

# Removable Partial Denture Design Involving Teeth and Implants as an Alternative to Unsuccessful Fixed Implant Therapy: A Case Report

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It has been more than 30 years since osseointegrated implants were first used clinically. During that time, various dental implants have been utilized, and high success rates have been reported.<sup>1-3</sup> However, as their uses have increased, implant failures have been reported.<sup>4-6</sup> For example, there are partially edentulous patients with an initial treatment plan of an implant-supported fixed partial denture (FPD) where one or more strategic implants fail to osseointegrate.

In some of these cases, the patient is not willing to undergo another dental implant procedure and an implant-supported FPD is not a valid treatment option. In situations where financial, systemic, or local conditions preclude the use of a FPD, a well constructed removable partial denture (RPD) can be an excellent treatment alternative.<sup>7,8</sup> It has been reported previously that prosthesis support can be improved with the use of osseointegrated dental implants<sup>9-13</sup>, with improved preservation and maintenance of existing hard and soft tissues around dental implants.<sup>14-16</sup>

## CASE REPORTS

A 75-year-old male patient presented for treatment complaining of both maxillary and mandibular unsta-

*Various dental implants have been used, and high success rates have been reported. However, as their uses increase, implant failures have been reported. There are partially edentulous patients with an initial treatment plan of an implant-supported fixed partial denture. At times, one or more strategic implants fail to osseointegrate. In situations where financial, systemic, or local conditions preclude the use of a fixed partial denture, a well constructed removable partial denture can be an excellent treatment alternative. It has been reported that prosthesis support can be improved with the use of osseointegrated dental implants, with improved preser-*

*vation and maintenance of existing hard and soft tissues around dental implants. This article describes the prosthodontic rehabilitation of a partially edentulous patient by the use of a removable partial denture design involving teeth and implants as an alternative to unsuccessful fixed implant therapy. This treatment option solved a difficult clinical problem derived from the failure of two strategic implants and provided the patient with an esthetic and functional prosthesis. (Implant Dent 2004;13:218-222)*

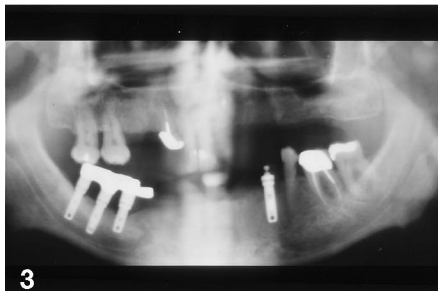
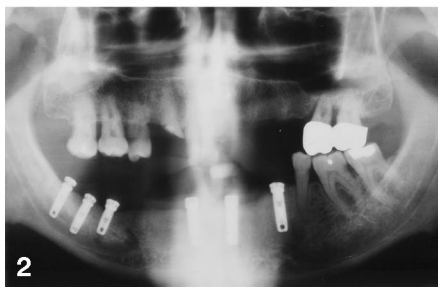
**Key Words:** removable partial denture, dental implants, combination, partially dentate patient

ble RPDs. Numerous teeth had been lost because of advanced adult-type periodontitis. Hopeless teeth (maxillary left first and second molars with left mandibular cuspid and first premolar) were extracted while the patient underwent conservative, nonsurgical periodontal therapy.

The rehabilitation treatment plan included a maxillary RPD and a mandibular implant-supported FPD extending from the right second molar to the left first bicuspid. Six screw-type Steri-Oss implants (Nobel Biocare, Yorba Linda, CA) were placed in areas of missing teeth: right second and first molars, second bicuspid, left first incisor, canine, and first bicuspid. Two implants, at the left first incisor and canine, failed after becoming mo-

bile and were removed at the stage II uncovering surgical procedure. X-rays of the right second premolar area implant showed marginal bone resorption with exposure of the first thread. The patient declined any additional dental implant therapy. The remaining implants, with the present distribution, could serve as abutments to support a long-span restoration with a questionable long-term prognosis. The rehabilitation treatment plan in the mandible was changed to an implant tooth-supported RPD. The implants placed on the mandibular right side were splinted with a milled Unoral 34 gold alloy bar (Unor, Zurich, Switzerland) mesially welded to a Tima ball attachment (Unor). The implant at the left first premolar location was connected

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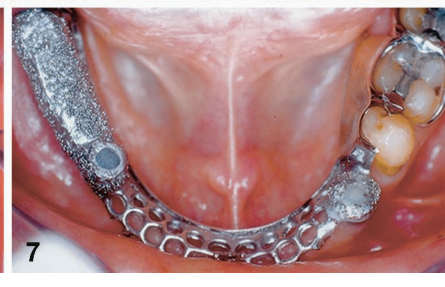
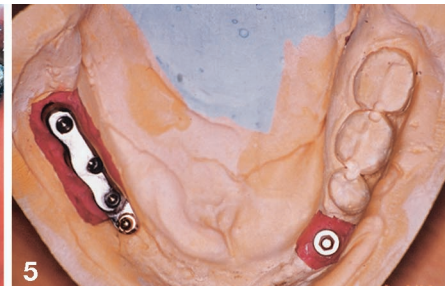
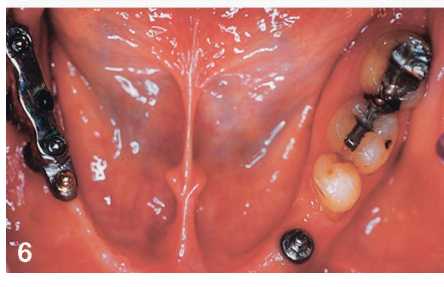
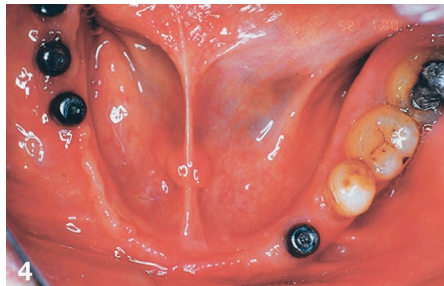
**Fig. 1.** Preoperative status radiograph showing a few hopeless teeth: left mandibular cuspid and first premolar were extracted, whereas left second premolar and first and second molars were sound and stable periodontally.

**Fig. 2.** Panoramic radiograph view after placement of six implants. The rehabilitation treatment plan included a mandibular implant-supported FPD.

**Fig. 3.** Thirty-six-month postoperative follow-up panoramic radiograph showing a stable and satisfactory situation around implants and teeth.

to a Steri-Oss ball attachment as well. These elements served as the infrastructure for a cast RPD, achieving additional retention and stabilization from the periodontally sound mandibular left first and second molars and the second premolar. An embrasure-type clasp design with proper occlusal rest preparations were used in these teeth. The final restoration resulted in a stable and retentive modified Kennedy class III teeth and implants-borne RPD. The patient was placed on a 6-month review and maintenance schedule (Figs. 1-3).

Thirty-six months later, the prosthesis was entirely satisfactory to the



**Fig. 4.** Clinical occlusal view. Two implants, at the left first incisor and canine, failed after becoming mobile and were removed at stage II uncovering surgical procedure.

**Fig. 5.** Laboratory working model: the implants placed on the mandibular right side were splinted with a milled Unoral 34 gold alloy bar mesially welded to a Tima ball attachment. The implant at the left first premolar location was connected to a Steri-Oss ball attachment as well.

**Fig. 6.** Occlusal clinical view.

**Fig. 7.** Metal framework of the RPD with rests and embrasure-type clasp on molars.

patient, and the remaining teeth and implants were in sound condition (Figs. 4-7).

## DISCUSSION

For the partially dentate patient described, although an implant-retained fixed prosthesis was planned initially, the failure of two strategic implants prevented this treatment. The patient declined any additional dental implant therapy. The remaining implants, with their existing distribution, could serve as abutments to support a long-span restoration with a questionable long-term prognosis. The final rehabilitation of this patient resulted in a RPD design involving teeth and implants that provided improved retention and stability, with satisfactory prosthodontic and esthetic results of the prosthesis. Removable implant-supported overlay prostheses have numerous potential advantages, including increased retention and stability and increased patient satisfaction compared with that associated with conventional removable prostheses.

Preservation and maintenance of existing hard and soft tissues around implants are improved because of load-related bone formation.<sup>14-16</sup> These advantages can help to accommodate

esthetic and phonetic variables. It is suggested that an RPD design, involving teeth in conjunction with implants, be considered a prosthodontic treatment option for the rehabilitation of some partially dentate patients.

## SUMMARY

For the partially dentate patient, an RPD design involving teeth in conjunction with implants was used successfully to overcome many of the difficulties associated with a large edentulous span and provided the patient with an esthetic and functional prosthesis.

## Disclosure

The authors claim to have no financial interest in any company or any of the products mentioned in this article.

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## Abstract Translations [German, Spanish, Portugese, Japanese]

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**Mit Implantaten wie auch Eigenzähnen bestückte herausnehmbare Teilprothese als Alternative bei Versagen einer festen Implantatbehandlung: eine Fallstudie**

**ZUSAMMENFASSUNG:** Viele verschiedene Zahnimplantattypen sind inzwischen bezüglich ihrer Einsetzbarkeit erprobt und vielfach hohe Erfolgsquoten wurden veröffentlicht. Mit verbreiteter Implantatverwendung mehren sich allerdings auch die Meldungen über das Fehlschlagen von Implantationsbehandlungen. So gibt es Beispiele von Patienten mit fehlenden Zähnen im Zahnapparat, deren ursprünglicher Behandlungsplan eine Implantatgestützte feste Teilprothese vorsieht, bei denen sich aber eines oder mehrere der strategischen Implantate nicht mit dem Knochenunterbau verbindet. Bestehen finanzielle, systemische oder lokal bedingte Hindernisse für den Einsatz einer festen Teilprothese, kann eine gut gearbeitete herausnehmbare Teilprothese eine hervorragende Behandlungsalternative darstellen. Es gibt Nachweise dafür, dass die prothetische Haltbarkeit durch den Einsatz von in das Knochengewebe integrierenden Zahnimplantaten verbessert werden kann. Zusätzlich weisen die harten sowie weichen Teile des die Zahnimplantate umlagernden Gewebes eine verbesserte Stabilität und höhere Lebensdauer auf. Der vorliegende Artikel beschreibt die Wiederherstellung des teilweise zahnlosen Gebisses eines Patienten durch eine herausnehmbare Teilprothese unter Nutzung sowohl eigener Zähne als auch nachträglich eingesetzter Implantate. Diese Behandlungsmethode stellte eine sinnvolle Alternative zu dem vorher unternommenen gescheiterten Behandlungsansatz mit fester Implantation dar und löste das durch das Versagen zweier strategischer Implantate hervorgerufene schwerwiegende klinische Problem, so dass dem Patienten eine allen ästhetischen und funktionellen Gesichtspunkten gerecht werdende prothetische Lösung bereit gestellt werden konnte.

**SCHLÜSSELWÖRTER:** herausnehmbare Teilprothese, Zahnimplantate, Kombinationstherapie, Patient mit unvollständigem Gebiss

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***El diseño de una dentadura parcial removible que incluye los dientes e implantes como alternativa para la terapia de implante fijo no exitosa: Informe de un caso***

**ABSTRACTO:** Se han usado varios implantes dentales y se han informado altas tasas de éxito. Sin embargo, a medida que aumenta su uso, se han informado fallas de los implantes. Hay pacientes parcialmente edentulosos con un plan inicial de tratamiento de una dentadura parcial fija apoyada en implantes (FPD por sus siglas en inglés). En ciertos momentos, uno o más implantes estratégicos fallan en su integración ósea. En situaciones donde las condiciones financieras, locales o sistémicas previenen el uso de una FDP, una dentadura parcial removible bien construida (RDP por sus siglas en inglés) puede ser una excelente alternativa de tratamiento. Se ha informado que se puede mejorar el soporte de la prótesis con el uso de implantes dentales oseointegrados con una preservación mejorada y mantenimiento de los tejidos existentes duros y blandos que rodean a los implantes dentales. Este artículo describe la rehabilitación protodóntica de un paciente parcialmente edentuloso a través del uso de un diseño del RPD que incluye dientes e implantes como alternativa a una terapia con implante fijo no exitosa. Esta opción de tratamiento resolvió un problema clínico difícil derivado de la falla de dos implantes estratégicos y ofreció al paciente una prótesis funcional y estética.

**PALABRAS CLAVES:** dentadura parcial removible, implantes dentales, combinación, paciente parcialmente dentado.

***Projeto de dentadura parcial removível envolvendo dentes e implantes como alternativa para terapia malsucedida de implante fixo: Relato de Caso***

**RESUMO:** Vários implantes dentários foram utilizados e altas taxas de sucesso foram relatadas. Contudo, à medida que seu uso aumenta, os fracassos nos implantes têm sido relatados. Há pacientes parcialmente desdentados com um plano inicial de tratamento de uma dentadura parcial fixa suportada por implante (FPD). Às vezes, um ou mais implantes estratégicos deixam de se osseointegrar. Em situações em que as condições financeiras, sistêmicas ou locais impedem o uso de um FPD, uma dentadura parcial removível (RPD) bem construída pode ser uma excelente alternativa de tratamento. Foi relatado que o suporte da prótese pode ser melhorado com o uso de implantes dentários osseointegrados com preservação e manutenção melhoradas de tecidos duros e moles existentes em volta dos implantes dentários. Este artigo descreve a reabilitação protética de paciente parcialmente desdentado pelo uso de projeto de RPD envolvendo dentes e implantes como alternativa para uma terapia malsucedida de implante fixo. Esta opção de tratamento resolveu um problema clínico difícil derivado do fracasso de dois implantes estratégicos e forneceu ao paciente uma prótese estética e funcional.

**PALAVRAS-CHAVE:** dentadura parcial removível, implantes dentários, combinação, parcialmente dentado

## 失敗した固定インプラント・セラピーにかわる方法としての歯とインプラントを含むFPD 可脱部分義歯デザイン

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**要約：**これまで各種のデンタル・インプラントが使用され、高い成功率が報告されてきた。しかしそれらの使用件数が増えるにつれて、失敗例の報告も聞かれるようになった。ここに、部分無歯患者のインプラント支持固定部分義歯（FPD）を初期処置計画とする症例がいくつかある。しかし、このstrategicなインプラントのうちのいくつかは、時にosseointegrateしないことがある。

患者の経済能力にかかわるあるいは全身または体の一部の特殊な条件のためにFPDの使用ができない場合に、よく構成された可脱部分義歯（RPD）が、それに代わって優れた治療法となりうる。Osseointegrateしたデンタル・インプラントの使用によって、インプラント周辺部の既存の硬・軟組織の保存と管理が向上し補綴支持が改善することはすでに報告されてきている。

本論文は、成功率の低い固定インプラント・セラピーに代わる方法として歯とインプラントを含むRPDデザインを使った部分無歯患者の補綴リハビリについて解説する。この治療法は2本のstrategicインプラントの失敗により発生した臨床上の困難な問題を解決し、患者に審美的で機能的な補綴を提供することに成功した。

**キーワード：**可脱部分義歯、デンタル・インプラント、コンビネーション、部分無歯患者

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