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Association between Postural Disorders and Temporomandibular Dysfunction among Dental Students: A Cross-Sectional Study

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ABSTRACT

Temporomandibular dysfunction includes conditions that impact the jaw joint and surrounding muscles. Their facial expressions show different kinds of pain, trouble moving their jaw, making noises at joints, or having headaches. Several elements could contribute to their display, such as posture discrepancies. This research aimed to determine how common temporomandibular joint disorders were among dental students during their clinical training at our faculty, and to examine if there is a connection between these conditions and specific posture issues. A cross-sectional descriptive study was conducted by administering a self-completed electronic questionnaire that included both a physical examination of the mouth and posture analysis. The findings show that there is often an issue with TMJ in this group of students, and some connections exist between posture problems like shoulder unbalance and joint discomfort. Data show that managing TMD requires considering posture alongside other disciplines. This approach ensures accurate diagnosis and ongoing care

Introduction

Temporomandibular dysfunction (TMD) is a common, unknown, complex and self-induced condition. (Okeson, 2019) They happen when the mouth's ability to chew exceeds what it can handle. (Breton-Torres I, 2016) ROBIN. Olivier. Les Ulis was released in 2013.

TMD receives attention through various disciplines today, combining dental care, neurological insights, psychological understanding, and postural analysis. Global strategy becomes crucial due to non-local factors' impact on TMJ's cause. (Cazals G, 2017) Postural disorders have become increasingly prominent in scientific research. In the 1960s, many research showed that poor posture affects TMJ problems. The current understanding is that even though the manducatory system lacks true "postural input," it still affects posture control. (Michel MARIGNAN, 2016)

Subjective research does not yield conclusive findings. Only specific types of TMDS impact body equilibrium.

Studies on TMD factors among dental students have been conducted, yet they lack consideration for posture. (B Jagdhari Smriti1, 2014), but an exception is made for a study done by Assel C in 2023 which found a connection between posture and TMJ disorders among music students.

Could dental care have something to do with TMJ problems? Dentists often make people sit in awkward positions for long periods, which might contribute to TMJ issues.

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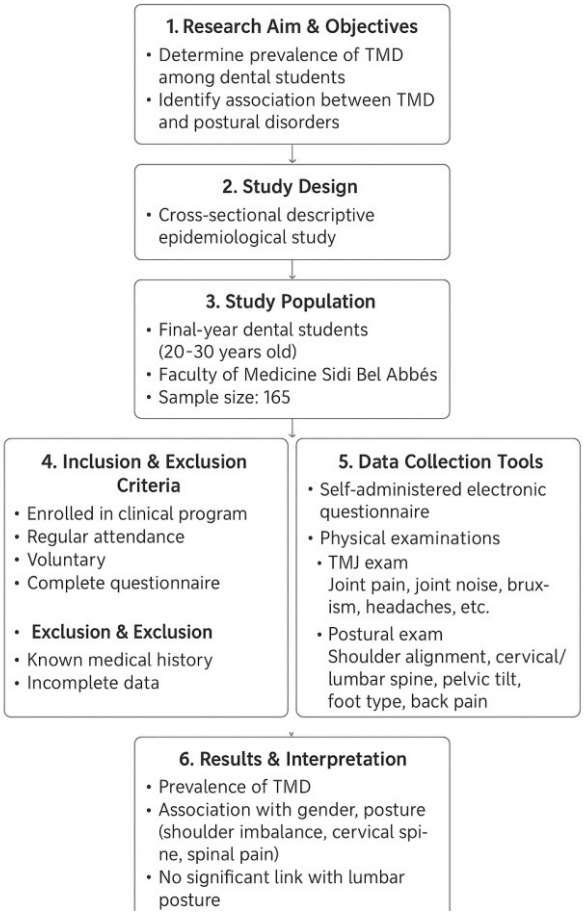

Figure 1: methodological diagram

1. Research aims and objectives:

The main goal of this research was to find out how many students in dental school have TMJ problems. The secondary objectives were to: identify factors associated with the onset

of TMD. Estimating the occurrence of back pain and posture issues among dental students during their training period.

2. Study design:

A cross-sectional descriptive epidemiological study was carried out in the periodontics section of the dental school at the TALEB Morad Sidi Bel ABBES Faculty of Medicine for four months from February 2025 to May 2025.

3. Study population:

The group we're studying consists of dental students enrolled in their final year at our TALEB Morad Faculty of Medicine because of these factors. Accessibility and availability: Students' regular attendance at the dental clinic encourages them to fill out questionnaires and undergo examinations. Students in the clinical cycle gain new understanding about TMJ disorders by learning them during their last semester of preclinical studies. This knowledge helps them interpret and react to self-assessments effectively. The course concludes with an emphasis on TMJ disorders at the end of the occlusodontics module. By concentrating on a youthful populace, we diminish the impact of age-related illnesses that might act as an extraneous variable. Students in the clinical cycle must demonstrate recent clinical experience as part of their seniority criterion,

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reducing potential bias associated with longer periods of practice. Practicing professionals are left out because of this reason.

Clinical training starts with basic tasks like scaling and conservative treatments. Often done under poor ergonomics, these procedures can lead to bad posture habits. Early signs of TMJ disorders should be recognized to prevent long-term issues.

4. Inclusion and exclusion criteria:

Inclusion criteria:

Enrolled students in the clinical program.
Between twenty and thirty years old.

Regular attendance at the clinic.

Questionnaire completed in full.

Voluntary participation with no constraints.

Confidentiality and anonymity of the data collected.

Exclusion criteria:

Presence of a known medical history. Incomplete questionnaire. Initially, 170 students were selected; however, only 165 met the inclusion criteria. The number of people studied was 165.

5. Data collection tools:

A self-administered electronic questionnaire becomes designed to accumulate the facts required for this look at, such as several sections protecting:

Socio-demographic and scientific statistics: age, sex, 12 months of examine and medical and surgical records.

DTM exam : joint pain, joint noise, dyskinésies, migraine, Head aches, bruxisme, parafunctions, etc.

Postural exam: shoulder alignment, pelvic alignment, cervical sag, lumbar sag, foot kind and back pain.

The questionnaire was distributed electronically and completed anonymously by clinical cycle students.

After facts series, evaluation changed into achieved on SPSS version 21 software program.

6. results and interpretation:

6.1. Description of the study population by age group:

The students' ages ranged from 20 to 30 years, with the majority being between 20 and 23 years old (75.1%). This was followed by students aged 24 to 26 years (21.9%) and those aged 27 to 30 years (2.4%). The average age of the students was 22.84 years. (Figure 2)

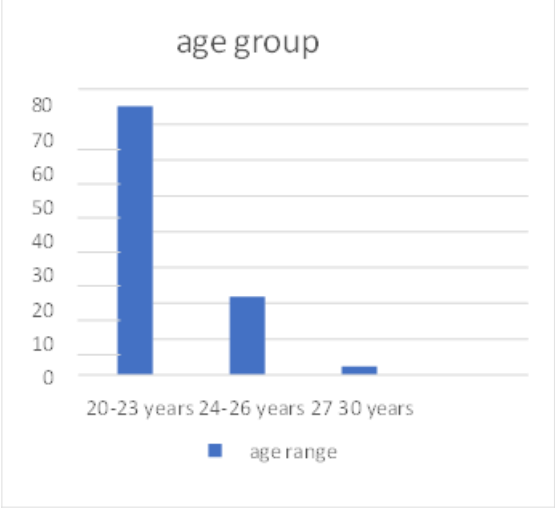

Figure 2. Distribution of students by age group.

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6.2. Description of the student population by gender:

Students break down into 70.30% women and 29.70% men, giving a male/female sex ratio of 0.43.

(figure 3)

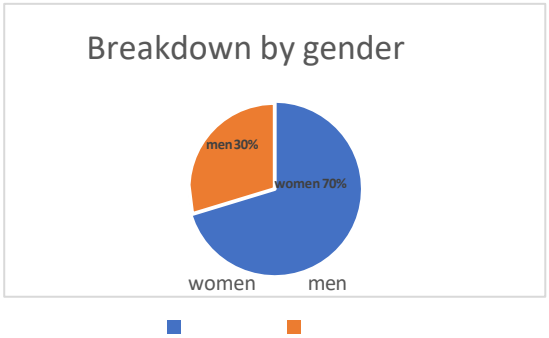

Figure 3: Distribution of students by gender.

6.3. Description of the study population according to the presence of at least one sign of TMD:

Among the students, 58.18% had at least one sign of TMD, while 41.82% had none (Figure 4).

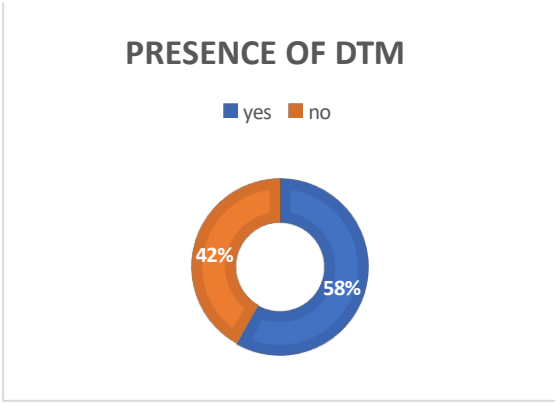

Figure 4: Distribution of students according to the presence of signs of TMD.

6.4. Interpretation of TMD by gender:

H0 (null hypothesis): there is no statically significant association between gender and the presence of TMD.

H1 (alternative hypothesis): there is an association between gender and the onset of TMD. Statistical test: X^2 of independence.

Table 1: Distribution of TMDs by gender.

	Women	**Men**	**Total**
Presence of TMD	76	20	**96**

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No TMD	40	29	**69**
Total	**116**	**49**	**165**

Degree of freedom: (2-1) × (2-1) = 1
Significance level: α = 0.005 Critical value of X^2 = 3.841
Value of X^2: 8.72 (greater than 3.841)
The null hypothesis is rejected. There is therefore a statistically significant association between gender and the presence of TMDs.
There are several hypotheses to explain this difference, firstly certain physiological characteristics, such as hormonal variations, with greater joint laxity linked to oestrogen levels, oestrogen receptors being present in the TMJ. (Minghelli B, 2014)

6.5. Interpretation of TMD according to shoulder alignment

H0 (null hypothesis): There is no significant link between having TMD and shoulder alignment.

H1 (alternative hypothesis): There is a connection between the start of TMD and shoulder alignment.

Statistical test: Chi-square test for independence (Table 2)

Degrees of freedom: (2-1) = 1

Significance level: α = 0.005

Critical value of chi-square: 3.841

Chi-square value: 5.25 (which is higher than 3.841)

The null hypothesis is rejected.

This means there is a statistically significant link between shoulder alignment and the presence of TMDs.

Scapular asymmetry, like one shoulder being higher or lower than the other, might be a postural factor linked to having TMDs.

It could also be seen as a postural factor that increases the chance of developing temporomandibular dysfunction.

Table 2: Distribution of DTMs according to shoulder alignment.

	Shoulder imbalance	**Straightness of shoulders**	**Total**
Presence of TMD	15	81	**96**
No TMD	3	66	**69**
Total	**18**	**147**	**165**

6.6. Crossing of the TMD with the cervical arrow:

H0 (null hypothesis): there is no statically significant association between the presence of TMD and cervical spine.

H1 (alternative hypothesis): there is an association between the appearance of TMD and cervical spine.

Statistical test: X^2 of independence. (table 3)

Degree of freedom: (2-1) × (2-1) = 1

Significance level: α = 0.005

Critical value of X^2 = 3.841

X^2 value: 5.75 (which is higher than 3.841)

The null hypothesis H0 is rejected, meaning there is a statistically significant connection between a pathological cervical spine and the presence of TMD.

A problematic cervical spine, whether it's exaggerated or reduced, might be seen as a postural factor that increases the chances of developing TMD.

This link could be because imbalances in the muscles and joints of the neck affect the position of the jaw and how the temporomandibular joint works.

Table 3: Distribution of DTMs according to neck deflection.

	Arrow cervical spine	Arrow physiological cervical spine	Total
Presence of TMD	20	76	**96**
No TMD	5	64	**69**
Total	**25**	**140**	**165**

6.7. DTM crossed with lumbar arrow:

H0 (null hypothesis): there is no statically significant association between the presence of DTM and lumbar sag.

H1 (alternative hypothesis): there is an association between the appearance of TMD and lumbar sag.

Statistical test: X^2 of independence. (Table 4)

Degrees of freedom: (2-1) × (2-1) = 1

Significance level: α = 0.005

Critical value of X^2 = 3.841

The calculated X^2 value is 2.10, which is less than 3.841

Therefore, the null hypothesis is not rejected, meaning there is no significant link between lumbar sagittal posture and the presence of temporomandibular disorders. Lumbar posture, even though important for overall postural balance, does not seem to be directly connected to the occurrence of temporomandibular dysfunction in this group of students. It does not appear to be directly related to the development of temporomandibular dysfunction in this student population.

Table 4: Distribution of MTDs according to lumbar spine deflection.

	Lumbar spine pathological	physiological	Total
Presence of DTM	21	75	**96**
No DTM of DTM	9	60	**69**
Total	**30**	**135**	**165**

6.8. Cross-tabulation of TMD with spinal pain:

H0 (null hypothesis): there is no statically significant association between the presence of TMD and spinal pain.

H1 (alternative hypothesis): there is an association between the onset of TMD and spinal pain.

Test statistic: X^2 of independence.

(Table 5).

Degree of freedom: (2-1) × (2-1) = 1

Significance level: $\alpha = 0.005$

Critical value of $X^2 = 3.841$

Value of X^2: 10.23 (which is higher than 3.841)

The null hypothesis H0 is rejected, meaning there is a statistically significant link between spinal pain and the presence of TMDs.

Spinal pain, whether in the neck, upper back, or lower back, might be seen as a postural factor connected to temporomandibular dysfunctions.

This connection may be due to the neuromuscular and biomechanical relationship between spinal posture and the function of the jaw area

Table 5: Distribution of MTDs according to spinal pain.

	Presence of spinal pain	**No spinal pain**	**Total**
Presence of DTM	59	37	**96**
No DTM of DTM	25	44	**69**
Total	**84**	**81**	**165**

7. Discussion:

7.1. Comparison age groups with other studies:

Our results are in line with:

- National Center for Education Statistics, which showed that over 65% of students are under the age of 24 years old (Statistics, 2023).

- A cross-sectional study with a sample size of 60 patients has found that age was 25.32+10.6. (al., December 2024)

- According to Eurostat data, over 50% of students enrolled in tertiary education are aged between 20 and 24.

(Eurostat., 2024)

7.2. Comparison gender with other studies:

- According to Open Edition Journal, the predominance of women reflects a trend observed nationally and internationally in medical and paramedical courses, including dentistry. (Page-Hercouet, 2008)

- Yousfi in his study of 100 patients also found a predominance of the female gender with 64% against 36% of men. (K., 15 mai 2022)

7.3. Comparison presence of at least one sign of TMD:

Our results are comparable with:

- Data from the National Institute of Dental and Craniofacial Research (NIDCR, 2025) which found that approximately 50-75% of adults have at least one clinical sign of TMD.

at least one clinical sign of TMD (Research., National Institute of Dental and Craniofacial Research. Prevalence of TMJD and its Signs and Symptoms. 2025)

- The prevalence of TMD reported in these student populations is relatively variable. The averages found among dental and medical students are very close, equal to 55.2% and 57% respectively. (Özdinç S, 2020); (Xie C, 2019)

7.4. Comparison of TMD cross gender with other studies:

Betül Çiftçi, Aslıhan Uzunkulaoğlu, and Deniz Öke Topçu studied 325 adults.

They found that about 10.30% had a shoulder issue, while 89.7% were considered normal (Betül Çiftçi, 2021)

4. Conclusions

In our cross-sectional descriptive study, a significant association has been found between the presence of TMD and postural disorders, confirming our initial hypothesis. Indeed, good working posture can not only prevent the onset of musculoskeletal disorders, but also limit the stresses that affect

7.5.comparison of TMD cross vertebral pain with other studies:

Hourest & al. found an interrelation between DAM and associated musculoskeletal pain. (Hourset M, 1 oct 2019)

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