

# Soft Tissue Management on Pontic and Implant Sites Before Implants Insertion

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February 27, 2021

## Abstract

This report demonstrates a method for shaping the soft-tissue of pontic and future implant sites before implants placement. After non-restorable teeth were extracted, soft-tissue was contoured to achieve ovate-shape on pontic and implant areas. These initial contouring procedures allowed the shape of the soft-tissue to be evaluated before implant placement.

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## Acknowledgments

Authors would like to thank UAB Graduate Prosthodontics for their support and James Brandley for his laboratory support.

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### Key Clinical Message

This report demonstrates a method for shaping the soft-tissue of pontic and future implant sites before implants placement. After non-restorable teeth were extracted, soft-tissue was contoured to achieve ovate-shape on pontic and implant areas. These initial contouring procedures allowed the shape of the soft-tissue to be evaluated before implant placement.

**Keywords:** Implants, soft-tissue, contouring, esthetics, prosthesis, zirconia

### Introduction

The esthetic management and preservation of tissue stability in the area surrounding implant abutments have been important topics for investigation and discussion.<sup>1,2</sup> The esthetics of implants replacing the maxillary anterior teeth are particularly challenging as patients are very conscious of this area, and have high demands, especially for harmony between the implants and the soft tissue.<sup>3-5</sup> Soft tissue management to achieve this has conventionally been performed after implant placement using implant-supported provisional restorations.<sup>6</sup>

However, when this is achieved through surgical shaping and pressure from the implant supported provisional restorations, the soft tissues surrounding implant and other pontic areas do conform the desired shape, but inflammation is a common complication especially in restoring spanning multiple teeth.<sup>7,8</sup> This inflammation has several causes. The surgery and pressure themselves often lead to inflammation directly, and while this management is in progress the soft tissue and implants are not fully adapted to one another, leaving space where food particles can be retained and plaque develop, causing further inflammation.<sup>9</sup> This inflammation could reduce the stability of osseointegration, and lead to periimplantitis. This case study demonstrates a technique for managing the soft tissue before implant placement, which should avoid these problems. The aim of this report is to evaluate the clinical outcome of soft tissue management before implant placement.

### Clinical Report

A 45 years-old female patient presented to the clinic with the chief complaint “My front crowns are loose and they come off sometimes”. The patient reported that she had had crowns made of porcelain fused to metal placed on teeth from the maxillary right lateral incisor to the left incisor, fifteen years ago. (Fig. 1) These crowns had become loose and come off sometimes; she used to cement them back with an over-the-counter remedy from the pharmacy. The papilla between the teeth was also decreased leading to black triangles between them.

After a detailed clinical evaluation, the maxillary right lateral incisor, both central incisors and left lateral incisor were diagnosed with mobility grade II, and incisal wear was found on the on maxillary right and left canines. Radiographic evaluation showed the old crowns and metal posts on the maxillary left latera incisor, both central incisors and right lateral incisor. The patient had high esthetic demands, and showed interest in having fixed all-ceramic restorations from maxillary right canine to left canine. The patient was informed of the need to remove the old crowns in order to re-asses the clinical situation of the teeth, and agreed to the procedure.

The existing restorations of the maxillary incisors were removed, and secondary caries was found in all teeth, with a fractured core on maxillary left central incisor, and mobility grade II on all teeth. Therefore, these teeth were deemed hopeless. (Fig. 2) The patient was informed of the option of having 2 implants in order

to support a fixed prosthesis from maxillary left lateral to right lateral incisors, and single restorations on maxillary right and left canines. The patient approved the plan and the treatment was initiated.

A diagnostic wax-up was performed and a milled provisional restoration was fabricated for the span between maxillary canines. The maxillary canines were prepared, and the patient was sent for tooth extractions. The maxillary central and lateral incisors were extracted and particulate cortico-cancellous allograft bone (Cortical/Cancellous Chips, AlloSource Headquarters, Centennial, CO, USA) with collagen dressing (Puracol, Collagen Wound Dressing, Medline Industries Inc, Northfield, IL, USA) and resorbable sutures (Polysyn FA, Surgical Specialties Corporation, Wyomissing, PA, USA) was placed to achieve complete socket seal. (Fig. 3) The milled provisional restoration, made of polymethyl methacrylate, was cemented with an ovate pontic shape in the extraction sites, without interfering with the sutures. The initial provisional restorations applied a very light pressure, and included a space between the soft tissue and the provisional restoration to enable the patient to clean underneath the pontic and in the connector areas. (Fig. 4)

The patient returned two weeks later. The provisional was removed, and the pontic units were built-up using self-curing acrylic resin (Jet Tooth Shade, Lang Dental, Wheeling, IL, USA) in order to establish contact under slight pressure and maintain the developed ovate soft tissue contour, while the interproximal areas between the pontic units were opened with a disc (Acrylic Temporization System, Brasseler USA Dental, Savannah, GA, USA) in order to provide space for the papilla tissue. The patient returned again 2 weeks later and same procedure was performed.

Two months later, the patient was seen again for follow-up and the same procedure was performed. The thickness of the soft tissue was measured with a periodontal probe. (Williams Color-coded single end probe, Hu-Friedy Mfg. Co., LLC, Chicago, IL, USA) Carbide and diamond football burs (Medium Football bur, Brasseler USA Dental, Savannah, GA, USA) were used to improve the architecture of the pontic sites. (Fig. 5) The provisional restoration was built-up again using acrylic resin material (Acrylic Temporization System, Brasseler USA Dental, Savannah, GA, USA) in order to match the contour provided by the football burs. Two weeks later, the provisional restoration was removed to evaluate the final contour of the soft tissue. (Fig. 6)

The soft tissue achieved the desired shape and the implant therapy was planned using implant software (SimPlant, Dentsply Sirona Implants Inc, York, PA, USA). (Fig. 7) Two implants at the sites of maxillary right lateral incisor and maxillary left central incisor were planned to support a dental prosthesis from maxillary left lateral incisor to right lateral incisor. These sites were chosen based on the condition and thickness of the bone in the incisor region. Implant surgery was performed with palatally-oriented crestal incision and bilateral sulcular incisions on the canines to reflect a full muco-periosteal flap. The incision lines for the flap were planned to avoid damaging the soft tissue line created during the preparation. Two bone-level implants of size 4.1mm (BLT RC, Straumann Group, Basel, Switzerland) were inserted. (Fig. 8) A simple interrupted suture technique (Polysyn FA, Surgical Specialties Corporation, Wyomissing, PA, USA) was used for primary soft tissue closure. (Fig. 9) The implants were not loaded, and the existing fixed provisional restoration was cemented back on to the canines. During the two months of osseointegration, the provisional restoration maintained the soft tissue architecture that has been previously obtained.

After 4 months, the pontic sites of maxillary right lateral incisor and left central incisor were hollowed with acrylic carbide burs (Acrylic Temporization System, Brasseler, Savannah, GA, USA) in order to accept the temporary cylinders (Cylinder RC, Straumann Group, Basel Switzerland) engaged with the implants. The new screw-retained provisional restoration maintained the same tissue contour and three weeks later a final impression was made. (Fig. 10) The final restorations were screw-retained porcelain fused to zirconia to replace the incisors with zirconia abutments which were fixed to the titanium bases and single porcelain fused to zirconia crowns on the canines. Final restorations were tried-in for clinical and radiographic assessment, and patient satisfaction was achieved. Final implant restoration was placed and torqued according to the manufacturer instructions, while single crowns on maxillary right and left canines were cemented (RelyX Luting 2 Cement, 3M Espe, Saint Paul, MN, USA). Occlusion was checked and adjusted as necessary. Patient was satisfied with the final outcome. (Fig. 11) A night guard was provided in order to protect the dentition

and final restorations.

## Discussion

This technical report introduced a different approach for soft tissue contouring for implants in the esthetic zone. Traditionally, peri-implant tissue is contoured after the insertion of the implant placement. However, soft-tissue contouring prior to implant placement may provide a more predictable outcome in the final tissue architecture for pontic and implant areas before the endosteal implants are inserted. Patient and clinician can evaluate success and limitations prior to implant placement. It may also shorten the time required for tissue contouring with implant provisional restorations.

Optimal esthetics for implant therapy could be achieved by proper 3-dimensional planning, ideal implant depth in relation to adjacent teeth and peri-implant soft tissue molded by the provisional prosthesis.<sup>10,11</sup> Immediate implant placement with provisional restoration is a common procedure in which the goal is to establish an ideal emergence profile with maximum tissue volume, preserving mid-facial gingiva and enhancing patient comfort and acceptability.<sup>12,13</sup> This then serves as a guide for designing and fabricating the final restoration.<sup>14</sup> However, the present report has shown that all these goals could be achieved on pontic and implant sites before the implants are inserted.

After soft tissue is ideally as described in this report, it would be possible to perform flapless implant placement. This is suitable for patients with sufficient keratinized gingival tissue and bone volume in the implant recipient site. It has been reported that flapless implant placement approach minimizes post-operative peri-implant tissue loss, and therefore reduces the difficulties of the soft tissue management after the surgical intervention.<sup>15</sup> In addition, flapless implant approach may cause less traumatic surgery, decreases operative time, provides faster postsurgical healing and fewer complications after surgery, and provides more comfort to the patient.<sup>16,17</sup> However, implanting through the prepared soft tissue risks damaging the prepared areas, rendering the prior treatment meaningless. If a flap is used, a very simple secondary operation to create a hole for the implant is sufficient, reducing the potential damage to the shaped soft tissue. This has further advantages in allowing a clear view of the surgical site,<sup>18</sup> and the full penetration of irrigation water to the osteotomy, preventing thermal damage. Thus, we chose to use open flap surgery in this case, and the results were satisfactory. Nevertheless, it would be useful to investigate the combination of this contouring procedure with flapless implant placement to determine the best overall technique.

The design of the flap used in this case was based on two main considerations. Conventional open-flap dental implant therapy cuts the soft tissue on a line passing through the center of the implant location. However, in this case the incision was made around the edge of the gingival tissue, creating a single flap that lifted off the area. First, this avoided any damage to the shaped soft tissue that might result from an incision passing through that area. Second, by moving the sutured area away from the implant, it reduced the risk of infection in the newly-placed implant while the incisions were healing. This may have contributed to the successful outcome. However, the choice of incision location is influenced by many factors, and this approach may not be suitable in some cases.

Following this protocol, the clinician and patient can see the future final tissue contour in the pontic sites before implant placement. This will enable both sides to agree on an appropriate strategy to achieve the desired esthetics if there are shortcomings in the remaining soft tissue.

## Conclusions

Soft tissue contouring for implant restorations may be challenging, however contouring the tissue prior implant placement may provide a more predictable outcome in the final tissue architecture. This sequence allows patient and clinician can evaluate success and limitations prior to implant placement.

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## Figure Legends

Figure 1. Initial clinical situation

Figure 2. Radiographic evaluation and crowns removal.

Figure 3. Teeth extraction.

Figure 4. Initial provisional restoration contouring the tissue.

Figure 5. Soft tissue contouring with diamond and carbide burs.

Figure 6. Soft tissue contoured.

Figure 7. Implant planning.

Figure 8. Implant placement.

Figure 9. Suturing and provisional placement.

Figure 10. Final provisional restoration and contour.

Figure 11. Final ceramic restorations.



















