

The Use of Telescopic Crowns in Removable Partial Denture Treatment for Patients with Severe Periodontal Disease: Two Patient Case History Reports

Jin-Hyun Cho, DDS, PhD¹/Sung-Am Cho, DDS, PhD²

Two patient case histories are described as examples of treatment of severe periodontitis in severely compromised partial dentitions. Management consisted of periodontal treatment and telescopic crown support for removable partial dentures with friction pin retention. *Int J Prosthodont* 2016;29:175–178. doi: 10.11607/ijp.4205

Successful treatment outcomes using double-crown removable partial dentures (RPDs) have been reported for patients with few remaining and unfavorably distributed teeth,¹ although it appears that no guidelines currently exist for recruiting periodontally compromised teeth for this treatment approach. The latter can and should be considered for double- or multiple-crown abutments to support and retain RPDs. This treatment alternative may actually prevent additional bone loss, improve prosthesis load transmission to underlying tissues, maintain sensory feedback, improve denture stability, and be perceived as psychologically comforting.²

Weber and Frank introduced the hybrid telescope crown with a friction pin and a base metal alloy.³ This approach does not rely on frictional retention between inner and outer crowns, but is instead retained solely by a friction pin on a small channel. This clinical case history report describes the management of two partially edentulous and periodontally compromised patients via employment of telescopic crowns and RPDs.

Patient 1 Case History

A systemically healthy 59-year-old woman presented with a poorly fitting decade-old mandibular prosthesis in the presence of generalized periodontitis and readily discernible mobility of teeth 25 to 27. Clinical and panoramic radiographic examinations confirmed

generalized chronic periodontitis with different degrees of bone resorption around the residual mandibular dentition, particularly on the distal abutments adjacent to edentulous ridges (Fig 1). A mandibular telescopic crown-supported and -retained RPD (34, 32, 31, 41, 42, and 43) and maxillary fixed partial prosthesis (25 to 27) were recommended. Required endodontic and periodontal treatment was performed on both jaws during an 8-week period.

The inner crown wax-ups with 2-degree tapers and chamfer margins were designed on the mandibular laboratory cast, and spaces for friction pins were prepared at the proximal surfaces of teeth 34, 32, and 43 (Fig 2). The outer crown wax-ups with metal wings were made on the final master cast produced from the second pick-up impression. Spark erosion protocol was applied to the inner and outer crown contact space, prepared for the friction pin and engaging approximately 0.4 mm of each crown surface (Figs 3a and 3b).³ Spark erosion holes (34, 32, 31, 41, 42, and 43) were created between the inner and outer crowns, the friction pin was inserted, and laser welding and sandblasting were performed (Figs 3c and 3d). The metal RPD framework was fabricated and laser welded to the outer crown wings.

Prosthetic teeth were arranged, and a trial wax-up was constructed followed by its processing. A hard resin (Sinfony, 3M ESPE) was used to build over the outer crowns, the inner crowns were cemented, and the denture was delivered.

The patient was followed up over a 7-year period (Fig 4), and her oral hygiene and periodontal condition were well maintained. Initial, immediate posttreatment, and 7-year follow-up panoramic radiographs showed well-maintained bone levels (Fig 5).

Patient 2 Case History

A 37-year-old man with severe periodontitis receiving treatment for type II diabetes mellitus underwent

¹Assistant Professor, Department of Prosthodontics, School of Dentistry, Kyungpook National University, Daegu, Korea.

²Professor, Department of Prosthodontics, School of Dentistry, Kyungpook National University, Daegu, Korea.

Correspondence to: Dr Sung-Am Cho, Department of Prosthodontics, School of Dentistry, Kyungpook National University, 2175, Dalgubeoldae-ro, Jung-Gu, Daegu, Republic of Korea.
Fax: 82 53 427 0778. Email: sachu@knu.ac.kr

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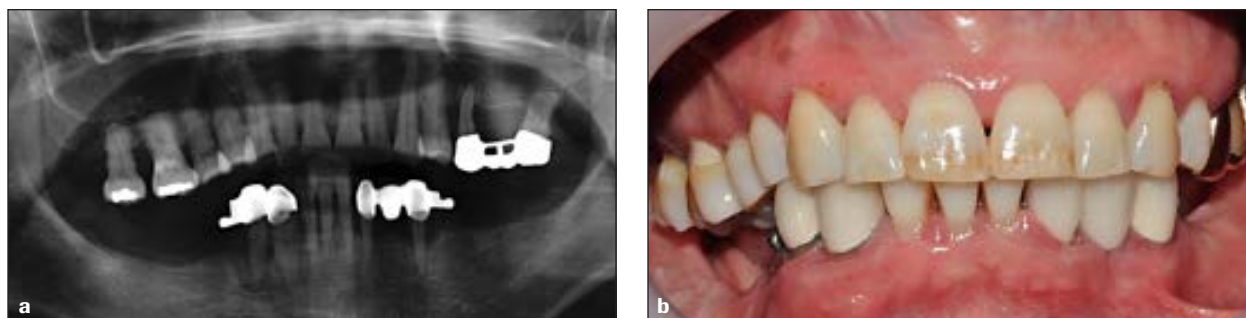


Fig 1 Patient 1. The initial panoramic radiograph **(a)** and clinical examinations **(b)** revealed severe mandibular alveolar bone resorption, particularly at the distal abutments adjacent to the edentulous ridge.



Fig 2 **(a)** Inner crowns wax-up at a 2-degree taper axial wall (solid red lines) and **(b)** space for the friction pin (broken red line) were prepared on the distal abutment margins (32, 34, and 43). The inner crown had a chamfer margin (encircled broken red line). **(c)** The casted inner crowns on the master cast.

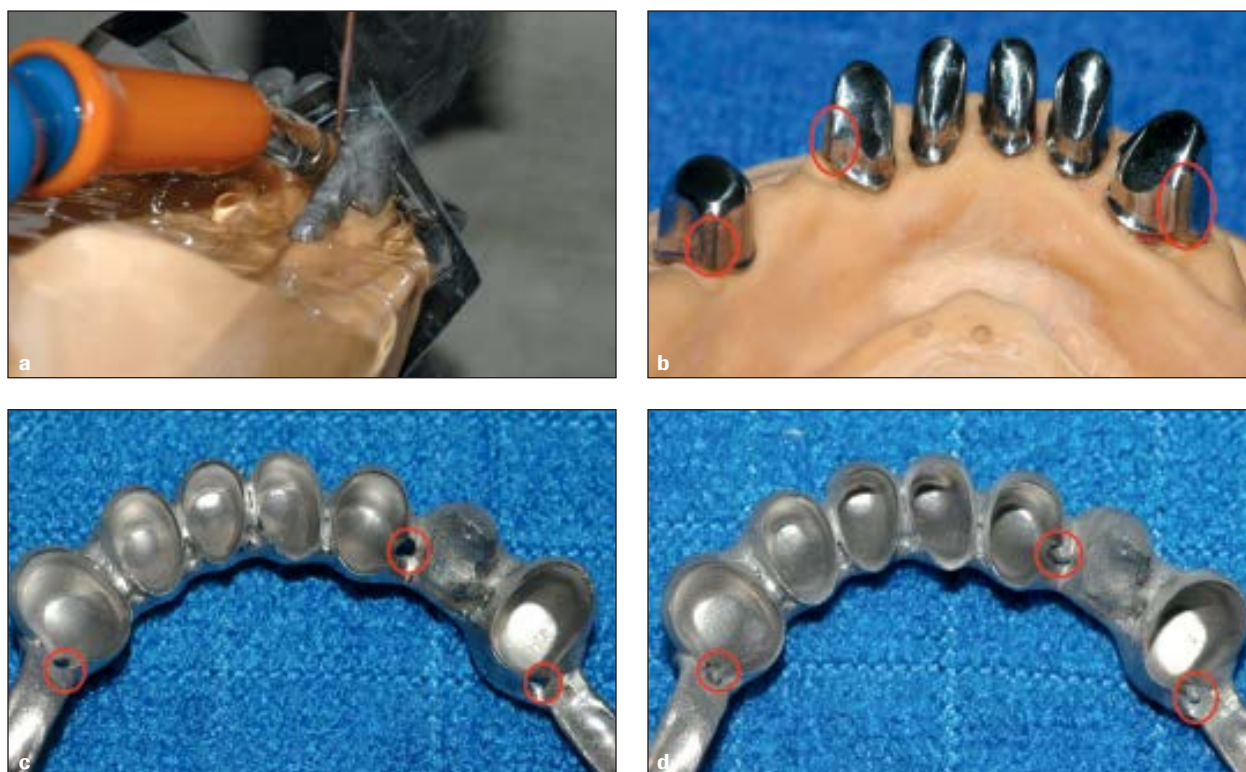


Fig 3 Spark erosion and laser welding procedure. **(a)** The spark was generated when the copper rod contacted the work piece. **(b, c)** The spark-erosion holes (red circles) were created on the inner and outer crowns, approximately 0.4 mm on each side. **(d)** Laser welding of the friction pin.



Fig 4 The inner crowns (a) and denture (b) after 7 years.

oral examination. Initial clinical and panoramic examinations revealed that most of the teeth were unsalvageable with the exception of four that had an extremely poor crown-to-root ratio (Fig 6). Several treatment options were presented to the patient, who was prompted by economic considerations to select a telescope crown-supported/retained RPD using teeth 13, 23, 43, and 47 as abutments.

All teeth except 13, 23, 43, and 47 were extracted. A periodontal flap was raised (one-stage full-mouth disinfection) in an effort to eliminate bacterial infection.⁴ Crown height on the four remaining teeth was decreased in an effort to improve crown-to-root ratio, and root canal treatment was performed. Grade 3 tooth mobility during the initial treatment stages prevented fabrication of a provisional denture. After 8 weeks, abutment tooth mobility decreased to grade 1 to 2, and the gingival tissue was adequately healed. The prosthodontic treatment was then carried out and completed as described in the first case history (Fig 7). When compared with the initial radiograph (Fig 8a), bone regeneration was observed at mesial and distal areas of the mandibular teeth (Fig 8b), which was well maintained over the 8-year observation period (Fig 8c).

Discussion

Two types of double crowns using a base metal alloy are classified by the retention mechanism. The Marburg double crown uses the TC-SNAP system, and the hybrid telescopic crown uses a friction pin for additional attachments.^{3,5} This telescopic crown protocol with a friction pin system offers several advantages. It permits the inner crown bulk to be reduced to provide more space to build the outer crown esthetically and hygienically.³ In addition, the friction pin allows retention adjustment, and repair is easily achieved if the pin is broken. The apparent long-term successful alveolar bone maintenance in both patients may be attributed to several factors: (1) an improved crown-root ratio (C/R ratio) that decreases

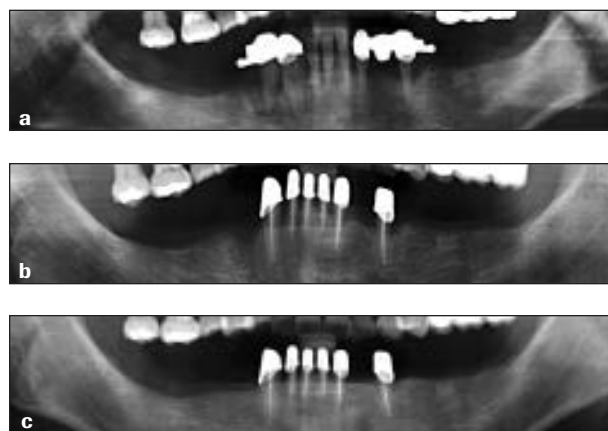


Fig 5 Comparison of the (a) initial, (b) delivery, and (c) 7-year follow-up panoramic radiographs. Bone regeneration was observed on the distal surfaces of 34 and 43 at delivery. The bone regenerative sites were well maintained after 7 years.

the lever arm effect and increases the stress transmitted to the periodontal bone; (2) the specific one-stage full-mouth disinfection treatment using a periodontal surgical flap approach;⁴ (3) favorable resultant axial loading achieved by a rigid double/multiple crown connection; and above all else, (4) good supportive periodontal therapy, particularly personal oral hygiene.⁶ Throughout the 7- to 8-year clinical follow-up monitoring period, prosthetic-related complications included denture fracture, denture mobility, hard resin fracture, and retention loss. The prostheses were relined 2 to 3 times to reduce denture mobility. Outer crown hard acrylic resin fracture and diminished double crown retention were easily resolved by rebuilding the resin and activating the friction pin.



Fig 6 Patient 2. Initial panoramic radiograph (a) and clinical examination (b) revealed severe alveolar bone resorption along the entire dentition.



Fig 7 The inner crowns (a) and denture (b) after 8 years.



Fig 8 Comparison between the (a) initial, (b) delivery, and (c) 8-year follow-up panoramic radiographs. Bone regeneration was observed on the mesial and distal surfaces at delivery. The bone regeneration sites were well maintained after 8 years.

Conclusions

The use of telescopic crowns to support and retain RPDs, providing suitable prosthodontics management, is described for two patients with periodontal

disease. Successful treatment outcomes for these selected case history reports were accompanied by routine periodontal and uncomplicated prosthodontic maintenance procedures.

Acknowledgments

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