The Reproduction of Implants and Prepared Teeth in One Final Master Cast: A Case Report

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This case report describes a method to produce one final master cast for the simultaneous prosthetic treatment of implants and natural teeth in a single arch. After tooth preparation, a first impression was used to fabricate electroformed crown frameworks. In the next appointment, the crown frameworks were seated and collected with the implant transfer copings in a single-phase fixation impression, which was used to fabricate a final master cast. This procedure divides the treatment process into distinct steps, leading to a faster and less challenging workflow. *Int J Prosthodont 2013;26:51–53. doi: 10.11607/ijp.2926*

When working with fixed or removable dentures involving implants and prepared teeth in a single arch, clinicians often find it difficult to transfer both structures simultaneously to a final master cast. The most common approach includes tooth preparation, placement of the implant transfer copings, and taking of a one-step, two-phase impression for a master cast, which can then be used to fabricate tooth- and implant-supported restorations. However, this method does not consider the different requirements for the reproduction of prepared teeth and implants. For natural teeth, flawless reproduction of the finishing lines and of the entire preparation is essential,[1] whereas small errors regarding the distance between teeth can be clinically compensated for via tooth mobility. In contrast, implants are completely immobile and thus require precise reproduction of the three-dimensional position.[2] Different approaches have been described to solve this problem:

1. The treatment is divided into different phases in which the tooth- and implant-supported restorations are fabricated separately.[3]
2. Two impression techniques are combined into a single impression. First, small custom impression trays covering only the area of the prepared teeth are filled with impression material and put in place. Next, transfer copings are attached to the implants, and a fixation impression is used to collect the transfer copings and the trays.[3]
3. Frameworks for the implants and teeth are fabricated independently after separate impressions. The frameworks are then placed in the mouth, and a fixation impression is made.[3]

This case report describes an alternative procedure that combines the advantages of the second and third approaches while also accelerating the entire treatment process.

Case Report

A 44-year-old woman with a partially edentulous maxilla requested implant restoration of her missing teeth. She also needed several new crowns. After surgery and a healing period of 6 months, the implants (XiVE, Dentsply Friadent) were uncovered and provided with healing abutments.

Prosthetic treatment began with tooth preparation. To achieve precise reproduction of the infragingivally located finishing lines, a two-step putty wash technique using polyvinyl siloxane impression material (Panasil putty/initial contact, Kettenbach) was selected.[1] A preliminary arch recording (Bite Wax, American Dental Systems) was performed. Vacuum-mixed type IV dental stone (Fujirock EP, GC) was used to pour the impression. Electroformed crown frameworks (AGC, Wieland) were fabricated on the resulting cast together with an open custom tray (PalaXpress, Heraeus Kulzer).

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Fig 1 Transfer copings on the implants and crown frameworks on the prepared teeth before the single-phase impression.

Fig 2 Single-phase impression with transfer copings and crown frameworks.

Fig 3 Final master cast.

Fig 4 Definitive restoration.

In the subsequent appointment, the crown frameworks were seated and fixed with temporary cement (TempBond, Kerr) to avoid distortion. Transfer copings were placed on the implants (Fig 1), and a single-phase fixation impression was taken (Impregum Penta, 3M ESPE) (Fig 2) followed by a new arch recording (Futar D, Kettenbach).

A final master cast (Fujirock EP) (Fig 3) was prepared to fabricate the entire restoration. The crown frameworks were veneered (VMK-Master, Vident), and the implant abutments (AuroBase, Dentsply Friadent and MainBond Sun, Heraues Kulzer) were fabricated. After try-in and veneering of the implant abutments, all crowns were stained, glazed (VMK-Master), and prepared for placement (Fig 4).

Discussion

In clinical situations with only supragingival finishing lines, the single impression technique is certainly viable; however, this technique is less successful in cases with infragingivally prepared teeth.[1]

Although the three approaches discussed earlier highlight the complexity of combined tooth-implant treatment, the authors could find no evidence-based information on this topic. All three techniques have disadvantages. The first approach requires all necessary adjustments in both sets of restorations to be performed in the mouth because no final master cast for the entire restoration is available. This also complicates color matching. In the second approach, the small custom trays may interfere with the implant impression copings when in close proximity.[3] These trays are also prone to displacement during manipulation with the implant copings. Additionally, the procedure is quite strenuous for patients. The third approach requires another patient visit and—depending on the intended restoration—an additional welding procedure.

The alternative approach described in this case report aims to combine the advantages of the second and third strategies while avoiding their disadvantages. With this technique, the strain on patients and clinicians is reduced because the impression of the prepared teeth is made independently from the implants. In addition, this approach allows for the application of a two-step impression technique, which offers advantages especially for teeth with infragingivally located finishing lines.[1] The intraoral geometry and three-dimensional implant positions can be best reproduced with a pickup impression.[4,5] Finally, only two impressions are necessary to obtain the final master cast, thus speeding up the treatment.

Conclusions

This case report described a method to fabricate one final master cast for the simultaneous prosthetic treatment of implants and teeth in a single arch. In such cases, dividing the procedure into separate steps makes it possible to meet the different requirements for implants and natural teeth. In turn, this makes the treatment process much easier for the patient and clinician and allows for additional quality control.

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Literature Abstract

Early stage squamous cell cancer of the oral tongue—Clinical features affecting outcome

This study reported the authors' experience in the management of patients with early stage squamous cell cancer (SCC) of the oral tongue treated at the Memorial Sloan-Kettering Cancer Center (MSKCC) and investigated the clinicopathologic factors predictive of outcome. A total of 216 patients with early stage SCC (clinical T1N0-T2N0), who underwent surgery and received postoperative radiation therapy, were identified. Overall survival (OS), disease-specific survival (DSS), recurrence-free survival (RFS), local RFS (LRFS), neck RFS (NRFS), and distant RFS (DFRS) were determined using Kaplan-Meier method. Clinical and pathologic factors were subjected to univariate and multivariate analyses to determine the factors that were predictive of survival. At a median follow-up of 80 months (range, 1 to 186 months), the 5-year DSS, OS, and RFS rates were 86%, 79%, and 70%, respectively. Patients with occult neck metastases were found to have a five-fold increased risk of dying compared to patients without occult metastases. Main predictors for LRFS and NRFS were a positive surgical margin and the depth of invasion, respectively. The authors conclude that in their experience, patients with early stage oral tongue cancer have a good prognosis, and the main predictor of survival outcome was the presence of occult metastases.

Ganly I, Patel S, Shah J. *Cancer* 2012;118:101–111. **References:** 41. **Reprints:** Ian Ganly, Head and Neck Service, Memorial Sloan-Kettering Cancer Center, 1275 York Avenue, New York, NY 10021. Email: ganly@mskcc.org—*Teo Juin Wei, Singapore*