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Impacts and prevention of musculoskeletal disorders among odontostomatologists

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Abstract

Musculoskeletal disorder (MSD) is a group of periarticular conditions affecting the soft and bony tissues of the limbs and back. Its prevalence is high among odontostomatologists, ranging from 60 to 90.3%. It is therefore a real source of concern and a public health problem. The aim of this study was therefore to describe the impacts and prevention of this disorder among odontostomatologists.

This is a literature review study following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method. The documentary search on scientific databases was carried out using the keywords TMS, odontostomatologists, ergonomics, prevention. The study included all articles on the impacts and prevention of MSDs among odontostomatologists published over the past 10 years from 2013 to 2023 written in French or English without restriction as to article type. Incomplete, irrelevant articles published in scientific conferences were excluded.

The study analyzed 32 articles and showed that the main impacts of MSDs were pain (56.5%), self-medication (17.4%), reduced quality of work and working hours (17.4%), absenteeism and early retirement (13.0%). Prevention was based on the practice of good ergonomics (73.3%), the use of magnifying glasses (33.3%) and the practice of physical exercise after work (20%).

Given these results, ongoing training in MSD prevention is essential to reduce or avoid its occurrence.

Keywords: Musculoskeletal Disorders (MSD); Odotostomatologist; Ergonomics; Prevention

1 Introduction

The National Public Health Agency or “Public Health France” defines musculoskeletal disorders (MSD) as “a set of periarticular conditions affecting the soft tissues (muscles, tendons, nerves, vessels, cartilage) and bones of the limbs and back [1]. Pain and functional discomfort are the main manifestations of these pathologies [2]. MSDs are one of the most common occupational disorders among odontostomatologists since dentistry is a physically and mentally demanding job due to the numerous therapeutic procedures, concentration and mental pressure involved [3]. Dental professionals practice in a fairly restricted environment and the nature of the work requires repetitive movements of

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the arms, wrists and hands while adopting uncomfortable static postures of the trunk, neck and shoulders for long period [4, 5]. Tilting, neck rotation, forward bending with loss of cervical and lumbar lordosis and raised arms working in prolonged isometric/eccentric static contraction represent the main risk factors for musculoskeletal disorders (MSDs) [6]. Moreover, with the onset of the Sars-Cov2 pandemic, the use of additional protective devices increases mental stress, the risk of unbalanced postures and further reduces freedom of movement [7]. Thus, in recent years, MSDs have become more frequent and considered a serious cause of concern [8]. Indeed, its prevalence among odontostomatologists was 81.4%, in Brazil in 2017[9], 84.9% in Italy in 2021[10], 92% in Germany in 2020 [11], 58.3% in India in 2020 [12], 61.5% in Lebanon in 2017 [13], 35.24% in Mali in 2016, 95% in Cameroon in 2016 and 75% in Madagascar in 2018 [14-16].

In addition to their generally high prevalence in all countries, they constitute the leading cause of work-related morbidity [17]. MSDs therefore represent a real public health problem and preventing their occurrence is a major challenge. This is why a study was carried out, with the aim of describing the impact of musculoskeletal disorders among odontostomatologists, and the measures taken to prevent them.

2 Material and methods

2.1 Search strategy and eligibility criteria

This is a systematic review presented in accordance with the PRISMA statement. The documentary search on scientific databases such as Google Scholar, Pubmed was carried out using the keywords TMS, odontostomatologists, ergonomics, prevention during 1 month from March 11 to April 12, 2023.

All articles on the impact and prevention of MSD among odontostomatologists published over the last 10 years, from 2013 to 2023, written in French or English and whatever the type of article, were included in this study.

All articles on the impact and prevention of MSDs among odontostomatologists that were incomplete, imprecise or not published as scientific articles were excluded from the study.

Articles obtained by searching Google Scholar and Pubmed were compiled and duplicates were removed. Next, titles and abstracts were screened for eligibility. Then, the full texts of relevant titles and abstracts were assessed according to inclusion and exclusion criteria, and those that did not meet the criteria were excluded.

2.2 Assessment of methodological quality and risk of bias

All included articles were independently assessed by the first three authors using specific scoring tools such as the INSA International Narrative Systematic Assessment method (La Torre, Backhaus and Mannocci, 2015) for narrative reviews, the Newcastle Ottawa Scale for cross-sectional and cohort studies (Wells, Shea&O'Connell, 2009). The evaluation result by each reviewer was compared and the discrepancies were discussed for the final evaluation of the articles studied.

2.3 Parameters studied

The parameters studied were extracted from the articles included and constitute two parts:

Part one: impacts of musculoskeletal disorders

- Pain and its localization
- Use of medication,
- Decrease in quality of work and working hours,
- Absenteeism and early retirement,
- Disorganization of teams and disturbance of working atmosphere,
- Impact on the economy,
- Cessation of daily activity.

Part two: preventive measures for musculoskeletal disorders

- Good ergonomics
- Use of magnifying glasses
- Four-handed work

- Physical exercise

This study has no conflict of interest

3 Results

1016 articles were identified on the databases (Google Scholar and Pubmed), 1004 were retained after removing duplicates. After screening titles and abstracts, 937 articles were excluded. Thus, 67 articles were evaluated in full text of which 35 were excluded and 32 articles were included in the present study (Figure 1).

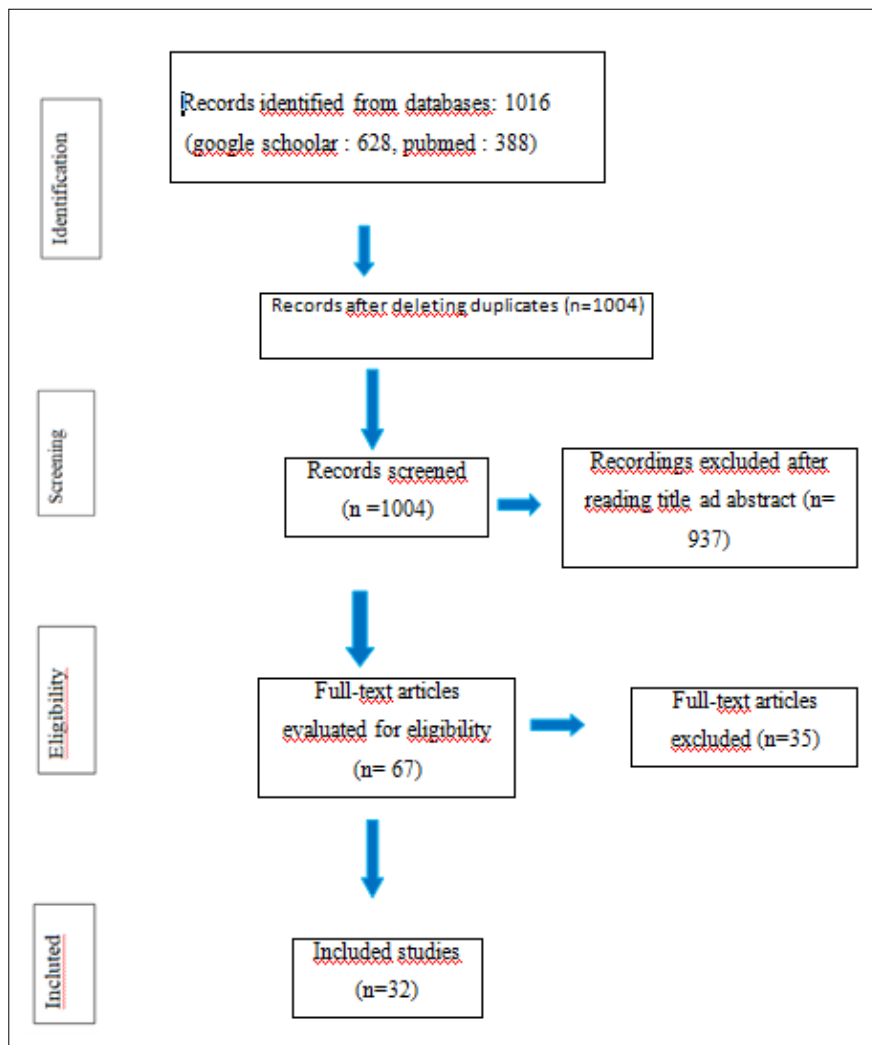


Figure 1 PRISMA flow diagram

Table 1 Distribution of articles according to the context mentioned in the article

	Frequency	Percentage (%)
Impacts of MSD	17	53.1
MSD prevention	9	28.1
Impacts and prevention of MSD	6	18.8
Total	32	100

Table 2 Distribution of articles according to the impacts of TMS

Impacts of MSDs	Frequency (n=23)	Percentage(%)
Pain located in the neck +++, lumbar spine, shoulders, elbow, wrist, hands, fingers, knee, ankle	13	56.5
Self-medication	4	17.4
Decrease in quality of work and working hours	4	17.4
Absenteeism and early retirement	3	13.0
Impact on the economy	1	5.3
Cessation of daily activity	1	5.3
Disorganization of teams, disruption of the working atmosphere	1	4.3

Table 3 Distribution of articles according to MSD prevention measures

Means of prevention	Frequency (n=15)	Percentage (%)
Good ergonomics	11	73.3
Magnifying glass use	05	33.3
Physical exercise	03	20.0
Four-handed work	01	6.6

4 Discussion

The objective of this study was to describe the impact and prevention of musculoskeletal disorders among Odontostomatologists, based on an analysis of 32 selected articles (figure 1). Among these articles, 53.1% confirmed the impacts of musculoskeletal disorders, 28.1% on prevention and 18.8% on both impacts and prevention measures (table 1).

4.1 Impacts of musculoskeletal disorders

4.1.1 Pain and medical impact

According to this study, the musculoskeletal disorder caused pain according to 56.5% of the articles more frequently in the neck (table 2). This may be linked to poorly designed workstations and poor vision of the patient's oral cavity. This result is consistent with other studies [18, 19].

In the long term, pain can be chronic, leading to restrictions in aptitude and disability among odontostomatologists. This leads them to seek help from a healthcare professional or resort to drug treatments as Table 2 shows us(17.4%). According to the study by Pejčić *et al*, the presence of musculoskeletal pain is associated with taking analgesics, at least once a week [20]. Odontostomatology's status as a medical profession facilitates access to self-medication analgesic drugs for practitioners suffering from musculoskeletal pain.

4.1.2 Professional repercussions

MSDs were also a source of reduced work quality and hours worked (17.4%) (table 2). This will subsequently cause a reduction in professional efficiency and a change in the work rhythms of odontostomatologists. This result is in agreement with the study by Pejčić *et al* [20]. The study by Feng *et al* also showed a reduction in professional activities in more than one practitioner out of five participants affected by MSDs [21].

At a more advanced stage, TMS could anticipate premature retirement (13.0%) (table 2). They represent the main cause of premature retirement of OS who have stopped working for health reasons [22]. According to Ronzi Y *et al*, it should

be noted that the symptoms of MSD can lead OS to situations of work stoppage of duration, incapacity, professional reclassification or even loss of work due to medical incapacity or dismissal and thus a drop in income [2].

The above-mentioned temporary or definitive interruption of activities had repercussions on the economy and financial means of odontostomatologists (5.3%) (table 2). According to statistics from the Autonomous Retirement Fund for OS and Midwives, illnesses or accidents in the “Rheumatology” medical specialty accounted for the largest proportion of daily benefits paid to dentists temporarily unable to practice [23]. This payment to the private dental surgeon is only possible from the 91st day following the onset of this incapacity to practice [24]. This represents a significant loss of income for the practitioner who must also continue to meet the expenses involved in the liberal practice and management of a dental practice such as paying rent, repaying a loan or paying the salaries of any employees. This can jeopardize the financial equilibrium and sustainability of the dental surgeon’s business. The obligation to leave the profession and change careers will therefore have an economic impact for the dental surgeon [25].

4.1.3 *Consequence on daily and personal quality of life*

In addition to these professional and economic consequences, this study showed that MSDs will also have an impact on the quality of life of an odontostomatologist (5.3%) who has suffered a MSD (table 2) and many authors have confirmed this situation in their studies [25, 26]. Feng *et al* found a reduction in the time devoted to daily leisure activities due to musculoskeletal symptoms in 25% of practitioners participating in their study [21]. Additionally, MSDs can lead to depletion of well-being, job dissatisfaction and finances for dental clinicians and the team [27].

4.1.4 *Consequence for the company or dental practice*

According to 4.3% of the articles studied (table 2), MSDs were the cause of the loss of quality, team disorganization and deterioration of the working environment. Added to this direct cost, there are the expenses of replacing absent employees, lowering productivity and increasing the company's contribution rate. MSDs will lead to a loss of productivity and quality for companies, making it difficult for employers to cope with absenteeism and to replace employees on sick leave, as well as difficulties in reclassifying them when they return to work. The indirect costs of MSDs for companies are estimated at several billion euros a year and for upper limbs MSDs alone, the overall cost would be close to 1.5% of the European gross domestic product (GDP) [2].

4.2 **Prevention of musculoskeletal disorders**

4.2.1 *Good ergonomic position*

According to the study, the majority of articles (73.3%) (table 3) showed that practicing good ergonomics is an important strategy for the preventing Musculoskeletal Disorders by adjusting the patient's chair and its position in relation to the practitioner. According to Hallaj S *et al*, adjusting the patient’s chairs and the odontostomatologist’s chair helps support the odontostomatologists’s neck of and thus improves working posture [28]. The intervention of ergonomic guidelines and exercises resulted in a significant reduction in MSDs in dental clinics according to the study by Nasar M *et al* [29].

4.2.2 *Using a magnifying glasses*

The use of magnifying glasses in the dental office helps prevent MSD according to 33.3% of the articles studied (table 3). In particular, the use of the ergonomic dental chairs with magnifying lenses led to positive changes in the working posture of the OS and placing them almost in the correct ergonomic position [30]. According to the study by Wilson C *et al*, the large effect size scale for vertically-adjustable-front-lens-mounted (VAFLM) loupes resulted in clinically relevant improvement in head tilt angles that may translate into better overall posture and reduced upper extremity MSDs in dental providers [31]. Similarly, the use of magnifying glasses appears to improve working posture and reduce shoulder pain [32].

4.2.3 *Four-handed work*

With a good ergonomic position, four-handed activity is an effective way to prevent MSDs (6.6%) (table 3) because according to Bridger RS, it minimizes undesirable movements by the operating team and accelerates the progress of most dental procedures [33]. Teams that practiced four-handed work showed a higher frequency of cervical syndrome while sciatica, hands, back, legs and circulatory system and system problems occurred in those who did not [34].

4.2.4 Physical exercise

This study showed that physical exercise after work had a positive effect on musculoskeletal disorders according to 20% of the articles (table 3). This result was brought by several studies. According to Pejčić N *et al*, regular exercise and massages improve flexibility, coordination and muscle strength [20]. In doing so, exercise promotes balanced musculoskeletal health and will also provide mental relaxation from the high psychosocial demands of work according to Rachmawati YL and Nawang D [35]. Furthermore, it plays an important role in their career to be healthy, safe and have a longer career according to Kovačevska Ivona *et al* [36].

5 Conclusion

Musculoskeletal disorder is an occupational disease frequently encountered among healthcare workers, particularly odontostomatologists.

It is the cause of pain and stiffness which at the same time disrupts the practitioner's professional and personal life, jeopardizing the image of the practice or company.

Musculoskeletal disorder is indeed a disease with catastrophic impacts, and working four handed in an ergonomically correct position corrects or minimizes the negative impact of this disease. Added to this is the practice of regular physical exercise and massage after work.

Thus, it is important to train oral health workers, especially students, in the prevention of this disorder and encourage them to practice in clinics during their university studies to ensure their health and working lives in the future.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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