ANTERIOR EXTRACTION & Implant Placement in a Severely Deficient Site

Multidisciplinary Enhancement of Hard & Soft Tissue Profiles: Prosthetic Considerations, Part II

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The digital version of this article will feature a direct link to Part 1 of this article.

Abstract

A proper diagnosis is of paramount importance in creating a "road map" for the multiple treatment options we can offer our patients. The more advanced the problem is, decisions regarding treatment can be fairly simple or quite complicated. The incorporation of numerous techniques often requires the knowledge and ability of several specialists, including the general dentist.

Interdisciplinary communication and management from the onset of problems has enhanced treatment outcomes for the clinical dilemmas we routinely face in dentistry. On complex cases the decision taken can have favorable or adverse results with an impact that is evident from a health perspective in the supporting bone, surrounding soft tissues, prosthetic design, function, and esthetics. While the short-term objectives and results of such treatment must reflect an improved clinical situation, we strive for a positive and optimal long-term outcome with all patients.

Key Words: risk management, teamwork, long-term results, soft tissue contouring, computer-designed prosthetics.

Figure 1: Preoperative view showing advanced gum recession of 9 mm with loss of the labial bone. No attached gingivae, with the surrounding tissue extremely inflamed and exhibiting bleeding upon probing.

Recreating the history of any given problem can, in some instances, help establish some guidelines for future treatment.

Introduction

The positive evidence of orthodontic forced eruption altering bone and its surrounding soft tissues around hopeless teeth prior to their extraction was proven[1-7] and described in Part I of this article (*jCD*, Winter 2012, Vol. 27 Number 4).[8]

Recreating the history of any given problem can, in some instances, help establish some guidelines for future treatment. Periodontal problems can have a devastating impact upon individual or numerous teeth, the causes being multifactorial. From a mild reversible soft tissue problem to a moderate or advanced predicament involving bone loss, the solution(s) for the affected tooth or teeth will be dictated by the level of the disease. Furthermore, the type of periodontal defect can determine the predictability that the anticipated treatment may provide.

Clinical Case

As described in Part I of this article, a 57-year-old female presented with a non-contributory medical history except for oral bisphosphonate therapy over a five-year period. The bisphosphonate therapy was discontinued just prior to seeking a dental consultation. The patient's chief complaint at her first appointment was a significant concern about the existing right central incisor, particularly related to the considerable recession, exposed root, and associated cosmetic deformity **(Fig 1)**.

Oral examination recorded generalized (+) mobility levels across her entire dentition except for the maxillary right central incisor, which exhibited a Class II+ mobility. All posterior teeth presented with a balanced occlusion, a slight localized recession, and a history of mild bone loss but were otherwise periodontally stable. The upper right lateral and central incisor had undergone endodontic therapy several years earlier, with the upper central incisor requiring a subsequent apicoectomy.

In conjunction with the gingival recession and apicoectomy, the majority of the osseous labial plate of the right central incisor had resorbed. While the defect on the labial of #8 was significant, it was also localized. Important influencing considerations were the anatomy of the soft tissue defect, having a triangular shape, as well as the lack of any attached gingivae.

The more advanced the problem is, treatment may be equally complicated, and in some instances may fall short of the expected results, even when multiple procedures are implemented **(Figs 2 & 3)**. The diagnosis will be essential to identify all possible reasons that created such problems, hence the need to address them during the treatment-planning phase. Even with most current techniques and materials, the final result can find shortcomings as regeneration of the lost periodontal ligament creates a quandary on the surrounding hard and soft tissues.

Considering all available options to solve any given clinical problem, the most conservative one should always be initially considered, since all other options can be implemented at a later time. Therefore, the abutment was modified on its buccal emergence profile **(Figs 4a & 4b)**; by reducing its profile, the aim was to allow for the gingival tissue to reposition itself in a more incisal direction **(Figs 5a & 5b)**.

Relevant Diagnostic Influences Relevant diagnostic influences were as follows:

- high patient expectations
- high lip line
- gingival recession resulting in uneven gingival margins
- lack of attached gingivae, #8
- lack of labial plate of bone, #8
- lack of cosmetic smile parameters of balance, harmony, and continuity of form.
- lack of shade match, #7.

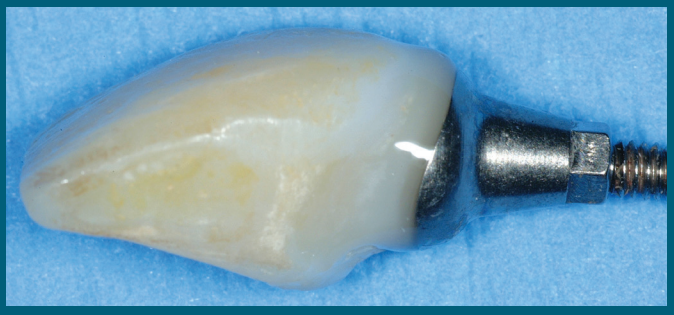
Upon clinical evaluation, the lingual aspect of the crown showed severe adjustment on the porcelain and the metal substructure **(Fig 6)**.

Discussion

As the bone sets the architecture to support the soft tissue height, the soft tissue will shield the underlying abutment, follow, and conform to the new environment. Important aspects to consider for long-term stability are the characteristics of the existing soft tissue biotype and whether there is a need or advantage for a connective tissue graft to improve the long-term stability for the treatment to be implemented.[9,10]

Figure 2: Tissue biotype around implant-supported provisional on the upper right central incisor appears to be thin and unstable, despite the excellent results achieved with the previously provided treatment.

Figure 3: Incisal view showing healing after implant uncovery and fabrication of the provisional. There is a concern with the irregular palatal tissue contour.



Figures 4a & 4b: Figure 4a shows lateral view of the provisional and TiDesign abutment (Dentsply Implants; Waltham, MA). Figure 4b shows a modified abutment with a concave buccal contour to allow for the tissue to migrate in an incisal direction.

Figure 5a: Titanium abutment and provisional modified in a concave direction to allow for gingival tissue to fill in.

Figure 5b: Buccal view showing the exposed gingival margin of the titanium abutment and the modified provisional. Gingival contours are slightly wider, attempting to provide support for papillae.

Figure 6: There was a history of aggressive occlusal adjustment on the #8 crown).

With the concern about possible exposure of the implant threads on the palatal side, and the thin and irregular buccal soft tissue, an additional procedure was done utilizing the tissue from the palate, to attempt to improve the clinical environment around the implant, even though such defect in this location can be extremely difficult to correct in a predictable manner.

While the original defect was eliminated, the buccal tissue appeared unstable; the initial objective was to create the best long-term healthy environment around the treated teeth and implant, thus converting the thin soft tissue biotype into a thicker, denser, stippled tissue that will better protect the implant during function **(Figs 7a & 7b)**.

The provisional had an undercontoured gingival anatomy. There was an attempt for the gingival tissues to fill in around the abutment and adjacent teeth while still providing support for the interproximal papillae. In addition to the initial somewhat acceptable, but less than ideal results, it was critical to let the tissue undisturbed healing time to allow it to mature before taking a final impression.

Once the tissues surrounding the implant healed, even though the gingival contour had flatten out **(Fig 7c)**, a final impression was taken to create an accurate model that would be utilized for the creation of a computer-generated custom abutment for the implant.

Such technology has proven invaluable in creating excellent esthetic results with titanium,[11-18] gold-shaded titanium,[19] and zirconia abutments[20,21] in addition to accuracy of fabrication[22,23] with optimal fit between the implant and the abutment.[24,25]

Among the goals when designing a computer-generated abutment are the creation of ideal subgingival contours to support the soft tissues, ideal taper, and length for maximum retention of the final restoration. Clear communication between the restorative dentist and abutment designer is extremely important **(Figs 8a-8c)**.

Computer-designed zirconia copings enable us to create excellent-fitting restorations for the natural tooth and to the abutment **(Fig 9)**.

With the completed crown on the upper lateral incisor permanently cemented, the zirconia abutment was screwed in, torque tightened to 25 Ncm, and a cotton pellet placed covering the abutment screw and closed with a temporary cement **(Fig 10)**.

The final restoration(s) must at least meet the original goals, foremost from a health perspective and function. It is especially critical for the anterior teeth to deliver the anticipated esthetic results **(Figs 11 & 12)**.

Figure 7a: Buccal view of the initial healing three weeks after the connective tissue graft, reflecting that more healing time is needed.

Figure 7b: Buccal gingival volume and interproximal papillae had not filled in as originally expected.

Figure 7c: Buccal view of the provisional and surrounding tissue prior to taking a final impression. While the tissue is irregular, it is healthy and is expected to somewhat fill in further with time.

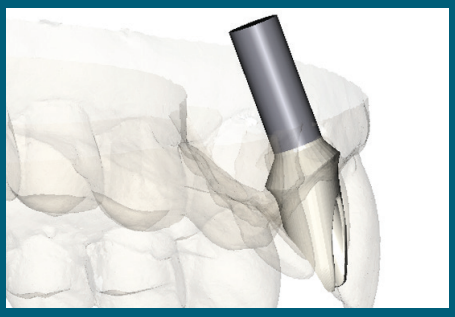


Figure 8a: Lateral view of computer planning of the zirconia abutment.

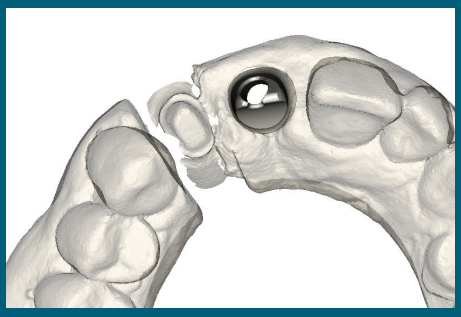


Figure 8b: Occlusal view of computer planning of the zirconia abutment.

Figure 8c: Buccal view of the Atlantis (Dentsply Implants) zirconia abutment showing the customized emergence profile and proper length of the abutment.

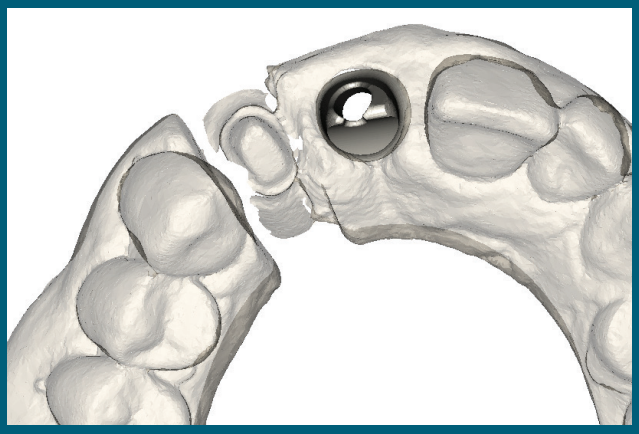


Figure 9: Full zirconia copings for the natural tooth and implant.

Figure 10: Buccal view of the Atlantis zirconia abutment on the right central incisor.

Figure 11: Palatal view of final restorations cemented.

Figure 12: Buccal view of final restorations cemented.

It is essential to reevaluate initial goals and make the necessary adjustments during treatment, especially when managing a complex case or when a setback occurs.

The final crowns were permanently cemented, ensuring there was no residual subgingival cement, which could lead to periodontal and peri-implant soft tissue inflammation.

Note the final result as compared to the pre-treatment image **(Figs 13-15)**.

The positive visual clinical results are equally important to a radiographic evaluation reflecting the existing bone level around teeth and the implant. Long-term bone preservation should be monitored radiographically and compared to the radiograph taken at the time of delivering the final restoration **(Fig 16)**.

Summary

Astute treatment planning and objectives must be well defined once a diagnosis has been established. It is essential to reevaluate initial goals and make the necessary adjustments during treatment, especially when managing a complex case or when a setback occurs. Utilization of modern technology in addition to proper judgment during all phases of treatment will lead to the best possible results a patient and practitioner can expect. Features of implant design and fit of the prosthetic components that reduce micro-movement, in addition to the fit of the final restoration can help determine the preservation of bone and the surrounding soft tissue levels.

Acknowledgement

The authors thank Todd and Dean Franson (First Impressions Laboratory; Schaumburg, IL) for the full zirconia copings shown in **Figure 7**. *They also give special thanks to Fujiki Toshi (Oral Rehabilitation Center; Skokie, IL) for his master ability in creating the final restorations shown in* **Figure 10**.

Figures 13-15: The lateral view reflects the initial defect on the central incisor and shows the correction of the defect with the gingivae healed.

Figure 16: Radiograph of the final restorations.

Features of implant design and fit of the prosthetic components that reduce micro-movement, in addition to the fit of the final restoration can help determine the preservation of bone and the surrounding soft tissue levels.

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Disclosure: The authors have relationships with numerous manufacturers and have financial interest in most new developments in the science and art of dentistry over the past two decades. They did not report any disclosures specific to the content of this article.

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