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Acute and Chronic Temporomandibular Disorder Pain:

A review of differentiating factors and predictors of acute to chronic pain transition

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Abstract

Aims: The aims of this review were to: (i) assess the factors that differentiate acute from chronic temporomandibular disorders (TMD) pain; (ii) assess the risk factors associated with the transition from acute to chronic TMD pain; and (iii) summarize and appraise the studies.

Method: The databases used were MEDLINE, Embase, and Cochrane Database of Systematic Reviews. Eligible studies included articles comparing acute to chronic TMD pain, and cohort studies assessing the risk factors implicated in the transition from acute to chronic TMD pain.

Results: Seven articles were selected: one case-control study, three cross-sectional studies, and three cohort studies. These studies found that psychological factors were more common in chronic than acute TMD pain patients; however, these factors did not increase the transition risk in the multivariable model. Myofascial and baseline pain intensity were associated with the transition from acute to chronic TMD pain at a 6-month follow-up. Due to methodological weaknesses in the available literature, more research is required to establish the risk factors implicated in the transition from acute to chronic TMD pain.

Conclusion: This review found some evidence that myofascial pain and pain intensity are associated with the transition risk from acute to chronic TMD pain at a 6-month follow-up. There is insufficient evidence to draw conclusions about the role of demographics and psychological disorders as independent risk factors.

Keywords: Temporomandibular Disorders, Acute Pain, Chronic Pain, Transition, Review.

Introduction

Temporomandibular Disorders (TMD) are a group of musculoskeletal disorders which affect the muscles of mastication, the temporomandibular joints, and/or associated structures.[4] Studies put in evidence several biopsychosocial factors associated with the risk of TMD pain.[5-12] Persistence of TMD pain is common; about one-third to half of TMD patients continue to suffer TMD pain after follow-up.[13-15] Thus, it is crucial to prevent acute TMD pain from becoming chronic, which is more challenging to treat.

The **A**cute to **C**hronic Pain Transi**TION** (ACTION) Program was established to identify the risk factors implicated in the transition from acute to chronic TMD pain, and to promote new methods to prevent this transition. As stated by the National Institutes of Health (NIH), "we do not fully understand how acute progresses to chronic pain at any level, from molecular to behavioral".[22]

The aim of the first phase of the ACTION Program was to review the evidence available to identify factors that differentiate acute from chronic TMD pain, as well as the risk factors associated with the acute to chronic TMD pain transition. Thus, we conducted a review addressing these two questions, taking into account the quality of the articles included in this review.

Methods

Eligibility criteria

Studies that compared acute to chronic TMD pain and those that assessed the risk factors associated with the transition from acute to chronic TMD pain were the potentially eligible studies for inclusion in this review. From those, only studies that used a temporal criterion to

define acute and chronic TMD pain were included in this review. Further, animal studies, unpublished studies, reports, systematic reviews, meta-analysis, conference abstracts, editorials, case reports and case series, and randomized clinical trials (RCT) were excluded. We decided not include unpublished studies since the methodology and quality are better assessed in peer-reviewed articles than in "gray literature" such as conference proceedings.[24,25]

Search strategy and data collection

The literature search was performed using MEDLINE, Embase, and the Cochrane Database for articles published from 1992 to March 2020. Table 1 illustrates the Medical Subject Headings (MeSH) terms and text words used in the search. The search strategy was designed by the librarian. General terms were used to increase the likelihood of finding the target articles. Results of the search were downloaded into Endnote X7.5 and Rayan QCRI.

Four authors (O.S., A.V., S.E., E.L.) participated independently in the screening stage to identify potential articles; all abstracts were read, and potential eligible articles were selected. The same authors assessed the full potential of the articles to further determine their eligibility. In the case of a disagreement between evaluators, a consensus was achieved through group discussion with all reviewers. Data were extracted in similar fashion from all selected articles to decrease the potential bias that may occur when information gathering is done subjectively.[26]

Quality assessment

Three evaluators appraised the quality of the eligible studies (O.S., S.E., A.V.). The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines were

followed to evaluate the published studies.[25] Also, we used the NIH score (https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools) to assess the quality of the articles. We added the following items from STROBE such as Study design (# 4), Statistical methods (# 12), Participants (# 13), Main results (#16), Limitations (# 19), and Generalisability (#21) to the NIH score calculation to assess the quality of the studies.

Results

Figure 1 shows the PRISMA diagram that illustrates the article selection process. The initial search of the literature yielded 1825 publications from January 1992 to March 2020: Medline (n = 173), Embase (n = 1598) and Cochrane (n = 54). From 1825 publications, 210 were excluded as they were duplicates. From 1615 publications that were screened, 1329 were excluded. Of the remaining 286 potential articles, 279 articles were excluded. Ultimately, seven articles satisfied the eligibility criteria and were included in this review: one case-control study,[27] three cross-sectional studies,[28-30] and three cohort studies.[31-33] The quality of these studies ranges from 22% to 56% thus the risk of bias needs to be considered (Table 2).

Factors differentiating Acute from Chronic TMD pain

Studies listed in Tables 3 to 5 compared acute to chronic TMD pain. Gatchel *et al*.[27] conducted a case-control study enrolling 101 TMD pain patients referred by dentists and oral surgeons in the Dallas-Fort Worth area to the Division of Psychology at the University of Texas Medical Center. Diagnosis of TMD was based on Laskin's criteria,[34] and chronic TMD pain was defined as pain that persists for equal or more than 6 months.

Reiter *et al.*[28] and Nguyen *et al.*[29] conducted cross-sectional studies where chronic TMD pain was defined as pain that persists for 3 months or more. In Cao *et al*.[30] cross-sectional study, chronic TMD pain was defined as pain that persists for more than 3 months. TMD diagnosis was based on Research Diagnostic Criteria (RDC/TMD)[35] or Diagnostic Criteria (DC/TMD).[36] The samples in Reiter *et al.,*[28] Nguyen *et al.*[29] and Cao *et al*.[30] studies consisted of 188 TMD patients from Tel Aviv University, 198 patients from the Dental Hospital of Chulalongkorn University, and 112 TMD pain patients from the Center for TMDs and Orofacial Pain, Peking University School and Hospital of Stomatology, respectively.

Demographics

No statistically significant differences were found on the mean age,[27-30] race,[27] education,[27] and social class[27,28] distributions between the acute and the chronic TMD pain groups (Tables 3 to 5). Unfortunately, Gatchel *et al*.[27] and Nguyen *et al.*[29] did not provide the *P-values* or 95% confidence intervals (95%CI), and Reiter *et al.*[28] did not provide numerical values (count, percentage, or mean), only the *P-values*: P_{sex} = 0.28, P_{age} = .28, $P_{\text{employment status}}$ = .28, $P_{\text{marital status}}$ = .66, P_{income} = .28, $P_{\text{education}}$ = .97, and $P_{\text{missing work days}}$ = .73. While Cao *et al*.[30] found that relative to males, females had higher odds of chronic than acute TMD pain (Odds ratio [OR] = 3.39, 95% Confidence Interval [CI] = 1.15-9.90), most studies did not find a significant sex difference between groups.[27-29]

Psychological factors

Tables 3 to 4 illustrate the distribution of psychological factors between acute and chronic TMD pain groups. Depression,[27,28,30] somatoform disorders[27,28] and stress[30] were significantly more common among the chronic than the acute group.

Three studies evaluated the distribution of anxiety and found conflicting results. Gatchel *et al*.[27] found that in the acute TMD pain group, anxiety disorders were more prevalent than in the chronic group, contrary to findings of Reiter *et al.,*[28] and Cao *et al.*[30] where no statistically significant differences were found between groups.

There were no statistically significant differences on the distribution of substance abuse, eating disorders, adjustment disorders, and personality disorders.[27] The evidence of nondifference between groups is limited to a single study with a small sample size, making the conclusions weak. It is peculiar that paranoia in the Gatchel *et al*. study[27] was found in 16% and 18% of acute and chronic TMD pain patients, respectively. It is possible that this finding was caused by selection bias since the patients were referred to the Division of Psychology at the University of Texas Medical Center.[27]

TMD diagnosis, pain intensity, Grade Chronic Pain Scale, and comorbidities

Reiter *et al*.[28] found that the acute and chronic TMD pain groups differ significantly regarding the diagnosis of myofascial pain without limited opening (P = .008), myofascial pain with limited opening (P = .02), and arthralgia (P = .02), but without giving the direction of this difference. Nguyen *et al.*[29] found that myalgia was the most common diagnosis for both groups, and arthralgia was more common in the acute group, even though this difference was not statistically significant (Table 5).

Further, no statistically significant differences were found on the means of pain intensity[29] (P = .74[28]), pain frequency[29], Grade Chronic Pain Scale (GCPS, P = .88[28]), disability days (P = .83[28]), and disability score (P = .07[28]) between the two TMD pain groups.

Cao *et al.*[30] reported that chronic TMD pain patients had higher levels of sleep impairment mostly due to the use of sleep medication (Table 4). Nguyen *et al.*[29] found that coexisting pain beyond orofacial areas (e.g. facial pain, neck, abdomen) was more common among patients with chronic TMD pain and only chronic TMD pain participants presented comorbidities (e.g. fibromyalgia, chronic fatigue syndrome) (Table 5).

Factors associated with the transition from acute to chronic TMD pain

Three 6-month cohort studies were conducted by Garofalo *et al*. (1998)[31] and Epker *et al*. (1999 and 2000)[32,33] to identify predictors for the transition from acute to chronic TMD pain. These studies[31-33] used similar methodologies. TMD patients were referred by general dentists or oral and maxillofacial surgeons to the TMD Clinical Treatment Program at the University of Texas Southwestern Medical Center in Dallas. Newspaper or university campus fliers also advertised the study to recruit potential patients. Acute TMD pain patients were eligible if they had never looked for TMD treatment or sought treatment within six months of the first visit evaluation. The authors justified that their criterion for defining acute TMD pain was aimed at decreasing the chance of recall bias, since recalling when pain begins is difficult, and patients tend to look for treatment only when the pain reaches a clinically significant level. A telephone interview was conducted at the 6-month follow-up using the GCPS[37] to assess the transition from acute to chronic TMD pain, defined by a CPI score greater or equal to 15 at 6-month of follow-up.

In the Garofalo *et al*. study,[31] out of 164 acute TMD pain cohorts, 153 (93.3%) completed the 6-month follow-up and 87 (56.9%) developed chronic TMD pain. In the first Epker *et al.* study,[32] from 204 acute cohorts, 175 (85.8%) completed the follow-up and 144 (82.3%) developed chronic TMD. It is possible that the Epker cohorts included patients from the Garofalo cohorts.

The Garofalo *et al*.[31] and Epker *et al.*[32] prospective 6-month cohort studies revealed that only CPI and myofascial pain (Axis I Group I disorder) at baseline were associated with the transition risk (Table 6). Epker *et al*.[32] found a negative association between CPI and transition ($\beta = -0.06$, $P < .001$) on the logistic regression analyses, in contrast to Garofalo *et al*. ($\beta = 0.03$, $P = .003$).[31] Both authors concluded that the CPI score at baseline was positively associated with acute to chronic TMD pain transition risk. This slope inversion may be due to the covariates included in the final model: the Garofalo *et al*. study[31] included CPI, GCPS, myofascial pain, nonspecific symptoms, and an interaction term between sex and Group I disorders, while the Epker *et al*. study[32] only included the statistically significant variables, CPI and myofascial pain. In addition, a borderline association was found with GCPS III or IV by Garofalo *et al*. (1998).[31] The association between myofascial pain and the transition risk appears to be modified by sex ($\beta_{\text{interaction factor between Group I and sex}} = 1.22$, $P = .09$). Psychological factors and age were not associated with this transition.[31,32]

Epker and Gatchel's[33] conducted a second study with 115 acute TMD patients to investigate if coping profiles were associated with the transition from acute to chronic TMD pain. Using the Multidimensional Pain Inventory (MPI) instrument, acute TMD patients were classified as: dysfunctional (greater severity of pain, higher levels of affective distress, lower levels of activity,

and greater pain interferences), interpersonally distressed (lacking support from significant others), or adaptive copers (less severe pain, lower levels of pain-related interference and interpersonal distress). Of the acute TMD pain patients, 83% with dysfunctional and interpersonally distressed profiles and 48.4% with adaptive coper profiles developed chronic TMD pain ($P < 0.001$).

Discussion

The results of this review demonstrated that the transition from acute to chronic TMD pain is common.[31,32] This goes in line with the findings that acute to chronic transition is common (23% to 67%) with postoperative and back pain.[38-40]

We found that myofascial pain was associated with the risk of transition from acute to chronic TMD pain, and that this risk was not confounded by nonspecific symptoms, pain intensity, and GCPS. This risk appears to be greater among females. The magnitude of the association may not be overestimated as these studies are prospective. These findings are in parallel with Reiter *et al*.[28] findings where myofascial pain was more common among the chronic TMD pain group. It is worth noting that myofascial pain is also considered a major risk factor for chronic pain.[41,42] We do not know if the contribution of myofascial pain is modified by the type of muscle pain (e.g., myalgia or myofascial pain), presence of comorbidity, pain duration, or any unmeasured confounder.

Cohort studies found that pain intensity at baseline were associated with the persistence of TMD pain.[15,43-45] The findings of this review suggest that pain intensity is a relevant risk factor for the transition from acute to chronic TMD pain. This risk was not confounded by myofascial

pain diagnosis, GCPS, nonspecific symptoms, or sex.[31] These findings concur with other studies that also found that pain intensity contributes to acute to chronic pain transition.[38-40] This association may not be modified by the definition of acute or chronic pain. Acute back pain intensity contributed to the acute to chronic pain transition, regardless of the definition of acute pain (lasting from 1 to 8 weeks,[39,46] ≤ 1 week[47], less than six months[48]), or chronic pain (3-month,[46,47] and six months or more, and ≥ 20mm on the 0-100 VAS and ≥ 5 on the Roland and Morris Disability Questionnaire[48]). It is possible that pain intensity risk is modified by pain type (e.g., continuous), comorbidity, and duration of acute pain.

This review found that disability may also contribute to the transition risk, since a borderline risk was found with GCPS III or IV.[31] This goes in line with Reiter *et al*.[28] on a borderline difference on the disability score between acute and chronic TMD cases ($P = 0.07$).

Somatoform disorders appear to be more common among chronic than acute TMD pain patients.[27,28] The prospective cohort findings suggest that this covariate is a potential risk factor implicated in the transition, even if this risk was not statistically significant.[31]

Depression was more common among patients with chronic than those with acute TMD pain.[27,28] These findings are not aligned with prospective cohort studies[31,32] where depression was not associated with transition risk. Some additional points need to be considered. First, depression may increase the risk of chronic disable pain, instead of pain intensity, since previous studies found that psychological factors are associated with transition from an acute to chronic disabling condition.[46,48] Second, it is possible that the contribution of psychological factors to the TMD transition risk is modified by the duration of exposure and severity of the psychological symptoms.[15] Third, the occurrence of other covariates may modify the psychological risk.[44]

Finally, we have incongruent results between the cross-sectional and cohort studies, where the first found that depression was more common among subjects with chronic rather than acute TMD pain, and the latter found that depression did not contribute to the acute to chronic pain transition. This contrast may be explained by an association of pain duration with psychological symptoms,[27] and their combination leading to treatment-seeking; therefore, patients with chronic pain may be more depressed and look for treatment more frequently.

Limitations

Even if every effort was performed to include all articles and evaluate them in a reasonable and scientific way, this review has several limitations. First, it is possible that our strategy (Table 1) did not identify all relevant articles because the authors did not use the terms used in the search strategy. Second, studies included in this review used a temporal criterion to define acute and chronic TMD pain, along with treatment-seeking and pain intensity. Definitions of chronic pain using pain intensity[37,49] and treatment-seeking[50] have been used in the past to decrease the chance of misclassification. To counterbalance this limitation, we decided to include all studies, regardless of chronic pain definition to prevent the selection bias specific to a definition of chronic pain. The decision was also found in another review aimed to identify the predictors of transition from acute to chronic back pain.[46] Third, a small number of studies compared acute to chronic TMD pain and only three cohort studies assessed the risk factors associated with the transition, possibly from the same cohort. Fourth, Table 2 shows that the quality score of the articles was low, raising questions on the validity of the findings. Fifth, this review does not intend

to provide the mechanism associated with the transition from acute to chronic TMD pain. A number of underlying peripheral and central mechanisms contribute to this transition.[51-53]

Future research plan

The following is recommended:

1. Chronic pain should be defined according to valid and reliable criteria. The use of the IASP is recommended.[54] Intensity and quality of pain should be included in the sensitivity analysis.
2. The eligibility criteria should be detailed, as well as the participation rate.
3. Potential risk factors should precede the study outcomes.
4. Multiple levels of potential risk factors are recommended.
5. Study outcomes, potential risk factors and confounders should be assessed using valid and reliable instruments.
6. Multivariable analysis adjusting for potential confounders is recommended. Effect modifiers should be investigated.
7. The amount of missing data and loss to follow-up should be reported.
8. Sensitivity analysis and strategies to evaluate bias are recommended.

Conclusion

This review appraised seven articles. The literature found some evidence that myofascial pain and pain intensity are associated with acute to chronic TMD pain transition. There is insufficient evidence to draw conclusions about the role of demographics, GCPS, disability, and

psychological disorders as independent risk factors. The quality of the studies prevents us from drawing any definitive conclusions regarding the differences between acute and chronic TMD pain and risk factors associated with TMD pain transition.

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Conflict of interest statement

The authors report no conflict of interest.

Authors' contributions

A.V., M.G., J.F., E.S. took part in designing the study. Four authors (A.V., O.S., S.E., E.L.) participated in the screening stage to identify potential articles. Four reviewers independently reviewed 10 articles (A.V, O.S., S.E., E.L.). Three evaluators appraised the quality of the eligible studies (O.S., A.V., S.E.). Four authors wrote the manuscript (A.V., O.S., M.G., S.E.). All authors revised and approved the manuscript.

Tables and Figure legends

Figure 1. Flowchart of the article selection process in this review.

Table 1. Medical Subject Heading terms and text words used in the search.

Table 2. Study quality assessment

Table 3. Demographic and psychological characteristics between acute and chronic TMD pain

Table 4. Demographic, psychological and sleep comorbidities between acute and chronic TMD pain

Table 5. Demographic and clinical characteristics differences between acute and chronic TMD

Table 6. Predictors associated with the transition from acute to chronic TMD pain at 6 months of follow-up

Figure 1 - Flowchart of the article selection process in this review

PRISMA 2009 Flow diagram (http://www.prisma-statement.org From Moher *et al.,* (2009))

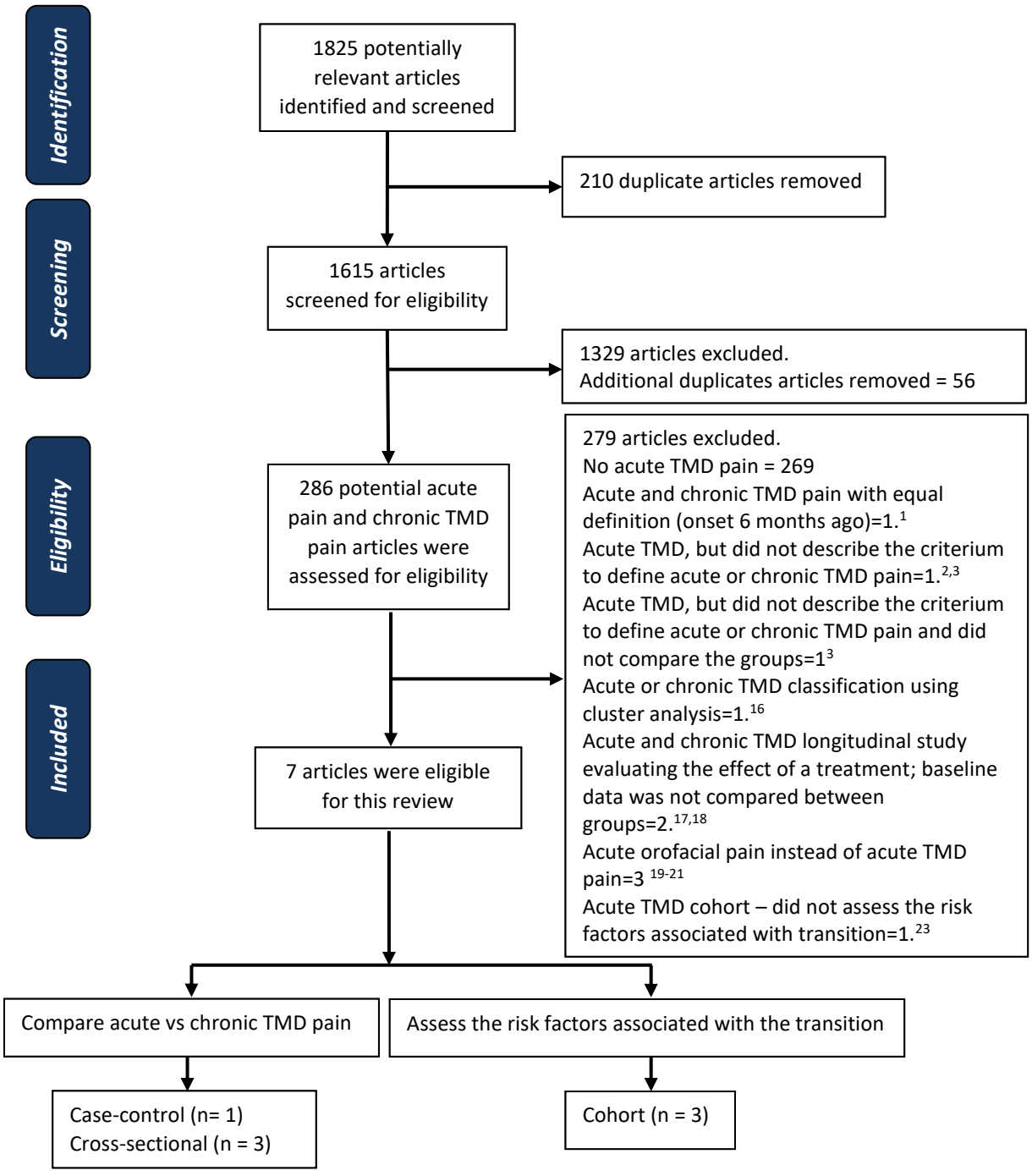

Table 1. Medical Subject Heading terms and text words used in the search		
1. exp Craniomandibular Disorders/	6. or/1-5	11. exp Chronic Pain/
2. exp Facial Pain/	7. exp Acute Pain/	12. exp Chronic Disease/
3. (TMD or TMJD).tw.	8. (acute or acutely).tw.	13. or/11-12
4. ((temporomandibular* or craniomandibular*) adj3 disorder*).tw	9. exp Acute Disease/	14. 6 and 10 and 13
5. (facial* adj3 pain*).tw.	10. or/7-9	

Notes: tw = text word, * = truncation, adj = adjustment, exp = exploded.

Table 2. Study quality assessment							
Items	Gatchel *et al.* 1996[27]	Reiter *et al.* 2015[28]	Nguyen *et al.*2019[29]	Cao *et al.*2020[30]	Garofalo et *al.*1998[31]	Epker *et al.*1999[32]	Epker *et al.*2000[33]
	Case-control and cross-sectional studies				Cohort studies		
1. Was the research question or objective in this paper clearly stated?	1	1	1	1	1	1	1
2. Was the study population clearly specified and defined?	0	1	1	1	0	0	0
3. Was the participation rate of eligible persons at least 50%?	0	0	1	0	0	0	0
4. Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all patients?	0	1	1	1	0	0	0
5. Was a sample size justification, power description, or variance and effect estimates provided?	0	0	0	0	0	0	0
6. Were the exposure(s) of interest measured prior to the outcome(s) being measured?	0	0	0	0	1	1	1
7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?	N/A	N/A	N/A	N/A	1	1	1
8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?	0	1	1	1	1	1	1
9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study patients?	1	1	0	1	1	1	1
10. Was the exposure(s) assessed more than once over time?	0	0	0	0	0	0	0
11. Were the outcome measures clearly defined, valid, reliable, and implemented consistently across all study patients?	1	1	1	1	1	1	1
12. Were the outcome assessors blinded to the exposure status of patients?	0	0	0	0	0	0	0
13. Was loss to follow-up after baseline 20% or less?	N/A	N/A	N/A	N/A	1	1	0
14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?	0	0	1	0	1	0	0
15. Was the study design reported? *	0	0	1	1	1	0	0
16. Was the statistical method described? *	0	1	1	1	1	1	0
17. Was the study participants properly described (participation rate)?*	0	0	1	1	0	0	0
18. Was the result properly reported? *	1	0	0	1	0	0	0
19. Were the study limitations and potential bias described?*	0	0	0	0	0	0	0
20. Was Generalisability described?*	0	0	0	0	0	0	0
Total score (*Items from the STROBE)	22% (4/18)	39% (7/18)	56% (10/18)	56% (10/18)	50% (10/20)	40% (8/20)	30% (6/20)

Table 3. Demographic and psychological characteristics between acute and chronic TMD pain						
Gatchel *et al.* (1996)[27]*	**Factors measured**		**A** $^{< 6 \text{ months}}$ (n=51)	**C** $^{\geq 6 \text{ months}}$ (n=50)	**Diff**	***P*-value**
Demography	Mean Age		≈ 38	≈ 38	A = C	NR
DSM-III Axis I Clinical disorders	Somatoform disorders	Lifetime (%)	5.9	50.0	C > A	< .001
		Current (%)	5.9	50.0	C > A	< .001
	Affective disorders	Lifetime (%)	45.1	78.0	C > A	< .001
		Current (%)	11.8	34.0	C > A	< .001
	Anxiety disorders	Lifetime (%)	52.9	24.0	A > C	< .001
		Current (%)	47.1	12.0	A > C	< .001
	Substance abuse	Lifetime (%)	25.5	30.0	NS	NR
		Current (%)	2.0	4.0	NS	NR
	Eating disorders	Lifetime (%)	5.9	6.0	NS	NR
		Current (%)	2.0	0	NS	NR
	Adjustment disorders	Lifetime (%)	3.9	2.0	NS	NR
		Current (%)	3.9	2.0	NS	NR
DSM-III Axis II Personality disorders	Paranoid (%)		15.7	18.0	NS	NR
	Schizoid (%)		2.0	0	NS	NR
	Schizotypal (%)		0	2.0	NS	NR
	Passive-aggressive (%)		2.0	6.0	NS	NR
	Self-defeating (%)		2.0	4.0	NS	NR
	Obsessive-compulsive disorder (%)		5.9	10.0	NS	NR
	Avoidant (%)		5.9	4.0	NS	NR
	Histrionic (%)		7.8	8.0	NS	NR
	Narcissistic (%)		0	0	NS	NR
	Antisocial (%)		3.9	0	NS	NR
	Borderline (%)		3.9	10	NS	NR
	Other (%)		0	2.0	NS	NR
Reiter *et al.* (2015)[28]**	**Factors measured**		**A** $^{< 3 \text{ months}}$ (n = 49)	**C** $^{\geq 3 \text{ months}}$ (n = 139)	**Diff**	***P*-value**
SCL-90-R	Depression (%)	Level 1	34.9	65.1	C > A	.04
		Level 2	20.6	79.4		
		Level 3	16.7	83.3		
	Anxiety (%)	Level 1	31.8	68.2	NS	.18
		Level 2	25.0	75.0		
		Level 3	17.0	83.0		
	Somatization (%)	Level 1	35.8	64.2	C > A	.08
		Level 2	19.6	80.4		
		Level 3	21.3	78.7		

Abbreviations: A: Acute TMD, C: Chronic TMD, Diff: difference, NS: Non-significant, NR: Not reported,
Note: Diagnosis of TMD: *Laskin's criteria, **Research Diagnostic Criteria (RDC/TMD)
DSM: Diagnostic and Statistical Manual of Mental Disorders Revised. SCL-90R: Symptom Checklist 90-revised
Lifetime prevalence base rates of Axis I disorder in general population: somatoform disorders (0.1-0.2), substance abuse (15-20), affective disorders (5-26), anxiety disorders (1-25). Prevalence base rates of current Axis I disorder in general population: somatoform disorders (0.03), substance abuse (3-5), affective disorders (3-6), anxiety disorders (7), eating disorders (0.5-3).

Table 4. Demographic, psychological and sleep comorbidities between acute and chronic TMD pain						
Cao *et al*. (2020)[30]*	**Factors measured**		**A**$^{\leq 3 \text{ months}}$ (n = 68)	**C**$^{> 3 \text{ months}}$ (n = 44)	**Diff**	***P*-value**
Demography	Age	Mean, (SD)	40.5 (15.4)	40.7 (18.5)	NS	.87
		OR (95% CI)	1.00 (0.97-1.03)			
	Gender	Female, n (%)	42 (61.8)	37 (84.1)	C > A	.03
		Male, n (%)	26 (38.2)	7 (15.9)		
		OR (95% CI)	3.39 (1.15-9.90)			
DASS-21	Depression	n (%)	5.7 (8.4)	15.3 (12.8)	C > A	.05
		OR (95% CI)	2.82 (0.96-8.28)			
	Anxiety	n (%)	7.6 (8.1)	13.9 (10.9)	NS	.71
		OR (95% CI)	1.24 (0.40-3.88)			
	Stress	n (%)	8.9 (9.8)	17.8 (13.4)	C > A	.02
		OR (95% CI)	4.40 (1.32-14.63)			
PSQI	Global score	Mean, (SD)	7.5 (4.2)	9.4 (4.7)	C > A	.03
	Subjective sleep quality	Mean, (SD)	1.3 (0.9)	1.5 (0.8)	NS	.16
	Sleep latency	Mean, (SD)	1.2 (0.9)	1.5 (1.1)	NS	.11
	Sleep duration	Mean, (SD)	1.2 (0.8)	1.5 (1.0)	NS	.22
	Habitual sleep efficiency	Mean, (SD)	0.8 (1.2)	0.8 (1.1)	NS	.85
	Sleep disturbances	Mean, (SD)	1.2 (0.6)	1.4 (0.6)	NS	.13
	Use of sleep medication	Mean, (SD)	0.3 (0.8)	0.9 (1.3)	C > A	.002
	Daytime dysfunction	Mean, (SD)	1.5 (1.0)	1.9 (1.1)	C > A	.059
	PSQI	OR (95% CI)	1.45 (1.32-3.98)		NS	.47

Abbreviations: A: Acute TMD, C: Chronic TMD pain, SD: Standard deviation, Diff: difference between groups, 95%CI: Confidence interval, NS: Non-significant, NR: Not reported. OR: Odds ratio, DASS-21: Depression, Anxiety and Stress Scale - 21 Items, PSQI: Pittsburgh Sleep Quality Index.
Note: *Diagnostic Criteria (DC/TMD)

Table 5. Demographic and clinical characteristics differences between acute and chronic TMD						
Nguyen *et al.* (2019)[29]	**Factors Measured**		**A**$^{< 3 \text{ months}}$ (n = 110)	**C**$^{\geq 3 \text{ months}}$ (n = 88)	**Diff**	***P*-value**
Demography	Age	Mean (SD)	33.0 (11.9)	34.6 (12.6)	NS	NR
	Gender	Female, n (%)	79 (71.8)	72 (81.8)	NS	NR
		Male, n (%)	31 (28.2)	16 (18.2)		
DC	Diagnosis	Myalgia, n (%)	67 (60.9)	52 (59.1)	NS	NR
		Arthralgia, n (%)	19 (17.3)	8 (9.1)		
		Combined, n (%)	24 (21.8)	28 (31.8)		
GCPS	Pain intensity (0-10 NRS)	Mean (SD)	5.4 (1.9)	5.9 (1.9)	NS	NR
Pain frequency	Percentage of pain days in the past 2 weeks.[55]	%	77.6	68.5	NS	NR
CPSQ	Coexisting pain beyond orofacial area	No, n (%)	66 (60)	24 (27.3)	NS	NR
		Yes, n (%)	44 (40)	64 (72.7)		
Different questionnaires[56-60]	Presence of comorbidities	No, n (%)	-	22 (17.5)	NS	NR
		Yes, n (%)	-	66 (82.5)		

Abbreviations: A: Acute TMD, C: Chronic TMD pain, SD: Standard deviation, Diff: difference between groups, NS: Non-significant, NR: Not reported, DC: Diagnostic Criteria, GCPS: Graded Chronic Pain Scale.
CPSQ: Comprehensive Pain Symptom Questionnaire.
Coexisting pain beyond orofacial area: facial pain, neck, shoulder sides, arms, chest, abdomen, back, hips, buttocks, and legs. Presence of comorbidities: fibromyalgia, chronic fatigue syndrome, irritable bowel syndrome, interstitial cystitis, frequent headache, chronic low back pain and chronic pelvic pain.
American College of Rheumatology fibromyalgia questionnaire,[56] the Schedule of Fatigue and Anergia/General Physician (chronic fatigue syndrome) scale,[57] the Rome III questionnaire (irritable bowel syndrome),[58] and the Pelvic Pain and Urgency/Frequency symptom scale (interstitial cystitis)[59,60]

Table 6. Predictors associated with the transition from acute to chronic TMD pain at 6 months of follow-up						
	Garofalo *et al*. (1998)[31] (n = 153)			Epker *et al*. (2000)[32] (n = 175)		
Variable	**β**	**OR**	***P*-value**	**β**	**OR**	***P*-value**
CPI	0.03	0.97	.02	- 0.06	-	< .001
GCPS III or IV	2.01	0.13	.09	-	-	-
Myofascial pain (Axis I Group I disorder)	1.43	0.24	.03	0.78	-	.003
SCL-90-R Nonspecific Symptoms Scale Score	0.45	0.64	.15	-	-	-
Sex × Group I Disorders	1.22	2.90	.09	-	-	-
Abbreviations: CPI: Characteristic Pain Intensity Score, GCPS: Graded chronic pain score, SCL-90R: Symptom Checklist 90-revised, OR: odds ratio.						

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