International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

# Musculoskeletal Disorders in Dental Practitioners

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**Summary:**
The dentist is particularly exposed to the risk of developing one or more musculoskeletal disorders due to certain particularities and constraints inherent in the practice of his profession. Not only are work-related musculoskeletal disorders (MSDs) compromising professional but also personal life.
**Objective:** To assess among dentists the frequency of MSDs and their correlations.
**Methodology:** Over six months, 184 Marrakech dentists underwent a descriptive, cross-sectional survey. A typical Nordic questionnaire was applied to evaluate dentists' last 12-month physical state.
**Results:** Among practitioners, a 12-month high prevalence for musculoskeletal diseases was noted—83.7%. The most afflicted anatomical areas were lower back, cervical region, and upper limbs. Among the related elements are years of professional experience and > 45 years of age. These disorders compromised the quality of life and the working connection of both the practicing people.
**Conclusion:** A serious occupational health issue in dental offices, MSDs highlight the need for designing and implementing sensible prevention strategies.

**Keywords:** dentistry; Nordic questionnaire, musculoskeletal diseases; pain; impact.

## Introduction:

Chronic pain and functional impairment in joints, muscles, ligaments, tendons, nerves, and bones describe musculoskeletal diseases (MSDs) (1). These pains are caused or aggravated by work [2]. The different MSDs studied mainly concern neck pain, lower back pain, shoulder pain, upper limb pain, and knee pain. In the UK [3], Canada [4], and France [5], they are the most often occurring causes of absence in the workplace. MSDs follow upper respiratory tract disorders in the Czech Republic as the most common cause of work absenteeism [6].

Among dentists, musculoskeletal complaints had a one-year prevalence ranging from 50% to 93% [7, 8]. MSDs contribute significantly to sick leave, reduced productivity, and leaving the profession [9].

Dentists have recorded that the most often affected areas of the body are the neck, back, and shoulders [7, 8].

Ten often occurring MSDs have complex etiology [10]. They arise from tissue being overworked. These illnesses start from an imbalance between the expectations placed on the person and their physiological capacity to oppose. Self-repair systems thus get overwhelmed and result in pathological situations [11].

Still, MSDs at work go unreported even today. While several studies on this topic [12, 13] have been conducted, to our knowledge, no study on MSDs among Moroccan dentists has been done. The purpose of this study was to identify different kinds of MSDs among dentists and investigate their pertinent risk factors and effects on their working life.

**Materials and methods:**

This was a six-month descriptive cross-sectional observational research lasting 6 months, from November 1, 2022 to April 30, 2023. The study population was represented by public and private sector dental surgeons from the Association of Dental Doctors (AMD) in Marrakech.

After receiving the first responses, the reminder surveys were redistributed a second time to non-responders in order to increase the response rates for better statistics. Therefore, a total of 184 dentists were included.

The questions were answered using the Nordic standardized questionnaire created by Kuorinka et al. in 1987 [14], allowing the evaluation of dentists' last twelve-month physical state. It is useful for occupational health physicists, occupational epidemiological investigations, and CN questions of S-TPQ that are especially prepared for MSD screening aim.

In the following anatomical areas: Neck, Shoulder/Arm, Elbow/Forearm, Hand/Wrist, Fingers, Upper Back, Lower Back, Hip/Thigh, Knee/Leg, Ankle/Foot, the symptoms—pain, discomfort, stiffness—were evaluated in previous twelve months.

The first section of the questionnaire was to gather dentists' general background. Validated data variables acquired to assess risk factors for MSDs were gender, age, marital status, years of practice, the number of patients seen daily, and the effect of MSDs on daily life activities.

The second section of the questionnaire concentrated on statistical correlations between putative factors and MSDs.

**Statistical analysis:**

Data analysis conducted with SPSS 20 $P < 0.05$ defined statistical significance.

**Results:**

**1. General data in the study population:**

A 265 questionnaires were sent to dentists for our study sample; 184 of them were filled in (69.43% response rate). Our study population was predominantly female: 57.7% and under 45 years of age (64.7%). The age of the population ranged from 24 to 75 years. The average age of the dentists was 39.3 years (standard deviation: 9.96). Demographic details are presented in Table 1.

9.96).Demographic details are presented in Table 1.

| | **Number of dental surgeons (n=184)** | **Percentage (%)** | **P (significance level)** |
|---|---|---|---|
| **Sex** | Female: 106<br>Male: 78 | 57.7%<br>42.3% | 0.491 |
| **Marital status** | | | |

| | | | |
|---|---|---|---|
| Bachelor<br>Married<br>Divorce<br>Widower | 54<br>114<br>10<br>6 | 29.3%<br>62%<br>5.4%<br>3.3% | **0.003** |
| **Age group (year))**<br>≤45 years old<br>>45 years old | <br>119<br>65 | <br>64.7%<br>35.3% | <br><br>**0.000** |
| **Number of patients seen per day**<br>≤20 sick<br>Between 20-40 patients<br>>40 patients | <br>73<br>90<br>21 | <br>39.7%<br>48.9%<br>11.4% | <br>0.582 |
| **Exercise duration**<br>≤10 years<br>>10 years | <br>85<br>99 | <br>46.2%<br>53.8% | <br>**0.000** |
| **Nature of work**<br>Part time<br>Full time | <br>118<br>66 | <br>64.1%<br>35.9% | 0.178 |

**Table I: Sociodemographic characteristics of dental surgeons (n = 184)**

**2. Prevalence of musculoskeletal symptoms:**

Of the responding dentists, 30 (16.3%) said they had no symptoms; 154 (83.7%) experienced musculoskeletal complaints in at least one anatomical area during the past twelve months.

**3. Affected Anatomical Sites**

For each anatomical region examined, the frequency of musculoskeletal symptoms was sought to identify those most affected. Table 2 presents the results for the period of the "last 12 months". Some anatomical areas were particularly more affected than others. Indeed, most dentists had experienced symptoms in the "Arm/Shoulder" region (88 surgeons, or 47.8%), followed by the "Upper back" (87 surgeons, or 47.3%), then the "Neck/Nape" (86 surgeons, or 46.7%) and finally the "Lower back" (85 surgeons, or 46.2%). In addition, 41 dentists (22.3%) reported problems in the “Thigh/Hip” region, 39 dentists (21.2%) in the “Fingers” area and 36 surgeons (19.6%) in the “Leg/Knee” area. Other regions were less affected:33 surgeons (17.9%) for “Wrist/Hand”, 20 surgeons (10.9%) for “Foot/Ankle” and 19 surgeons (10.5%) for “Forearm/Elbow”. Thus, over the “last 12 months” period, the anatomical areas most affected in the participants were located in the cervical region, the upper limb, and the lower back.

| **Anatomical area** | **Number of dentists who presented musculoskeletal symptoms in the anatomical area concerned** n (%) |
|---|---|
| Neck/Nape | 86 (46.7) |
| Arm/Shoulder | 88 (47.8 ) |
| Forearm/Elbow | 19 (10.3) |

| | |
|---|---|
| Wrist/Hand | 33 (17.9) |
| Fingers | 39 (21.2 ) |
| Upper back | 87 (47.3) |
| Lower back | 85 (46.2) |
| Thigh/Hip | 41 (22.3) |
| Leg/Knee | 36 (19.6 ) |
| Foot/Ankle | 20 (10.9) |

**Table 2: Number and percentage of dentists who presented musculoskeletal symptoms during the previous 12 months, by anatomical area.**

Over the “last 7 days” period, musculoskeletal symptoms were present in 70 dentists (38%) while 114 dentists (62%) had no disorder.

The majority of practitioners reported a 12-month prevalence of musculoskeletal symptoms in multiple body areas (64.1%) and 19.6% had symptoms in only one area (Table 3).

| Number of affected areas | Number | Percentage (%) |
|---|---|---|
| One zone only | 36 | 19.6 |
| Multiple areas | 118 | 64.1 |

**Table 3: Distribution of dentists by number of areas affected**

The prevalence of MSDs was not similar in male and female practitioners. Thus, in the "Hand, Wrist" region, there was a male predominance (p = 0.05) and in the "lower back" region, the majority of practitioners were women (p = 0.03). The prevalence of MSDs by anatomical areas according to gender is presented in Table 4.

| Anatomical area | Women (n) | Men (n) | P (significance level) |
|---|---|---|---|
| Neck | 52 | 34 | 0.463 |
| Shoulder/Arm | 53 | 35 | 0.491 |
| Elbow/Forearm | 10 | 9 | 0.643 |
| Hand/Wrist | 14 | 19 | **0.05** |
| Fingers | 20 | 19 | 0.368 |
| Upper back | 46 | 41 | 0.218 |
| Lower back | 60 | 25 | **0.03** |
| Hip/Thigh | 23 | 18 | 0.824 |
| Knee/Leg | 16 | 20 | 0.149 |
| Ankle/Foot | 10 | 10 | 0.466 |

**Table 4: Prevalence by MSD area according to sex**

All practitioners over 45 years old suffered from MSDs. No particular trend was observed between the occurrence of MSDs and the number of patients seen per day (p=0.582).

The prevalence of MSDs by years of practice was statistically significant (p=0.000). The prevalence of MSDs was not significantly different between full-time and part-time practitioners (p=0.178).

### 3. Intensity of pain felt:

The intensity of pain felt by dentists at the time of answering the questionnaire was carried out by self-assessment (Figure 1).

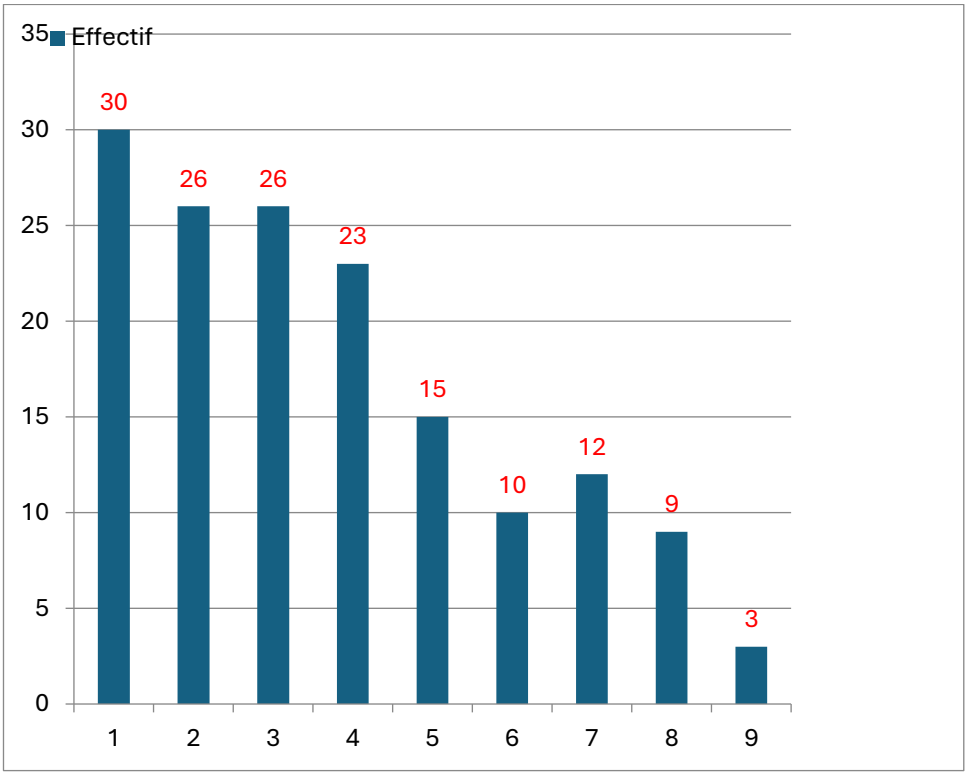


**Figure 1: Pain intensity (pain VAS)**

**Figure 1:**Number of symptomatic dentists (intensity > 0) at the time of completing the questionnaire according to the intensity of pain felt in all areas combined

### 4. Impact of MSDs on practitioners:

The impact of MSDs on practitioners' daily activities is presented in the table5. MSDs had led to medical consultations, a reduction in work and leisure activities, hospitalizations, and sick leave.

| | Frequency | Percentage (%) |
|---|---|---|
| **Reduction in professional activity** | 60 | 32.6 |
| **Reduction in leisure time** | 53 | 28.8 |
| **Medical consultations** | 26 | 14.13 |
| **Hospitalization** | 3 | 1.63 |
| **Sick leave** | 12 | 6.52 |
| **No impact** | 30 | 16.3 |

**Table 5: Impact of MSDs on daily activities**

**Discussion:**

Our study revealed the great frequency of musculoskeletal complaints among dentists. Furthermore, comparable to other research from Australia (87.2%) [15] and Lithuania (86.5%) [16], was the frequency of MSDs in Morocco. Still, it was lower in Saudi Arabia (59.2%) [18] and greater in Turkey

(94%). [17]. Compared to an Indian population (25.9%), our study cohort of dentists had a far greater prevalence of MSDs [19].

In line with other research [20, 21], age and years of practice were statistically significant for MSD prevalence in our study. Older practitioners either have evolved adaption methods, like better ergonomic posture, exercise, and rest, or see fewer patients because of age-related issues.

Although this was not validated in our investigation, a study from the Czech Republic found the daily patient count as a predictor of MSDs [12].

Different types of work and posture make dentists prone to pain in certain parts of the body [22]. Our findings match several studies showing that the most often affected areas are the extremities, cervical spine, and lower back [23, 24].

MSDs compromise practitioners not only physiologically but also psychologically [25], which reduces productivity and quality of life.

Many research studies have revealed that MSDs are rather widespread among dentists due to static postures in dental practice, which are maintained for lengthy durations, repeated movements, force exertion, vibrations and psychological stress [26,27]. One of the restrictions is that, as this is a cross-sectional study, variables could not be determined causally.

For epidemiological application, the Nordic questionnaire applied is thus standardized, verified, and consistent [14, 28]. Still, adding further details on participants' general health state, musculoskeletal history, and physical activity practice would help to clarify the outcomes.

**Conclusion:**

To address this high MSD prevalence, the association shows that dentists would need increased information regarding musculoskeletal dysfunction and related health. More research is required to define particular risk factors and create successful preventive strategies.

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