

Treatment of a hemiplegic patient with an implant-supported fixed-detachable removable prosthesis

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Background

This case presentation documents the prosthodontic treatment of a partially edentulous patient with right sided hemiplegia secondary to ischemic cerebrovascular accident (CVA). Post-stroke patients face substantial oral health challenges including diminished masticatory efficiency, dysarthria, dysphagia, ataxia and hygiene maintenance^{1,2}. Compromised food intake, oral clearance and home care increase the risk of caries, periodontal disease and prosthesis failure³. Moreover, poor oral health contributes to an increased salivary bacterial count, which increases the risk of aspiration pneumonia, a leading cause of post-stroke hospitalization and mortality³. Few assessment tools, guidelines and established protocols for prosthodontic care specific to the stroke population are available.

Treatment history

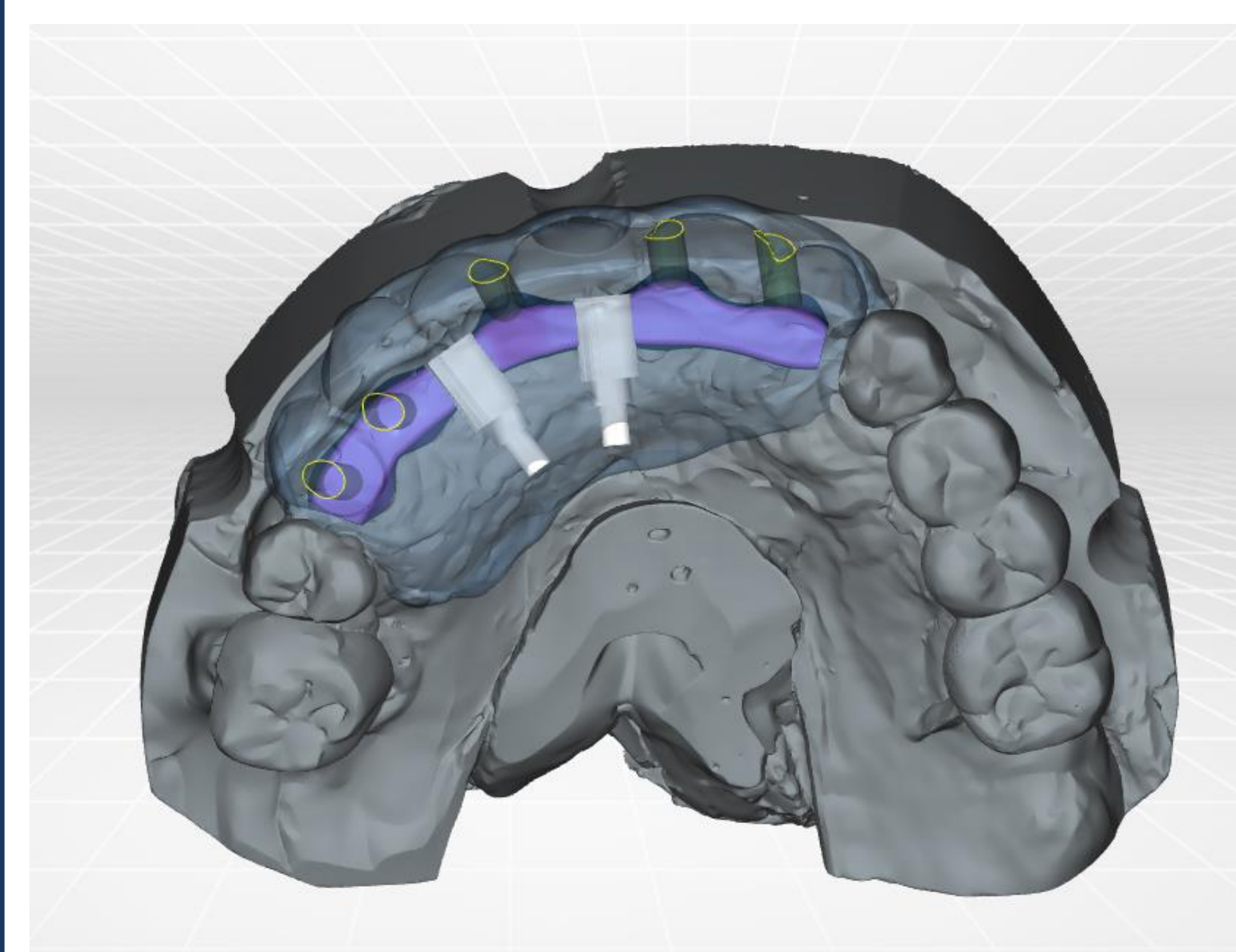
The 45 year-old female patient initially presented to Montefiore Medical Center Department of Dentistry in 2016. A comprehensive treatment plan involving extraction of all hopeless teeth, implant-supported fixed reconstruction and periodontal maintenance was implemented and completed in 2017.

In 2018, the patient suffered a traumatic fall due to ataxia and fractured the roots of teeth #5, 6, 7 with irreparable damage to the platforms of implants #8 and #10.



Pre-op panoramic radiograph

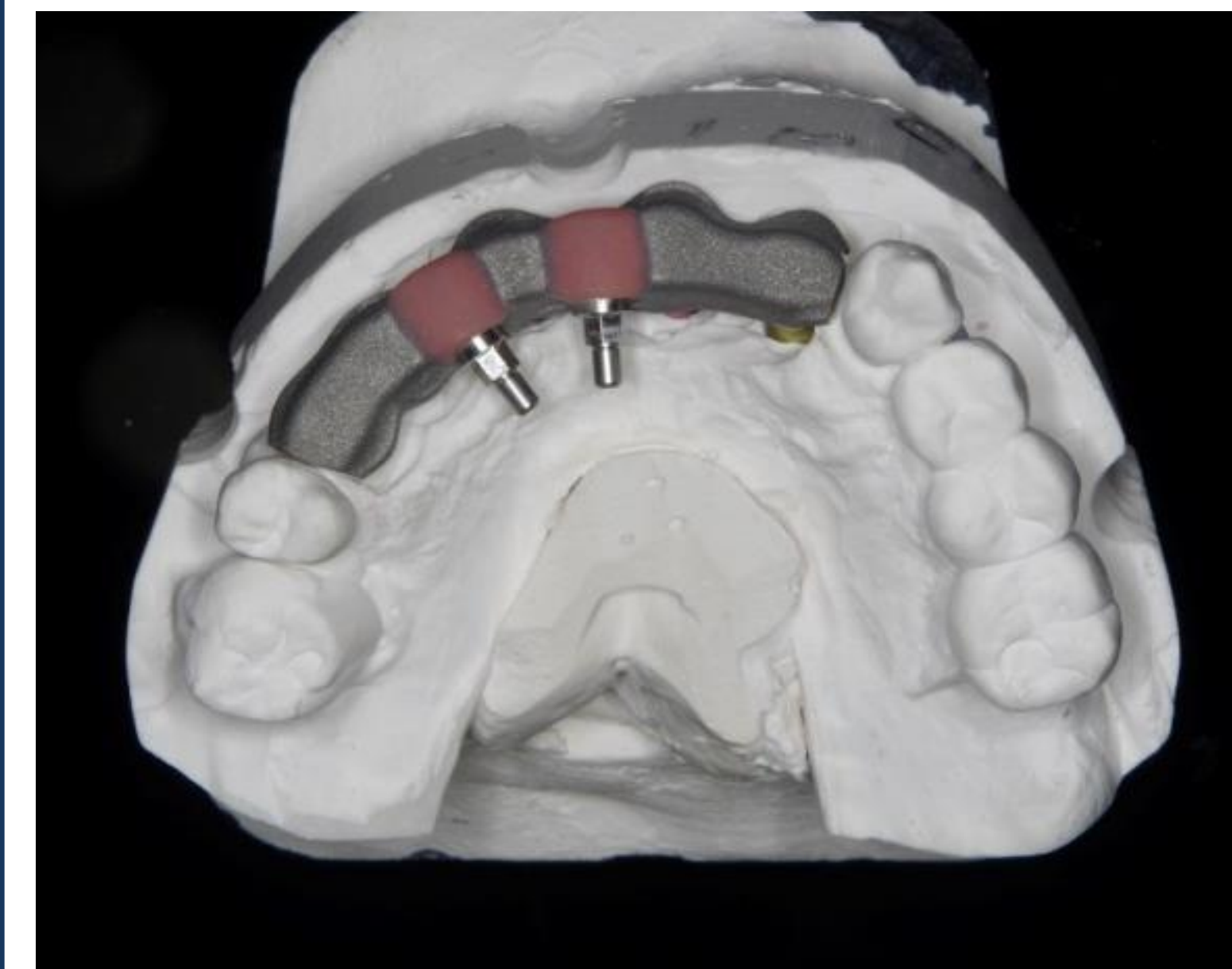
The non-restorable teeth and damaged implants were subsequently removed and an interim removable prosthesis was delivered. The patient elected to be rehabilitated with fixed prostheses and underwent staged surgical treatment with guided bone regeneration and the placement of five implants for a planned implant-supported fixed dental prosthesis #5-10.



Computer-aided design (CAD) of prosthesis



Titanium substructure



Mesostructure with MK1 attachments



Frontal view of substructure



Frontal view of prosthesis



Full smile

Clinical Procedure

When the definitive restorative phase of treatment began in 2021, it was determined that the hard & soft tissue deficiency and the palatal location of the implants relative to the final teeth positions would make fixed implant-supported prostheses imprudent. Additionally, the patient's hemiplegia and ataxia would also render any proper oral hygiene maintenance of FDP very challenging.

Despite the patient's initial desire for fixed restorations but recognizing the complexity of the clinical situation, she agreed to a fixed-detachable prosthesis with a flange that provides adequate lip support and facilitate access for oral hygiene.

A two-piece, fixed-detachable prosthesis (*Marotta Dental Studio, Inc*, Farmingdale, NY; *Panthera Dental*, Québec, Canada) that incorporates a milled titanium bar substructure retained with abutment screws and an acrylic titanium superstructure retained with two MK1 precision attachments was digitally designed and fabricated. The substructure was milled with minimal occlusal taper to augment retention and stability, and the intaglio surface was contoured to facilitate access for hygiene maintenance. The prosthesis is retained by the insertion of pins in the superstructure into orifices in the substructure. The assembly can be disengaged by inserting a small key into orifices located on the buccal surface of the prosthesis that are above the smile line and easily accessible to the patient. The intimate fit of the superstructure over the bar ensures a rigid prosthesis with predictable retention and minimizes wear of the attachments over time. The patient was able to demonstrate insertion and removal of the prosthesis with the use of one hand, and was instructed on proper care and oral hygiene regimen.

At 1 year recall, the prosthesis remained in function with no loss of retention or stability.

Conclusions

Compared with healthy patients, studies have reported that post-stroke patients had worse oral health status across a range of parameters. Although this patient was functionally independent and maintained good oral hygiene, a fixed implant-supported prosthesis would have been inappropriate given the linguovered positions of the implants and the anticipated challenges in home care. An implant-supported fixed detachable prosthesis with an esthetic labial flange is a viable treatment to consider for patients with significant oral tissue defects yet desire fixed rehabilitation^{4,5}. The improved access for oral hygiene is especially beneficial in patients who suffer from undermined neuromuscular skills.

References

1. Kwok C, McIntyre A, Janzen S, Mays R, Teasell R. Oral care post stroke: a scoping review. *J Oral Rehabil*. 2015 Jan;42(1):65-74.
2. Schimmel M, Leemann B, Herrmann FR, Kiliaridis S, Schneider A, Müller F. Masticatory function and bite force in stroke patients. *J Dent Res*. 2011 Feb;90(2):230-4.
3. Dai R, Lam OL, Lo EC, Li LS, Wen Y, McGrath C. A systematic review and meta-analysis of clinical, microbiological, and behavioural aspects of oral health among patients with stroke. *J Dent*. 2015;43(2):171-180.
4. Morgano SM, Verde MA, Haddad MJ. A fixed-detachable implant-supported prosthesis retained with precision attachments. *J Prosthet Dent*. 1993 Nov;70(5):438-42.
5. Fortin Y, Sullivan RM, Rangert BR. The Marius implant bridge: surgical and prosthetic rehabilitation for the completely edentulous upper jaw with moderate to severe resorption: a 5-year retrospective clinical study. *Clin Implant Dent Relat Res*. 2002;4(2):69-77.