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A comprehensive Approach to Restore Function and Aesthetics in Partially Edentulous Patient with Telescopic Bridge: A Clinical Case Report

Reem Hatem Ibrahim[1,*] , Ereny Maged Gerges[2], Jessica George Nashat [3], Mahmoud Attia[4], Dina Mohamed Elawady[5]

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Abstract

Background: Telescopic bridge provides less tissue coverage and improved aesthetics compared to telescopic overdenture.

Methods: A 62-year-old female patient with many hopeless teeth was presented to MSA University clinic, seeking the replacement of her missing teeth. After thorough diagnosis and treatment planning, she received a maxillary telescopic bridge, and a mandibular thermopress partial denture. The patient was followed up for two years and patient satisfaction was evaluated.

Results: The maxillary telescopic bridge and the lower mandibular thermopress partial denture improved the function and the aesthetics of the patient. The patient was satisfied with the results, as the treatment has improved her comfort, speech, and chewing ability

Conclusion: The maxillary telescopic bridge and the mandibular thermopress partial denture showed a successful treatment option for better functional, aesthetic, and biological needs of the patient.

1 Introduction

When considering the restoration of missing teeth in older, partially edentulous patients who are not candidates for implants or prefer to avoid surgical procedures, various options are available. These include fixed prosthetics, removable dentures, and other non-surgical solutions. [1]

Prosthodontists always consider removable prostheses to be the best treatment option for these patients. They advocate partial dentures or overdentures as telescopic overdentures, but patients sometimes don't prefer removable prostheses because of the tissue coverage and the consequences that occur due to lack of proper hygiene as denture stomatitis.[1,2]

Furthermore, it is believed that the telescopic overdenture has retention related problems because of the repeated insertion and removal of the denture and the wear of the crowns metal. Not only that, but a lot of studies have reported that telescopic overdenture has technical failure problems such as loss of cementation,

* **Corresponding author**.
E-mail address: reemhatem0106@gmail.com

1 *Bachelor of Dental Surgery, Faculty of Dentistry, October University for Modern Sciences and Arts, Egypt.*

2 *Bachelor of Dental Surgery, Faculty of Dentistry, October University for Modern Sciences and Arts, Egypt.*

3 *Bachelor of Dental Surgery, Faculty of Dentistry, October University for Modern Sciences and Arts, Egypt.*

4 *Lecturer of Prosthodontics, Faculty of Dentistry, October University for Modern Sciences and Arts, Egypt.*

5 *Associate professor of Prosthodontics, Faculty of Dentistry, October University for Modern Sciences and Arts, Egypt.*

fracture of artificial teeth, the metal framework, or the denture base.[2]

Recently, some studies suggested that telescopic bridge is a better option for partially edentulous patients that aren't indicated for implant placement. Telescopic bridge consists of primary coping that fits the prepared tooth and secondary coping that fits on the primary coping, the primary coping changes the shape of the tooth and brings all the abutments in a parallel alignment.[3,4,5]

Both treatment options are indicated for the same cases as the unfavourably distributed teeth, unparallel abutments and unfavourable periodontal conditions. However, the telescopic bridge remains a better choice as the telescopic overdenture requires soft tissue coverage to gain retention. Considering the retention of the telescopic bridge, it doesn't need soft tissue coverage as the retention is gained by the frictional retention between the primary coping and the secondary coping in addition to the negative air pressure.[3,4]Moreover, the telescopic bridge can be considered to have more superior advantages than the telescopic overdenture; the telescopic bridge is resilient and has stress breaking action and it transfers the chewing forces to the abutment teeth and the vertical forces to the soft tissue.[3,4]

Therefore, It is essential to tailor the treatment plan to the patient's specific needs, preferences, and overall health, ensuring comfort and functionality. Prosthodontists should choose between these two options wisely when doing the treatment plan, likewise all the clinical and laboratory steps should be accurate. Skilled dentists and technicians should work in harmony to fabricate telescopic prosthesis.[2]

Thermopress partial denture proved satisfactory for partially edentulous patients, it is considered a suitable treatment option for Kennedy class I cases. According to a study comparing different partial denture types, the thermopress partial dentures showed increased retention due to the decrease in the gap between the partial denture and the underlying tissues, moreover it showed no abutments failures.[6]

Therefore, the aim of this case report was to explore the fabrication of a telescopic bridge as a treatment option for partially edentulous patients with a limited number of remaining teeth in the upper arch, in conjunction with a thermopress partial denture for the lower Kennedy Class I partially edentulous arch. This approach seeks to enhance both function and aesthetics for patients who are not candidates for implants placement.

2 Materials and Methods

A 62 years old female patient came to the outpatient clinic, Faculty of Dentistry, MSA University with missing and hopeless teeth in the maxillary arch and Kennedy class I partially edentulous lower arch. Her main complaints were that she could not eat properly, and she wanted to enhance her smile. The medical condition of this patient revealed a history of gastroesophageal reflux disease. Regarding her dental history, because of poor oral hygiene, the patient had lost multiple teeth.

2.1 Clinical examination and patient records

Clinical examination revealed that the patient had a bad oral hygiene, extensive decay and multiple edentulous spaces. She had undergone endodontic treatment and received an amalgam restoration on her upper right first premolar. Additionally, she had a crown placed on her upper left lateral incisor, and both of her upper central incisors also received endodontic treatment.

Furthermore, panoramic and periapical imaging conducted to assess the restorability of the remaining teeth revealed the presence of impacted wisdom teeth. Specifically, there were impacted third molars in the upper right, lower right, and upper left positions. **(Fig. 1a)** It also showed that the upper right first premolar has an old deep perforation, upper left lateral incisor and lower left second molar were badly decayed. **(Fig. 1b-1d)**

The upper and lower right wisdom teeth were indicated for extraction as the patient felt pain and uncomfortability in these teeth. Cone Beam Computed Tomography (CBCT) was done to check bone quality and quantity, it showed that there is bone resorption and not enough bone for Implant treatment. Maxillary and mandibular primary impressions were made using stock trays and alginate impression material "Zhermack: Tropicalgin" to obtain diagnostic casts. Facebow record was made to mount the maxillary cast on a semi-adjustable articulator "Bio-art" and centric as well eccentric relation records was registered to mount the lower cast on the articulator. **(Fig. 1e & 1f)**. The treatment plan option selected was to fabricate a maxillary telescopic bridge and lower partial denture as the best choice for this patient.

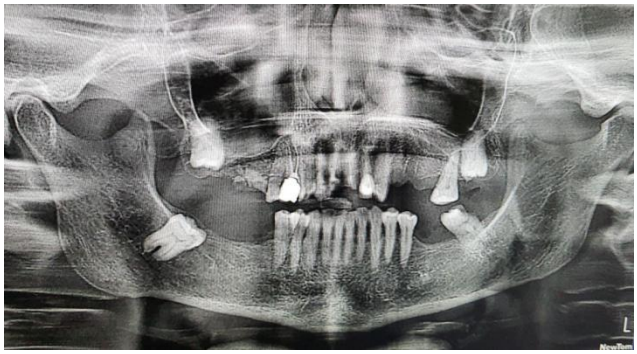

Figure 1a. Pre-operative panorama

Figure 1b. Pre-operative intraoral "frontal view"

Figure 1c. Pre-operative photo of Maxillary arch "occlusal view'

Figure1d. Pre-operative photo of mandibular arch "occlusal view"

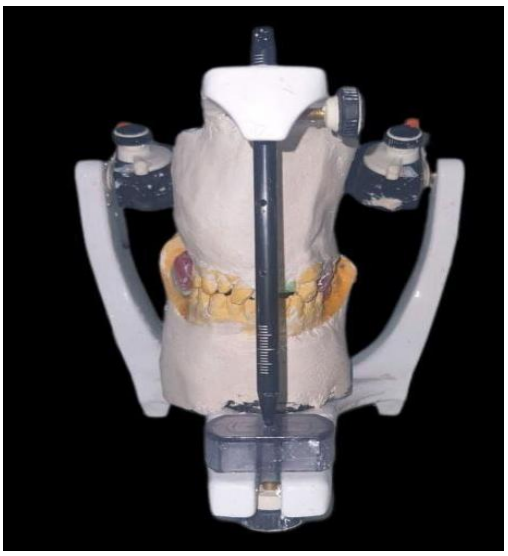

Figure 1e. Mounted diagnostic casts on semi-adjustable articulator (frontal view)

Figure 1f. Mounted diagnostic casts on semi-adjustable articulator. (lateral view)

2.2 Clinical Workflow

Supragingival and subgingival scaling with root planning were done. Also, patient motivation on proper oral hygiene measures was carried out which was necessary for our treatment plan. Upon removing the caries from the upper two centrals, it was found that the upper two centrals were restorable, so post and core was performed to both teeth, followed by removal of caries in upper right second premolar and application of composite restoration. Surgical phase included surgical removal of the upper and lower right third molars, simple extraction of remaining root of upper right first molar, the abscessed upper left lateral incisor, upper right first premolar and lower left second molar.

The definitive phase included preparations for the abutments receiving the telescopic crowns; upper left second molar, upper left canine, upper left and right central incisors, upper right lateral incisor, upper right canine and upper right second premolar. **(Fig. 2)** Retraction cords were placed, and impression was made using addition silicone material "Zhermack : elite HD+" and bite registration material was applied. **(Fig. 3a-3c)**

Figure 2a. Preparation of primary copings

Figure 3a. Addition silicone impression for the prepared abutments to receive the primary copings

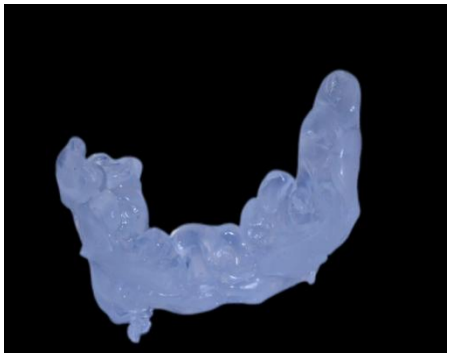

Figure 3b. Bite registration

Figure 3c. Casts showing abutments preparation to receive the primary copings

Temporary crowns were made for the patient to preserve the gingiva in their positions till the temporary bridge is fabricated by the dental laboratory. CAD/CAM milled metal telescopes were cemented using glass ionomer cement "Micron" **(Fig. 4a-4c)**.

Figure 4a. Primary copings on cast

Figure 4b. Cementation of the primary copings intraorally

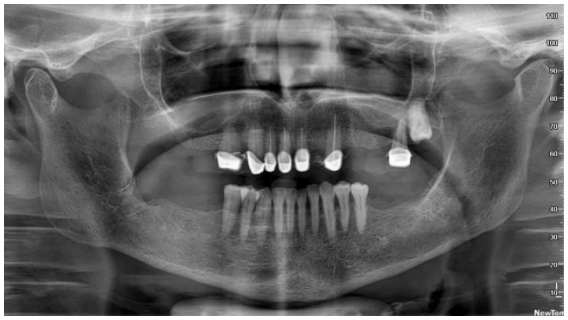

Figure 4c. Panorama after cementation of the copings

PMMA framework was fabricated to check the margins and retention **(Fig. 5a)**, then metal framework try- in after taking scans for the upper arch was performed while the metal copings are cemented **(Fig. 5b &5c)**, on this phase it was necessary to check the midline and the margins. Finally, delivery of the Porcelain Fused to Metal "PFM" telescopic bridge was done after checking the margins and the bite. **(Fig. 5d &5e)**

Figure 5a. Temporary bridge after cementation of the primary copings

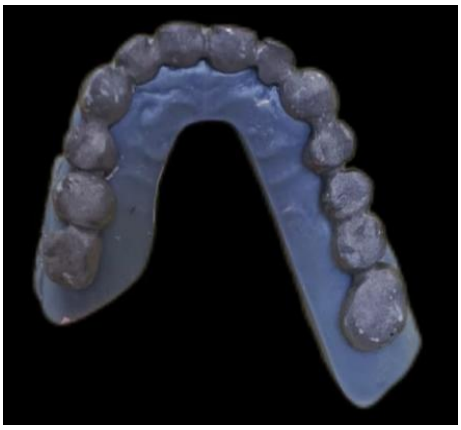

Figure 5b. Metal framework of the telescopic bridge "occlusal view"

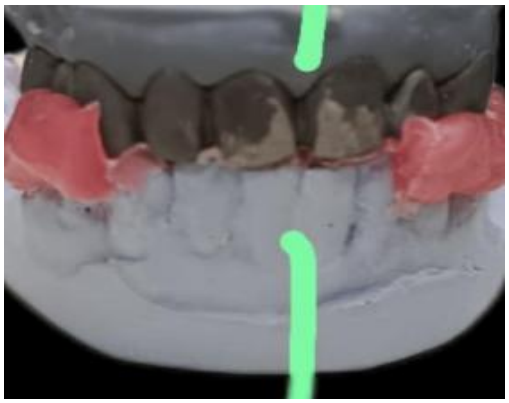

Figure 5c. Metal framework checking midline and occlusion

Figure 5d. Telescopic bridge after insertion in patient's mouth "frontal view"

Figure 5e. Telescopic bridge "occlusal view"

After the delivery of the upper telescopic bridge, secondary impression for the lower arch was made using medium rubber base impression material "silaxil". **(Fig. 6a)** , with impression of the upper arch by alginate material "Zhermack: Tropicalgin" for the laboratory to adjust the bite properly then jaw relation was recorded., then try in to check patient's speech and bite. To fabricate thermoplastic partial denture, thermopress 400 was used and adjusting preheating temperature 220°C, time as 20 minutes and injecting pressure as 5 bars according to manufacturer's instructions, a Vaseline was used as a lubricant before introducing the selected cartridge into one of the two heating cylinders where the cartridge membrane was pointed to the flask chamber. Removal of the excess lubricant was done, after processing of the denture, denture insertion was done and also selective grinding for intraoral adjustments of occlusion. **(Fig 6b &6c)**

Figure 6a. Secondary impression using medium rubber base impression material

Figure 6b. Delivery of the flexible partial denture

Figure 6c. Post-operative extraoral photo.

Oral Health Impact Profile was assessed using the OHIPEDENT19 Questionnaire at prosthesis insertion, after a 1 year then after 2 years follow up periods. The questionnaire consists of 19 questions each with score 0-4 on likert scale where the minimum score calculated for a patient is 0 and maximum 76. The questionnaire was translated into Arabic and validated [7] **(Fig. 7)**

OHIP-EDENT-19 questionnaire form:

A-functional limitation.
1.Have you had difficulty chewing any food because of problems with your denture?
2. Have you had food catching in your dentures?
3.Have you felt that your dentures haven't been fitting properly?
B-physical pain.
4.Have you had painful aching in your mouth?
5.Have you found it uncomfortable to eat any food because of problems with your dentures?
6.Have you had sore spots in your mouth?
7.Have you had uncomfortable dentures?
C-Psychological disorder.
8.Have you been worried by dental problems?
9.Have you been self-conscious because of your dentures?
D- Physical disability.
10.Have you had to avoid eating some food because of problems with your dentures?
11.Have you been unable to eat with your dentures because of problems with them?
12. Have you had to interrupt meals because of problems with your dentures?
E- Psychological disability.
13. Have you been upset because of problems with your dentures?
14. Have you been a bit embarrassed because of problems with your dentures?
F- Social disability.
15.Have you avoided going out because of problems with your dentures?
16.Have you been less tolerant of your spouse or family because of problems with your dentures?
17.Have you been a bit irritable with other people because of problems with your teeth, mouth, or denture?
G-Handicap.
18.Have you been unable to enjoy other people's company as much because of problems with your dentures?
19.have you felt that life in general was less satisfying because of problems with your dentures?

A

نموذج استبيان (OHIP-EDENT-19)

أ. التقييم الوظيفي.
1-هل واجهت صعوبة في مضغ أي طعام بسبب مشاكل في طقم أسنانك؟
2-هل كان لديك طعام يصطاد في أطقم الأسنان الخاصة بك؟
3-هل شعرت أن أطقم الأسنان الخاصة بك لم تكن مناسبة بشكل صحيح؟
ب. الألم الفمية.
4-هل عانيت من ألم مؤلم في فمك؟
5-هل وجدت أنه من غير المريح تناول أي طعام بسبب مشاكل في أطقم الأسنان الخاصة بك؟
6-هل عانيت من بقع مؤلمة في فمك؟
7-هل كان لديك أطقم أسنان غير مريحة؟
ت. التقييم النفسي.
8-هل كنت قلقا من مشاكل الأسنان؟
9-هل كنت خجولا بسبب أطقم الأسنان الخاصة بك؟
ث. المشاكل الجسدية.
10-هل اضطررت إلى تجنب تناول بعض الطعام بسبب مشاكل في أطقم الأسنان الخاصة بك؟
11-هل لم تتمكن من تناول الطعام مع أطقم الأسنان الخاصة بك بسبب مشاكل معها؟
12-هل اضطررت إلى مقاطعة وجبات الطعام بسبب مشاكل في أطقم الأسنان الخاصة بك؟
ج. المشاكل النفسية.
13-هل كنت منزعجا بسبب مشاكل في أطقم الأسنان الخاصة بك؟
14-هل شعرت بالحرج قليلا بسبب مشاكل في أطقم الأسنان الخاصة بك؟
ح. المشاكل الاجتماعية.
15-هل تجنبت الخروج بسبب مشاكل في أطقم الأسنان الخاصة بك؟
16-هل كنت أقل تسامحا مع زوجتك أو عائلتك بسبب مشاكل في أطقم الأسنان الخاصة بك؟
17-هل كنت عصبيا بعض الشيء مع الآخرين بسبب مشاكل في أسنانك أو فمك أو طقم أسنانك؟
خ. الاحتياجات الخاصة.
18-هل لم تتمكن من الاستمتاع بصحبة الآخرين بنفس القدر بسبب مشاكل في أطقم الأسنان الخاصة بك؟
19-هل شعرت أن الحياة بشكل عام كانت أقل إرضاء بسبب مشاكل في أطقم الأسنان الخاصة بك؟

B

Figure 7. OHIPEDENT19

3 Results

According to OHIPEDENT19 Questionnaire, the patient reported a score of 20 after the follow up period compared to 69 at the time of prosthesis insertion. The results of this clinical report showed that the telescopic bridge and the thermopress removable partial denture is a successful treatment option for this patient to achieve functional and aesthetic needs. The frictional retention between the primary crowns "metal coping" and the bridge provided a better retention and stability for the prosthesis. The prosthetic rehabilitation of the patient made her more confident and increased her chewing ability, comfort and speech.

4 Discussion

The presented clinical report describes the treatment of a 62-year-old female patient with edentulous spans in both upper and lower arches, bad aesthetics and inability to eat properly. She had badly decayed un-restorable teeth, bone resorption and bad oral hygiene. Since this patient had history of gastroesophageal reflux disease, so prosthesis with denture bases and tissue coverage as partial denture and telescopic overdenture will be an irritating experience for her, as she is suspected to suffer from xerostomia, stomatitis and aphthous like ulcers due to GERD disease.[8]

Moreover, tooth-supported overdentures were not selected due to their disadvantages, including the necessity for endodontic treatment on the supporting teeth and the risk of having a thin acrylic denture base. [9] Additionally, tooth-supported overdentures with attachments were deemed inappropriate in this case due to insufficient bone support. Contraindications for using attachments include patients with severe periodontitis and those with a high caries index. This type of prosthesis can also lead to periodontal issues that require ongoing maintenance. [10] Furthermore, the retention of these prostheses can be compromised by the wear of the attachments.[11]

Since the patient was not a candidate for implants placement, the treatment option for this case was the telescopic bridge for the maxillary arch and flexible partial denture for the lower arch. The bridge included a distal cantilever in upper right molar as the telescopic bridge is resilient, it has stress breaking action, moreover it has better retention than the telescopic overdenture and it also transfers the chewing forces to the abutment teeth and transfers the vertical forces to the soft tissues., also telescopic bridges are widely used when there is severe periodontal problems and in small number of teeth that are unfavourably distribute, also in patients with poor dexterity.[3-5]

Based on the scientific research, the telescopic bridge will prevent the patient from facing the hassle of the telescopic overdenture which includes: fracture of artificial teeth, the metal framework, or the denture base and retention related problems due to repeated insertion and removal of the denture.[2]

The telescopic bridge has better retention as it gains its retention from the frictional retention and the negative air pressure, it provides splinting of teeth and helps in management of tipping of teeth.[3,4]

Thermopress partial denture was a better choice in the lower arch to preserve the health of the soft tissue covered by the partial denture and to preserve the abutments. It has superior mechanical properties as creep resistance, flexibility, fatigue endurance, dimensional stability and wear resistance. Additionally, it is light in weight and can match the colour of the mucosa.[6]

This treatment plan is successful because the patient was a good candidate for this treatment

approach, this patient has unfavourably distributed teeth, bone loss and periodontal disease, telescopic bridge was a successful treatment option as through the frictional retention, the resiliency and stability, provide stable retention over time, secondary splinting effect on supporting teeth, moreover, it gave the patient more confidence, better eating ability and better aesthetics. Further studies are needed to evaluate the long-term success and complications of such treatment modalities.

5 Conclusion

This clinical case report demonstrates the effectiveness of a comprehensive approach in restoring function and aesthetics for partially edentulous patients using maxillary telescopic bridges and mandibular thermopress partial dentures. The treatment not only addressed the patient's immediate dental needs but also significantly enhanced her quality of life by improving comfort, speech, and chewing ability. The positive outcomes observed over the two-year follow-up underscore the viability of telescopic bridges as a preferred solution, minimizing tissue coverage while maximizing aesthetic appeal. Overall, this case reinforces the importance of tailored prosthetic strategies in achieving optimal patient satisfaction and functional restoration..

Authors' Contributions

Reem Hatem Ibrahim managed the application of the materials and wrote the manuscript. Ereny Maged and Jessica George shared in the clinical work. Mahmoud Attia supervised clinical work. Dina Elawady managed the conceptualization, supervised the clinical work, Methodology, Writing – Original draft, Resources and reviewed the manuscript.

Conflict of interest

The authors declare that they hold no competing interests.

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