdrawal from professional practice. Whether years of work potentiate or mitigate these complaints is not yet defined, since there are numerous factors associated with these disorders. **Objective:** To investigate the possible relationship between the presence of musculoskeletal disorders and length of time working in dental surgeons. **Materials and method:** exploratory descriptive cross-sectional study with a quantitative approach to the data carried out through a questionnaire applied to 108 dental professionals in the State of Maranhão, collecting information on pain, location, intensity and duration of work. **Results:** The results showed that pain was more prevalent in professionals with 1 to 3 years of work, with the most affected regions being back (lower), back (upper), shoulders, wrists and hands. **Conclusion:** Through the study, we found that there is no relationship between musculoskeletal disorders and the time of work of these professionals.

**Keywords:** Musculoskeletal Disorders, Working Time, Dentists.

## 1 INTRODUCTION

Musculoskeletal diseases and pain (MSD) are described as a set of diseases and complaints that have impacts on various structures of the musculoskeletal system of the human being. These include, for example, joints, muscles, bones, nerves, blood vessels, ligaments, tendons, and supporting structures such as intervertebral discs (LIETZ, ULUSOY, NIENHAUS, 2020).



MSDs can arise from one or multiple injuries and result in pain or sensory disturbances in various regions of the body. They can become a temporary or chronic disease – the latter is more common, accounting for 40% of all chronic diseases (LIETZ, ULUSOY, NIENHAUS, 2020).

Several studies have found that MSDs often lead to increasing incapacity for work, sick leave, poorer quality of work, decreased job satisfaction, work-related accidents, and premature abandonment of occupation (LIETZ, ULUSOY, NIENHAUS, 2020).

In addition, there is greater awareness and concern in distinguishing the effects of physical inactivity and sedentary lifestyle, since an individual can be classified as active according to the definition standardized by the World Health Organization (WHO) and, at the same time, have a sedentary lifestyle, as is the case of those who sit for a long time according to Lopes et al (2021).

Knowledge about ergonomics has advanced a lot. Studies have revealed its importance for the quality of life of dentists. However, there is a great lack of application of its concepts and principles in dental practice, according to Castilho et al., (2021).

Scientific evidence indicates the high prevalence of joint, muscular, lumbar problems and other work-related musculoskeletal disorders (WMSD), mainly due to poor posture, lack of ergonomic planning of equipment, work environment, work systems, among others according to Castilho et al (2021).

Also according to Castilho et al., (2021), this has caused many dentists to work with low productivity, low comfort and, above all, no quality of life, which, in many cases, can leave them temporarily unemployed or even condemn them to abandon their careers early.

Work-related musculoskeletal disorders (WMSD) are highly prevalent, and it is essential to recognize the factors associated with them and their determinants Lopes et al (2021).

According to Castilho et al., (2021), among the main causes of the development of WMSD in dentistry are poor posture at work. In view of the above, and due to the existing gap in the area, this study aims to identify the regions of the dental professional's body that present musculoskeletal dysfunctions, and to relate these pain complaints and their intensity to the time and specialty of practice.

## 2 MATERIALS AND METHODS

### 2.1 STUDY DESIGN, SAMPLE AND EVALUATION SITE

This is an analytical cross-sectional study that aimed to identify the presence of musculoskeletal disorders in dentists in the state of Maranhão, Brazil, throughout their professional lives. Academics in the first and last period of internship and dentists of any specialty who had been working for at least 1 year and practiced for at least four hours/day were included, whether in the public or private sector. Patients with systemic pain diseases, such as fibromyalgia, rheumatoid arthritis, among others, and



those with temporary interruption of working time, as well as those who did not fully answer the questionnaires, were excluded.

## 2.2 ASSESSMENT OF MUSCULOSKELETAL PROFILE AND SYMPTOMS

Initially, we were provided, through the CRO, with a list with e-mail and telephone contact, as well as the number of dental professionals in the state of Maranhão. Subsequently, we contacted the professionals by e-mail, sending a letter for the explanation and invitation to participate in the study, along with the link to the questionnaire built through the *Google Forms tool*. The signature of the informed consent form was a basic and mandatory condition for the rest of the questions to be viewed and answered.

The questionnaire constructed through the *Google forms tool* for data collection contained questions to explore sociodemographic data and work characteristics, as well as personal and health habits such as: smoking habits, physical activity, information on working hours, health history, prepared by the researchers and which subsidized data on factors associated with musculoskeletal disorders. Musculoskeletal symptoms and their respective areas of affection were assessed using the Self-Estimated Functional Inability because of Pain *Questionnaire* for Brazilian workers. PINHEIRO (2020).

This instrument was chosen because it allows not only the assessment of muscle pain or discomfort, but also to what extent it affects the professional activity and is divided into 5 levels: (0) No pain, (1) Some pain, but not many problems, (2) A lot of pain, but I can bear it, (3) A lot of pain, I avoid certain movements and (4) I can't work because of the pain. They were also asked if they were prevented from carrying out their work, daily living or leisure activities; and/or sought health services such as physicians or physiotherapists due to these symptoms in the last 12 months.

For those who already have painful symptoms and functional discomfort due to pain, an invitation was made to come to the school clinic of Ceuma University, at the orofacial pain outpatient clinic, for a more detailed evaluation and physical therapy aimed at minimizing the pain, rehabilitation protocol and ergonomic guidance, free of charge. Of the 550 questionnaires sent, only 125 answered them in full, 50 of which were dental students and 100 professionals.

The collected data were presented as means, standard deviations (SD), differences between means and 95% confidence intervals (CI) of differences, and significance level was set at 5%.

This study was based on Resolution 466/12 of the National Health Council that regulates research involving human beings, submitted to the Human Research Ethics Committee of CEUMA University and approved by opinion No. 4,055,586.



### 3 RESULTS AND DISCUSSION

Working in a dental practice predisposes dentists to biological, chemical, psychological, and ergonomic hazards. These occupational hazards are associated with the occurrence of musculoskeletal disorders (MSD). MSDs constitute a group of serious occupational diseases characterized by pain and dysfunction that affect the musculoskeletal system that includes nerves, tendons, muscles, and intervertebral discs. ALSHOUIBI et al., (2020).

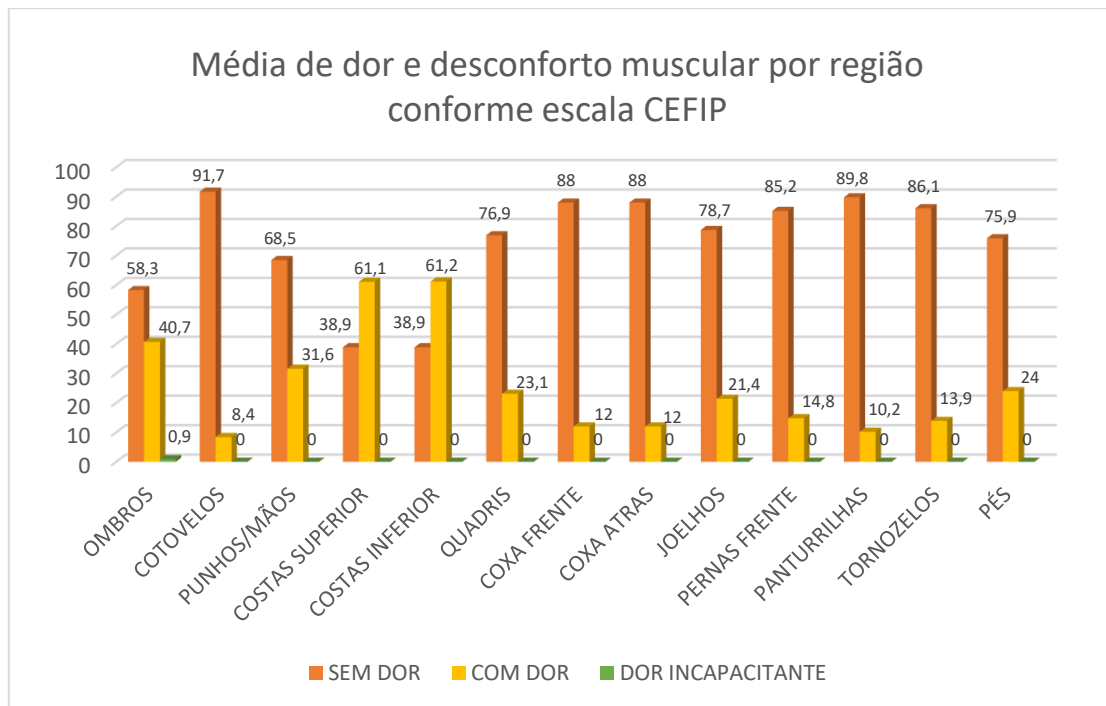
A study conducted with 1,250 dentists from Belgium, Luxembourg and the Netherlands showed that 64% of the professionals evaluated had disorders in the neck, shoulders and spine; 42% suffered from headaches; there was a higher occurrence of postural disorders in women; higher occurrence of disorders in dentists over 1.80 m tall; higher occurrence of neck and shoulder disorders among dentists who worked with direct vision of the maxilla; and 1/3 of the dentists had muscle fatigue.

It was also shown that the more difficult the treatment, the worse the posture, and also that the neck muscles were the ones that most contributed to the occurrence of fatigue and disorders according to Castilho et al., (2021).

Several studies show that dentists work in the same posture for many hours at a time and are exposed to static body posture. In addition, they use equipment with inadequate lighting and color combinations and are exposed to an annoying sound load, which affects both mental and physical health. CASTILHO et al., (2021).

In addition, it is known that while working, dental professionals need to perform precise hand movements, adopt awkward working postures, use vibrating dental instruments, and perform administrative work and repetitive monotonous tasks for a long time. (LIETZ, ULUSOY, NIENHAUS, 2020).

In view of this need for action, one of the points of this study was to observe the average of the reports of musculoskeletal pain and discomfort segmented by body regions, from the sample of 108 professionals, following the criteria of the CEFIP scale, as shown in the graph below.



Above, among all the regions of the body, we found that the ones with the most reports of musculoskeletal pain and discomfort are the lower back, i.e., lumbar region, with 61.2%, followed by the upper back with 61.1%, shoulders with 40.7% and wrists and hands with 31.6%.

The regions that signaled a higher incidence of pain are not surprising, since dental practice involves prolonged static postures, postures with forward flexion and repeated rotation of the head, neck and trunk to one side, overloading certain muscle groups, until it leads to stress.

This postural tendency is explained by Neves et al., (2022), who explain that as the posture deviates more from the neutral, the muscles responsible for the main side of rotation or flexion become stronger and the corresponding antagonist muscles become weakened, creating a muscle imbalance.

In the clinical practice of these professionals, due to short and insufficient rest periods, the damage rate is higher than the repair rate. The body, in order to protect the stressed area from further pain or injury, compensates by using another part of the muscle to maintain posture. This is known as muscle replacement. This is a cycle that perpetuates itself, and can result in the development of a whole range of musculoskeletal disorders. NEVES et al., (2022).

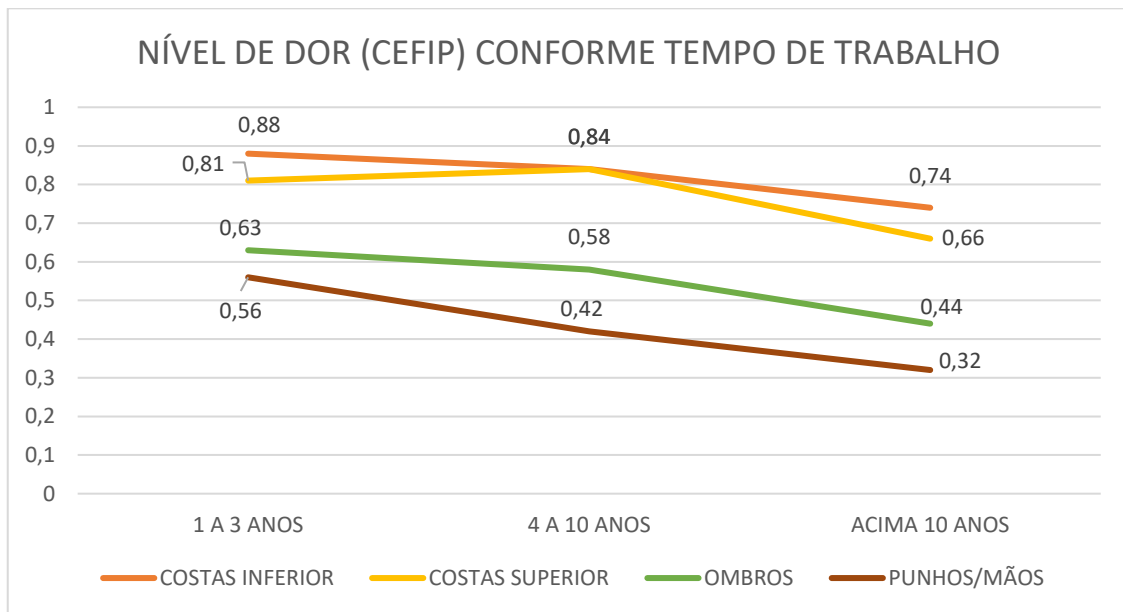
In the study conducted by Meisha DE et al., (2019), the prevalence of WMSD was 70% among dentists, with the most common location of WMSD pain being in the lumbar region (85%) and neck (84.6%). Recent research indicates that dentists have a higher risk of developing Carpal Tunnel Syndrome (CTS) due to frequent pressure from wrist movements, causing inflammation of the flexion tendons and compression of the median nerve.

Among other most commonly observed disorders are: muscle pain, headache, visual disturbances, poor circulation and varicose veins, bursitis of the shoulders and elbows, tendinitis, back



problems such as kyphoscoliosis, cervical, dorsal, lumbar changes and inequality in shoulder height. Santos et al., (2017); Meisha DE et al., (2019); Fernandez de Grado et al., (2019); Pejčić et al., (2020).

When we relate the pain complaints of these most mentioned regions with the time of work of these professionals, we found that they are not related, as shown in the graph below.



Above, among the regions of the body that had greater relevance in the level of pain according to the CEFIP scale, we found a decrease in the report of pain during the increase in the time of work of these professionals. In which we obtained an average fall of 15% for the back in the lower part, 18% fall for the back in the upper part, 30% fall in the report of pain for the shoulder region and 42% for wrists and hands.

The study also shows that 71.4% of the professionals interviewed perform some type of preventive practice or treatment to minimize pain that may be related to work.

Preventive actions, such as regular physical activity, stretching, maintaining a balanced posture, or alternating between different positions, are also very important in preventing musculoskeletal disorders and reducing pain caused by these disorders. Meisha DE et al., demonstrated that dentists who practice any sport or exercise were 50% less likely to report musculoskeletal disorders (MSD).

In addition, being regular in exercise decreased the chances of MSD even more by 10%. Working in chairs with adequate lumbar support also positively influences the reduction of pain related to MSDs, as they are beneficial in correcting the dentist's posture, facilitating a neutral posture of the lumbar spine that is considered favorable to musculoskeletal health and prevents back pain. In the same way, the use of magnifying loupes improves working posture and reduces shoulder pain. Neves et al., (2022).



Some initiatives would be of great value to the health of these professionals, such as training workshops on ergonomic practices for dentists, which would increase awareness about ergonomic practices and, consequently, reduce the negative consequences on musculoskeletal health. Other evidence-based health promotion activities include the promotion of exercises for low back pain. Meisha DE et al., (2019).

Stretching is also recommended to obtain elasticity in tissues injured by occupational diseases and to combat a sedentary lifestyle. It has a preventive and complementary character to the professional's relaxation and ergonomics. They are the exercises of first choice in cases of injuries caused by RSI/WMSD. The way they are performed allows a certain range of motion to be obtained and has prophylactic value. SANTOS et al., (2017).

#### **4 CONCLUSION**

Through the results obtained in the present study, it was possible to verify that there was no relationship between musculoskeletal disorders and time of work of these professionals, since the results obtained pointed to the presence of pain mainly in professionals with 1 to 3 years of work, highlighting as the most affected regions back (lower), back (upper), shoulders, wrists and hands.

Our results draw attention to the multifactorial causes of pain in these professionals, reinforcing the importance of a closer exploration of possible factors associated with these pains, as well as what can lead to the appearance and aggravation of these pains, so that we can suggest strategies to minimize and, if possible, elucidate and solve this problem, which is a problem for a large number of professionals and can even culminate in permanent absence from work.



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