

Osseointegrated implant connected with natural tooth using a semiprecision attachment: A clinical report

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Present report consists of a clinical evaluation of an implant-tooth supported prostheses using an intracoronal semiprecision attachment. An osseointegrated implant was inserted in the mandible as an alternative to the right second molar. The superstructure was designed as a fixed partial denture to replace the missing mandibular right first molar, and the attachment was used between the pontic and mandibular right second premolar. Although slight gingival recession was observed around the implant after 11 years of service, no accidental changes were found in the implant body, the natural tooth abutment, or the superstructure. The success resulted from certain clinical guidelines including plaque control after the completion of prosthodontic treatment. The semiprecision attachment made maintenance easy and adequately connected the implant with the natural tooth for long term. (*Int Chin J Dent* 2004; 4: 51-55.)

Key Words: biomaterial, implant-tooth support, prognosis, superstructure.

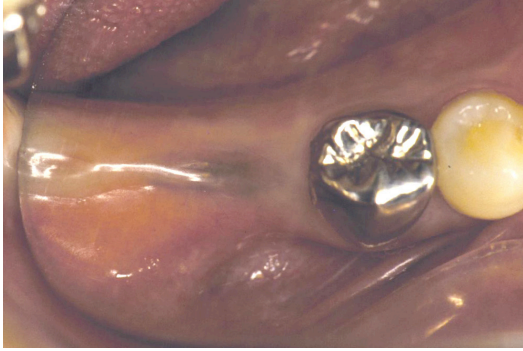
Introduction

Cylindrical root-form osseointegrated implants form a popular option for replacing missing teeth. Although a variety of cylinders are applicable, whether or not the implant can be connected with the natural tooth is of great concern to clinicians in the selection of a suitable implant system.^{1,2} The IMZ system (Friadent GmbH, Mannheim, Germany) was reported to be characterized by an intramobile element (IME) and an intramobile connector.³⁻⁵ These intramobile components, which are made with polyoxymethylene, simulate the physiological movement of a natural tooth.⁶ The distributed occlusal stress is considered to facilitate bone remodeling around the implant. The intramobile components must be renewed periodically, due to deterioration and surface contamination.⁷

Screw-fixed attachments have been used as a standard of care for IMZ system with good results.⁸ Semiprecision attachments, such as custom fabricated keyway and prefabricated slide type attachments, allow the superstructure to be removed when exchanging the intramobile components.⁹ In comparison to the screw-fixed attachments, however, limited information is available concerning implant-tooth supported prostheses fabricated using semiprecision attachments. This clinical report followed a prosthodontic service with the purpose of evaluating an intracoronal semiprecision attachment placed between the IMZ implant and the natural tooth abutment.

Clinical Report

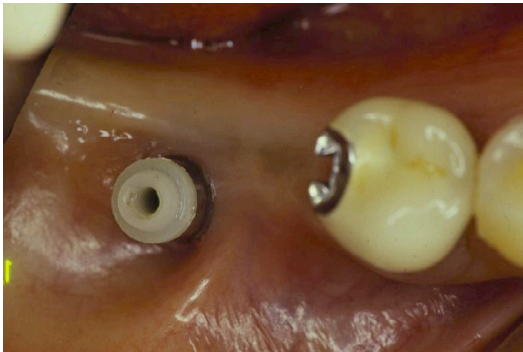
A 33-year-old healthy female had a chief complaint of mobility of the fixed partial denture placed between the mandibular right second premolar and second molar. The patient was unhappy with the fixed partial denture and wanted a fundamental solution.



1



2a



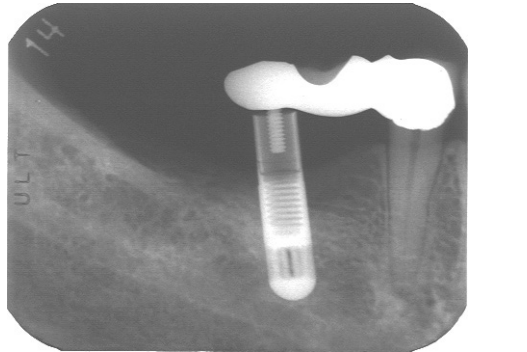
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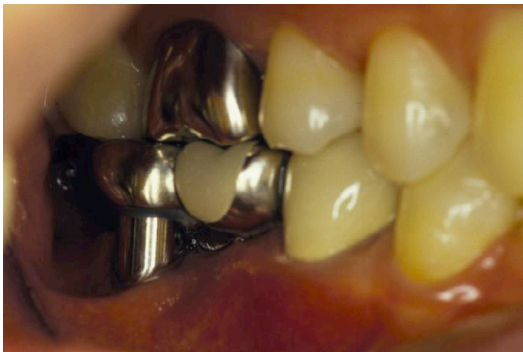
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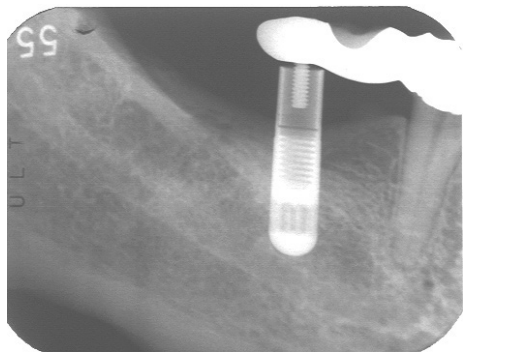
4a



4b



4c



4d

- Fig. 1.** Intraoral view before treatment with the dental implant.
- Fig. 2.** a, Occlusal view following placement of IMZ implant and the superstructure.
The superstructure was partially veneered with fired porcelain.
b, The distal part of the superstructure could be detached from the second premolar abutment of the semiprecision attachment.
- Fig. 3.** Intramobile element (IME) and transmucosal implant extension, which were replaced at 6 months intervals. Considerable dental plaque was attached to the screw of IME.
- Fig. 4.** Lateral views and radiographs of the implant-tooth supported prosthesis. Except for slight gingival recession, no significant changes were observed between 4 months and 11 years after the completion of the superstructure.
a, Clinical situation showing the prosthesis 4 months after treatment.
b, Radiograph, corresponding to Fig. 4a.
c, Clinical situation showing the prosthesis 11 years after treatment.
d, Radiograph, corresponding to Fig. 4c.

A patient interview was conducted, records were reviewed, and radiographs were made; diagnosis and a treatment plan were then completed. Severe tooth collapse due to caries was observed around the inserted post core in the mandibular right second molar. The mobility was therefore resulted from the prosthetic loosening. It was explained to the patient that tooth extraction would be advisable, and that prosthetic treatment was possible by means of a removable partial denture or dental implant. The radiographic examination suggested that the available bone volume was too small to insert implant in the area of right second molar because of the location of mandibular foramen.

The fixed partial denture was cut in the distal area of the mandibular right second premolar and partially removed, after which the mandibular right second molar was extracted and an interim denture was fabricated. Eight months after the extraction (Fig. 1), an IMZ system implant body (4 mm in diameter and 13 mm long) was inserted in the area corresponding to the distal portion of the mandibular right first molar. The superstructure was designed as a fixed partial denture in which an attachment (The Beyeler Slide Attachment, Inoue Attachment Co. Ltd, Tokyo, Japan) was used between the first molar pontic and the second premolar restoration (Figs. 2a and 2b). A high gold containing alloy (Degudent Universal, Dentsply Sankin Co. Ltd, Tokyo, Japan) was cast directly onto the prefabricated attachment to form the male and female components of the superstructure, then the metal framework was partially veneered with a feldspathic porcelain (VMK 68, Vita Zahnfabrik GmbH, Bad Säckingen, Germany).

Following placement of the superstructure, observation was conducted on the second week, the first month, the third month, and at intervals of 6 months thereafter. Since the semiprecision attachment used in this report did not have minute screws (thus differing from screw type fixation), handling was comparatively easy.

Dental plaque was attached to IME and transmucosal implant extension (TIE) when they were replaced at 6 months intervals (Fig. 3). Eleven years after the placement of the superstructure, no significant changes were found in the implant or the abutment tooth, except for slight gingival recession around the implant (Figs. 4a-4d). According to the success criteria reported by Esposito et al.,⁷ it is considered that this implant-tooth supported prosthesis had functioned well.

Discussion

Amongst the variety of options available for replacement of missing teeth, this article presented a modification of a traditional technique for implant-tooth supported prostheses. In situation that osseointegrated implants are connected to natural teeth, there is concern with respect to potential fracture of implant components or the natural teeth, bone resorption, secondary caries, and lost screws.⁷⁻⁹ Furthermore, the natural teeth occasionally subside, causing positional discrepancy in slide type attachments, which may be due to the differences between the amount of displacement of the implants and that of natural teeth during loading.² Although dental plaque attached to the IME (Fig. 3) suggests that the IME was loose, such accidents did not occur in this case. The authors speculate that this was because the load applied to the retainer during occlusion was appropriate, the displacement amount of the IME was similar to that of the natural teeth, the IME and TIE were replaced at comparatively short intervals of 6 months, and the friction force in the attachment area was sufficiently high.

The IMZ implant system has the potential to survive for over 16 years in the oral environment.⁵ However, when part of the plasma-sprayed area of the implant body is exposed in the oral cavity accompanied by gingival recession, plaque control becomes difficult. Regular oral hygiene instruction, observation of occlusal changes and adjustment, and attention to gingival recession are therefore essential to longer-term success.

The present report suggests that a favorable prognosis may be expected when a three unit fixed partial denture is planned. Taking the undesirable effects of a cantilever into account, vertical displacement at the attachment may be increased when a load is applied to a multi-unit pontic.

In the limited experience presented here, the intracoronal semiprecision attachment made maintenance easier, and proved adequate in the role of connecting the implant with the natural tooth for 11 years.

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