

CASE REPORT

Predictable Peri-implant Soft Tissue Esthetics in the Anterior Zone

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Abstract

Peri-implant soft tissues besides constituting the outer frame which complements the beauty and attractiveness of the mouth tissue also play an important role in defining the anterior esthetics setup of an implant-supported restoration.²

Keywords: Soft tissue graft, immediate implants, anterior esthetic zone.

Echoing the relationship between the periodontal tissues and natural tooth, the supporting tissues of an osseointegrated implant must be organized not only to anchor the implant in the bone but also to form a soft tissue seal around the implant as it emerges into the oral cavity. It has long been recognized that for a clinical success the titanium implant must form and maintain integration not only with bone but also the connective tissue and epithelium.¹

Hence the term “soft tissue integration” and its importance in maintaining the perfect harmony in the esthetic zone, comprising of the “pink and white” has become the most challenging task.

Soft tissues constitute the outer frame that also complements the beauty and attractiveness of the mouth. This in itself explains the importance of the peri-implant soft tissue in achieving natural tissue contour and pleasant smiles. Peri-implant architecture takes a major share in the esthetic setup of an implant-supported restoration.²

BIOLOGY OF THE PERI-IMPLANT MUCOSA

There is a significant difference between the tissues surrounding the natural teeth and implants. In implants due to lack of cement like structures, connective tissue fibers of the peri-implant mucosa are stretched parallel to the implant surface rather than perpendicularly attached to the root surface as seen in natural teeth. Most groups of surracestral fibers (gingivodental and transeptal fibers) do not exist surrounding the implant abutment.

Important vital differences also include the restricted blood supply, which is due to the absence of periodontal ligament and associated blood vessel branch. The branches from the bone and oral soft tissues only provide the blood supply to the Peri-implant mucosa. In natural teeth the gingival vascularization is derived from the branches originating from the interdental septa, periodontal ligament and oral mucosa. Further the peri-implant mucosa contains a high amount of collagen and low number of fibroblasts therefore the peri-implant mucosa can also be defined as “scar-like tissues”. The fragile nature of the Peri-implant mucosa makes its ability to withstand excessive clinical manipulations unpredictable especially in thin tissue biotype.³

The patient’s periodontal biotype is the most important factor in determining the outcome in esthetic implant therapy. Two distinct biotypes have been described thick flat and thin scalloped.⁴ Each biotype responds to surgical and restorative interventions in a predictable fashion.

Classification of Alveolar Ridge Defects⁵

According to volume of defect: large/small

According to nature of defect: hard tissue/soft tissue

According to morphology: vertical/horizontal

Seibert⁶ have classified ridge defects into three classes:

Class 1: Loss of buccolingual width but normal apicocoronal height.

Class 2: Loss of apicocoronal height but normal buccolingual width.

Class 3: A combination of loss of both height and width of the ridge.

RATIONALE FOR SOFT TISSUE GRAFTING IN IMPLANT DENTISTRY

Significant soft tissue complications have been reported around endosseous implant permucosal abutments. Peri-implantitis and bone loss can have negative effect on the long-term prognosis of the implant reconstruction hence for the health of the Peri-implant connective tissue and sound Peri-implant seal is of critical importance.¹⁰

THE CONNECTIVE TISSUE GRAFT

Connective tissue grafts have their advantages of dual blood supply at recipient site, less invasive donor, superior color match, technically less demanding, not dependent on smooth palatal surface for success and tremendously versatile.

VARIOUS APPLICATIONS OF CONNECTIVE TISSUE GRAFTS IN IMPLANT DENTISTRY

- Soft tissue coverage of exposed abutment surfaces
- Augment the thin morphotype of gingiva for esthetics (vertical and horizontal soft tissue ridge deficiency)
- Improve the health of Peri-implant tissues by providing a zone of attached nonmobile soft tissue around permucosal implant structures.

ADVANTAGES OF IMMEDIATE IMPLANTS

- Prevent undue resorption bound to happen post extraction shortened rehabilitation time
- Second surgical intervention not required
- Psychological trauma reduced
- Easier definition of implants position
- Better esthetics.

CASE REPORT

A 40-year-old male patient presented with desire to replace the front tooth. Intraoral examination revealed discolored tooth 21 with associated pathologic migration and mobility (Fig. 1). Nature of the keratinized mucosa exhibited thin soft tissue morphotype and Class 1 Seibert's ridge deficiency.⁵

Treatment plan included extraction of 21 with immediate implant and soft tissue augmentation with connective tissue graft to improve the biotype.



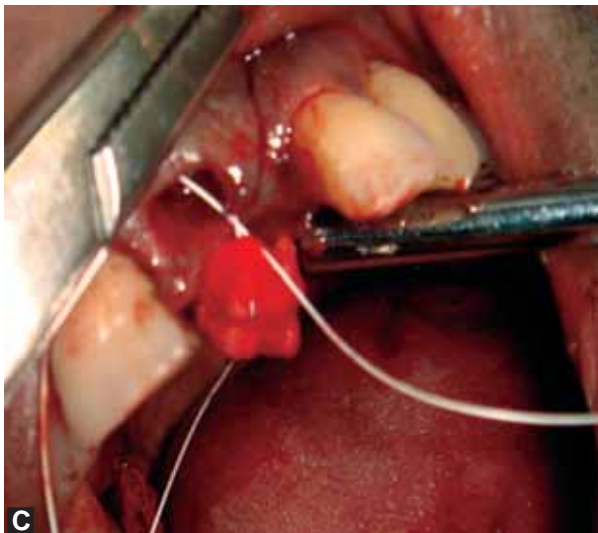
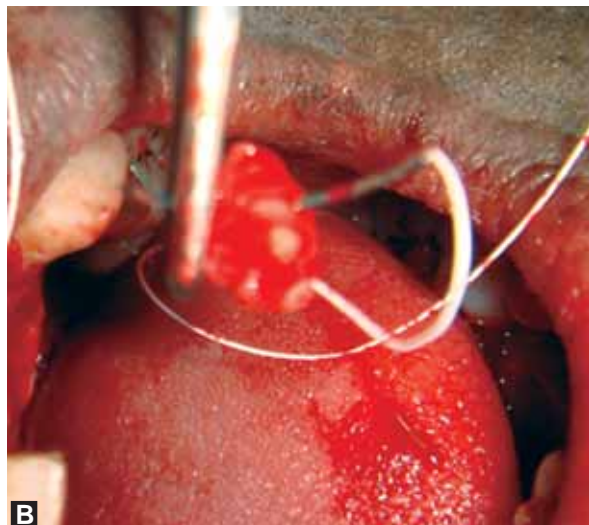
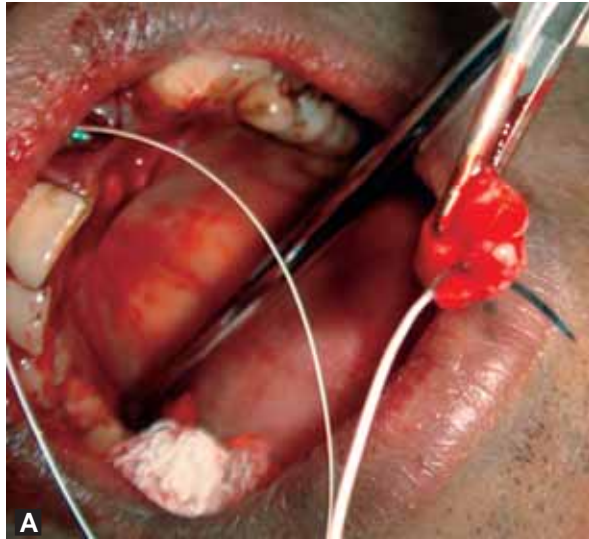
Fig. 1: Preoperative clinical

TREATMENT

Tooth 21 was extracted under local anesthesia. Papilla saving unilateral vertical incision was marked for buccal reflection. Immediate tapered implant (Biohorizon AL 4.8/12 mm) placed as per manufacturers protocol (Fig. 2) Simultaneous split thickness palatal flap was raised in the maxillary anterior area (Fig. 2) to harvest the connective tissue graft. Connective tissue graft was transported to the site. Purse string technique was adopted for suturing the connective tissue graft. Cytoplast suture (4-0) was initiated in the apical end of the raised flap of the recipient site passed twice through the graft, and finally the suture was backed out into the vestibule adjacent to the area where it entered (Figs 3A to C) Gentle apical tugging of the horizontal mattress suture was employed to guide the graft without folding it.



Fig. 2: Partial thickness palatal flap reflection and connective tissue pedicle outlined



Figs 3A to C: Purse string procedure for placement of CT graft

Subsequent to Apical horizontal mattress suturing, interrupted sutures were placed to secure the coronal portion of the graft. Early graft consolidation was observed at 2 weeks (Fig. 4).

Follow-up at 8 months for stage 2, presented an appreciable augmentation of the soft tissue in the concerned site. Crestal incision was marked to facilitate placement of the healing abutment. 2 weeks later impression was made for the PFM crown. To match the color esthetics in relation to the neighboring teeth, crowns were done on 11,21 (cement retained implant prosthesis) and 22. Final clinical view revealed a stable Peri-implant soft tissue (Figs 5 and 6).

RESULT

Twenty-two months follow-up of the case revealed stable peri-implant soft tissues.



Fig. 4: Postoperative (buccal and palatal)



Fig. 5: Prosthetic abutment in place



Fig. 6: Postrestorative clinical view

DISCUSSION

For functionally and esthetically perfect soft tissue four factors are important: width and position of the attached gingiva, the buccal volume (contour) of the alveolar process, the level and configuration of the gingival margin, size and shape of the papilla¹¹ Presurgical planning, implant positioning, esthetic bone grafting, provisionalization are the treatment considerations that affect the treatment outcomes associated with dental implants in the anterior maxillary area¹²

Langer and Calagna⁷ introduced the subepithelial connective tissue graft as a new approach to anterior cosmetic enhancement. It happens to be an extremely versatile procedure to enhance soft tissue contours around natural teeth and implants. Langer and Langer⁸ modified the technique to be further described by Nelson.⁹

Management of soft tissue in the esthetic zone has been classified as:

- a. Before implant placement
- b. During implant placement
- c. At the time of abutment connection
- d. At post abutment connection.¹³

A 3 to 4 months of minimum waiting period should be available for the soft tissue to stabilize before selecting the

final abutment/making the final impression.¹⁴ Healing time influences soft tissue procedures because peri-implant soft tissues require longer healing periods to reach a stable condition after remodeling. Various studies with favorable results have been reported with immediate implant placement and simultaneous connective tissue graft.¹⁵

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