Combination Syndrome: Treatment With Dental Implants

Mario Cabianca, DMD*

Successful outcomes depend on thorough evaluation and proper diagnosis of a patient’s oral condition. Once the starting point has been determined and the final outcome is designed, the treatment plan merely becomes the method of reaching the desired result.

Combination syndrome was first described by Kelly1 as destructive changes in hard and soft tissues of patients with complete maxillary denture opposing an unstable bilateral free-end mandibular partial denture.2,3 The long-term result is extrusion of the remaining mandibular anterior teeth and the alveolar process surrounding them with loss of posterior mandibular bone. The plane of occlusion becomes reversed. Papillary hyperplasia of the hard palate develops. The premaxilla becomes atrophic as a result of the force exerted on this soft bone during occlusion. The maxillary tuberosity develops hypertrophy, creating a limited interarch space.

If not corrected, the unstable occlusion can result in progressive posterior mandibular atrophy leading to greenstick fractures. The method of reestablishing a proper occlusal relationship is discussed in this article using a conventional maxillary denture and fixed mandibular implant restoration to correct the occlusal issues.

**CASE REPORTS**

A healthy 60-year-old male patient presented with a complete maxillary conventional denture (Fig. 1) and 5 carious anterior mandibular teeth (Fig. 2). The mandible showed extrusion of both the alveolar process and remaining dentition. A limited interarch space was evident (Figs. 3, 4, and 5).

The patient desired restoration of his teeth within his budgetary limits, with a preference for a nonremovable prosthesis, if possible.

The treatment plan that was developed included a new upper denture opposing a fixed mandibular (FP-2; CE Misch Prosthodontic Classification) prosthesis (see Table 1). This FP-2 prosthesis restores the anatomic crown and a portion of the root of the natural tooth, the result is a longer-looking tooth.4

**Surgical Procedure**

The patient was required to have no food or fluids from midnight before surgery (NPO). The patient was given 0.5 mg sublingual triazolam 1 hour before surgery for sedative purposes. In addition, amoxicillin (antibiotic to prevent infections), dexamethasone (corticosteroid used to minimize postoperative swelling) and ibuprofen (nonsteroidal antiinflammatory drug used to assist in preventing swelling as well as analgesia) were also administered 1 hour before surgery. The patient’s mouth and face were scrubbed with chlorhexidine (0.12%). Bilateral inferior alveolar nerve blocks were given with 2% articaine (1:100,000 epinephrine) and local infiltration with 2% lidocaine (1:50,000 epinephrine) to assist with hemostasis. A midcrestal incision was made from the second molar area to the distal canine bilaterally. A full-thickness buccal flap was reflected and tied back to the vestibule using 2-0 silk suture material. The surgical tube template was inserted to mark the locations on the alveolar crest. This template was replaced with the alternate template to prepare the osteotomy within the buccal confines of the template. The no. 36 (19) and no. 46 (36) sites were prepared for a 4.0 mm × 11-mm (Biohorizons, Birmingham, AL) endosteal root form implant and inserted. Site no. 34 (21)
received a 4.0 mm × 13-mm (Restore, Lifecore Biomedical, Chaska, MN) implant and the no. 45 (29) received a 4.0 mm × 10-mm (Restore, Lifecore Biomedical) implant. Biohorizons implants were used in the posterior area because of their increased surface area.

The flap was then extended across the anterior segment connecting the bilateral incisions. The remaining teeth were extracted, and an alveo-plasty was performed on the anterior undercuts of the buccal aspect of the ridge to level the extruded segment. A 5.0 mm × 11.5-mm implant (Restore, Lifecore Biomedical) was inserted into the no. 33 (22) osteotomy, a 5.0 mm × 13.0-mm (Restore, Lifecore Biomedical) went into the no. 43 (27) position, and finally a 4.0 mm × 13.0-mm implant (Restore, Lifecore Biomedical) filled the no. 32 (23) position. In summary, 7 implants were used to support the planned prosthesis.

Flap margins were trimmed with scissors to allow primary closure with no redundant tissue. Flaps were reapproximated using 3-0 Vicryl (Johnson & Johnson, Somerville, NJ) in an interrupted and continuous manner.

The immediate complete lower denture was relined using Visco-gel tissue conditioner (Dentsply, Weybridge, UK). A piece of rubber dam was placed over the incision line before relining to prevent contamination of the wound. Ice packs were given to the patient and postoperative instructions were provided in writing to the spouse.

Sutures were removed 2 weeks postsurgically, and the immediate lower denture was once again relined using hard chairside acrylic (Kooliner; GC America, Alsip, IL).

**Prosthetic Procedure**

Four months postsurgically, second-stage surgery occurred. The patient was instructed not to wear the upper denture for 24 hours before this appointment to permit tissue relaxation. A final impression of the maxilla using a custom tray and polyvinylsiloxane was made. The patient was anesthetized with bilateral blocks, and the mandibular implants were uncovered using a tissue biopsy punch.

**Table 1. Prosthodontic Classification**

<table>
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<tr>
<th>Type</th>
<th>Definition</th>
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<tr>
<td>FP-1</td>
<td>Fixed prosthesis, replaces only the crown, looks like a natural tooth</td>
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<tr>
<td>FP-2</td>
<td>Fixed prosthesis: replaces the crown and a portion of the root; crown contour appears normal in the occlusal half but is elongated or hypercontoured in the gingival half</td>
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<tr>
<td>FP-3</td>
<td>Fixed prosthesis: replaces missing crowns and gingival color and portion of the edentulous site; prosthesis most often uses denture teeth and acrylic gingiva, but can be porcelain to metal</td>
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<tr>
<td>RP-4</td>
<td>Removable prosthesis, overdenture supported completely by implant</td>
</tr>
<tr>
<td>RP-5</td>
<td>Removable prosthesis: overdenture supported by both soft tissue and implant</td>
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![Fig. 1. Before smile line.](image1)

![Fig. 2. Extruded anterior alveolar bone resulting from unstable occlusion.](image2)

![Fig. 3. Mounted study casts showing limited interarch space (right) and reversed occlusal plane.](image3)

![Fig. 4. Extruded alveolar anterior bone with 100% overbite.](image4)

![Fig. 5. Mounted study casts showing limited interarch space (left).](image5)
Permucosal extensions were inserted. The complete lower denture was relined again. Chlorhexidine (0.12%) was prescribed for use twice a day for 2 weeks.

Four weeks later, the patient received a final impression of the implants using direct impression transfers, a custom tray, and polyvinylsiloxane. The midline, incisal edge position, occlusal plane, buccal lip support, and anterior segment were indicated on the processed acrylic maxillary base and wax rim. The mandibular abutments were placed on the molar and premolar implants to establish the vertical dimension and centric relation. Permucosal extensions were replaced, and abutments were sent to the lab for final preparation to achieve parallelism. The occlusal plane (Curve of Spee and Curve of Wilson) was developed on the mandibular bridges using a Misch Occlusal Analyzer (Root Laboratory, Leewood, KS) This plate is set against the occlusal surfaces of the mandibular teeth and is based on a 4-inch Sphere (Fig. 7).

Final try-in of the maxillary denture with teeth set in wax was made against the completed mandibular fixed porcelain-fused-to-metal bridges. Denture teeth were set in a medial-positioned lingualized occlusion. Misch proposed this occlusal design, which is a modification of the occlusal scheme first developed by Payne and Pound. Only the lingual cusps of the maxillary posterior teeth are in contact with the central fossa during centric occlusion. The mandibular molar cusps are positioned medial to a line drawn from the mesial of the canine to the lingual aspect of the retromolar pad. The mandibular prosthesis was created in 2 sections with a break between the left canine and first premolar. These bridges were designed to accommodate mandibular flexure and limit torsion on the implants.

After esthetics, occlusion, phonetics, and comfort were evaluated the denture was processed in heat-cured acrylic and delivered with the finished fixed mandibular bridges. Verification of abutments being seated required periapical films. The implant abutments were then torqued to 30 Ncm. Cotton was placed over the abutment screws and sealed with Fermit-N (Vivident, Schaan, Liechtenstein).

The internal bridge abutments were lightly coated with petroleum jelly and then the bridges were cemented using NeoTemp (Teledyne Water Pik, Fort Collins, CO). This was done because a cemented prosthesis permits a more passive fit as opposed to a screw-fixed prosthesis. Final panoramic (Fig. 8) and periapical films (Figs. 9, 10, and 11) were taken to verify cement removal and baseline crestal bone levels.

The occlusion, oral hygiene, and soft tissue were reevaluated 2 weeks after delivery (Figs. 12 and 13).

**DISCUSSION**

Combination Syndrome is an occlusal problem that slowly develops over time. Once detected, treatment options are evaluated. These options must resolve the problems of function, esthetics, and patient desires, as well as economics. To fulfill these requirements, 2 types of prostheses are available: conventional dentures or an implant-retained prosthesis. The use of a conventional denture in restoring the mandibular dentition provides the least patient satisfaction as compared with a fixed prosthesis. For this reason, the patient elected to have the mandibular rehabilitation with an implant-retained prosthesis. The maxillary dentition was restored with a conventional denture because the patient had been wearing, had tolerated, and had accepted a complete denture. Also, both esthetics and economics were easily managed with this prosthesis.

After treatment is completed, it is essential to maintain recare appointments at 3, 6, and 12 months during the first year to observe any changes in posterior support. If acrylic tooth wear and support are lost in the posterior regions, accelerated premaxilla atrophy will develop from excessive forces. Bilateral balanced occlusion is essential for long-term success.

This case study deals with treatment of Combination Syndrome. Understanding the cause can assist the practitioner in preventing further residual ridge deterioration.

**CONCLUSION**

Posterior tooth loss might not be a concern for the patient in the short-term. However, the long-term implications often result in unstable occlusion. Implants provide a predictable
method of tooth replacement offering excellent functional and esthetic benefits. Like with any complicated treatment, thorough diagnosis, planning, and implementation of treatment will result in an outstanding outcome for both the patient and dentist.

Disclosure
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Fig. 8. Completed case panoramic film shows separation of 2 bridges on the left side.
Fig. 9. Right periapical film shows baseline crestal bone level and positive abutment seating.
Fig. 10. Anterior periapical film.
Fig. 11. Left-sided periapical film.

Fig. 12. Final prosthesis in situ. Vertical dimension of occlusion is reestablished.
Fig. 13. Rejuvenated smile.

REFERENCES
2. Kelly E. Changes caused by a mandibular removable partial denture opposing a maxillary complete denture. 

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**Das Kombinationssyndrom und seine Behandlung mit Zahnimplantaten**

**ZUSAMMENFASSUNG:** Kauflächenseitige Probleme werden häufig nicht eingehend genug untersucht. Sie werden nur unzureichend behandelt oder bleiben gar von einer Behandlung ausgeschlossen. Der vorliegende Artikel beschäftigt sich daher mit einem konkreten Fall dieser Behandlungsproblematik, dem so genannten Kombinationssyndrom. Bei der beschriebenen Behandlungs methode wird mit einer festen Unterkieferprothese gearbeitet, die über unmittelbar nach der Zahnextraktion eingepflanzte Implantate befestigt wird.

**SCHLÜSSELWÖRTER:** Okklusion, implantatgestützte Prothetik, Diagnose, Wiederherstellung

**Síndrome de combinación: Tratamiento con implantes dentales**

**ABSTRACTO:** Los problemas del plano oclusal a menudo no son evaluados correctamente. Pueden quedar sin tratamiento o tratados de manera inadecuada. Este artículo analiza uno de dichos problemas, conocido como el síndrome de combinación. El método de tratamiento descrito incluye usando una prótesis mandibular fija sobre implantes que han sido colocados inmediatamente después de las extracciones dentales.

**PALABRAS CLAVES:** oclusión, prostética del implante, diagnóstico, reconstrucción

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Síndroma de Combinação: Tratamento com implantes dentais.

SUMÁRIO: Muitas vezes os problemas de plano oclusal não são avaliados adequadamente. Podem ser deixados sem tratamento ou ser inadequadamente tratados. Este artigo examina esse problema conhecido como Síndroma de Combinação. O método de tratamento descrito envolve o uso de próteses mandibular fixas sobre os implantes que têm sido colocados imediatamente depois das extrações dentais.

PALAVRAS CHAVES: oclusão, prótese de implante, diagnose, reconstrução.

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要約: Occlusal planeにおける問題は十分な診断を受けられることで、未治療のまま放置されあるいは不適切な処置を受ける場合もある。本論文は合併症問題として知られる問題について論じ、抜歯直後に設置されたインプラント上部に固定下顎補継を使用する治療法を説明される。

キーワード: 咬合、インプラント補継、診断

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