ISSN: 2469-5734

Metello Neves LB, et al. Int J Oral Dent Health 2026, 13:181
DOI: 10.23937/2469-5734/1510181
Volume 13 | Issue 1
Open Access

International Journal of Oral and Dental Health

ORIGINAL ARTICLE

The Unified Brief Screening Protocol (UBSP): An Evidence Based Tool for Pain Phenotyping

Leonardo Brigido Metello Neves [1,2]*, ***Bruno Luiz Baldessarini*** [3] ***and Paulo Laino*** [3]

[1]*Department of Temporomandibular Disorders, Hospital da Boca, Santa Casa da Misericórdia do Rio de Janeiro, Rio de Janeiro, RJ, Brazil*

[2]*School of Dentistry, Estácio de Sá University, Rio de Janeiro, RJ, Brazil*

[3]*American Dental Institute, Orlando, United States*

***Corresponding author:** *Leonardo Brigido Metello Neves, DDS, MSc, PhD, Department of Temporomandibular Disorders, Hospital da Boca, Santa Casa da Misericórdia do Rio de Janeiro, Rua Santa Luzia, 206, Castelo, Rio de Janeiro, RJ, Brazil, Tel: +55 (21) 98788-4007*

Abstract

The Unified Brief Screening Protocol (UBSP) for Nociplastic Pain in Orofacial Conditions: Framework Development and Preliminary Feasibility Evidence.

Background: The International Association for the Study of Pain's recognition of nociplastic pain constitutes a significant conceptual advance. Nevertheless, implementation in routine clinical practice is hindered by diagnostic complexity and time constraints. There is a need for feasible screening approaches that integrate both sensory and psychosocial domains, especially in high-volume clinical settings.

Objective: This study introduces the Unified Brief Screening Protocol (UBSP), a pragmatic framework that integrates brief sensory screening with validated ultrashort psychosocial instruments for nociplastic pain phenotyping, and provides preliminary proof-of-concept evidence for its psychosocial component.

Methods: A systematized literature review (2017-2025) informed the conceptual development of the UBSP. The psychosocial component of the protocol (Step 2) was retrospectively applied to a derivation cohort of patients with chronic orofacial pain (n = 78). Feasibility was assessed by administration time, and convergent validity was examined using an established brief mental health screening instrument.

Results: The psychosocial screening component demonstrated a median administration time of 2.3 minutes. High psychosocial comorbidity was identified in approximately 22% of patients, with moderate agreement observed between pain-specific psychosocial screening and the convergent measure. When combined with projected sensory screening steps, the estimated total duration of the complete UBSP was less than 7 minutes.

Conclusion: The UBSP offers a structured, time-efficient framework for integrating sensory and psychosocial screening into early phenotyping of nociplastic pain. The present proof-of-concept findings support the feasibility and convergent validity of its psychosocial component. Prospective validation of the complete protocol is required before widespread clinical application.

Keywords

Nociplastic pain, Orofacial pain, Temporomandibular disorders, Central sensitization, Screening protocol, Psychosocial factors

Introduction

The formalization of nociplastic pain by the International Association for the Study of Pain (IASP) [1] and its subsequent inclusion in the International Classification of Diseases, 11th Revision (ICD-11) [2], represent significant conceptual milestones in pain medicine. This framework challenges the traditional dichotomy between nociceptive and neuropathic pain by recognizing pain arising from altered nociception, where central nervous system hyperexcitability predominates despite the absence of clear peripheral tissue damage or nerve injury [1,2]. However, a substantial implementation gap persists: standardized nociplastic pain phenotyping is lacking in approximately 78% of primary and secondary care settings, primarily due to diagnostic complexity and time constraints [3].

Citation: Metello Neves LB, Baldessarini BL, Laino P (2026) The Unified Brief Screening Protocol (UBSP): An Evidence Based Tool for Pain Phenotyping. Int J Oral Dent Health 13:181 doi.org/110.23937/2469-5734/1510181

Accepted: April 03, 2026 : **Published:** April 07, 2026

Orofacial pain (OFP) and temporomandibular disorders (TMD) affect an estimated 10-15% of the adult population worldwide, with chronicity rates approaching 40% [4], and exemplify these diagnostic challenges [5]. Pain chronification in TMD often involves central sensitization mechanisms that extend beyond biomechanical dysfunction [6]. Comprehensive phenotyping protocols typically require quantitative sensory testing (QST) [7] and extensive psychosocial assessment batteries, such as the Generalized Anxiety Disorder-7 [8], Pain Catastrophizing Scale-13 [9], and Tinnitus Handicap Inventory [10]. These protocols impose time demands that are generally feasible only in research settings [11].

Recent developments in validated ultrashort psychosocial instruments, such as the Simplified Anxiety Scale (SAS-3) [12] and the Pain Catastrophizing Scale-Short Form (PCS-S) [13], have demonstrated that robust psychometric properties can be maintained despite substantial reductions in administration time. These tools exhibit strong correlations with established gold-standard measures and acceptable internal consistency, while reducing assessment duration by approximately 60-75%. However, no protocol has yet integrated these ultrashort instruments with the IASP 2021 nociplastic pain screening criteria into a unified clinical workflow suitable for high-volume practice settings [14]. The Unified Brief Screening Protocol (UBSP) is introduced here, with preliminary proof-of-concept evidence provided by retrospective application of its psychosocial component (Step 2) to a clinical cohort of patients with chronic orofacial pain (n = 78). This analysis examines classification frequency, convergent validity, and feasibility metrics. While comprehensive prospective validation, including standardized sensory examination (Step 1b) [15], remains necessary, this work advances the UBSP from a theoretical construct toward a partially validated clinical screening tool.

Study Design

This investigation was structured as a methodological development and proof-of-concept study to propose and preliminarily evaluate a brief clinical screening protocol for nociplastic pain phenotyping [16]. The research comprised two complementary components: (1) a systematized literature review supporting the development of the Unified Brief Screening Protocol (UBSP), and (2) a retrospective application of the psychosocial component of the protocol to an existing clinical cohort of patients with chronic orofacial pain.

Development of the Unified Brief Screening Protocol

Systematized literature review

A systematized literature review was conducted to identify conceptual frameworks, screening criteria, and validated assessment tools relevant to nociplastic pain and central sensitization. Electronic searches were performed in four databases: PubMed/MEDLINE, Scopus, Web of Science, and the Cochrane Library, covering publications from January 2017 to May 2025. This time frame encompasses the period from the early formal discussions of nociplastic pain to contemporary clinical implementation strategies [17].

The search strategy combined Medical Subject Headings (MeSH) and free-text terms [18], including: “nociplastic pain” OR “central sensitization” OR “centralized pain” AND (“orofacial pain” OR “temporomandibular disorder” OR “TMD”) AND (“screening” OR “assessment tool” OR “brief scale” OR " psychometric"). Inclusion criteria were: (1) peer-reviewed publications; (2) studies reporting psychometric data on pain-related or psychosocial assessment instruments, or describing the application of nociplastic pain criteria; and (3) articles published in English or Portuguese. Exclusion criteria included: (1) case reports, editorials, and letters; (2) studies focusing exclusively on surgical or interventional procedures; and (3) publications lacking psychometric data or information relevant to clinical feasibility [19].

Two independent reviewers screened titles and abstracts, followed by full-text assessment [20]. Disagreements were resolved by consensus. The study selection process is summarized using a PRISMA flow diagram (Figure 1). The review was conducted as a systematized review appropriate for protocol development, without prior registration or formal risk-of-bias assessment [21].

Structure of the unified brief screening protocol

The UBSP was designed as a stepwise screening tool that integrates the sensory and psychosocial dimensions of nociplastic pain [22], in accordance with contemporary IASP recommendations [23].

- Step 1a: Initial clinical screening based on pain history and distribution [24].
- Step 1b: Brief sensory screening, including assessment of pain beyond the primary symptomatic region [25].
- Step 2: Psychosocial screening using validated ultrashort instruments, including the Simplified Anxiety Scale (SAS-3) [12] and the Pain Catastrophizing Scale-Short Form (PCS-S) [13].

The protocol was explicitly designed to minimize administration time while preserving clinically meaningful information relevant to pain phenotyping [26].

Retrospective clinical application

Study population: The psychosocial component of the UBSP (Step 2) was retrospectively applied to a derivation cohort of patients with chronic orofacial

pain (n = 78). This cohort was derived from a previously conducted validation study of the PCS-S and included adult patients diagnosed with chronic orofacial pain conditions, including temporomandibular disorders [13].

Psychosocial measures and convergent validity: Psychosocial screening was performed using the PCS-S [13] and SAS-3 [12]. To assess convergent validity, results were compared with scores obtained from an established brief mental health screening instrument (PHQ-4) [27]. High psychosocial comorbidity was defined based on established cutoff values for the PCS-S [13].

Feasibility assessment: Feasibility was evaluated by measuring administration time for the psychosocial screening component and estimating total protocol duration based on projected timings for the sensory screening steps [28]. Descriptive statistics were used to summarize administration time, frequency of psychosocial comorbidity classification, and agreement with convergent screening measures [29].

Ethical considerations: The retrospective analysis was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval for the original data collection was obtained from the appropriate institutional ethics committee, and all participants provided written informed consent at the time of enrollment in the original study [30]. No additional patient contact or intervention was performed for the purposes of the present analysis.

Methodological transparency was enhanced by preregistering the study protocol in the Open Science Framework (OSF) prior to data analysis (Registration DOI: 10.17605/OSF.IO/N625X; registration type: OSF Preregistration; date registered: January 30, 2026). The preregistration includes the study rationale, design, and analytical framework and is publicly available under a Creative Commons Attribution 4.0 International License (CC BY 4.0) [31].

Results

Literature review and protocol development

The systematized literature review identified 21 key studies that informed the conceptual framework and structure of the Unified Brief Screening Protocol (UBSP). These studies provided evidence supporting the clinical relevance of nociplastic pain phenotyping, the feasibility of brief sensory screening approaches, and the psychometric validity of ultrashort psychosocial instruments. The findings guided the selection of screening domains and instruments integrated into the UBSP, with particular emphasis on clinical applicability and time efficiency [32].

Characteristics of the clinical cohort

The retrospective derivation cohort consisted of 78 adult patients with chronic orofacial pain. All participants met the criteria for chronic pain duration and had completed psychosocial assessments as part of the original data collection. The cohort included patients diagnosed with temporomandibular disorders and other chronic orofacial pain conditions [33].

Psychosocial screening outcomes

The psychosocial screening component of the UBSP (Step 2) had a median administration time of 2.3 minutes, with a range of 1.5 to 4.0 minutes. This represented a substantial reduction in assessment time compared with conventional multi-item psychosocial batteries commonly used in clinical and research settings [34]. High psychosocial comorbidity, as defined by established cutoff values for the Pain Catastrophizing Scale-Short Form, was identified in 17 of 78 patients (22%) [35]. Among these patients, 11 individuals (65%) also screened positive on the convergent mental health screening instrument (PHQ-4), indicating moderate agreement between measures [36].

Feasibility and estimated total protocol duration

Based on the observed administration time for the psychosocial component and projected timing for the sensory screening steps, the estimated total duration of the complete UBSP was under seven minutes. In contrast, conventional assessment approaches that incorporate multiple psychosocial questionnaires typically require 16-25 minutes to complete [37].

Summary of key findings

The results demonstrate that the psychosocial component of the UBSP can be administered rapidly in a clinical context while identifying a subset of patients with elevated psychosocial comorbidity. The observed convergent validity and marked reduction in administration time support the feasibility of integrating the UBSP into routine clinical workflows [38](Table 1).

Discussion

The Unified Brief Screening Protocol (UBSP) [16] is proposed, with preliminary proof-of-concept evidence supporting the feasibility [28] and convergent validity [13,29] of its psychosocial component [12,13] in a clinical population with chronic orofacial pain [4,33]. These findings address a critical gap between contemporary conceptual frameworks of nociplastic pain [1,14] and their practical implementation in routine clinical settings [3,26].

The results demonstrate that the psychosocial screening component of the UBSP can be administered in approximately 2 minutes [34,37] while identifying a clinically relevant subset of patients with elevated psychosocial comorbidity [5,35]. This represents a substantial efficiency gain compared with conventional assessment batteries, which often impose time demands incompatible with high-volume clinical practice [34,37].

Table 1: Synthesis of evidence-based studies (n = 21) supporting the conceptual structure, sensory screening, and psychosocial components of the UBSP.

Domain	Ref.	Author (Year)	Main Focus / Denouement	Application at UBSP
Fundamentals of Nociplastic Pain	[1]	Kosek (2024)	IASP criteria for nociplastic pain.	Definition of the core phenotype.
	[14]	Nijs (2021)	Phenotyping of pain in the future.	Basis for the Step 1 structure.
	[16]	Bilika (2025)	Application of criteria in chronic pain.	Protocol logic validation.
	[23]	Raja (2020)	Revision of the definition of pain.	Multidimensional approach.
	[26]	Ablin (2024)	Multidisciplinary pain management.	Justification of the screening model.
Orofacial Pain and TMD	[4]	Al-Harthy (2025)	Need for TMD education.	Clinical justification of the study.
	[5]	Badri (2025)	Psychological distress in the OFP clinic.	Need for Step 2 (psychosocial).
	[6]	Ferrillo (2022)	Central awareness in TMD.	Connection between TMD and nociplasticity.
	[11]	NASEM (2020)	Individual load gives TMD.	Socioeconomic and clinical impact.
	[33]	Schiffman (2014)	Gold Standard DC/TMD.	Reference for clinical diagnosis.
Ultra-short instruments	[12]	Neves (2025)	SAS-3 validation.	Step 2 anxiety tool.
	[13]	Neves (2025)	PCS-S validation.	Step 2 catastrophizing tool.
	[27]	Kroenke (2009)	PHQ-4 validation.	Convergent validity reference.
	[9]	Sullivan (1995)	Structure of the original PCS.	Theoretical basis for the short version.
	[10]	Baguley (2001)	Rapid symptom screening.	Concept of efficiency in instruments.
Feasibility and Screening	[7]	van Driel (2024)	Practical guide to sensory testing.	Basis for sensory screening (Step 1b).
	[24]	Stretanski (2025)	Evaluation methods that of pain.	Standardization of Step 1a.
	[25]	Arant (2022)	Remote tenderness in chronic pain.	Rationale for evaluating remote locations.
	[28]	Sailing (2024)	Psychological profiles and clinical pain.	Sensory-psychological integration.
	[37]	Li (2023)	Reliability of brief protocols.	Proof that <10 min protocols work.
	[38]	Alagappan (2025)	Implementation of biopsychosocial.	Support for fast workflow.

Time constraints are a frequently cited barrier to the clinical adoption of multidimensional pain assessment [3,11], and the observed reduction in administration time may facilitate broader implementation of nociplastic pain screening in general medical settings [14,28].

Importantly, the UBSP does not seek to replace comprehensive diagnostic evaluations or standardized sensory testing [7,33]. Instead, it is designed as a pragmatic triage tool to support early phenotyping and guide subsequent clinical decision-making [16,26]. By integrating brief sensory screening with validated ultrashort psychosocial instruments, the protocol aligns with contemporary recommendations emphasizing the multidimensional nature of chronic pain [23] while remaining feasible for routine use [14,28]. The moderate convergent validity observed between the PCS-S and an established brief mental health screening instrument supports the construct validity of the psychosocial component [13,29].

Although not all patients with elevated catastrophizing scores screened positive on the convergent measure, this finding is consistent with the conceptual distinction between pain-specific cognitive-affective processes and general psychological distress [9,27]. This distinction reinforces the importance of pain-focused psychosocial screening rather than reliance solely on general mental health instruments [13,36].

The focus on orofacial pain and temporomandibular disorders provides a clinically relevant test case for the UBSP, as these conditions frequently involve overlapping nociceptive, nociplastic, and psychosocial mechanisms [5,6,11]. The proposed framework may assist clinicians in distinguishing predominantly nociceptive presentations from mixed or centrally mediated pain patterns, thereby supporting more targeted and individualized management strategies [14,26]. Nevertheless, the conceptual structure of the UBSP is not limited to orofacial pain and may be adaptable to other chronic pain conditions, pending further validation [16,22] Several limitations should be acknowledged. First, the retrospective application of the psychosocial component precludes causal inference and limits conclusions regarding diagnostic accuracy [19,29]. Second, the full protocol, including standardized sensory examination, was not prospectively evaluated in the present study [15,37]. Third, the derivation cohort was drawn from a single clinical context, which may limit generalizability [32,33]. Accordingly, prospective studies evaluating the complete UBSP across diverse clinical populations are required to establish reliability, diagnostic performance,

and clinical impact [14,38]. Despite these limitations, the present findings contribute to the growing body of literature emphasizing the need for pragmatic, time-efficient approaches to chronic pain assessment [26,28]. The UBSP offers a structured and testable framework that bridges theoretical advances in nociplastic pain [1,14] with the realities of clinical practice [3,38]. Future research should focus on prospective validation, inter-rater reliability, and the evaluation of patient-centered outcomes associated with UBSP-guided clinical pathways [23,38].

Conclusion

The Unified Brief Screening Protocol (UBSP) represents a pragmatic approach to nociplastic pain phenotyping that balances contemporary conceptual frameworks with the practical constraints of routine clinical care. The current proof-of-concept findings indicate that the psychosocial component of the UBSP can be efficiently administered and demonstrates acceptable convergent validity in a clinical population with chronic orofacial pain. Through the integration of brief sensory screening with validated ultrashort psychosocial instruments, the UBSP provides a structured framework for early clinical triage and individualized decision-making. Although prospective validation of the complete protocol remains necessary, this approach has the potential to facilitate the implementation of multidimensional pain assessment in high-volume medical settings.

Acknowledgments

The authors extend their sincere gratitude to Dr. Fernando Luíz Duarte de Almeida, Head of the Center for Dental Care, Education, and Research, for entrusting the lead author, Coordinator of the Orofacial Pain and Temporomandibular Disorders Service at Santa Casa da Misericórdia do Rio de Janeiro, with the responsibility of establishing and coordinating clinical, educational, and research activities in orofacial pain. We also gratefully acknowledge the invaluable contributions of the clinical staff and patients who participated in this study.

Funding Declaration

The authors received no funding for this study. This research was conducted without any specific grant from public, commercial, or non-profit funding agencies.

Conflict of Interest Declaration

The authors declare no conflicts of interest.

Ethical and Copyright Considerations

The instruments described in this appendix are widely used, validated clinical screening tools. Full item content is not reproduced to comply with copyright and licensing requirements. Clinicians and researchers should refer to the original publications for complete instrument details and scoring instructions.

Key Points

- The clinical implementation of nociplastic pain phenotyping remains limited by diagnostic complexity and time constraints.
- The Unified Brief Screening Protocol (UBSP) integrates sensory and psychosocial screening into a rapid, clinically feasible workflow.
- The psychosocial component of the UBSP demonstrated convergent validity and substantial reductions in administration time.
- The UBSP provides a pragmatic framework to support early pain phenotyping and clinical triage in routine practice.
- Prospective validation of the complete protocol is required before widespread clinical adoption.

Ethical Approval

This study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Institutional Ethics Committee of Santa Casa da Misericórdia do Rio de Janeiro (Registration DOI: 10.17605/OSF.IO/N625X).

Author Contributions

All authors contributed equally to the conceptualization, methodology, formal analysis, investigation, and writing (original draft, review & editing) of this work.

Registration

This study protocol is registered on the Open Science Framework (OSF) and is available at: https://doi.org/10.17605/OSF.IO/N625X

References

1. Kosek E (2024) The concept of nociplastic pain-where to from here? Pain 165: S50-S57.
2. Almeida MSC, Sousa Filho LF, Rabello PM, Santiago BM (2020) International classification of diseases-11th revision: From design to implementation. Rev Saude Publica 54: 104.
3. Toda K (2025) Integrating nociplastic pain into neuropathic pain framework: A proposal for a revised classification. Front Pain Res (Lausanne) 6: 1661667.
4. Al-Harthy MH (2025) Orofacial pain and temporomandibular disorders education at Umm Al-Qura University: Perceptions and curriculum improvement recommendations. Dent J (Basel) 13: 465.
5. Badri P, Hernández I, Long J, Amin M, Friesen R (2025) Chronic orofacial pain and psychological distress: Findings from a multidisciplinary university clinic. J Oral Facial Pain Headache 39: 152-162.
6. Ferrillo M, Giudice A, Marotta N, Fortunato F, Di Venere D, et al. (2022) Pain management and rehabilitation for central sensitization in temporomandibular disorders: A comprehensive review. Int J Mol Sci 23: 12164.

7. Van Driel MEC, Huygen FJPM, Rijsdijk M (2024) Quantitative sensory testing: A practical guide and clinical applications. BJA Educ 24: 326-334.
8. Stein MB, Sareen J (2015) Clinical practice. Generalized anxiety disorder. N Engl J Med 373: 2059-2068.
9. Sullivan MJL, Bishop SR, Pivik J (1995) The pain catastrophizing scale: Development and validation. Psychol Assess 7: 524-532.
10. Baguley D, Norman M (2001) Tinnitus handicap inventory. J Am Acad Audiol 12: 379-380.
11. National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Health Care Services; Board on Health Sciences Policy; Committee on Temporomandibular Disorders (TMDs): From Research Discoveries to Clinical Treatment. (2020) Temporomandibular disorders: Priorities for research and care. In: Olivia Yost, Cathy T Liverman, Rebecca English, Sean Mackey, Enriqueta C Bond, Washington (DC): National Academies Press (US), Individual and Societal Burden of TMDs.
12. Metello Neves LB, Lima BC, Rafael Vidal Peres, Bruno Luiz Baldessarini, Pires JDM (2025) Simplified anxiety scale (SAS-3): Development, psychosocial justification, and clinical application in patients with orofacial pain. Int J Oral Dent Health 12: 177.
13. Metello Neves LB, Lima BC, Baldessarini BL, Pires JDM, Rafael Coutinho Mello Machado (2025) The simplified pain catastrophizing scale (PCS-S): A pilot study of a screening tool for orofacial pain. Int J Oral Dent Health 12: 176.
14. Nijs J, Lahousse A, Kapreli E, Bilika P, Saraçoğlu İ, et al. (2021) Nociplastic pain criteria or recognition of central sensitization? Pain Phenotyping in the Past, Present, and Future. J Clin Med 10: 3203.
15. Bellosta López P, Doménech García V, Palsson TS, Herrero P, Christensen SWM (2023) Long-term consistency of clinical sensory testing measures for pain assessment. Korean J Pain 36: 173-183.
16. Bilika P, Nijs J, Billis E, Zacharias Dimitriadis, Achilleas Paliouras, et al. (2025) Applying nociplastic pain criteria in chronic musculoskeletal conditions: A vignette study. J Clin Med 14: 1179.
17. Lawrence R, Mogford D, Colvin L (2017) Systematic review to determine which validated measurement tools can be used to assess risk of problematic analgesic use in patients with chronic pain. Br J Anaesth 119: 1092-1109.
18. Lipscomb CE (2000) Medical Subject Headings (MeSH). Bull Med Libr Assoc 88: 265-266.
19. Patino CM, Ferreira JC (2018) Inclusion and exclusion criteria in research studies: Definitions and why they matter. J Bras Pneumol 44: 84.
20. Stoll CRT, Izadi S, Fowler S, Green P, Suls J, et al. (2019) The value of a second reviewer for study selection in systematic reviews. Res Synth Methods 10: 539-545.
21. Brown KL, Pagel C, Ridout D, Jo Wray, Victor T Tsang, et al. (2020) Early morbidities following paediatric cardiac surgery: A mixed-methods study. Southampton (UK): NIHR Journals Library.
22. Ocay DD, Ross BD, Moscaritolo L, Ahmed N, Ouellet JA, et al. (2023) The psychosocial characteristics and somatosensory function of children and adolescents who meet the criteria for chronic nociplastic pain. J Pain Res 16: 487-500.
23. Raja SN, Carr DB, Cohen M, Finnerup NB, Flor H, et al. (2020) The revised international association for the study of pain definition of pain: Concepts, challenges, and compromises. Pain 161: 1976-1982.
24. Stretanski MF, Stinocher S, Grandhe S (2025) Pain Assessment. In: StatPearls. Treasure Island (FL): StatPearls Publishing.
25. Arant KR, Katz JN, Neogi T (2022) Quantitative sensory testing: Identifying pain characteristics in patients with osteoarthritis. Osteoarthritis Cartilage 30: 17-31.
26. Ablin JN (2024) Nociplastic pain: A critical paradigm for multidisciplinary recognition and management. J Clin Med 13: 5741.
27. Kroenke K, Spitzer RL, Williams JB, Löwe B (2009) An ultra-brief screening scale for anxiety and depression: The PHQ-4. Psychosomatics. 50: 613-621.
28. Vela J, Dreyer L, Petersen KK, Arendt-Nielsen L, Duch KS, et al. (2024) Quantitative sensory testing, psychological profiles and clinical pain in patients with psoriatic arthritis and hand osteoarthritis experiencing pain of at least moderate intensity. Eur J Pain 28: 310-321.
29. Sedgwick PM (2024) Updated guidelines for the reporting of methods and statistical analyses. Acta Obstet Gynecol Scand 103: 4-6.
30. World Medical Association (2013) World medical association declaration of helsinki: Ethical principles for medical research involving human subjects. JAMA 310: 2191-2214.
31. Foster ED, Deardorff A (2017) Open Science Framework (OSF). J Med Libr Assoc 105: 203-206.
32. Mancin S, Sguanci M, Anastasi G, Godino L, Lo Cascio A, et al. (2025) Methodological framework for rigorous systematic reviews: Tailoring comprehensive analyses to clinicians and healthcare professionals. Methods 234: 314.
33. Schiffman E, Ohrbach R, Truelove E, Look J, Anderson G, et al. (2014) Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) for Clinical and Research Applications: recommendations of the International RDC/TMD Consortium Network* and Orofacial Pain Special Interest Group†. J Oral Facial Pain Headache 28: 6-27.
34. Heaton RK, Getto CJ, Lehman RAW, Fordyce WE, Brauer E, et al. (1982) A standardized evaluation of psychosocial factors in chronic pain. Pain 12: 165-174.
35. Sousa CRA, Arsati YBOL, Velly AM, Silva CALD, Arsati F (2023) Catastrophizing is associated with pain-related disability in temporomandibular disorders. Braz Oral Res 37: e070.
36. Mills SD, Fox RS, Pan TM, Malcarne VL, Roesch SC, et al. (2015) Psychometric evaluation of the patient health questionnaire-4 in hispanic americans. Hispanic Journal of Behavioral Sciences 37: 560-571.
37. Li R, Holley AL, Palermo TM, Ohls O, Edwards RR, et al. (2023) Feasibility and reliability of a quantitative sensory testing protocol in youth with acute musculoskeletal pain post-surgery or post-injury. Pain 164: 1627-1638.
38. Alagappan TR, Roy ST (2025) Implementation outcomes of a biopsychosocial model pain management protocol in chronic musculoskeletal pain. J Educ Health Promot 14: 493.