

CASE REPORT



A case report of minimally invasive strategies for denture support in a geriatric patient with medical comorbidities

Ayuni Maisarah Ridzuan¹, Nusima Mohamed^{2*}

¹ Faculty of Dentistry, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia.

² Department of Conservative Dentistry and Prosthodontics, Faculty of Dentistry, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia.

Abstract

Geriatric patients in dentistry commonly present with medical comorbidities. It is necessary to thoroughly evaluate the patient's medical condition and then develop appropriate treatment plans, which provide greater benefits and help prevent medical complications. This case report describes the prosthodontic management of a geriatric female with partial edentulism, longstanding denture use, and systemic diseases, emphasising individualised care in a high-risk patient. A 69-year-old Chinese woman attending the Universiti Sains Islam Malaysia Polyclinic complained of a loose upper acrylic denture worn for 30 years, and presented with multiple caries, generalized recession and partial edentulism in both arches. She had a history of hepatitis B managed with medication and maintained follow-up, and shoulder cancer that finished chemotherapy 10 years ago. A black, purplish lesion on the left buccal mucosa adjacent to tooth 28 was detected during clinical examination. Strict infection control protocols were employed throughout treatment following her medical history. Pre-prosthetic procedures, including maintaining her oral hygiene, restoration, root canal treatment before denture construction, were done under proper management due to the patient's history of trismus. The case emphasized the challenges of prosthodontic management in geriatric patients with systemic disease and compromised dentition. The integration of restorative procedures and denture construction aimed to restore function and improve quality of life is discussed while considering the patient's systemic comorbidities.

Keywords: dentures, geriatric, prosthodontics, root canal treatment, trismus

Introduction

According to the World Health Organisation, by 2030, one in every six individuals worldwide will be aged 60 years and above. The global population of the elderly is projected to increase from 1 billion in 2020 to 1.4 billion by 2030, and this figure is expected to double to approximately 2.1 billion by 2050 (World Health Organisation, 2024). The rapid growth of the ageing population has been accompanied by

increasing awareness and demand for oral healthcare services among the elderly patients, also known as geriatric patients. This has brought better dental-educated geriatric patients with partial edentulism. On the other side, geriatrics are often presented with general health problems that are age-dependent, with specific dental problems of the remaining teeth (Sadatullah *et al.*, 2013). While in the prosthodontic management, the aim is to provide better masticatory functions as well as phonetics and aesthetics. However, significant

Received:

1 November 2025

Revised:

18 May 2026

Accepted:

22 June 2026

Published Online:

31 July 2026

How to cite this article:

Ridzuan, A. M., & Mohamed, N. (2026). A case report of minimally invasive strategies for denture support in a geriatric patient with medical comorbidities. *IIUM Journal of Orofacial and Health Sciences*, 7(2), 237–244. <https://doi.org/10.31436/ijoh.s.v7i2.462>

Article DOI:

<https://doi.org/10.31436/ijohs.v7i2.462>

*Corresponding author

Address:

Faculty of Dentistry,
Universiti Sains Islam Malaysia
Level 15, Tower B, Persiaran
MPAJ, Jalan Pandan Utama
55100, Kuala Lumpur, Malaysia

Telephone: +60126466867

Email address:

nusima@usim.edu.my

alterations in oral health due to aging can complicate the management. These problems require special skills on the part of the dentist to deal with aging dentitions (Zini and Pietrokovsky, 2006).

Geriatrics with partially edentulous requires proper assessments of the abutment teeth. The abutment condition offers the choice of both removable and fixed prostheses. Clinical presentation and various types of fixed or removable prostheses, alternatives and variations of design pose challenges in deciding a treatment plan (Sadatullah *et al.*, 2013). Furthermore, prosthetic design depends on the number and location of the abutments (Sadatullah *et al.*, 2013; Mericske-Stern, Taylor, & Belser, 2000).

Trismus or limited mouth opening poses significant challenges in dental management. It is a multifactorial etiology that may be derived from trauma, temporomandibular joint disorders (TMD), malignancies and radiation therapy (Mohammed *et al.*, 2024). Prosthodontic and restorative management need special consideration in terms of duration of procedures, application of rubber dam and impression taking procedures.

This case report will discuss strict infection control protocols employed throughout treatment following her medical history of Hepatitis B, followed by the pre-prosthetic procedures, including maintaining her oral hygiene, restoration, and root canal treatment of the left lower second molar, before denture construction, which were done under proper management due to the patient's history of trismus. The patient had consented

Case Report

A 69-year-old Chinese lady came to Dental Polyclinic Universiti Sains Islam Malaysia

(USIM) with a complaint of loose upper acrylic denture and requested a new set of dentures. Her upper denture is loose due to the missing teeth. She had worn the upper denture for 30 years. She was diagnosed with hepatitis B in the past 4 years ago and is still on anti-viral medication, Ricovir® and follows up every 6 months. She also has a history of shoulder cancer 14 years ago and had undergone chemotherapy; the last cycle of chemotherapy was 10 years ago.

Upon examination, she presented with a black purplish lesion (5mm x 5mm) on the left buccal mucosa adjacent to tooth 28 (Figure 1). The surface of the lesion is irregular, and upon palpation, it is non-tender. Upon occlusion, there is no cheek biting or trauma on the lesion area. Further check-up with Oral Pathology Oral Medicine (OPOM) USIM specialist had been done, and the blanching test was negative. Upon examination, the differential diagnosis was haemangioma and oral varices. The lesion needs to be reviewed and observed for any changes in size or colour. The patient had been referred under the OPOM clinic for regular assessment of the lesion.

She also presented with multiple carious teeth and generalized recession with tooth surface loss and partially edentulous on the upper and lower arches, as presented in the intraoral photos of Figure 2 (a-c). (a) The maxillary residual ridge has mild resorption, regular shape with normal mucosal thickness. There is presence of unilobulated torus palatinus 5x5 mm with average depth of palatal vault. (b) The mandibular residual ridge it has a moderate ridge resorption and a regular shape with normal mucosal thickness. Both arches are U-shape. (c) Incisors and molars relationship were undefined with no severe tooth surface loss. Even though the patient had a history of chemotherapy, the saliva was of normal consistency.



Figure 1. Pre-operative- black purplish lesion on left buccal mucosa to tooth 28.

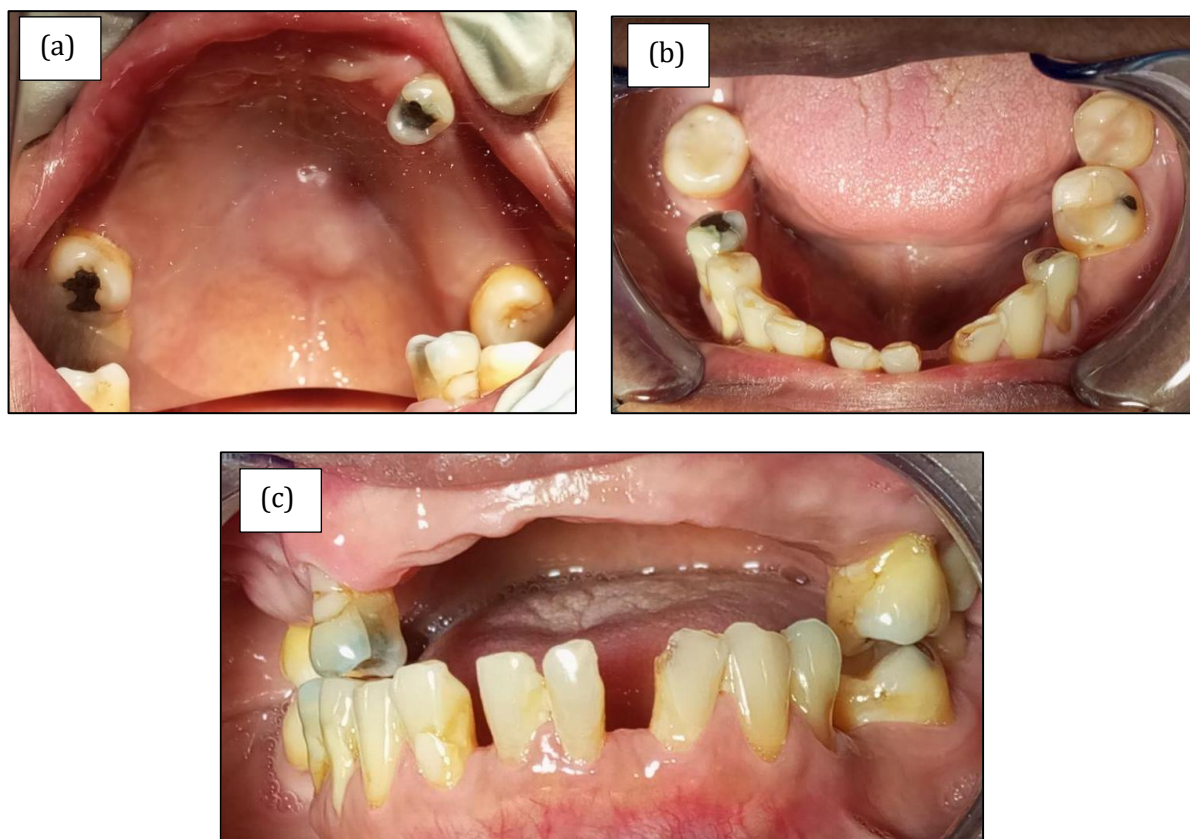


Figure 2. (a) Intraoral view of upper arch. (b) Intraoral view of lower arch. (c) Intraoral view during intercuspal position.

She also had history of open lockjaw due to trismus three times, which requires a proper precaution during a long duration of treatment, especially restorative part.

Temporomandibular joint (TMJ) examination showed that there is clicking sound on the left TMJ without mandibular deviation.

Due to the blood-borne disease and high risk of infection, infection control is amplified by using full personal protective equipment (PPE) during treatment. Before denture construction, other treatments such as oral hygiene education, restoration of carious teeth, full mouth scaling and polishing were done. A metal onlay on tooth 37 was done as a definitive restoration after the root canal treatment. Root canal treatment on 37 was treated by a restorative specialist due to the

severe apical root curvature of the tooth, shown in Figure 3 (a). There is present of radiopacity on occlusal of 37 extend until pulp chamber and presence of radiolucency at the apical area of the mesial root. The patient had undergone around three to four visits to complete the root canal treatment. She had a history of lockjaw once during the treatment. Due to the prolonged duration of treatment, her treatment duration was reduced.

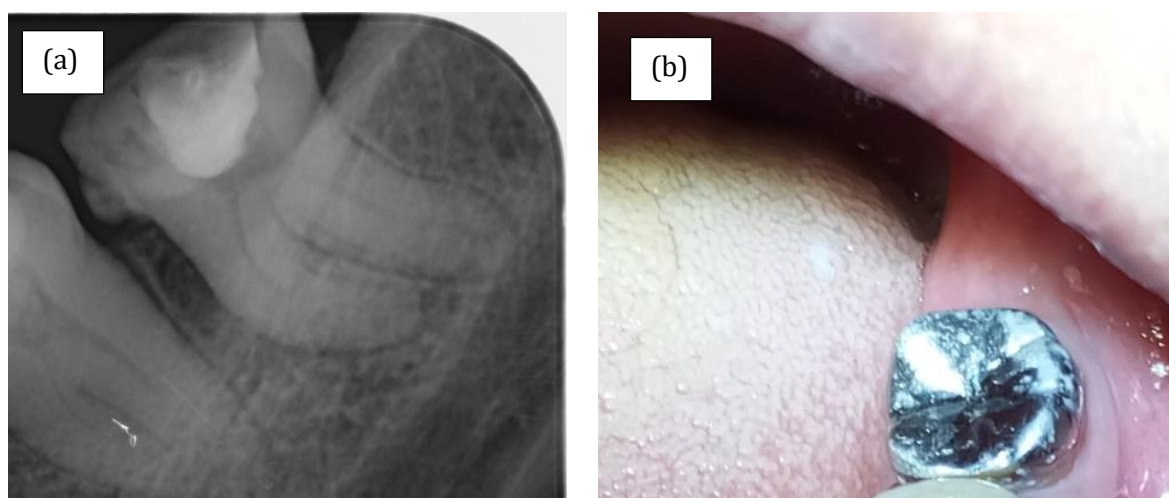


Figure 3. (a) Periapical of 37. (b) Full metal onlay on 37.

Metal onlay (Figure 3 (b)) was chosen as the definitive restorative material because 37 has a short crown height with loss of mesiolingual cusp. Therefore, to preserve the remaining sound tooth structure and durability of the tooth on occlusion, a metal onlay is the less invasive option compared to other materials such as zirconia or porcelain-fused-to-metal. One-millimeter occlusal reduction was done before chamfer margin was prepped one millimeter below occlusal surface. During the tooth preparation, to avoid recurrent lockjaw, the patient was instructed to open her mouth comfortably, and intermittent rest for the patient to close her mouth was provided. This aids in reducing over-exertion and strain towards the patient's TMJ and muscles. For aerosol procedures such as tooth preparation, an isolation room was booked prior to the appointment day to ensure infection control. Furthermore, full PPE and double gloving were practiced along

with the usage of high-volume suction to reduce the risk of contamination. Disposable examination sets were used to avoid cross-contamination, and other dental instruments were soaked in a different disinfection solution that contains a higher concentration.

Upper and lower cobalt-chrome (Co-Cr) partial dentures were constructed for the patient to replace the missing teeth as presented in the intraoral photos of Figure 4 (a-c). A Co-Cr partial denture was chosen due to the lack of remaining teeth on the upper arch, which may compromise the retention of the acrylic denture. The palatal coverage of the denture was also taken into consideration, where acrylic dentures need full palatal coverage to increase retention, while Co-Cr dentures have less palatal coverage, i.e. horse-shoe shape major connector which aids in releasing the torus palatinus area. Moreover, Akers' clasp was

chosen as the design on 27 Distal and 28 Mesial to provide stability and bracing. The lower denture was designed with a lingual bar as the major connector. The denture was reviewed after 2 months due to the time restriction of the clinical schedule. Fortunately, the patient could eat and speak

well with the denture, and there was no complaint of pain. However, there was slight discomfort in her lower denture, i.e. food stuck on the lingual bar. Upon examination, there is no gap at the lingual bar, and reassurance was given to the patient along with the denture hygiene instruction.

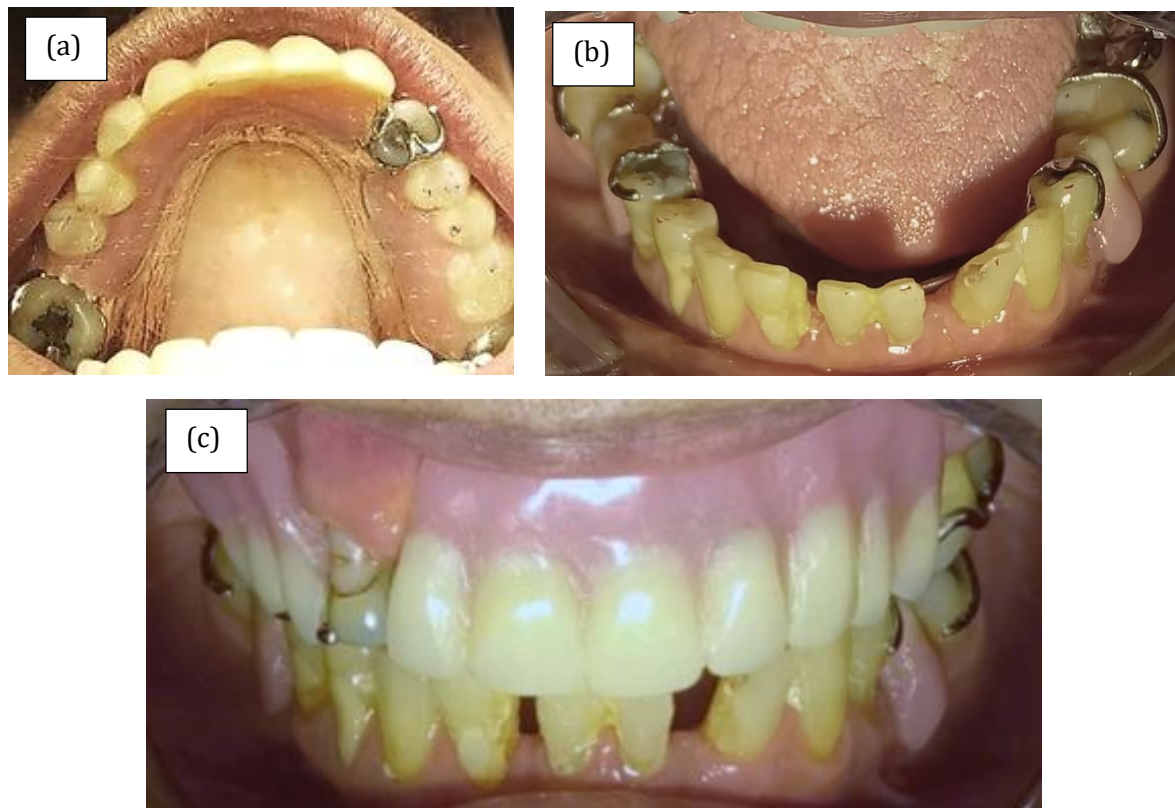


Figure 4. (a) Intraoral view of upper arch. (b) Intraoral view of lower arch. (c) Intraoral view during intercuspal position.

Discussion

This case study explained the complexity of managing a geriatric patient who has a history of hepatitis B, previous malignancy and TMD. It requires a multidisciplinary approach as the systemic comorbidities demand a beneficial prosthodontic rehabilitation as well as balancing the patient's medical risks by emphasizing a minimally invasive and functional restorative management with good infection control protocol.

1. Consideration of factors during treatment planning of a geriatric patient

A comprehensive dental treatment plan for geriatric patients requires holistic management that considers careful multiple connections with their health factors and a patient-centered approach (Ettinger *et al.*, 2021). Factors to be considered are the patient's cognitive status, functional ability, and psychological expectations (Ettinger *et al.*, 2021). Understanding the patient's expectations is important. In this case, even though patients request a denture, a comprehensive treatment needs to be handled before the denture can be

constructed. Managing a proper and correct dental need will help improve the patient's quality of life, thus improving patient satisfaction towards the given treatment. Apart from that, it is important to inform the patient regarding the treatment plan to align treatment goals with realistic expectations and to avoid any miscommunication.

Patients who have a history of TMJ problems, such as lockjaw, are also affected by procedural treatment. Stress may contribute to TMD, which is usually common in geriatric patients. The stress tolerance of each patient is varied, so the practitioner should identify their patient's stress tolerance towards dental treatment. Lockjaw or TMJ dysfunction may limit mouth opening, as in this patient's history, which may indicate that she has a progressive TMJ problem. Methods can be done to avoid TMJ problems during treatment, such as shortened appointment duration, muscle relaxation techniques and intermittent jaw rest, which was adopted in this case (Yadav *et al.*, 2018).

2. Prevalence of geriatric patients with medical comorbidities

A study conducted at King Saud Medical City reported a high prevalence of comorbidities among geriatric patients aged over 65 years. Among the total cohort of 5,874 patients, 2,394 individuals (40.7%) were diagnosed with a single disease, whereas 3,482 patients (59.3%) experienced more than one chronic illness. These findings highlight the substantial burden of comorbidity among the elderly population (Salem *et al.*, 2021).

Similarly, previous studies conducted in Malaysia have demonstrated that the prevalence of comorbidities among the elderly ranges widely from 15.8% to 83.0%, with a notably higher prevalence among individuals aged 75 years and above. In support of these findings, research by Shariff Ghazali *et al.* estimated that approximately 40.6% of Malaysians aged 60 years and older suffer from comorbid conditions. This evidence suggests that comorbidities represent a significant public health concern

among the ageing population in Malaysia. (Shariff Ghazali *et al.*, 2021).

In addition, chronic infectious diseases continue to contribute substantially to the disease burden in Malaysia. It is estimated that approximately one million individuals in Malaysia are chronically infected with hepatitis B, accounting for nearly 75% of all viral hepatitis cases in the country. The prevalence of hepatitis B infection is reported to be higher among males, with a male-to-female ratio of 2:1. Ethnic disparities have also been observed, with incidence rates reported among Chinese, Malays, and Indians at 36%, 26%, and 15%, respectively. In the present case, the patient was a 69-year-old Chinese female with hepatitis B infection, which, concurrent with a previous study, has reported that hepatitis B has higher incidence rates observed among the Chinese population compared to other ethnic groups. Furthermore, data from the Malaysian Ministry of Health indicate that approximately 5% of Malaysians are affected by hepatitis B, while more than 80% of hepatitis B and hepatitis C patients are within the economically productive age group of 25 to 55 years (Raihan, 2016).

Moreover, a study by Ahmad identified several modifiable lifestyle and socioeconomic factors as important predictors of chronic and non-communicable diseases among the elderly population. These factors include diets high in saturated fats, tobacco consumption, physical inactivity, low socioeconomic status, and limited educational attainment (de Lima *et al.*, 2020).

3. Management and infection control of the medically compromised geriatric patient

This patient has a history of hepatitis B. It is important to manage patients with correct infection control protocol and enhance strict cross-infection control procedures. High-volume suction and proper personal protective equipment (PPE) will

significantly reduce the aerosol contamination during prosthodontic and restorative procedures. Adherence to the latest protocol of infection control, especially the post-pandemic infection control recommendations, is suggested. In the present case, the Infection Control Guideline v3 (4.0 FPG) was used in the management of high-risk patients, including those with Human Immunodeficiency Virus (HIV) infection, as well as patients with hepatitis A, B, and E, among others.

4. Endodontic and restorative treatment consideration in the geriatric patient

Ageing-related changes to dentition can significantly impact root canal treatment (RCT) in geriatric patients. Aging leads to calcification of canals, enamel wear, dentin sclerosis, and reduced pulpal volume, which complicate root canal procedures (AlRahabi, 2019). In this case, the decision to preserve tooth 37 with a metal onlay after endodontic therapy is aimed at the conservative approach that maintains occlusal function and improves prosthesis support, thus improving the patient's quality of life.

However, RCT in geriatric patients presents technical difficulties due to the calcification and reduced size of the pulp chamber, making access and instrumentation more complicated. In this case, referral to an endodontist may be necessary for the second or third molars if there is extreme inclination ($>30^\circ$), as it can be highly complex and may require specialised expertise for successful treatment. Minimally invasive indirect restorations such as metal onlays are preferred in geriatric patients' dentition due to their longevity, marginal integrity, and reduced need for extensive tooth reduction. Hence, proper case selection and early referral can improve outcomes and ensure the best possible care for geriatric patients requiring endodontic therapy (AlRahabi, 2019).

5. Denture construction and the functional outcome in a geriatric patient

Denture construction in geriatric patients must provide good function, comfort and design to be able to maintain good oral hygiene. Furthermore, understanding patient preferences is essential, as some may have concerns about aesthetics, comfort, or functionality. Addressing their complaints and the purpose of requesting dentures while setting a realistic expectation to ensure their satisfaction is also important, as dentures may not fully replicate the feel and function of natural teeth.

Additionally, patient adaptation is also a key element, as elderly individuals may require time and guidance to adjust to their new prosthesis. A well-fitted partial denture is crucial, as shown in this study, to improve masticatory function and social confidence, thus quality of life. Furthermore, able to contribute to better nutritional intake and systemic health stabilization in geriatrics with medically compromised individuals (Friel and Waia, 2020). Proper counselling and follow-up appointments can enhance compliance and overall success in denture wear (Friel and Waia, 2020; Bellia *et al.*, 2023).

Conclusion

This study showed that proper planning of a holistic treatment plan may contribute to a good treatment outcome without compromising the geriatric patient's needs and expectations. Treatment for medically comorbid geriatric patients requires comprehensive assessment, strict infection control protocols and simple restorative and prosthodontic management to ensure good functional and aesthetic outcomes.

Acknowledgments

Declaration of generative AI and AI-assisted technologies for grammar and style

refinement during the preparation of this manuscript. The intellectual content of the manuscript remains entirely the work of the authors. Furthermore, written informed consent was obtained from the patient for publication of this case report and accompanying images.

References

- AlRahabi M. K. (2019). Root canal treatment in elderly patients: a review and clinical considerations. *Saudi Medical Journal*, 40(3), 217–223.
- Bellia, E., Monagheddu, C., Notaro, V., Ceruti, P., & Bassi, F. (2023). Relationship between oral rehabilitation and nutrients intake in the independent elderly: a systematic review of the literature. *Journal of Gerontology and Geriatrics*, 71, 187–205.
- de Lima, J. D., Teixeira, I. A., Silva, F. de O., & Deslandes, A. C. (2020). The comorbidity conditions and polypharmacy in elderly patients with mental illness in a middle income country: a cross-sectional study. *IBRO Reports*, 9, 96–101. <https://doi.org/10.1016/j.ibror.2020.07.008>
- Ettinger, R., Marchini, L., & Hartshorn, J. (2021). Consideration in planning dental treatment of older adults. *Dental Clinics of North America*, 65(2), 361–376.
- Friel, T., & Waia, S. (2020). Removable partial dentures for older adults. *Primary Dental Journal*, 9(3), 34–39.
- Mericske-Stern, R. D., Taylor, T. D., & Belser, U. (2000). Management of the edentulous patient. *Clinical Oral Implants Research*, 11, 108–125.
- Mohammed Binhuraib, H., Almousa, W. S., Nasser, T. M., Alwasifr, A. R., Almutawa, M. Y., Alsufyani, A. A. et al. (2024). Prosthodontic care for patients with trismus: a comprehensive review. *International Journal of Community Medicine and Public Health*, 12(1), 550–554.
- Raihan, R. (2016). Hepatitis in Malaysia: Past, present, and future. *Euroasian Journal of Hepato-Gastroenterology*, 6(1), 52–55. <https://doi.org/10.5005/jp-journals-10018-1167>
- Sadatullah, S., Al Moaleem, M., Assiry, A. and Eid, H. (2013). Full mouth rehabilitation of a geriatric patient. *Saudi Journal for Health Sciences*, 2(1), 67–72.
- Salem Alsuwaidan, Abrar Algharbi, Shrooq Alyami, Norah Almukhlifi (2021). Prevalence of comorbidity among elderly. *Global Journal of Aging & Geriatric Research*, 1(4). <https://doi.org/10.33552/giagr.2021.01.000518>
- Shariff Ghazali, S., Seman, Z., Zainuddin, N. H., Omar, M. A., Sooryanarayana, R., Ariaratnam, S. et al. (2021). Prevalence and factors associated with multimorbidity among older adults in Malaysia: a population-based cross-sectional study. *BMJ Open*, 11(10), e052126. <https://doi.org/10.1136/bmjopen-2021-052126>
- World Health Organization. (2024). Ageing and health. World Health Organization. Retrieved from:

<https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>

- Yadav, S., Yang, Y., Dutra, E. H., Robinson, J. L., & Wadhwa, S. (2018). Temporomandibular joint disorders in older adults. *Journal of the American Geriatrics Society*, 66(6), 1213–1217.
- Zini, Avraham & Pietrokovsky, J. (2006). Gerodontology teaching program at the geriatric dental clinic in Yad Sarah. *Refu'at ha-peh yeha-shinayim* (1993). 24. 31–4, 73.