



Telescopic Overdenture in a Renal Transplant Recipient: A Clinical Report

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Abstract

Telescopic overdentures provide superior stability and retention compared with conventional complete dentures. They reduce alveolar bone resorption, enhance masticatory efficiency, and improve overall patient comfort. This study describes and evaluates the oral rehabilitation of a 55-year-old renal transplant recipient exhibiting progressive bone loss, reduced prosthetic stability and retention, and diminished masticatory efficiency using a mandibular telescopic overdenture and a maxillary complete denture. Assessment of phonetics, oral comfort, and esthetics indicated that the patient was satisfied and able to chew and speak effectively while wearing the denture. Based on these results, we concluded that tooth-supported overdentures with telescoping crowns are better suited for rehabilitating partially edentulous organ transplant recipients.

Keywords: Telescopic; Overdenture; Removable Partial Denture; Organ Transplant

Introduction

In 2019, 28,256 patients from Saudi Arabia were diagnosed with end-stage renal disease (ESRD), according to the Saudi Center for Organ Transplantation (SCOT) [1]. As the nation provides unified

dialysis and transplant care, patients with ESRD, including those who have received transplants, have a well-documented medical history, according to the governmental authority of the Kingdom of Saudi Arabia [2].

The use of dental implants in organ transplant recipients (including those who have undergone renal transplant) remains debatable, as immunosuppressive drugs may adversely affect bone structure and impair wound healing. Clinical studies have demonstrated that immunosuppressive drugs may adversely impact osseointegration, reduce bone density, and compromise bone-implant contact; however, few issues with dental implant survival have been documented [3,4].

A variety of prosthetic options are available for the rehabilitation of patients with partial edentulism. Various treatment approaches, including fixed partial dentures (FPDs) with teeth or implants, conventional removable partial dentures (RPDs), and teeth/implant overdentures, have been recommended for partial edentulism depending on the clinical situation and necessity [5].

Conventional RPDs have been widely utilized owing to their numerous advantages, affordability, and simplicity of production and repair. Unfortunately, metallic clasps used to retain these dentures are often considered unsightly and can exert lateral forces on the abutment teeth, often resulting in gingival recession and increased tooth wear. Eventually, this causes bone resorption around the abutment teeth, potentially decreasing denture stability and retention [6].

Telescopic dentures refer to removable dental prostheses that cover and rest on one or more remaining natural teeth, natural tooth roots, or dental implants, and are partially supported by these structures. These are viable alternatives to conventional RPDs [7,8].

Compared with traditional complete dentures, telescopic dentures exhibit superior stability and retention. Moreover, they decrease alveolar bone resorption, increase masticatory efficiency, and improve patient comfort [9].

The concept of the telescopic crown originates from an optical microscope mechanism, which functions through the movement of two parallel cylinders. A denture that derives support from both the tooth and mucosal support is referred to as a telescope crown. This crown is designed as a detachable prosthesis that replaces a lost tooth by fitting over natural abutment teeth and the surrounding soft tissues [10].

To the best of our knowledge, only a few published reports have evaluated telescopic overdentures in solid organ transplant recipients of SOT.

This case report describes the oral rehabilitation of a renal transplant recipient using a mandibular telescopic overdenture and a maxillary complete denture. This treatment approach was selected to reduce complications in a medically compromised patient who was unable or unwilling to undergo surgical interventions, while preserving sensory feedback and enhancing denture retention and stability. Additionally, particular emphasis was placed on the psychological aspects associated with mandibular rehabilitation using telescopic overdentures.

Case Presentation

A 55-year-old female patient presented with the chief complaint of missing most of her upper and lower teeth Figure 1. The patient had no family history of clinical significance and reported no drug allergies. However, she had undergone renal transplantation 20 years prior and was currently maintained on prednisolone, tacrolimus, and simvastatin. Based on her medical condition, the patient was classified as American Society of Anesthesiologists (ASA) class III. Patients with an ASA class III classification typically require additional care and monitoring during surgical procedures due to the underlying systemic conditions. To minimize risks and guarantee patient safety, the anesthesiology team considers these aspects when organizing the anesthetic and surgical procedures [11].



Figure 1: Pretreatment intraoral photograph showing remaining lower canines and edentulous maxillary arch.

Regarding her dental history, the patient had undergone multiple extractions and prior prosthetic rehabilitation over the years, none of which were associated with complications. However, her oral hygiene practices were unsatisfactory. Her last dental visit was 2 weeks earlier, during which she underwent root canal therapy for teeth #33 and #43. Despite her poor dental history, the patient was cooperative and motivated to restore oral health and function.

Pretreatment clinical and radiological evaluation

Patient–nephrologist consultations were performed before the intervention. Comprehensive clinical and radiographic examinations revealed complete maxillary and partial mandibular edentulism. Tooth loss was primarily attributed to advanced periodontal disease and extensive dental caries.

Extraoral examination revealed normal skin texture with wrinkles in the lower third of the face. The face was symmetrical and classified as mesocephalic, with balanced facial thirds. The temporomandibular joints (TMJ) demonstrated no pain, clicking, or deviation, and the masticatory muscles were not tender. Examination of the cervical lymph nodes revealed no abnormalities.

Smile analysis revealed poor esthetics Figure 2. The maxillary edentulous ridge was not visible during an exaggerated smile, whereas the mandibular canines were exposed by approximately 2–4 mm, indicating supraeruption of teeth #33 and #43. Intraoral examination revealed generalized gingival inflammation, most pronounced in the anterior region. Furthermore, teeth #33 and #43 were endodontically treated with temporary restorations Figure 2. Pretreatment panoramic radiography demonstrated intact and symmetrical condyles with normal trabeculation of the bone Figure 3. The maxillary sinuses were clearly visualized, with no evidence of abnormalities or pneumatization observed. Periapical radiographs revealed root canal-treated teeth #33 and #43, each restored with temporary restorations. Based on the clinical and radiographic findings, the prosthodontic diagnosis included complete maxillary and partial mandibular edentulism (Kennedy class I, modification I).

Treatment procedure

The patients were informed of all possible treatment options. After considering the health of the remaining teeth and periodontal



Figure 2: Pre-treatment smile analysis.

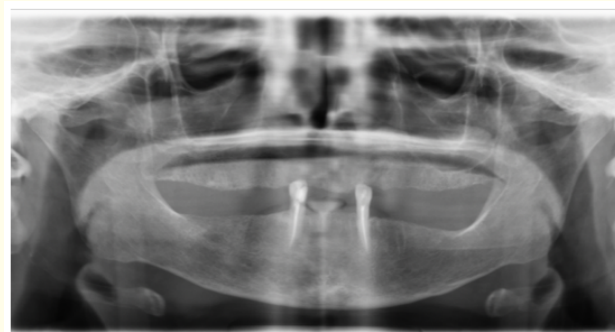


Figure 3: Pre-treatment panoramic radiograph.

tissues as well as the patient's expectations and anticipated benefits, a tooth-supported mandibular telescopic overdenture and a maxillary complete denture were selected. The patients provided informed consent for the treatment plan.

A preliminary evaluation was performed using an irreversible hydrocolloid, which was poured into a type III gypsum stone. The mandibular diagnostic cast was surveyed, and the maxillary cast was mounted using a Slidematic facebow. Centric relationships were recorded using the bimanual manipulation technique, and bite registration was obtained with silicone bite-registration material. The casts were mounted on a Denar Mark II articulator, and a diagnostic wax-up was performed. The remaining teeth were

utilized as guides to assess the occlusal plane and determine the necessary tooth preparation. Following meticulous evaluation, a final treatment plan was developed.

Temporary restorations of teeth #33 and #43 were removed, and a fiber post and core build-up was placed for tooth #43. Maxillary custom trays were tested intraorally, followed by border molding using a green-stick compound. Final maxillary impression was obtained using light-body polyvinyl siloxane (PVS) material, and the posterior palatal seal was recorded.

Mandibular tooth preparations were finalized following the diagnostic teeth try-in to fabricate primary telescopic crowns. Gingival retraction was achieved using plain braided cords soaked in aluminum chloride solution. The final impression was made using the putty-wash technique with light body and putty PVS impression materials. Wax patterns were fabricated on teeth #33 and #43, and the parallelism of the two primary telescopic crown patterns was verified using a dental surveyor. The parallelism of the metal crowns was examined after spinning and casting.

Primary telescopic crowns were attempted intraorally, followed by mandibular custom tray verification and border molding using a green stick compound. The primary crowns were then cemented, and a pick-up final impression was made using light- and heavy-body PVS materials to fabricate secondary crowns with a chrome-cobalt framework. Secondary crowns were tried in, and centric relationship records were obtained using bimanual manipulation with record blocks and bite-registration material. The facebow transfer was repeated to mount the upper cast, which was articulated on a Denar Mark II articulator.

Teeth try-in was performed to establish a bilateral balanced occlusal relationship and to assess the patient's adaptation to the occlusal vertical dimension, esthetics, phonetics, and occlusal plane. Maxillary complete dentures and mandibular telescopic overdentures were processed using heat-cured acrylic resin. The primary telescopic crowns were cemented with dual-cure resin cement, and the prostheses were delivered after confirming the occlusal relationship Figures 4 and 5. Recall and maintenance appointments were scheduled to monitor the adaptation, function, and oral health.



Figure 4: Delivery of a maxillary complete dentures and mandibular telescopic overdentures A. Telescopic crowns post-operative occlusal view B. Intraoral post-operative frontal view.



Figure 5: Pre-treatment smile analysis. A. frontal view B. Extraoral post-operative lateral view. C. Extraoral post-operative frontal view.

The patient was followed up at 24 hours, 1 week, and 4 weeks after the insertion of the new prosthesis, with no reported complications.

Discussion

The global prevalence of chronic kidney disease has been increasing, and it is associated with higher morbidity, mortality, and reduced quality of life, as well as a substantial financial burden on the healthcare system [12,13]. Obesity, hypertension, and diabetes mellitus are the primary contributing factors to the condition [13,14].

Renal transplantation is considered the optimal treatment for end-stage kidney disease [15,16]. Advances in renal transplantation techniques, along with the availability of potent immunosuppressive medications, have resulted in higher survival rates for renal transplant recipients compared with recipients of solid organ transplants [17]. Serious adverse effects, including immunosuppression, renal artery or vein stenosis/thrombosis, urinary blockage or leakage, graft rejection, psychosis, and cancer, can occur in patients who receive renal transplantation [17-19]. Additionally, infection is the leading cause of death [20].

Management of dental health in transplant recipients can be challenging, as all patients require potent immunosuppressive therapy and some may present with additional systemic conditions.

The current study aimed to present and evaluate the oral rehabilitation of a 55-year-old renal transplant recipient with progressive bone loss, low stability and retention, and reduced masticatory efficiency using a mandibular telescopic overdenture and a maxillary complete denture. To the best of our knowledge, only a few published reports have evaluated telescopic overdentures in renal transplant recipients.

In immunocompromised individuals, the oral cavity represents a significant potential source of sepsis, and the oral environment may be directly and profoundly affected by cytotoxic medications or the transplantation process. Provision of dental care during this period without appropriate supervision may lead to hemostatic and infectious complications [14,15]. Quality of life is significantly affected by these issues, underscoring the need for a comprehensive approach to management and prevention.

Consistent with these findings, the current case demonstrated an impoverished dental history, with multiple extractions over the years and prior prosthetic rehabilitation. Oral hygiene practices were suboptimal. Clinical and radiographic examinations revealed complete maxillary and partial mandibular edentulism. Tooth loss was primarily attributed to advanced periodontal disease and extensive dental caries.

Complete or partial edentulism negatively affects a patient's facial appearance and psychological state, in addition to impairing oral function [6]. This was reflected in the patient's chief complaint, which was "I wanted to replace my missing teeth".

The rehabilitation of patients with edentulism is complicated and requires a variety of treatment approaches. The most popular restoration choices are traditional dentures, such as RPDs or complete dentures, although they have several disadvantages. Retention and stability are critical factors for the successful function of removable complete dentures or RPDs [6].

Close collaboration between dentists and treating nephrologists is essential for the management of the oral health of transplant recipients. The purpose of these consultations is to determine the appropriate medication for the patient and to assess whether the nephrologist should adjust the immunosuppressive and anticoagulant therapy before the dental procedures [21]. According to these international recommendations, the patient's nephrologist consultation was performed before any intervention, with careful monitoring of the patient's general and renal conditions throughout every stage of oral rehabilitation. This was evident from the absence of significant complications, including substantial bleeding and graft compromise, throughout the treatment period.

After evaluating the condition of the remaining teeth and periodontal tissues, alongside the patient's expectations and anticipated benefits, a tooth-supported mandibular telescopic overdenture and a maxillary complete denture were selected for this case.

The benefits of telescopic overdentures include improved stress distribution, stiff splinting action, and enhanced retentive and stabilizing qualities [22]. In this instance, the telescopic overdenture's ability to distribute stress evenly between the teeth and soft tissues is one of its primary benefits. Telescopic retainers

transfer occlusal stresses toward the long axis of abutment teeth and reduce the percentage of traumatic lateral forces [23]. Additionally, telescopic overdentures help inhibit residual alveolar bone resorption due to their effective stress distribution and preservation of proprioceptive feeling [24]. Compared to traditional partial dentures, they are aesthetically pleasing and hygienic.

Precise treatment planning is required to prevent anatomical complications and to position the implants in a manner that does not compromise the fabrication of esthetically pleasing restorations, thereby ensuring optimal outcomes for implant-supported restorations [25]. Furthermore, the success of a telescopic prosthesis depends on the careful selection of abutment teeth, thorough clinical and radiographic evaluation of their endodontic and periodontal status, assessment of bone levels and overall dental health, and maintenance of parallelism in the copings. This allows the forces to be transferred along the long axis of the abutment teeth, thereby negating lateral forces, preventing undesired tooth movements, supporting the tooth position, and stabilizing occlusion [26]. In the present case, the patient's masticatory performance significantly improved, and the stability of the dentures increased due to the preservation of the abutment teeth, which also maintained bone support and proprioception.

The materials selected for the primary and secondary copings should possess high shear strengths and wear resistance, as frictional surfaces directly influence retention. Consistent with the findings in the present case report, retentive forces were greater when cobalt-chromium copings were utilized [27].

Conclusions

For organ transplant recipients with partial edentulism, tooth-supported overdentures with telescoping crowns are a better option than regular removable dentures. However, future research should include larger patient populations and more frequent evaluations of the supporting structures.

Consent

The patient reviewed the article and provided written informed consent for publication of the case report.

Conflict Of Interest Statement

The authors disclosed no conflict of interest.

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