

Integrating Prosthodontics, Orofacial Pain Management and Public Health Strategies to Improve Patient Outcomes: A Narrative Review

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ABSTRACT

Orofacial Pain (OFP) is a complex, multifactorial condition that significantly impairs daily functioning and Quality of Life (QoL) across global populations. OFP often manifests through conditions such as Temporomandibular Disorders (TMD), bruxism, and occlusal disharmony. Prosthodontic interventions, particularly occlusal splints and full-mouth rehabilitation, are essential in mitigating symptoms and restoring functional harmony. However, access to such care remains uneven due to socioeconomic disparities, geographic limitations, and inadequate public awareness. The current review supports the concept of an integrative methodology that connects prosthodontic care to a nation's social policy, digital innovation, and psychosocial support. To overcome these barriers, it is essential to include prosthodontic therapies in schemes such as Ayushman Bharat and Medicaid, introduce school and community-based screening services, and train healthcare providers in stress management approaches as well as early disease detection. This model enhances the use of preventive care and long-term care, addressing the overall social determinants of oral health by coordinating clinical care with community-based outreach and a behavioural approach to health.

Keywords: Community dentistry, Psychosocial factors, Telemedicine, Temporomandibular joint disorders

INTRODUCTION

The OFP comprises a broad range of disorders affecting both the face and jaws, as well as the oral cavity, most commonly involving the Temporomandibular Joint (TMJ), neuropathic pain, and myofascial dysfunction [1]. It has a worldwide prevalence of 17-26% in adults and is more common in females and individuals experiencing psychological stress. OFP causes serious problems in chewing, talking, and normal interactions, as well as significant impacts on mental health and Quality of Life (QoL) [2].

The OFP has often been attributed in prosthodontic practice to occlusal imbalances, tooth loss, bruxism, and poorly fabricated prostheses. Although appliances such as splint therapy and occlusal adjustments are useful [3], many patients, particularly in rural or low-resource and underserved areas, face ineffective coverage due to socioeconomic factors, low health literacy, and inaccessibility of specialised care [4].

Health systems can take a radical approach to resolve these inequalities. The inclusion of treatment procedures such as occlusal splints, neuromuscular appliances, and supportive therapies in national insurance programs (e.g., Ayushman Bharat in India, Medicaid in the USA, California Children's Services) could considerably increase the accessibility of treatment [5]. Moreover, educating the community through schools, rural clinics, and elder care facilities, as well as implementing screening programs, can enable early detection of TMD and prosthetic needs [6].

In addition to mechanical and functional factors, the psychological aspect is deeply rooted in OFP. Facial pain is chronic and can easily be confounded by anxiety and depression, which contribute to increased pain perception and impaired treatment outcomes [7]. Therefore, prosthodontic care should incorporate mental health support. A multidisciplinary approach to treating dental patients, including dentists, psychologists, and pain specialists, allows for a more comprehensive treatment strategy.

Effective methods such as Cognitive Behavioural Therapy (CBT), guided biofeedback, and mindfulness techniques like yoga and

meditation have demonstrated potential in enhancing pain control and psychological resilience [8]. Routine mental health screenings using tools like the Patient Health Questionnaire-9 (PHQ-9) or Generalised Anxiety Disorder 7-item scale (GAD-7) during dental appointments would facilitate prompt referrals and support, ultimately leading to more effective, person-centered care [9].

The integrative neurofunctional model introduced in this paper represents a new line of thinking in the treatment of orofacial pain, particularly in patients with TMD. In the field of prosthodontics, there is an opportunity to integrate biomechanical rehabilitation with neuromuscular modulation and psychosocial assessment, enabling a comprehensive treatment plan that extends beyond traditional dental interventions.

The present review aims to offer clear insights into orofacial pain, its aetiology, psychosocial effects, and the importance of prosthodontic treatment for this condition using occlusal splints and full-mouth rehabilitation. It seeks to identify the obstacles associated with socioeconomic disparities, geographic constraints, and low awareness that limit access to care, and suggest an integrative, patient-centered approach that connects prosthodontic practice to broader public health strategies.

Aetiology of Orofacial Pain

The cause of OFP involves a complicated interplay among musculoskeletal, neurological, and psychological factors [10]. TMD, a major contributor, entails TMJ dysfunction, which produces pain or clicking and is often accompanied by limited joint mobility [11]. Another outcome is myofascial pain syndrome, associated with muscle overuse and improper posture [12]. Bruxism exacerbates TMD through involuntary teeth grinding, leading to muscle hyperirritability [13]. Neuropathic pain and headaches also play a role in this complex scenario [14,15]. Psychological variables such as stress and anxiety further increase OFP, correlating with the biopsychosocial model [7]. Recent research has elucidated the neurological underpinnings of neuropathic OFP, identifying novel

pain pathways that may inform targeted therapies. Understanding these diverse etiological factors is critical, as they directly influence the profound effects OFP has on patients’ daily lives and overall well-being [16].

Prosthodontic Interventions in the Management of Orofacial Pain

Prosthodontists play a pivotal role in diagnosing and managing orofacial pain, particularly when the aetiology involves TMD, parafunctional habits, or occlusal imbalances [17,18]. Several prosthodontic interventions are both therapeutic and diagnostic, contributing to pain relief and functional rehabilitation [Table/Fig-1].

Interventions	Indications	Mechanisms	Advantages	Limitations
Occlusal splints (e.g., Michigan splints) [19]	Bruxism, myofascial pain, early TMD	Neuromuscular stabilization, reduced joint load	Non invasive, widely studied, reversible	Requires compliance, short-term fix
FMR [17]	Advanced wear, occlusal collapse, chronic TMD	Re-establishes occlusal harmony, vertical dimension	Long-term correction, restores esthetics/ function	High cost, technical expertise needed
Selective grinding (Reversible occlusal therapy) [18]	Minor occlusal discrepancies	Adjusts contacts, balances occlusion	Quick relief, conservative	Requires precise diagnosis, not suitable for major cases
Prosthesis modification (Complete/ partial dentures) [19]	Edentulous patients with mucosal/ occlusal discomfort	Relieves trauma, improves fit and balance	Cost-effective, improves mastication	Frequent follow-ups, limited in poor manual dexterity
MORAs [18,19]	Complex TMD with occlusal discrepancies	Alters mandibular posture for realignment	Diagnostic and therapeutic tool	Requires customization, expensive

[Table/Fig-1]: Comparative overview of prosthodontic interventions for orofacial pain [17-19].
FMR: Full-mouth rehabilitation; MORA: Mandibular orthopaedic repositioning appliances

Impact of Orofacial Pain on Quality of Life

Chronic OFP severely impairs QoL, disrupting eating, speaking, and social interactions, often leading to isolation and depression [20]. Sleep disturbances and reduced productivity further compound emotional distress [21]. Psychosocial factors, such as anxiety, significantly exacerbate OFP, particularly in younger adults who report higher stress levels. Tailored interventions, like CBT, may benefit this group, while older patients might find more value in support groups addressing chronic pain coping strategies [22,23].

Reissmann DR et al., determined that patients experiencing TMD-related pain reported lower scores on oral health-related QoL, with the intensity of pain strongly connected to emotional and social limitations [24]. Anita H et al., found that chronic orofacial pain patients exhibited poor psychological health and functional issues, particularly in eating and communication [25]. Similarly, Aggarwal VR et al., confirmed that chronic facial pain is associated with poor life satisfaction, poor sleep quality, and a more frequent occurrence of depressive symptoms, justifying the multidimensional impact of OFP on daily living [26].

Psychological Burden of Orofacial Pain and Socioeconomic Intersections

The OFP, especially when chronic and unrelieved, exerts a profound psychological toll on individuals. As a TMD specialist, it is evident that the pain experience is not merely physiological but intricately linked to emotional, cognitive, and behavioural responses. Psychological co-morbidities especially anxiety, depression, somatisation, and sleep disturbances-are commonly reported among TMD patients [27].

1. **Emotional distress and pain amplification:** Research demonstrates a bidirectional relationship between pain and psychological distress. Persistent OFP activates central sensitization pathways, exacerbated by heightened emotional reactivity [28]. Patients often report fear of exacerbating the condition, social withdrawal, reduced work productivity, and disturbed interpersonal relationships. This chronic cycle of pain and distress leads to what is often termed “pain catastrophising,” wherein individuals perceive pain as unbearable and uncontrollable, further amplifying their perception of pain intensity [29].
2. **Impact of Socioeconomic Status (SES):** Poor socioeconomic status causes a greater psychological burden of OFP in affected individuals. This is largely attributed to the absence of multidisciplinary methods for pain management and psychological support [30]. Research indicates that individuals in lower socioeconomic layers are often unaware of the condition’s existence and its need for professional attention. As a result, they may be more inclined to rely on over-the-counter medications, which can delay proper diagnosis and treatment [31]. Parafunctional behaviours, such as bruxism, are also susceptible to the adverse effects of stress. Those in lower SES brackets are more vulnerable to long-term economic hardships, high population density, and the absence of social support, exacerbating their condition [32]. This situation is further worsened by the stigma surrounding mental health issues in such societies, leading to under-reporting of psychological distress and a lack of effective channels for support [33].
3. **Psychological aspects from a public health perspective:** The neglect of mental health in the context of dental pain represents a systemic gap from a public health perspective [34]. Integrated behavioural health services in oral healthcare facilities and dental institutions are generally unavailable, particularly in resource-limited environments. Addressing the psychosocial aspects of OFP is crucial not only to relieve pain but also to prevent chronic disability and enhance Oral Health-Related Quality of Life (OHRQoL) [35].
4. **Integration recommendation:** Dental and prosthodontic assessments may include validated psychological assessment instruments, such as PHQ-9, GAD-7, and Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) Axis II, which provide valuable data on the psychosocial components of OFP and TMD [36]. Psychosocial stressors that aggravate these conditions can be addressed at community levels through stress management training, particularly among rural and urban slum populations [37].

Moreover, it is essential that on the policy level, both TMD and OFP be included in national oral health initiatives and broader mental health policies to provide integrated care. Combined, these interventions highlight the importance of collaborative, biopsychosocial approaches in the diagnosis and management of OFP. Experts from various disciplines, guided by the pain science and patient-centered care framework, can play a crucial role in enhancing the OHRQoL of affected patients [38].

Effective OFP management requires coordinated roles across disciplines, from prosthodontists to psychologists [Table/Fig-2].

Disciplines	Role in OFP Management
Prosthodontist	Diagnose and rehabilitate occlusal and prosthetic issues
Psychologist/Psychiatrist	Address anxiety, depression, and pain catastrophising
Physiotherapist	TMJ mobilization, posture correction, biofeedback
Public health dentist	Community-level outreach, screening, and education
Digital health/AI specialist	Remote monitoring, digital diagnostics

[Table/Fig-2]: Roles of various disciplines in interdisciplinary management of OFP.

Challenges of Prosthodontic Management in the Elderly and Low Socioeconomic Groups

Prosthodontic management in elderly individuals and low SES populations is hindered by a combination of clinical, financial, systemic, and psychosocial barriers.

1. **Financial barriers:** Elderly patients, especially those without dental insurance, often cannot afford advanced prosthodontic treatments like dentures or implants. Similarly, individuals from low-SES groups are disproportionately impacted by out-of-pocket expenses and inadequate public coverage, leading to deferred or foregone treatment [38].
2. **Limited access to specialised care:** In rural and underserved areas, the lack of prosthodontic specialists restricts timely and adequate treatment. Patients face logistical barriers such as transportation difficulties and long waiting times. Wei L et al., highlighted geographic disparities in the availability of prosthodontic services in rural populations [39].
3. **Low oral health literacy and awareness:** Limited knowledge about oral diseases and prosthetic care leads to poor compliance and delayed treatment-seeking behavior in both elderly and low-SES populations. Language barriers, cognitive decline, and misinformation exacerbate these issues. Low health literacy in underserved communities directly contributes to prosthodontic neglect and complications [40].
4. **Co-morbidities and systemic health conditions:** Chronic conditions such as diabetes, osteoporosis, and cardiovascular diseases are more prevalent in elderly and low-income populations. These conditions affect wound healing, increase prosthetic failure rates, and complicate implant placement and maintenance. There is a need for prosthodontic protocols to adapt to systemic co-morbidities in older adults [41].
5. **Reduced manual dexterity and sensory decline:** Conditions like arthritis, tremors, and reduced vision impair the ability to maintain and handle removable prostheses, increasing the risk of denture-related mucosal trauma and infections [42]. Poor prosthesis hygiene in elderly edentulous patients often leads to reduced QoL and mucosal discomfort [43].
6. **Psychological and nutritional implications:** Inadequate prosthetic rehabilitation can contribute to speech difficulties, malnutrition, social withdrawal, and depression-especially in institutionalised or isolated older adults. OFP and prosthetic deficiencies often co-occur with anxiety, isolation, and poor eating habits in the elderly [44].
7. **Poor follow-up and maintenance:** limited mobility, financial constraints, and low prioritisation of oral health often result in infrequent dental visits. This delays repairs or adjustments, allowing minor prosthetic issues to evolve into chronic pain or mucosal damage. The lack of continuity of care contributes to preventable prosthodontic complications in low-resource settings [45].

Public Health and Policy Implications

Addressing these disparities requires a multi-pronged approach [46-50]:

- Expanding insurance coverage for prosthodontic treatments (e.g., dentures, implants).
- Deploying mobile clinics and teledentistry to remote communities.
- Training primary care and public health dentists in basic prosthetic care.
- Launching awareness campaigns for denture hygiene and early prosthodontic intervention.

It is advocated that there should be systemic integration of dental services into broader healthcare frameworks to ensure equity in oral health access.

Multimodal Framework for Orofacial Pain Management

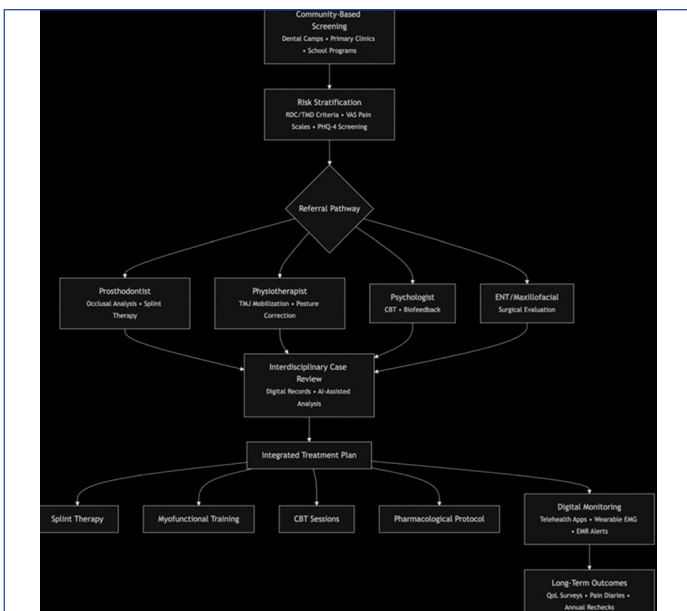
Despite significant advancements in both clinical prosthodontics and public health research related to orofacial pain, there remains a clear disconnect between the two fields. One major challenge is the fragmented approach to OFP management: prosthodontic care often focuses on symptom alleviation through clinical interventions (such as occlusal splints, prosthetic rehabilitation, or bite adjustments), while public health efforts primarily address broader psychosocial determinants like access barriers, socioeconomic disparities, and health literacy. However, few initiatives combine these insights into a unified strategy [51,52].

This lack of integration results in missed opportunities for comprehensive care. Patients may receive psychological counseling or basic dental services through public health channels without access to the prosthodontic interventions that could dramatically improve their QoL [53]. Conversely, clinical practices involving prosthodontics might not consider the wider social determinants affecting patient outcomes, including ongoing stress, a lack of education on pain control, or inadequate follow-up services [54].

The present review recommends integrating prosthodontic treatment with public health approaches to help control OFP and TMD. Through interdisciplinary collaboration, there will be a greater ability to improve early detection, make treatment more accessible, and support long-term recovery. This can be achieved at the community level by establishing screening services to identify OFP at an early stage and creating a referral system to connect patients with prosthodontic specialists [55]. Entry-level dentists can be trained in simple procedures that can be used in low-resource settings through the education of public health dentists. Additionally, patients can receive guidance on managing pain by incorporating both behavioural changes and dental care, which can make a significant difference [56].

The core components of the multimodal framework are as follows:

1. **Precision diagnosis through prosthodontic profiling:** Occlusal disharmonies, parafunctional habits, and prosthetic imbalances are common but under-recognised contributors to TMD. This approach emphasises early detection of biomechanical triggers through occlusal analysis, muscle palpation, and digital bite registration, thereby preventing the escalation of chronic orofacial pain [57].
2. **Integration of biometric feedback and neurofunctional assessment:** Incorporating tools such as Electromyography (EMG), thermography, and mandibular movement tracking provides objective, reproducible measures of dysfunction. These diagnostics help identify neuromuscular imbalances and guide targeted prosthodontic or splint therapy, enhancing clinical outcomes [58].
3. **Customised prosthetic rehabilitation with pain modulation:** Beyond restoring form and function, prosthetic design in this approach actively contributes to pain reduction by optimising mandibular posture, evenly distributing occlusal load, and minimising joint strain. This functional prosthodontic rehabilitation acts as a dynamic component of TMD therapy [56].
4. **Interdisciplinary referral and public health integration:** The model includes built-in referral pathways to orofacial pain specialists, psychologists, and physiotherapists, ensuring continuity of care. At the community level, it supports public health initiatives focused on early screening, education, and access to affordable TMD care for underserved populations [36].
5. **Digital workflow and AI-powered monitoring:** The inclusion of digital impressions, 3D jaw movement simulations, and AI-based pain diaries represents a forward-thinking advancement. These tools facilitate remote monitoring, enhance patient compliance, and contribute to long-term data collection for research and public health surveillance [58-60] [Table/Fig-3].



[Table/Fig-3]: Flowchart of the interdisciplinary OFP management model.

Global public health models offering prosthodontic rehabilitation:

Several countries have implemented publicly funded oral health programs that integrate prosthodontic rehabilitation, particularly targeting underserved and vulnerable populations. These initiatives demonstrate the critical role of government-supported services in improving access to oral health care.

1. Brazil-“Smiling Brazil” Program (Brasil Sorridente):

Launched in 2004, this national initiative offers free dental prostheses and comprehensive oral rehabilitation through the Unified Health System (Sistema Único de Saúde-SUS). The program has significantly expanded both fixed-site and mobile dental units to reach rural and low-income communities. Over 30 million dental prostheses have been distributed, resulting in notable improvements in oral function and QoL for economically disadvantaged populations [61].

2. United Kingdom-NHS dental services:

The National Health Service (NHS) offers subsidised dental care, including prosthetic services such as dentures, to eligible groups, including low-income individuals, children, and older adults.

Impact: The initiative has resulted in increased uptake of prosthodontic treatments and a measurable reduction in edentulism-related disability [62].

3. United States-Medicaid and medicare dental expansion:

Several U.S. states have expanded Medicaid to include prosthodontic services for elderly and disabled individuals. Pilot projects have also introduced coverage for complete denture fabrication and implant-supported prostheses.

Impact: States implementing these expansions have reported over a 40% increase in denture access among low-income elderly beneficiaries [63].

4. Canada-National dental care expansion (2024):

Canada's recent dental reform aims to provide phased, publicly funded dental coverage, including prosthodontic care, for low-income households, senior citizens, and persons with disabilities.

Impact: It is expected to benefit over 9 million Canadians, particularly by improving access to complete and partial dentures, as well as broader oral rehabilitation services [64].

5. India-Public oral health programs with prosthodontic extensions:

Under the Ayushman Bharat scheme, select Indian states have introduced oral health packages that encompass prosthetic rehabilitation, especially for geriatric populations and post-oncologic care. Government dental institutions serve as key providers of low-cost prosthodontic services.

Impact: Notable increases in service uptake have been observed during rural geriatric outreach camps and among patients undergoing post-radiotherapy oral rehabilitation [65].

6. World health organisation-Mobile dental clinic model:

Endorsed by the WHO and operational in multiple regions, mobile dental units offer prosthodontic services in disaster-affected, tribal, and geographically isolated areas. Staffed by dentists trained in removable prosthodontics, these units deliver decentralised, onsite care.

Impact: Access to dentures has been enhanced in refugee camps and remote communities, significantly reducing the travel burden for marginalised populations [66].

7. Australia-Veterans' dental scheme:

Administered by the Australian Department of Veterans' Affairs, this program offers comprehensive dental services-including dentures and implant-supported prostheses-to eligible war veterans and their dependents.

Impact: There have been demonstrated improvements in oral satisfaction, masticatory efficiency, and overall well-being among elderly veterans [67].

To ensure equitable prosthodontic care, especially in rural and underserved regions, public health policies must be effectively integrated into existing primary healthcare frameworks. This begins with expanding dental insurance coverage under national schemes (e.g., Ayushman Bharat in India, Medicaid in the USA) to include prosthodontic services such as dentures, occlusal splints, and implant-supported rehabilitation [63,65].

At the operational level, mobile dental units and tele-dentistry platforms can overcome geographic and specialist shortages by delivering on-site care and enabling remote consultations in low-resource areas [68]. Furthermore, training primary healthcare providers and rural dental officers in basic prosthodontic screening and prosthetic maintenance builds capacity for early detection and referral, reducing treatment delays.

CONCLUSION(S)

Public-private partnerships involving dental colleges and Non-Government Organisations (NGOs) can support targeted outreach programs, including free prosthetic camps for geriatric and medically compromised patients. Community-level health promotion campaigns, delivered via schools, panchayats, and local media, are crucial for improving awareness about the role of prosthetic rehabilitation in functional and psychosocial health. When implemented cohesively, these strategies can embed prosthodontic services into rural health systems, ensuring access, continuity, and a better QoL for underserved populations. Future studies should refine OFP management in underserved populations through randomised trials on prosthodontic interventions and explore psychosocial impacts on mental health. Assessing the cost-effectiveness of these strategies will also guide policy development.

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