

Case Report Treating Two Completely Edentulous Patients using Overdentures and Hybrid Prosthesis

Nkem Obiechina*

Pannu Dental Group, Fremont California

Citation: Nkem Obiechina. Case Report Treating Two Completely Edentulous Patients using Overdentures and Hybrid Prosthesis. *Int Clin Med Case Rep Jour.* 2024;3(4):1-6.

Received Date: 11 April, 2024; **Accepted Date:** 15 April, 2024; **Published Date:** 17 April, 2024

***Corresponding author:** Nkem Obiechina, Pannu Dental Group, Fremont California

Copyright: © Nkem Obiechina, Open Access 2024. This article, published in *Int Clin Med Case Rep Jour (ICMCRJ)* (Attribution 4.0 International), as described by <http://creativecommons.org/licenses/by/4.0/>.

ABSTRACT

Complete edentulism is classified by the World Health Organization as a disability based on the ability of the condition to severely impair mastication and speech as well as adversely impact social activity and quality of life for people who are edentulous. For edentulous patients use of conventional dentures can present some limitations especially in the mandible where rapid bone loss that is up to four times that of the edentulous maxilla and the presence of the tongue can be able to impair denture stability, retention and patient comfort. The use of dental implants to support or retain denture prosthesis has resulted in improved masticatory function, retention and stability for edentulous patients significantly improving their quality of life. The goal of this article is to present on two case reports involving Treatment planning of Overdenture and Hybrid prosthesis for Completely edentulous patients.

INTRODUCTION

Complete edentulism is an irreversible debilitating condition that adversely affects the quality of life, speech, mastication and systemic health of individuals that are missing their dentition. As a result of complete edentulism, there is a marked deterioration of oral condition causing continued bone loss in the edentulous arch, impairment of mastication due to reduced bite force and risk of reduction in the thickness of the masseter muscles making it difficult for completely edentulous patients to chew harder more nutritious foods. Systemically, a number of co-morbidities exist with edentulous patients because of reduced intake of fruits and vegetables that are more difficult to masticate, they can have increased risk of high cholesterol, cardiovascular disease, and gastrointestinal disorders as well as present with increased risk of peptic and duodenal ulcers.^[1]

There is also an increased risk of non-insulin dependent diabetes mellitus, hypertension, heart failure, ischemic heart disease and stroke.^[1] Additionally, an increased risk of kidney disease, sleep disorders and obstructive sleep apnea can occur.^[1] Watt and colleagues completed a cardiovascular study on 12,831 participants for 8 years and found that edentulous patients had 2.97 greater risk of mortality due to stroke compared with participants with natural dentition.

^[2] Based on their findings, they concluded that being edentulous is an independent predictor of cardiovascular disease mortality. ^[2]

After tooth loss occurs, continued bone loss can be able to result in loss of denture retention and stability and often result in decreased patient satisfaction with their conventional dentures especially in the mandible where alveolar ridge loss is about four times more rapid compared to the maxilla. Dental implant placement can be able to prevent continued bone resorption, improve stability, masticatory ability, comfort and retention of denture prosthesis. ^[3] The McGill Consensus report noted that while maxillary conventional dentures do not present with as many complications, mandibular conventional dentures present with many problems for patients that struggle to eat, speak and function because their dentures are often mobile. ⁴ In their study from 6 months to 9 years, they found that two implant supported mandibular overdentures were superior to conventional mandibular dentures, improving stability mastication, comfort and speech. ^[4] They also noted that having implant retained overdentures resulted in a modification of diet for edentulous patients studied and improved nutritional state. ^[4]

Options to rehabilitate completely edentulous patients with implants involves either a removable or fixed prosthesis. Removable prosthesis involves use of overdentures, while fixed prosthesis involves either hybrid prosthesis or fixed bridges. Compared to conventional denture prosthesis, people with overdentures have less loss of alveolar bone, and additionally, less atrophy of masticatory muscles in their mouth due to the stability of overdentures allowing increased activity of muscles without displacing the denture prosthesis. ^[5]

Advantages of overdentures include that they are more economical, designed for sites that have more severe alveolar bone resorption, as well as they are recommended for sites with high lip line, and for patients that require more frequent oral hygiene monitoring due to oral hygiene concerns and where there is a degree of variation with implant positioning. ^[6] Fixed prosthesis have the advantage of increased retention of prosthesis, enhanced masticatory activity, improved patient comfort and is indicated for patients that have adequate lip support and low to medium smile lines and adequate bone support. ^[6] The advantage of Fixed hybrid prosthesis compared to fixed bridges is that less implants are needed compared to fixed bridges and there is ability for the hybrid prosthesis to compensate for loss of alveolar bone.

In treatment planning prosthesis for completely edentulous patients, the goal is a prosthesis driven protocol with the prosthesis dictating type of implant therapy. The amount of interocclusal space helps to dictate the type of prosthesis that can be utilized. Tunkiwala and colleagues presented on four parameters that provide guidelines for planning type of prosthesis to utilize for completely edentulous patients based on Age, Bone volume, Cosmetic Display and Degree of Resorption. Based on age, younger completely edentulous patients are more likely to receive fixed prosthesis while older and geriatric patients are more likely to receive overdenture prosthesis since they are less complicated to maintain and require less manual dexterity. ^[6] Based on bone volume, Tunkiwala modified the Bedrossian classification that involved classification of the mouth into three Zones with Zone 1 including the premaxilla, Zone 2 including the premolar area and Zone 3 including the molar area. ^[10] Tunkiwala and colleagues reclassified bone availability into a

new classification with Zones involving bone in all zones(B1), Bone in the incisor area and premolar areas (B2), bone available in the incisor and Zygoma area (B3) and bone available in the Zygoma area only (B4). [6]When there is adequate bone in all zones fixed prosthesis is usually recommended while when there is limited alveolar bone and adequate bone in the zygoma, zygomatic implants would be indicated. [6]

For the cosmetic display parameter, edentulous patients with higher lip lines would require a denture support and are better served with removable prosthesis, compared to patients with lower lip line where fixed options can be indicated. [6]With regard to the parameter on degree of resorption and resulting interocclusal space, sites with minimum resorption(10mm-12mm) or moderate resorption (12-15mm) are usually treatment planned for fixed prosthesis, and arches with 15mm-18mm of interocclusal space are recommended for Hybrid or removable prosthesis, sites with excessive degree of resorption (>18mm) can only be treatment planned for only removable prosthesis, all forms of fixed prosthesis are usually contraindicated. [6] The amount of interocclusal space available usually determines the type of prosthesis that should be utilized.

In planning mandibular overdenture prosthesis, studies have shown that 2, 3 or 4 implants are able to present with optimal results with implant survival rates long term. [7] For maxillary overdentures, based on a study by Arraf and colleagues, the number of implants to utilize is dependent on bone quality, quantity, shape of residual arch, amount of ridge resorption and they found survival rates of 98.1% for six implants utilized in the maxilla, 96.9%for four or less implants that are splinted and 88.9% for four implants and less for un-splinted implants. [8]

For planning hybrid prosthesis, the number of implants to utilize is dependent on the amount of bone availability in the different zones. When there is bone available in the incisor and premolar zones, All on six implant prosthesis would be the option of choice, while if there is only bone in the incisor region and zygoma region, All on four implant prosthesis would be the option of choice with use of the Zygoma area if there is inadequate space for 4 implants within the incisor region. [6]Hybrid prosthesis usually require at least 15mm of interocclusal space, and offer the advantage of being able to compensate for loss of alveolar ridge by utilizing pink porcelain resin used for teeth retention. [11]

CASE REPORT 1:

Hybrid Prosthesis

An eighty eight year old male presented to our dental office with complaint that he could not taste his food and had problems masticating properly, he was happy with his mandibular overdenture, but wanted to replace his conventional maxillary dentures with fixed prosthesis in order to be able to masticate better. His CT scan x-rays showed adequate bone in the incisor and premolar area. All on 6 prosthesis retained on implants was recommended. Following administration of local anesthesia, and full thickness flap elevation, under copious irrigation, six Keystone implants were placed 4.5mmX10mm for site #4, 3.5mmX11.5mm for site #6 and 4.5mm X13mm for sites #8 and #10, and 4.5mmX10mm for site #12. All implants were locked at 30-50NCm. Surgical site was sutured with 4.0 Vicryl Sutures.

Prescriptions were given for Motrin 600mg, 16 tabs 1 tablet every six hours as needed for pain, and Chlorhexidine mouth wash to be used twice a day for 1 week and Amoxicillin 500mg 1 tablet three times daily for 1 week. Patient presented for follow up and was healing well. Four months later, the implants were uncovered and had integrated, healing abutments were placed. Patient completed his hybrid prosthesis supported by 6 implants with his restorative dentist, and was very happy with his hybrid prosthesis at his follow up appointment. (Figures 1-5)



Figure 1:

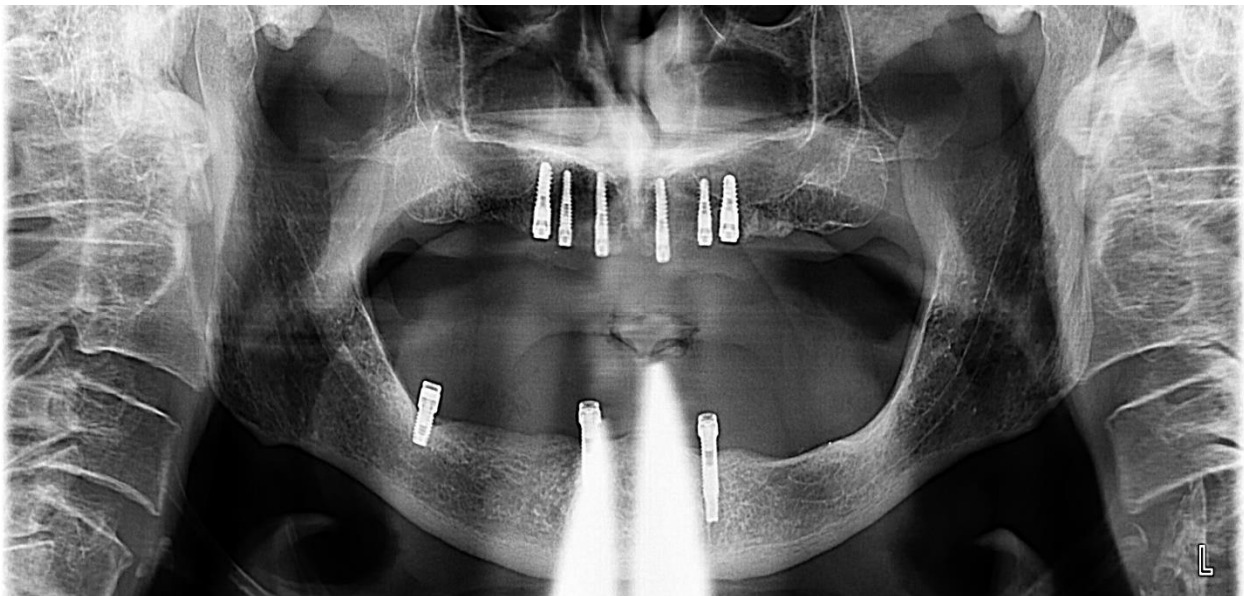


Figure 2:

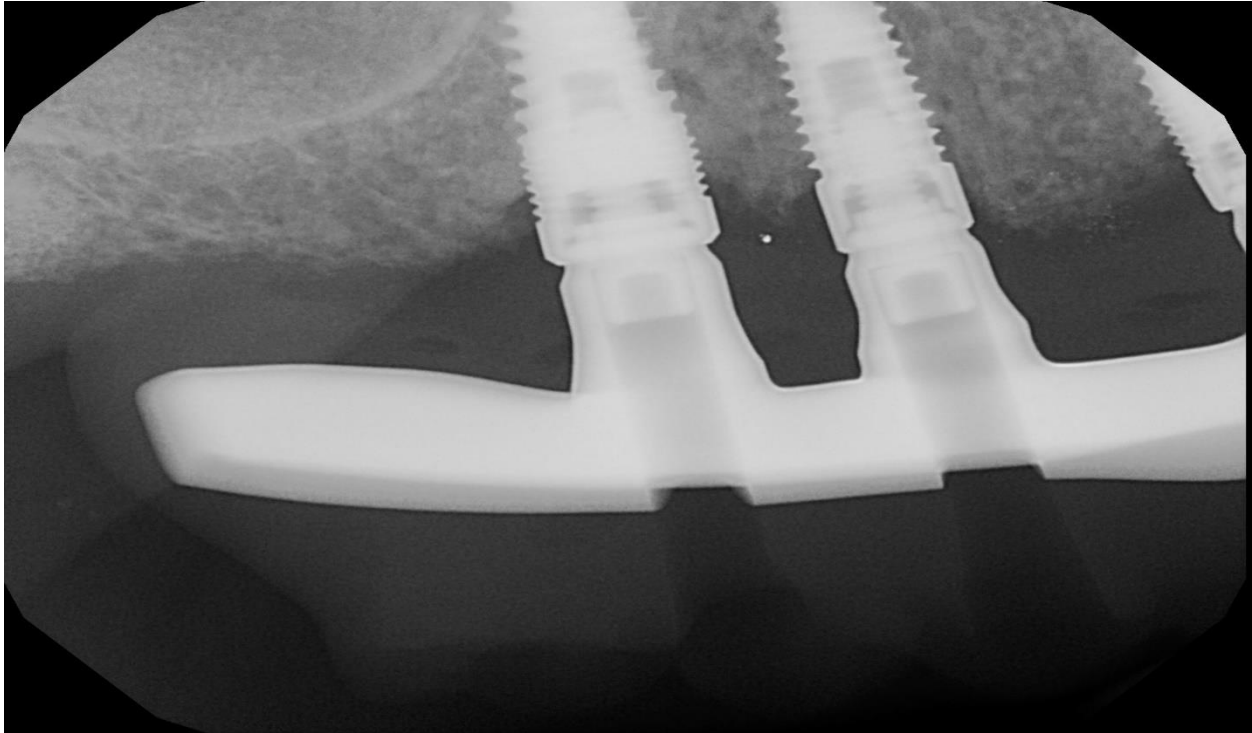


Figure 3:

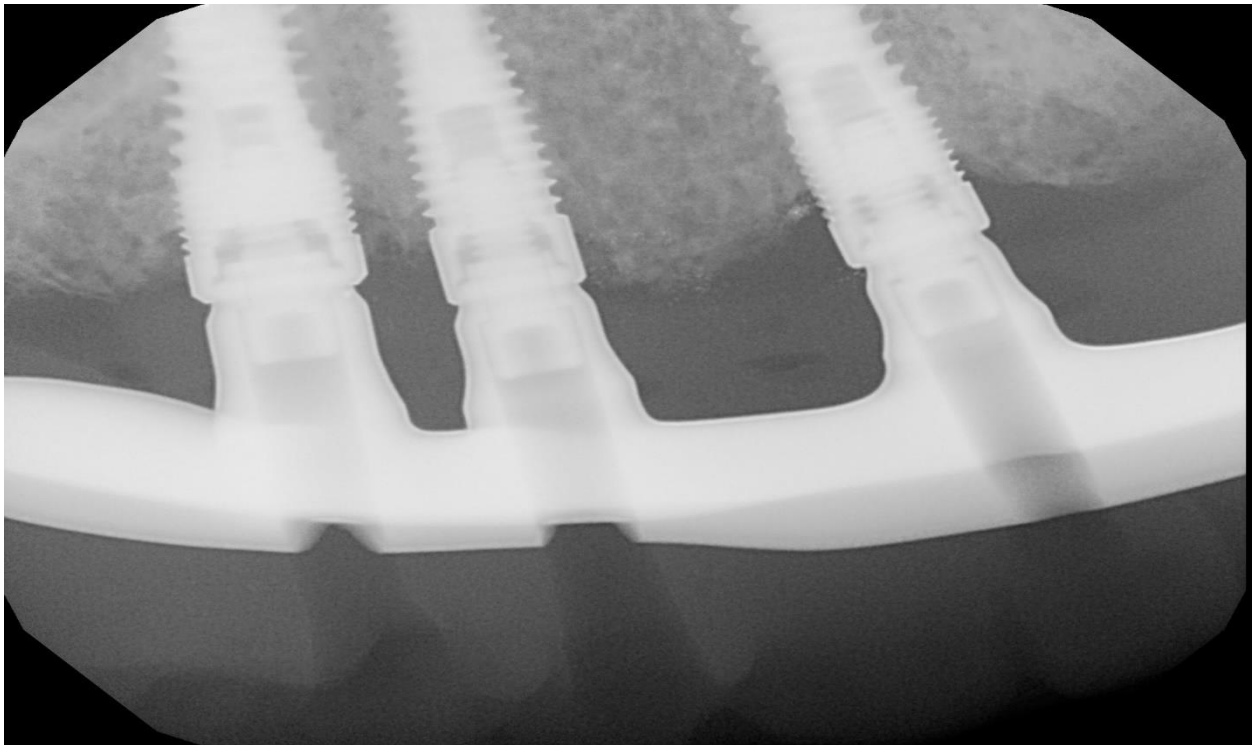


Figure 4:



Figure 5:

CASE REPORT 2

Overdenture prosthesis:

A seventy-two year old female presented to our office with the goal of changing her conventional maxillary dentures to overdentures for better masticatory ability, better ability to taste food and overall comfort, and also completing implant therapy for her mandibular teeth. She presented with a medium smile line, additionally, due to concerns with oral hygiene and maintenance of the prosthesis the goal was to restore with a maxillary overdenture prosthesis. CT scan x-rays were completed, a surgical guide was created for maxillary and mandibular teeth. Following administration of local anesthesia, a full thickness flap was raised, and six Southern Tri-Nex implant fixtures were installed for sites for #3 (4.3mmX12), #5 (4.3mmX12), #7 (4.3mmX12mm), #11(4.3mmX12mm), #13 (4.3X12mm) and #13 (5.0X10.5mm) using standard protocol for Southern dental implants, under copious irrigation. All implants were locked at 30-50 Newton centimeters. The surgical site was closed using 4.0 chromic gut sutures. Patient had dental implants also placed to replace teeth #19, #29 and #30. She was given for Motrin 600mg, 16 tabs 1 tablet every six hours as needed for pain, and Chlorhexidine mouth wash to be used twice a day for 1 week and Amoxicillin 500mg 1 tablet three times daily for 1 week. Post operative instructions were given, her denture was adjusted as a temporary prosthesis, and she was advised to have limited wear of dentures for 2 weeks. She was healing well at her post operative visit, and was seen four months later for uncovering and placement of healing abutments. She continued with her restorative dentist for the fabrication and insertion of her overdenture prosthesis. One of her mandibular implants for

tooth #30 was removed due to Periimplantitis all the other implants were stable and functioning well. Patient was also very happy with her improved masticatory function. (Figures 6-9)

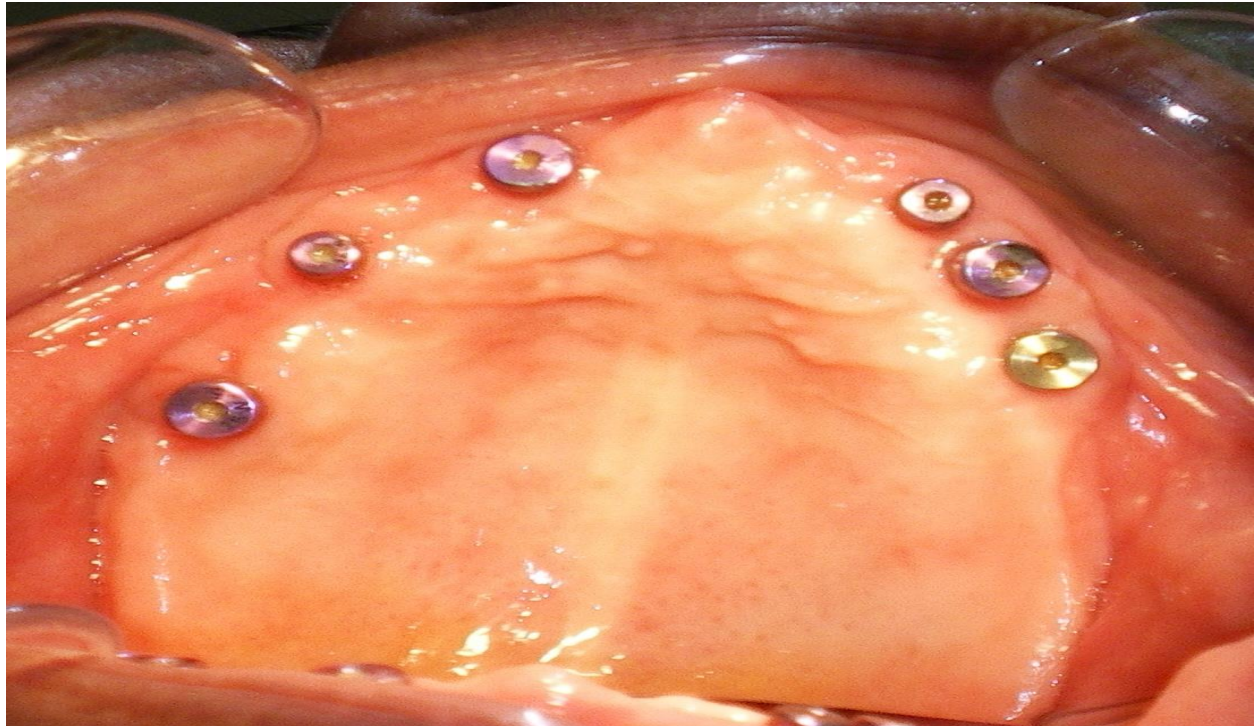


Figure 6:



Figure 7:

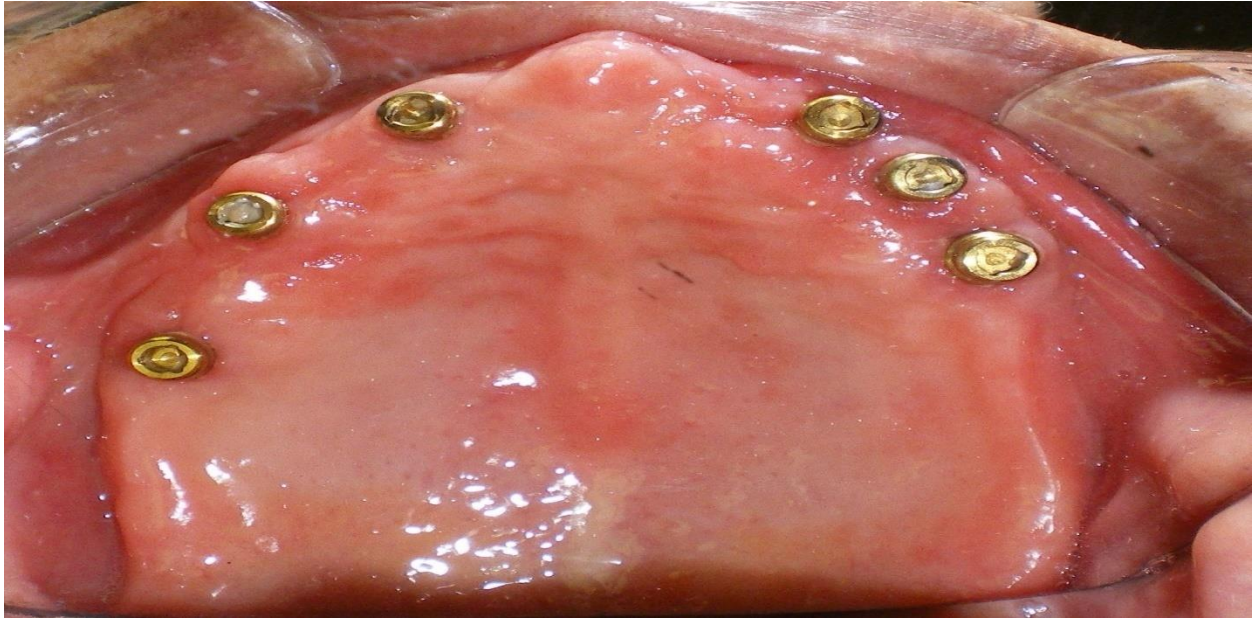


Figure 8:



Figure 9:

DISCUSSION

Complete edentulism presents as a major debilitating condition for patients who have lost all their dentition, affecting not just their oral condition but also impacting their ability to speak, masticate adequately as well as participate fully with social interactions. As a result of loss of masticatory efficiency, a number of edentulous patients have to limit their diet to soft foods that might not be as nutritious and as a result can be prone to conditions such as heart disease

and diabetes, and also malnutrition especially for elderly patients. Conventional dentures have also been shown to have about one fourth the masticatory force compared to natural dentition significantly reducing the ability for patients with complete edentulism to masticate efficiently. Use of denture adhesives while helpful with improving denture retention and stability has not been found to be able to improve masticatory efficiency.^[9] Additionally, as alveolar bone loss progresses their retentive ability can become weakened, they are also susceptible to fluids penetrating under the denture and affecting their effectiveness. The McGill Consensus recommended the use of at least 2 implant retained mandibular overdentures for a minimalist standard of care in the mandible due to the limitations of conventional dentures in the mandibular arch.^[4] Their study was able to show improved nutrition with the mandibular overdentures compared to conventional dentures.^[4]

Use of overdentures, hybrid and fixed bridge prosthesis have resulted in improved speech, mastication, and overall comfort and satisfaction and quality of life for edentulous patients regardless of age or dental arch. The goal in practice is to spend a significant amount of time on measures to prevent complete edentulism, and when complete tooth loss is inevitable or has already occurred, ensuring that patients are fully educated about its impact on their oral and systemic health, as well as ensuring that they are fully educated and informed about their choices with regards to use of dental implants for rehabilitation of their oral condition.

REFERENCES

1. Emami E, DeSouza RF, Kabawat M, Feine JS. The Impact of Edentulism on Oral and General health. International Journal of Dentistry 2013.
2. Watt RG, Tsakos G, De Oliviera C, Hamer M. Tooth loss and cardiovascular disease mortality risk-Results from Scottish heart survey. 2012.
3. Cooper LF. The Current and future treatment of Edentulism J. of Prosthodontics 2009;18(2): 116-122.
4. Feine JS, Carlsson GE, Awad MA, Mismeijer D. The McGill Consensus Statement on Overdenture Mandibular two-implant overdentures as first choice standard of care for edentulous patients. Gerodontology 2002;19(1): 3-4.
5. Goodacre CI. Implant Overdentures their benefits for patients. Saudi Journal of Medicine. Medicine 2018;6:1.
6. Tunkiwalla A, Kher U, Vaidya NH. "ABCD" Implant Classification for Treatment planning in completely edentulous arches. J of Oral Implantology 2020; 46(2): 93-99.
7. Abdoel SF, Haagedoom SS, Raphoebar GM, Meijier HAS. Implant supported mandibular overdentures: A retrospective study case series study in a daily dental practice. Int.Journal of Implant Dentistry 2021;7:64.
8. Assaf A, Daas M, Payne. Revisiting maxillary implant overdentures in 2022: A topic Review. Dentistry Review 2022: 100048.
9. Fenton D, Cooper L, DuQuin I, Minsley G, Glickes A, et al. Evidence based guideline for the Care and Maintenance of complete dentures: A publication Colleges of Prosthodontics. Journal of Prosthodontics 2011;20(1): S1-S12.

10. Bedrossian E, Sullivan RM, Malo P, Indresano T. Fixed-Prosthetic Implant restoration of the edentulous maxilla: A systematic pretreatment evaluation method. J of Oral Maxillofacial surgery 2008;66: 112-122.
11. Aguilera FC. Implant treatment planning for Hybrid Prosthesis. A clinical approach to the planning placement and restoration of implant supported hybrid prosthesis. Decisions in Dentistry 2020; 6(6): 36-39.