Case Report

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A Modified Mucogingival Approach For Immediate Implant Placement: A Case Report

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Abstract

This case report aims to present a modified mucogingival approach for immediate implant placement in a 70-year-old female patient with Stage III, Grade A periodontitis. The patient's thin gingival phenotype and thin buccal bone wall posed significant challenges for standard flapless implant placement.
The approach combined a unilateral buccal flap design, connective tissue grafting, regenerative techniques, and prosthetic guidance to achieve gingival augmentation and precise implant positioning. The method resulted in the successful restoration of horizontal tissue volume, an increased height of keratinized mucosa, coronal repositioning of the mucosal margin, and stable peri-implant bone levels.

Keywords: immediate implant placement, connective tissue graft, mucogingival approach

Introduction

Immediate implant placement (IIP) is a treatment modality, offering advantages such as shorter treatment timelines and fewer surgical interventions. However, this protocol does not fully prevent the buccal hard- and soft-tissue remodeling that naturally occurs after tooth extraction, which can result in peri-implant soft and hard tissue defects (1–4).
Advancements in periodontal surgery, particularly principles from periodontal plastic surgery, are now effectively adapted to implantology (2). The coronally advanced flap technique has shown significant potential in managing soft tissue at implant sites and enhancing aesthetic outcomes. The simultaneous use of connective tissue grafts during implant placement also offers several advantages, including stabilizing peri-implant bone levels, enhancing mucosal thickness, and improving the peri-implant soft tissue environment. In turn, this helps prevent complications such as mucositis and midfacial recession, while optimizing the aesthetic outcome (5). Furthermore, the combination of soft and hard tissue augmentation has been linked to reduced marginal soft tissue recession compared to hard tissue augmentation alone (6).

Case Description

The patient, N.R., is a 70-year-old female diagnosed with Stage III, Grade A periodontitis. Following comprehensive periodontal therapy, a stable condition of periodontal health on a reduced periodontium was achieved. N.R. has been consistently maintained in supportive periodontal therapy for the past 10 years. She is a non-smoker and reports no systemic diseases or ongoing medication use.

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Due to a deep carious lesion on the root, tooth #14 was considered irrational to treat. The treatment plan involved extraction followed by immediate implant placement (Figure 1).

Figure 1. Clinical and radiographic assessment of tooth #14.

The presurgical evaluation identified a thin gingival phenotype, with a buccal keratinized gingival height of 4 mm, including 2 mm of attached gingiva. The interdental papillae exhibited a loss of height and appeared narrow, attributed to the existing root proximity.

A CBCT assessment revealed horizontal bone loss, with no evidence of periapical pathology or furcation involvement. The imaging showed pronounced root divergence and a thin buccal alveolar wall, with the buccal root prominently projecting vestibularly. Significant root proximity was observed, particularly in the distal region. The presence of more than 3 mm of apical bone beyond the alveoli indicated the potential to achieve sufficient primary stability during IIP (Figure 2).

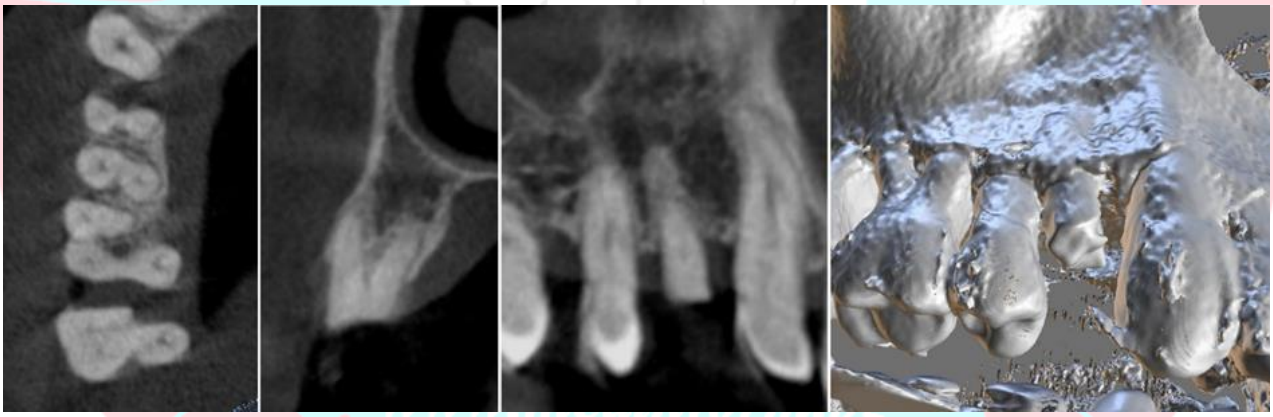

Figure 2. Presurgical CBCT evaluation.

The thoughtful analysis showed that IIP following the standard protocol was not indicated. The thin soft tissues and narrow interdental papillae presented a high risk of post-extraction tissue collapse, which could have led to peri-implant dehiscence. Additionally, the presence of a thin buccal bone wall significantly increased the risk of post-extraction bone resorption. To address these challenges, a modified mucogingival protocol was proposed. The planning for implant insertion is shown on figure 3.

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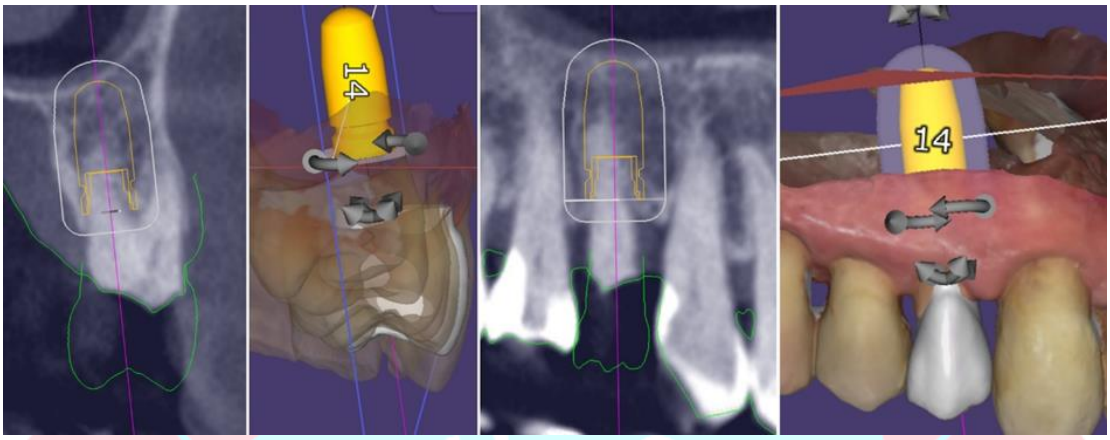

Figure 3. Digital planning for implant insertion.

The flap elevation began with oblique incisions converging toward the tooth, separating the papillae into anatomical and surgical parts. The surgical papillae were prepared in partial thickness, while the main flap was elevated in full thickness, extending 2 mm apically beyond the marginal bone crest. The flap elevation proceeded with a 'deep' split-thickness incision, followed by a 'superficial' one to ensure adequate flap mobility (Figure 4).

Figure 4. Coronally advanced envelope flap.

After elevating the buccal flap, tooth #14 was extracted atraumatically by separating the roots while preserving the integrity of the anatomical papillae (Figure 5).

Figure 5. Atraumatic extraction of tooth #14.

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The implant site was prepared in the digitally guided manner and dental implant T3Pro (ZimVie) was inserted. After implant insertion from the posterior palate was harvested a connective tissue graft. The width of the graft was sufficient to cover the bases of the de-epithelialized anatomical papillae, while the height extended coronally to the desired level of the marginal gingival edge and apically to 2 mm below the crestal bone edge. After de-epithelialization, the graft thickness measured 1.5 mm, ensuring optimal adaptation and integration with the recipient site (Figure 6).

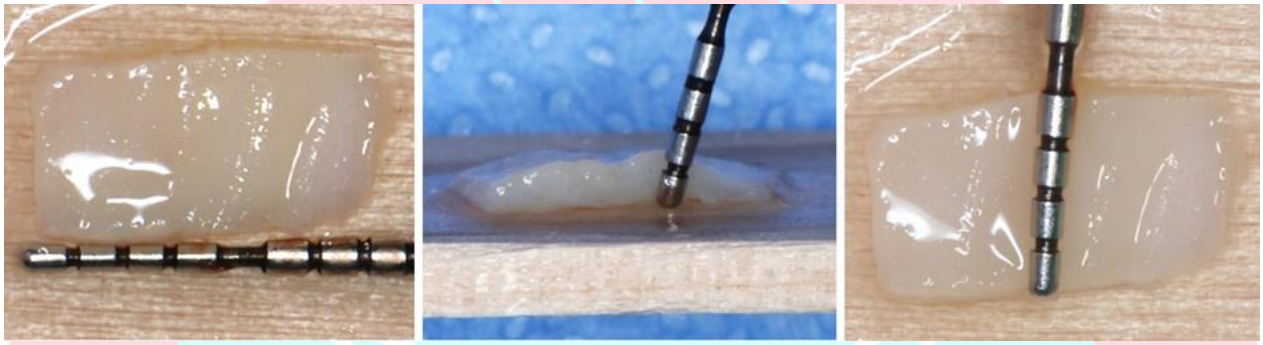

Figure 6. De-epithelialized connective tissue graft.

The graft was sutured to the inner aspect of the buccal flap, 1 mm apical to the flap margin, using horizontal mattress sutures (7/0 PGA; 7mm needle). The healing abutment was placed and bone graft material was applicated in the buccal aspect of the alveolus (Figure 7).

Figure 7. The connective tissue graft and the bone graft placement.

The flap was coronally repositioned and secured around the placed healing abutment using a modified simple interrupted suture (PGA 6/0, 12mm needle). A post-surgical radiograph was also taken (Figure 8).

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Figure 8. Sutured flap and radiographic assessment of implant placement.

Three months after surgery, the horizontal tissue volume was successfully restored, accompanied by an increased height of keratinized peri-implant mucosa and a coronal repositioning of the mucosal margin. Furthermore, a stable level of crestal peri-implant bone was maintained (Figure 9).

Figure 9. Clinical and radiographic assessment 3 months after surgery.

Additional conditioning of the shape and position of the peri-implant soft tissues was achieved using a provisional crown with a reduced emergence profile. This adjustment also contributed to crestal bone remodeling, as confirmed by radiographic evaluation one month after the placement of the provisional crown (Figure 10).

Figure 10. Peri-implant soft tissue conditioning with a provisional crown.

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At the sixth month, the complete maturation of the soft tissue, morphologically and dimensionally, was evident. The next step involved the placement of a definitive crown with an emergence profile designed to follow the established soft tissue contour (Figure 11).

The definitive crown provided adequate access for oral hygiene. The radiographic evaluation six months after crown placement showed stable crestal levels of peri-implant bone, with no significant reduction in the height of the peri-implant septa (Figure 12).

Figure 11. Final restoration.

Figure 12. Reevaluation 6 months after definitive crown placement.

Figure 13 illustrates the entire process of the development dynamics of the peri-implant soft tissue profile in both the crestal and buccal aspects, demonstrating the compensation of post-extraction soft tissue collapse. It also visualizes the restoration of the natural horizontal volume of the alveolar ridge, an increase in the height of the buccal keratinized mucosa, the deepening of the vestibule, and the achievement of a more coronal position of the mucosal margin.

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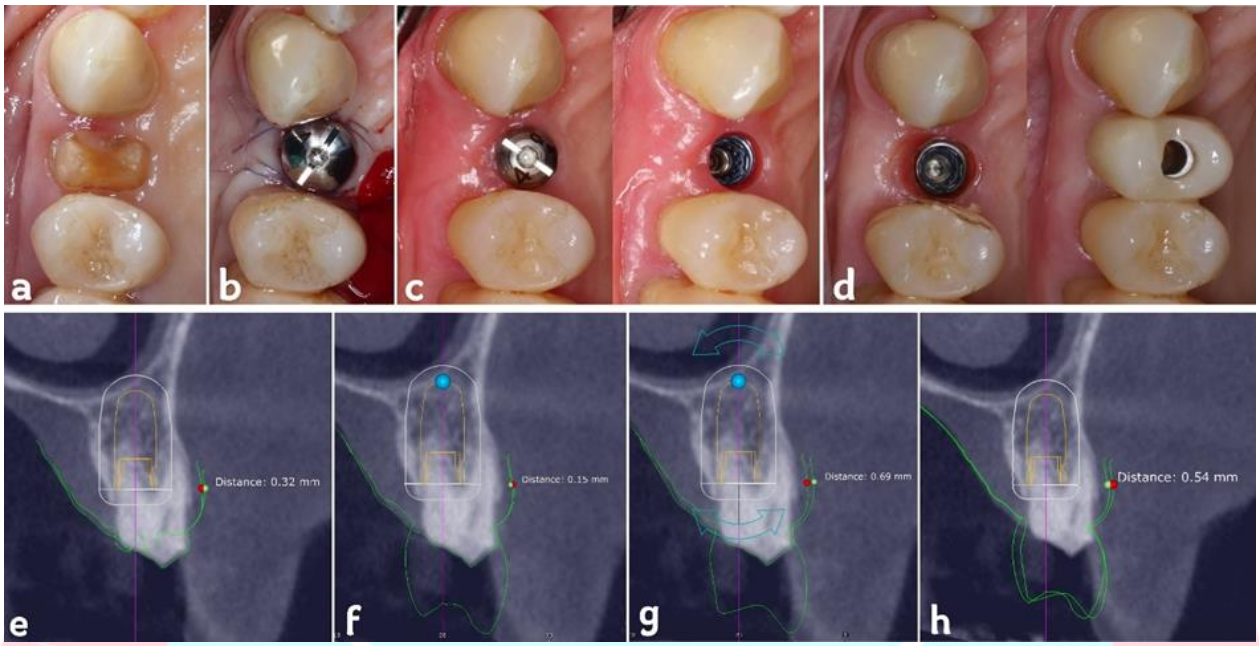

Figure 13. Clinical and digital monitoring of the development dynamics of the peri-implant soft tissue profile: a) Initial status before tooth extraction; b) After surgery; c)Three months post-surgery; d) Six months after definitive crown; e) Comparison between the initial status and the three-month post-implantation status, showing a 0.32 mm thickening; f) Comparison between the initial status and the six-month post-implantation status (three months with a provisional crown); g) Comparison between the initial status and the twelve-month post-implantation status (six months with a definitive crown), showing a 0.69 mm thickening; h) Comparison between the status at provisional crown placement and the six-month status with the definitive crown, showing a 0.54 mm thickening.

Discussion

Immediate implant placement is a treatment modality commonly recommended for single-tooth replacements in aesthetic areas. Traditionally, it is performed as a flapless procedure in sites with an intact and thick facial bone wall and thick gingival phenotype (7).

The described modified mucogingival approach for IIP aims to achieve optimal functional and aesthetic outcomes in sites typically considered contraindicated for immediate flapless implant placement (8, 9).

The approach involved elevating a unilateral split-thickness buccal flap, which enabled direct visual control during the osteotomy and enhanced the precision of implant positioning and bone augmentation by providing full visibility of the treated area (2, 9). It also facilitated simultaneous gingival augmentation during implant placement, achieving precise fixation of the connective tissue graft. Next, the coronal advancement of the flap compensated for potential shrinkage of the soft tissue. Moreover, the flap design preserved and the interdental papillae by avoiding crestal surgical elevation, which reduced the risk of post-extraction crestal bone resorption (11).

Furthermore, the extended mesiodistal dimension of the soft tissue graft - covering the full width of the papillae - enhanced the buccolingual thickness of the interproximal soft tissue. This prevented early papilla shrinkage and promoted an increase in papilla height during the conditioning phase with the temporary crown. The resulting increase in peri-implant mucosal thickness further supported the maintenance of interproximal marginal bone levels and helped minimize overall peri-implant bone loss (12). Consequently,

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at the one-year recall following placement of the final crown, stable crestal levels of the peri-implant bone were observed despite the initial remodeling. It can be assumed that the development of dense, attached peri-implant soft tissues and the establishment of a soft tissue seal contributed to preserving the peri-implant bone and maintaining stable bone levels (13). The approach also allowed for simultaneous soft and hard tissue augmentations, which have been shown to result in less marginal soft tissue recession compared to hard tissue augmentation alone (6,14).
Collectively, these factors contributed to the overall success of the procedure.

Conclusion

This case report highlights the successful application of the modified mucogingival approach for immediate implant placement. By integrating advanced flap design, soft tissue grafting, regenerative techniques, and prosthetic concepts, this approach demonstrates the potential to achieve optimal aesthetic and functional outcomes in cases that were previously considered contraindicated for immediate procedures.

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