

# Full-Arch Implant-Retained-Restoration. Fixed or Removable?

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Dental implants as abutments for full-arch restorations are a widely accepted treatment modality. However, when scheduling the use of a fixed or removable implant-supported full-arch restoration, many factors should be considered. Due to the possible need for additional surgical steps to enhance the esthetics surrounding fixed restorations, removable implant-supported dentures, often are a preferable alternative.

The current report presents a comprehensive treatment approach, wherein the patient undergoes different treatment modalities for restoration of the upper and lower full arches at different timelines along with discussing the advantages and disadvantages of each approach.

Although implants have become a widely accepted treatment modality, dentists and patients frequently are conflicted when deciding between a fixed or removable full-arch restoration. Many patients requiring a full-arch rehabilitation, wish an esthetically sophisticated and fixed-implant-retained denture (FIRD). In such cases, the esthetic outcomes are often severely restricted by bone loss as a cause of advanced periodontitis and/or tooth extractions.

Modern restorative materials and techniques make removable implant-retained-dentures (RIRD) to an esthetically and functionally acceptable alternative to FIRDs.<sup>1-4</sup>

A 55-year-old woman was referred for a complex periodontal-implant treatment (Fig. 1, Fig. 2). Due to severe pain teeth #18-16 and 14 were immediately extracted and the socket #14 was augmented using a non-resorbable membrane (Cytoplast, Regentex GBR-200; Osteogenics Biomedical,

Lubbock, TX).<sup>5,6</sup>

The patient was informed about the advanced bone destruction due to periodontitis and the following treatment plan were recommended: 1) extraction of the teeth # 13, 12, 22, 24, 14, 26, 36, and 32-42 due to advanced chronic periodontitis as well as caries, and surgical treatment of the rest dentition by access flap surgery; 2) strategic placement of implants to increase the number of abutments; 3) full-arch restoration of the maxilla with a RIRD using telescopic crowns as attachments; 4) implant or teeth retained bridges for restoration of the mandible.

The patient did not accept this proposal and sought treatment from another dentist.

One year later, the patient presented again for consultation. Eleven implants have been placed (#12-15, 24, 25, 36-34, 45 and 46) and the maxilla and mandible have been restored with FPDs at the patient's request (Fig. 3 – Fig. 5). However, the patient was dissatisfied with the esthetic results due to the unnatural length of the artificial teeth. Furthermore, the design of the existing FPDs impeded oral hygiene.

Due to a home accident, the fractured teeth #11-23, 33, 43, and 44 were extracted and an implant was immediately placed in region #44. Open tray impressions were taken using a polyether impression material (Impregum Penta Soft, 3M ESPE) and mounted on a semi-adjustable articulator (SAM 2P, SAM Prazisionstechnik GmbH, Gauting, Germany). For an immediate restoration, provisional abutments were used and temporary covered dentures were fabricated and retained on the provisional abutments (Fig. 6 – Fig. 8).

Two months later, full mouth rehabilitation of the maxilla (supported by six implants) and mandible (supported by six implants) was com-

pleted by fabrication of RIRDs using telescopic crowns as attachments, as previously described.<sup>7-9</sup> Customized abutments served as primary telescopes and electroformed pure gold copings (0.25 mm thickness, AGC Galvanogold, Au>99.9%, Wieland Dental Systems Inc., Pforzheim, Germany) served as secondary telescopes (Fig. 9, Fig. 10). The metal frameworks was milled from titanium (Zenotec Ti, Wieland Dental Systems Inc., Pforzheim, Germany; Fig. 11) and veneered using a photocured indirect ceramic polymer (Ceramage, Shofu, Ratingen, Germany; Fig. 12 – Fig. 15).

## Discussion

This report presents a case in which the patient was treated first with fixed restorations supported by implants and natural teeth and subsequently treated with an implant-retained removable denture.

The patient initially insisted on fixed restorations. Unfortunately, the dentist fulfilled this wish, despite the existing clinical conditions of loss of hard and soft tissue. No augmentative procedures were performed prior to implant placement, resulting in a compromised treatment outcome. While the fixed restoration resulted in a functionally satisfactory treatment outcome, the patient was displeased with the esthetic results. The main concern was the unnaturally long tooth shape necessary to compensate for the insufficient alveolar ridge height. The esthetic demands in such cases can be difficult to be fulfilled. Although several predictable periodontal surgical procedures can be used to augment hard and soft tissue to meet esthetic demands, the patient could reject these options or the dentist might not be entirely familiar with the outcomes of these selected procedures. Both scenarios can produce unsatisfactory results that become apparent only when treatment is complete.

Replacement of the fixed restoration with a removable one led to a more acceptable result. The treatment modality of using telescopic crowns as attachments for natural teeth and dental implants for dentures has been proven successful for many years.<sup>8,9,10</sup> This concept not only improves the retention form of the dentures due to frictional forces, but also improves the chewing ability for the patients. Other advantages of using telescopic crowns include feasibility for the patients to remove the denture for periodic hygiene and maintenance; which is detrimental, particularly from a periodontal perspective.

Various other alternatives to restore edentulous arches include fixed as well as removable prostheses.<sup>10</sup> With regards to availing the fixed option, clinicians routinely encounter resorption of the alveolar ridges leading to atrophy along with loss of vertical dimension of the tissues, which in turn, pertains to placement of dental implants in unfavorable positions. This can severely affect the prostheses by need for longer unesthetic teeth as was the case in the presented report. Also, unfavorable positioning of the implants may lead to difficult access to the screw holes complicating the fabrication of prostheses as well affecting the retrievability of the prostheses at the time of maintenance visits.

Other evident alternatives for RIRDs include use of bar-and clip retentive dentures. There are various reports suggesting soft tissue overgrowth in relation to the bar placed in these situations, hindering the long term oral hygiene regimen associated with these dentures.

The complication of fractures related to frameworks' veneering or one of the abutments in fixed as well as bar-and-clip RIRDs is also reported. It, not only affects usability of the denture

but also, adds an additional exorbitant expense and time consumption for replacement, serves as a definite disadvantage while electing this alternative.

In contrast to above mentioned shortcomings, ease of retrievability of telescopic crown supported RIRDs proves highly beneficial over other alternatives while overcoming the commonly encountered implant or natural teeth complications. Several complications related to dental implants range from implant-abutment screw loosening, peri-implant mucositis or peri-implantitis, or fracture of one of the used implants. Also, there is a potential risk of losing the used natural teeth abutment due to periodontal and/or endodontic/carious reasons that can affect the overdenture support. However, these circumstances can be evaded and continued usage of the telescopic crowns supported RIRD is possible with minor adjustments to the existing prostheses without compromising long term success of these dentures.

The case presented here raises the issue of whether dentists and/or surgeons should just follow patients' wishes and exhaust all high-tech surgical and augmentative possibilities or respecting periodontal principles should combine implant-prosthetic experience with evidence-based but less luxuriant surgical techniques. In many circumstances, the latter route is a better and safer treatment alternative.

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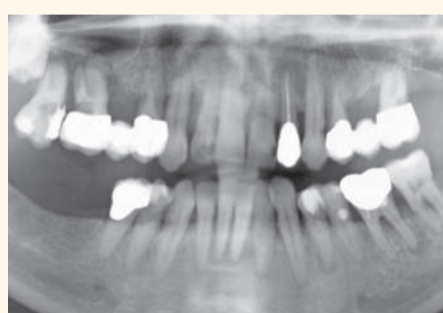


Fig. 1. Initial examination. Orthopantomograph.



Fig. 2. Initial examination. Clinical view.



Fig. 3. 2nd consultation. Orthopantomograph. After implant placement and prosthetic treatment.



Fig. 4. 2nd consultation. Clinical view (front).



Fig. 5. 2nd consultation. Clinical view (right).



Fig. 6. Orthopantomograph. After placement of implant #44.



Fig. 7. Provisional implant abutments and extraction sockets.



Fig. 8. Temporary restorations retained on the provisional implant abutments.



Fig. 9. Customized gold implant abutments.



Fig. 10. Fitting of the electroformed copings.



Fig. 11. Milled titanium framework.



Fig. 12. Final RIRD using telescopic crowns as attachment (front view).

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Fig. 13. Final restoration (right view).



Fig. 14. Final restoration (palatal view).



Fig. 15. Orthopantomograph. Final restorations in situ.

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## New organic toothpaste may inhibit harmful bacteria

By DTI

**SEOUL, South Korea:** A Seoul dentist has developed an all-natural toothpaste that aims to reduce the health risks posed by *Streptococcus gordonii*, an oral bacterium that initiates dental plaque formation. Once in the bloodstream, which it may enter through bleeding gingivae, for example, the bacterium also causes blood clots, which can lead to life-threatening conditions such as infective endocarditis, heart attack or stroke.

South Korean dentist Dr Hyung-Joo Moon, head of the Moon Dental Hospital in Seoul, recently obtained the patent for his bacteria-inhibiting

organic formula from the Korean Intellectual Property Office. Conventional toothpastes mainly focus on combating two major oral bacteria, *Streptococcus mutans* and *Porphyromonas gingivalis*, which are both associated with tooth decay and periodontal disease. However, inspired by a joint study by the Royal College of Surgeons in Ireland and the University of Bristol, which found that *S. gordonii* can trigger an infection of the inner lining of the heart when entering the bloodstream, Moon started developing a toothpaste that especially inhibits the growth of these bacteria.

“Endocarditis is a serious disease

treated only by surgery or strong antibiotics, which is becoming more difficult due to growing antibiotic resistance. Considering this, using my toothpaste will reduce the risks potentially caused by the bacterium,” Moon told the Korea Times.

The toothpaste’s anti-inflammatory ingredients include neem and castor oil, herbal extracts made from psyllium seed, Japanese star anise, and Japanese cornelian cherry. “Unlike most other toothpastes that use artificial chemical preservatives, this toothpaste is only composed of natural, organic compounds, which greatly reduces the risk of side effects,” Moon said.

As the oral mucosa is very susceptible to absorbing harmful substances into the body, it is especially important to use natural ingredients for oral care products, he emphasised. Tested among his patients, the toothpaste’s formula proved to help relieve inflammation, as well as sore gingivae and toothache.

The toothpaste is not available for purchase yet, but Moon is working on releasing it to market soon. [DOI](#)



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