

Review Article

Prosthodontic care for patients with trismus: a comprehensive review

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ABSTRACT

Trismus, characterized by restricted mouth opening, poses significant challenges in prosthodontic management due to its multifactorial etiology and impact on oral functionality. Common causes include trauma, temporomandibular joint disorders, malignancies, and radiation therapy, all of which can result in muscular or joint dysfunction. Clinically, patients experience difficulties in mastication, speech, and oral hygiene, which compromise their quality of life and complicate prosthodontic treatment. Addressing these challenges requires a multidisciplinary approach and the integration of advanced techniques. Innovative prosthodontic solutions have emerged to address the mechanical and esthetic needs of trismus patients. Sectional impression trays, intraoral scanners, and CAD/CAM technologies have improved the accuracy of prosthesis fabrication and reduced patient discomfort. Flexible materials, such as thermoplastics and high-strength ceramics, enhance the durability and comfort of prosthetic devices, while implant-retained prostheses offer stable, long-term solutions. These advancements not only restore oral functionality but also significantly enhance psychological well-being by improving esthetics and social confidence. Rehabilitation outcomes in trismus care extend beyond oral functionality. Effective prosthodontic interventions contribute to improved nutritional intake and systemic health by enabling patients to consume a more diverse and balanced diet. Psychological benefits, including reduced anxiety and enhanced self-esteem, are integral to the success of trismus management. Long-term success relies on tailored maintenance protocols, patient education, and emerging technologies like telemedicine, which support accessibility and consistent care. Comprehensive prosthodontic care, leveraging innovation and patient-centered strategies, addresses the multifaceted challenges of trismus. These approaches enhance both immediate and long-term outcomes, improving quality of life and ensuring holistic rehabilitation for affected patients. Advances in technology and materials continue to expand possibilities, paving the way for more effective and accessible solutions in the management of this complex condition.

Keywords: Trismus, Prosthodontic management, Limited mouth opening, Rehabilitation outcomes, Innovative techniques

INTRODUCTION

Trismus, commonly referred to as limited mouth opening, is a debilitating condition that significantly affects oral functionality and quality of life. This condition is often encountered in prosthodontics and presents unique challenges in treatment planning and execution. Trismus is characterized by restricted mandibular movement, which may result from a wide array of etiologies, including trauma, surgical interventions, malignancies, temporomandibular joint disorders, and radiation therapy for head and neck cancers.^{1,2} The severity of trismus often correlates with its underlying cause, with post-radiation fibrosis and scarring frequently leading to chronic and progressive forms of the condition. The impaired ability to perform fundamental oral functions such as mastication, swallowing, and speech makes trismus not only a physical disability but also a psychological burden on affected patients.³

Prosthodontic care for patients with trismus necessitates a thorough understanding of the condition's clinical and anatomical implications. Limited mouth opening poses challenges at various stages of dental treatment, including impression-taking, prosthesis fabrication, and placement. In addition, maintaining oral hygiene and ensuring long-term prosthesis functionality require tailored strategies. Conventional techniques such as modified impression trays and sectional prostheses have long been employed in managing these patients. However, the advent of digital dentistry, including three-dimensional imaging and computer-aided design/manufacturing (CAD/CAM) technologies, has revolutionized prosthodontic solutions for trismus patients. These advancements enable greater precision and efficiency in prosthesis design and delivery, particularly in cases with severe anatomical constraints.⁴

The management of trismus in prosthodontics is not merely about restoring oral function but also improving patients' overall health and well-being. Inadequate oral rehabilitation can exacerbate problems such as malnutrition, weight loss, and poor oral hygiene, leading to secondary complications like infections or even systemic health issues. Furthermore, the psychological impact of trismus, including reduced self-esteem and social interaction, underscores the importance of addressing this condition holistically.^{2,5} This review aims to provide a comprehensive overview of prosthodontic care for patients with trismus, emphasizing the challenges and solutions in clinical practice.

Prosthodontic management of patients with trismus presents unique challenges that require tailored approaches to overcome anatomical and functional limitations. Limited mouth opening complicates standard procedures, including impression-taking, jaw relationship recording, and prosthesis placement. For these patients, traditional techniques may not be feasible, necessitating innovative solutions such as sectional impression trays and custom prostheses. Recent advancements in digital

dentistry, particularly CAD/CAM, have demonstrated significant potential in addressing these challenges by allowing precise, non-invasive prosthesis fabrication tailored to individual patient needs.⁶

Functional restoration in trismus cases is not limited to mechanical rehabilitation but extends to improving patients' overall quality of life. Effective prosthodontic interventions can alleviate secondary complications such as malnutrition, speech difficulties, and oral hygiene challenges.

Moreover, these interventions play a critical role in enhancing patients' psychological well-being by restoring esthetics and functional confidence. Emerging materials and techniques, such as flexible prostheses and 3D printing, provide clinicians with greater adaptability and efficiency in treatment planning and delivery. These advancements underscore the importance of continuous research and innovation in addressing the complexities of trismus management.⁷

ETIOLOGY AND CLINICAL PRESENTATION OF TRISMUS IN PROSTHODONTIC PATIENTS

Trismus, often defined as a reduction in the ability to open the mouth due to dysfunction or restriction of the mandibular movement, is a multifaceted condition with diverse etiologies. Its underlying causes can be broadly classified into pathological, surgical, and therapeutic categories, each impacting prosthodontic management in unique ways. Pathological factors such as infections, trauma, and temporomandibular joint (TMJ) disorders are common contributors. For example, odontogenic infections like pericoronitis and abscesses can lead to acute muscle spasm and restricted jaw movement. Trauma-related injuries, especially those involving the mandibular condyle, can disrupt the normal function of the masticatory muscles and TMJ, resulting in persistent or progressive trismus.⁸

Surgical interventions in the orofacial region also contribute significantly to trismus development. Patients undergoing procedures for maxillofacial trauma or tumor resections frequently experience scar tissue formation, which restricts jaw movement. Additionally, radiation therapy, a mainstay in the treatment of head and neck cancers, is a prominent therapeutic cause. Radiation-induced fibrosis, particularly in the masseter and pterygoid muscles, leads to a gradual reduction in tissue elasticity and function. This condition, known as radiation-induced trismus, is especially challenging in prosthodontic care as it compromises not only the physical ability to open the mouth but also the tissue quality required for prosthesis retention and stability.⁹

Clinically, trismus presents as a spectrum of symptoms, varying in severity depending on the etiology and duration of the condition. Affected individuals typically exhibit restricted mandibular movement with interincisal

opening measuring less than 35 millimeters, a threshold considered diagnostic for trismus. Alongside mechanical limitations, patients often report associated pain, difficulty in mastication, and impaired speech. These symptoms can further complicate oral hygiene maintenance, predisposing patients to secondary complications such as periodontal diseases and caries. In prosthodontic settings, these functional and clinical challenges necessitate a comprehensive assessment, including detailed history-taking and diagnostic imaging, to evaluate the extent of muscular and joint involvement.¹⁰

Psychosocial aspects of trismus are equally significant, as patients frequently experience anxiety and frustration due to their inability to perform routine oral functions. This emotional burden often exacerbates their physical symptoms, creating a cycle that complicates management. For instance, prolonged limited mouth opening can lead to temporomandibular dysfunction, perpetuating pain and further restricting mobility. These interrelated challenges highlight the importance of a holistic approach to trismus care, incorporating both physical and psychological assessment to address the full scope of the condition.¹¹

CHALLENGES IN PROSTHODONTIC MANAGEMENT OF PATIENTS WITH LIMITED MOUTH OPENING

The prosthodontic management of patients with limited mouth opening presents a range of unique challenges that demand both innovative techniques and meticulous planning. One of the foremost difficulties lies in obtaining accurate impressions.

Conventional impression-taking techniques require adequate mouth opening to accommodate standard trays, which is often not possible in patients with trismus. Modified impression techniques, such as the use of sectional trays, demand significant technical skill and precision. Furthermore, the material properties, including viscosity and setting time, must be carefully selected to prevent discomfort or exacerbation of the condition during the procedure.¹²

Another critical challenge is achieving appropriate maxillomandibular relationship records, which are essential for constructing functional and esthetic prostheses. Restricted jaw movement complicates the use of traditional bite registration methods, as standard occlusal registration appliances may not fit within the patient's limited oral cavity.

In such cases, clinicians must resort to alternative methods, including manual manipulation or the use of small intraoral appliances. These adaptations, however, can compromise the accuracy of the jaw relationship record, potentially impacting the prosthesis's fit and function. Additionally, the time-intensive nature of these

procedures can lead to patient fatigue and further restrict mouth opening.¹³

Fabrication and delivery of prostheses also pose significant obstacles in patients with limited mouth opening. In fixed prosthodontics, for instance, the insertion of crowns or bridges requires sufficient mouth opening to navigate the prosthesis into place without compromising its integrity. Similarly, for removable prostheses, limited oral access may hinder proper positioning, leading to increased chairside time and adjustments. Segmental prostheses, which involve assembling parts intraorally, offer a potential solution but require advanced laboratory techniques and precise coordination between the clinician and the dental technician. This added complexity increases the overall treatment time and cost, making it less accessible for some patients.¹⁴

Maintenance of oral hygiene and prosthesis care represents another ongoing challenge. Patients with restricted mouth opening often struggle to clean their prostheses adequately, leading to plaque accumulation, periodontal disease, and secondary caries. Prosthodontists must design prostheses that are easy to maintain and educate patients on modified hygiene practices. However, compliance can be a concern, particularly in patients who experience discomfort or frustration due to their condition. Long-term follow-up and periodic prosthesis adjustments are essential but may be challenging to implement due to patient accessibility and the complexity of the required interventions.¹⁵

INNOVATIVE PROSTHODONTIC TECHNIQUES AND MATERIALS FOR TRISMUS PATIENTS

Advances in prosthodontic techniques and materials have significantly improved the care of patients with trismus. Among the most notable innovations is the use of sectional impression trays, which allow impressions to be taken in segments and later joined to form a complete mold.

This approach is particularly useful in patients with severe mouth opening limitations. The design and precision of these trays have been enhanced with the help of CAD/CAM technologies, allowing for more accurate impressions and reducing chairside adjustments. Additionally, the use of low-viscosity impression materials ensures that even minimal intraoral access can yield functional results.¹⁶

Digital dentistry has revolutionized prosthodontic care for trismus patients, offering non-invasive and highly accurate solutions. Intraoral scanners can now capture detailed digital impressions without requiring traditional impression trays, bypassing the challenges posed by limited oral access. These digital impressions can then be used to design and fabricate prostheses with a high degree of precision. Furthermore, additive manufacturing

techniques, such as 3D printing, enable the creation of complex prosthetic designs, including segmental prostheses that can be assembled intraorally. These technologies reduce the dependency on conventional methods, which often exacerbate patient discomfort, while simultaneously improving the accuracy and fit of the prosthesis.¹⁷ Innovations in materials have also played a critical role in addressing the unique needs of trismus patients. Flexible and lightweight materials, such as thermoplastic resins, are increasingly being used for the fabrication of removable prostheses. These materials provide a more comfortable fit and can be inserted with less effort compared to rigid alternatives.

Additionally, flexible denture base materials are less likely to fracture under the strain of limited oral access, extending the longevity of the prosthesis. For fixed prosthetics, high-strength ceramics and zirconia offer durability and esthetic benefits, while advancements in bonding agents ensure secure placement even under challenging circumstances.¹⁸

Another promising development is the integration of implant-supported prostheses tailored for trismus patients. Implant placement in these individuals can be challenging due to restricted surgical access; however, guided implant surgery using digital planning and surgical guides minimizes intraoperative difficulties. Once implants are in place, CAD/CAM-fabricated prostheses provide a precise fit, reducing the need for repeated adjustments. Additionally, magnet-retained overdentures are gaining traction as an effective solution for patients with limited dexterity or oral access. These prostheses allow for easy placement and removal, significantly improving patient satisfaction and long-term oral health outcomes.¹⁹

REHABILITATION OUTCOMES AND QUALITY OF LIFE IMPROVEMENTS IN TRISMUS CARE

Prosthodontic rehabilitation for trismus patients often goes beyond addressing mechanical limitations, focusing on restoring oral functionality and enhancing overall quality of life. The functional outcomes of prosthodontic interventions are closely tied to the patient's ability to perform daily oral activities, such as eating, speaking, and maintaining oral hygiene.

For many, even modest improvements in mouth opening can translate to significant gains in these areas. Prosthetic devices designed to optimize functionality under restrictive conditions, such as sectional prostheses or flexible dentures, allow patients to regain confidence in their ability to eat and communicate effectively. Such improvements play a critical role in reducing the social and psychological burden associated with trismus.¹³ Studies have shown that prosthodontic care significantly improves nutritional intake and general health in trismus patients. Limited mouth opening often results in a compromised diet, as patients are unable to consume a variety of foods. Prosthetic devices that enhance

masticatory efficiency enable the inclusion of a more diverse and nutritious diet. This not only addresses the immediate dietary deficiencies but also prevents long-term health complications related to poor nutrition. Moreover, advances in material science have contributed to the development of lightweight, easy-to-clean prostheses, making them more acceptable for daily use and promoting better oral hygiene, which further supports systemic health.^{20,21}

The psychological impact of trismus rehabilitation cannot be overstated. Patients frequently report a sense of isolation and frustration due to their inability to engage in normal social interactions. Addressing these concerns through effective prosthodontic care fosters a greater sense of self-esteem and well-being. Prostheses that are designed to prioritize esthetics, alongside function, help patients regain confidence in their appearance, which is critical for social reintegration. Research has indicated that improved esthetics and functionality contribute to a reduction in anxiety and depression levels, making prosthodontic care a vital component of comprehensive trismus management.²²

Long-term rehabilitation outcomes are also influenced by patient adherence to maintenance protocols and follow-up care. Customized patient education programs that emphasize the importance of prosthetic hygiene and regular adjustments are essential for sustaining the benefits of treatment. Additionally, advances in implant-retained prostheses have demonstrated improved long-term outcomes, particularly in terms of stability and patient satisfaction.

For trismus patients, these options offer durable solutions that reduce the need for frequent interventions, allowing them to focus on broader aspects of their recovery and life enhancement. Emerging technologies, such as telemedicine consultations and digital monitoring tools, further support long-term follow-up, ensuring continuous care for patients who may face mobility or accessibility challenges.^{23,24}

CONCLUSION

Prosthodontic care for patients with trismus requires a comprehensive approach that addresses functional, esthetic, and psychological challenges. Advances in techniques and materials have significantly enhanced treatment outcomes, enabling better quality of life and long-term rehabilitation. A patient-centered strategy, integrating innovative technologies and multidisciplinary collaboration, is essential for optimizing care. Continued research and development will further refine solutions, ensuring effective and accessible prosthodontic management for this complex condition.

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REFERENCES

1. Dijkstra P, Kalk W, Roodenburg J. Trismus in head and neck oncology: a systematic review. *Oral Oncol*. 2004;40(9):879-89.
2. Alzahrani AH, Alwthinani FK, Fahmi MK, Abdelfattah MY. An effective approach for prosthodontic rehabilitation for a trismus patient seeking removable partial denture. *Int J*. 2020;8(3):68-71.
3. Scott B, Butterworth C, Lowe D, Rogers S. Factors associated with restricted mouth opening and its relationship to health-related quality of life in patients attending a maxillofacial oncology clinic. *Oral Oncol*. 2008;44(5):430-8.
4. Beri A, Pisulkar SG, Bansod AV, Dahihandekar C. Alternative prosthodontic therapies: a multifaceted approach. *Cureus*. 2022;14(9).
5. Mishra N, Chand P, Singh RD. Two-piece denture-obturator prosthesis for a patient with severe trismus: A new approach. *The J Ind Prosthodont Soc*. 2010;10:246-8.
6. Muqet MA, Uzair M, Qaiser S, Ahmad N, Nisar A, Rizvi SSZ. Oral Rehabilitation in the Face of Thoracic Challenges: Prosthodontics Unveiling New Frontiers in Healthcare. *Medical and Life Sciences*. 2023;2(2):43-51.
7. Rekow ED. Digital dentistry: The new state of the art—Is it disruptive or destructive? *Dental Materials*. 2020;36(1):9-24.
8. Scott B, D'souza J, Perinparajah N, Lowe D, Rogers S. Longitudinal evaluation of restricted mouth opening (trismus) in patients following primary surgery for oral and oropharyngeal squamous cell carcinoma. *British J Oral and Maxillofac Surg*. 2011;49(2):106-11.
9. Goldstein M, Maxymiw WG, Cummings BJ, Wood RE. The effects of antitumor irradiation on mandibular opening and mobility: a prospective study of 58 patients. *Oral Surg, Oral Med, Oral Pathol, Oral Radiol, Endodontol*. 1999;88(3):365-73.
10. Abboud WA, Hassin-Baer S, Alon EE, et al. Restricted mouth opening in head and neck cancer: etiology, prevention, and treatment. *JCO Oncol Pract*. 2020;16(10):643-53.
11. Dijkstra P, Huisman P, Roodenburg J. Criteria for trismus in head and neck oncology. *Int J Oral and Maxillofac Surg*. 2006;35(4):337-42.
12. Prasad R, Bhide S, Gandhi P, Divekar N, Madhav V. Prosthodontic management of a patient with limited mouth opening: a practical approach. *The J Indian Prosthodont Soc*. 2008;8(2):83-86.
13. Haribhakti VV, Haribhakti VV. *Prosthetic Rehabilitation: Fundamentals. Restoration, Reconstruction and Rehabilitation in Head and Neck Cancer*. 2019:315-46.
14. Magdalena CMdAP, Makrakis LR, da Silva CHL. Prosthetic rehabilitation of a patient submitted to segmental mandibulectomy. *Research, Society and Development*. 2022;11(10):1032709.
15. Carroll K, Edelstein JE. *Prosthetics and patient management: A comprehensive clinical approach*. Slack Incorporated; 2006.
16. Kumar KA, Bhat V, Nair KC, Suresh R. Preliminary impression techniques for microstomia patients. *The J Ind Prosthodont Soc*. 2016;16(3):229-33.
17. Kim S-W, Park G-T, Huh Y-H, Park C-J, Cho L-R, Ko K-H. Digital workflow for prosthetic restoration in the pan facial fracture patient: A case report. *The J Korean Acad Prosthodont*. 2022;60(4):395-403.
18. 18. Kumar B, Fernandes A, Sandhu PK. Restricted mouth opening and its definitive management: A literature review. *Ind J Dent Res*. 2018;29(2):217-24.
19. Garrett N, Roumanas ED, Blackwell KE, et al. Efficacy of conventional and implant-supported mandibular resection prostheses: study overview and treatment outcomes. *The J Prosth Dent*. 2006;96(1):13-24.
20. Wallace S, Samietz S, Abbas M, McKenna G, Woodside JV, Schimmel M. Impact of prosthodontic rehabilitation on the masticatory performance of partially dentate older patients: can it predict nutritional state? Results from a RCT. *J Dent*. 2018;68:66-71.
21. Hayes M, da Mata C, Burke F, McKenna G. Impacts of Oral Rehabilitation on Nutritional Status. *Nutrition and Oral Health*. 2021;4:63-71.
22. Johnson J, Johansson M, Rydén A, Houltz E, Finizia C. Impact of trismus on health-related quality of life and mental health. *Head & Neck*. 2015;37(11):1672-9.
23. Crosetti E, Tos P, Berrone M, Battiston B, Arrigoni G, Succo G. Long-term follow-up of computer-assisted microvascular mandibular reconstruction: a retrospective study. *J Clin Med*. 2024;13(13):3899.
24. Haleem A, Javaid M, Singh RP, Suman R. Telemedicine for healthcare: Capabilities, features, barriers, and applications. *Sensors Int*. 2021;2:100117.

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