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ORIGINAL ARTICLE

The Simplified Pain Catastrophizing Scale (PCS-S): A Pilot Study of a Screening Tool for Orofacial Pain

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Abstract

Introduction: The management of orofacial pain (OFP) and temporomandibular disorders (TMD) is based on the biopsychosocial model, where pain catastrophizing is a critical predictor of worse clinical outcomes. Although the 13-item Pain Catastrophizing Scale (PCS) is considered the gold standard, it is impractical in high-volume clinics, creating a gap between research and practice.

Objective: To develop and test the Simplified Pain Catastrophizing Scale (PCS-S), a three-item tool for rapid psychosocial screening in patients with OFP and TMD.

Methodology: The PCS-S was developed through a literature review, item selection, and cultural adaptation and was subsequently applied in a pilot study involving 78 patients at a public hospital in Rio de Janeiro, Brazil. Administration took an average of 1.8 minutes, with scores greater than 7 indicating high catastrophizing. A subsample (n = 50) compared the PCS-S with the full PCS, calculating agreement percentages.

Results: Of the 78 patients, 22% (n = 17) exhibited high catastrophizing. The PCS-S demonstrated 85% overall agreement with the full PCS, with item-level agreement ranging from 86-90%. Psychological comorbidities were identified in 65% of high-catastrophizing cases.

Conclusion: The PCS-S is a feasible tool for screening catastrophizing, promoting multidisciplinary referrals, and aligning clinical practice with the biopsychosocial model within Brazil's Unified Health System (SUS).

Keywords

Catastrophizing, Implementation science, Orofacial pain, Temporomandibular disorder, Health services, Psychosocial screening

Abbreviations

OFP: Orofacial Pain; TMD: Temporomandibular Disorder; ACE: Adverse Childhood Experiences; HPA: Hypothalamic-Pituitary-Adrenal Axis; PCS: Pain Catastrophizing Scale; PCS-S: Simplified Pain Catastrophizing Scale; ANS: Autonomic Nervous System; CBT: Cognitive Behavioral Therapy

Introduction

Orofacial pain (OFP) and temporomandibular disorders (TMD) affect 10-15% of the adult population, representing a public health challenge due to their impact on quality of life and healthcare costs [1]. The biopsychosocial model recognizes pain as a dynamic process shaped by biological, psychological, and social factors [2,3]. Pain catastrophizing, defined as a negative cognitive-emotional response to actual or anticipated pain, is a potent modulator of the pain experience [4,5].

Characterized by rumination (persistent focus on pain), magnification (overestimation of threat),

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and helplessness (inability to cope with pain) [6], catastrophizing is associated with activation of brain regions such as the anterior cingulate cortex, prefrontal cortex, and amygdala, suggesting a failure in descending pain modulation [7,8]. Clinically, high levels of catastrophizing correlate with increased pain intensity, functional disability, opioid use, and risk of chronicity [9,10].

Despite its relevance, the 13-item Pain Catastrophizing Scale (PCS) [6], although psychometrically robust [11], is rarely used in high-volume clinics due to administration time and workload [12]. This research-practice gap results in the underdiagnosis of psychosocial factors, such as self-medication in TMD patients, which is associated with higher catastrophizing and prolonged pain [13]. To overcome this barrier, the Simplified Pain Catastrophizing Scale (PCS-S), a three-item tool designed for rapid psychosocial screening, was developed.

Objective

To present the development, methodology, and pilot application of the PCS-S, a three-item tool for rapid screening of catastrophizing in patients with OFP and TMD.

Methodology

Study design

A cross-sectional, descriptive pilot study was conducted at the specialized outpatient clinic of Hospital da Boca, Santa Casa da Misericórdia do Rio de Janeiro, Brazil, in 2024. A convenience sample of 78 patients diagnosed with OFP and/or TMD according to the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) was recruited. Inclusion criteria included adults (≥ 18 years) with orofacial pain complaints lasting at least three months. Patients with severe neurological conditions, recent craniofacial trauma, or inability to complete questionnaires were excluded. Ethical approval was granted by Estácio de Sá University's Research Ethics Committee (approval number: 5.861.248) following CNS Resolution No. 466/2012.

Development of the PCS-S

The development of the PCS-S followed a systematic, multi-phase process to ensure brevity, content validity, and clinical applicability:

- Literature Review: A comprehensive review focused on the original PCS [6], its Brazilian Portuguese version [11], and studies on catastrophizing in TMD patients [13,14].
- Item Selection: Item selection was guided by the factor structure reported in the Brazilian validation of the PCS [11], prioritizing items from the most significant factors, helplessness and rumination, which are strongly associated with functional disability and maladaptive behaviors [4,13]. The final items correspond to specific items from the full PCS.

Table 1: Simplified pain/tinnitus catastrophizing scale (PCS-S).
Instructions: Mark how you feel about your pain.
Scoring Scale: 0 = Never, 1 = Rarely, 2 = Sometimes, 3 = Often, 4 = Always.

Item No.	Statement	Psychological Dimension	Score (0-4)
1	I feel that the pain is unbearable and will never get better.	Helplessness	_
2	I constantly think about the pain.	Rumination	_
3	I feel I cannot cope with the pain.	Helplessness	_
		Total Score:	_

Note: The Total Score is the sum of the points from the three items (ranging from 0 to 12).

Interpretation: A total score > 7 suggests high catastrophizing and indicates the need to consider a referral for psychological support (e.g., Cognitive Behavioral Therapy).

- Cultural and Linguistic Adaptation: Cognitive interviews were conducted with 50 patients of varying educational levels to ensure clarity and accessibility. The scale was adjusted to include patients with tinnitus, a frequent comorbidity in TMD [13].
- The final PCS-S consists of three items rated on a 0-4 Likert scale, with a total score ranging from 0 to 12. A score > 7 was established as the cutoff for high catastrophizing [4,6]. The scale is presented in Table 1, located at the end of this manuscript.

Procedures

The PCS-S was administered by a trained examiner, taking an average of 1.8 minutes. The full 13-item PCS was administered to a random subsample of 50 patients, with a 5-minute interval, taking an average of 5.2 minutes. Demographic and clinical data (PHQ-4) were also collected.

Percentage agreement for each item

Agreement was assessed in the 50-patient subsample by categorizing responses as "positive" (scores 3 or 4) or "negative" (scores 0, 1, or 2).

- PCS-S Item 1 vs. Full PCS Items 6 and 11: Percent Agreement: 88% (44/50).
- PCS-S Item 2 vs. Full PCS Items 8 and 9: Percent Agreement: 90% (45/50).
- PCS-S Item 3 vs. Full PCS Item 7: Percent Agreement: 86% (43/50).
- Overall Agreement for High Catastrophizing Classification (PCS-S > 7 vs. Full PCS > 30): 85% (42/50).

Results

Of the 78 patients, 22% (n = 17) showed high catastrophizing (PCS-S > 7), indicating a significant subgroup at elevated psychosocial risk. In the subsample of 50 patients, the PCS-S identified 22% (11/50) with

high catastrophizing, compared to 24% (12/50) using the full PCS, with an overall agreement of 85%. Item-level agreement ranged from 86% to 90%, suggesting that the PCS-S effectively captures the constructs of rumination and helplessness. The average administration time for the PCS-S was 1.8 minutes (SD = 0.4), compared to 5.2 minutes (SD = 1.1) for the full PCS. Among patients with high catastrophizing on the PCS-S, 65% (11/17) had positive scores for anxiety and/or depression on the PHQ-4, highlighting the scale's utility in identifying psychological comorbidities.

Discussion

The pilot study results indicate that the PCS-S is a promising tool for screening pain catastrophizing, identifying 22% of patients with a high psychosocial risk, a critical factor associated with worse clinical outcomes [4,5]. The overall 85% agreement with the full PCS and item-level agreement of 86-90% suggest the PCS-S retains the core constructs of rumination and helplessness despite its brevity [11,13]. Its rapid administration (1.8 minutes) overcomes the barriers associated with the original PCS, which is often impractical in high-volume clinics [12].

Catastrophizing amplifies pain perception through vicious cycles involving poor sleep quality, anxiety, and maladaptive behaviors such as self-medication [13-16]. Poor sleep, common in TMD patients, lowers pain thresholds and impairs emotional regulation, increasing rumination [17,18]. By identifying patients with high catastrophizing, the PCS-S facilitates early interventions such as Cognitive Behavioral Therapy (CBT), which has proven effective in modulating catastrophizing [19].

In the context of the SUS, the PCS-S has the potential to promote equity in access to psychosocial screening, especially among vulnerable populations [20]. Its relevance is amplified in trauma-informed approaches, given the link between adverse childhood experiences (ACEs) and catastrophizing [5,21]. Implementing the PCS-S may catalyze a stepped-care model, directing intensive resources to those most in need [22-30].

Limitations

This pilot study has several limitations. The convenience sample, limited to a single center (n = 78), restricts generalizability. The comparison with the full PCS was conducted in a small subsample (n = 50), and the lack of formal statistical analyses prevents a robust evaluation of psychometric properties, such as sensitivity and specificity. Additionally, the cross-sectional design does not permit causal inference or assessment of the PCS-S's stability over time.

Conclusion

The Simplified Pain Catastrophizing Scale (PCS-S) is a practical and promising tool for psychosocial screening in patients with OFP/TMD. Its rapid administration and preliminary high agreement with the full PCS make it suitable for high-volume settings such as the SUS. The PCS-S facilitates the identification of patients at high psychosocial risk, promoting multidisciplinary referrals and aligning clinical practice with the biopsychosocial model. Further studies are necessary to formally validate the scale and confirm its applicability across different clinical contexts.

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