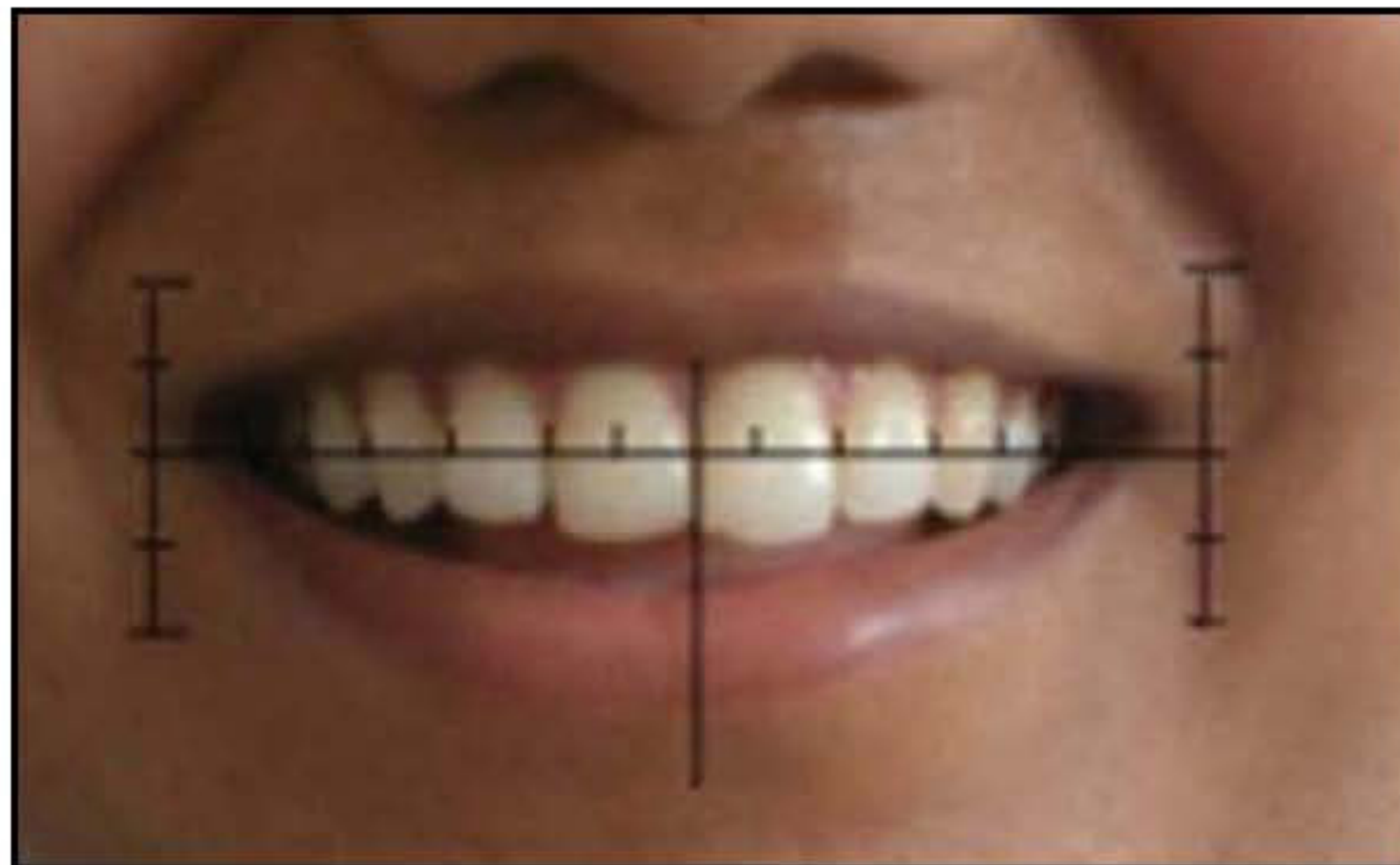


Soft Tissue Esthetics in Implant Dentistry Strategies for Success: A Case Presentation

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Abstract



Echoing the relationship between the periodontal tissues and a natural tooth, the supporting tissues of an osseointegrated implant must be organized not only to anchor the implant in the bone, but also to provide functional and esthetic dental rehabilitation. Where

esthetic rehabilitation is concerned, it is governed by multiple patient and surgical factors defining the esthetic risk in the anterior region (esthetic zone). The aim of this paper is to discuss multiple factors which must be considered for optimal soft tissue esthetics in implant dentistry.

KEY WORDS: Dental implant, esthetics, bone graft, gingival graft, treatment planning

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INTRODUCTION

Echoing the relationship between the periodontal tissues and a natural tooth, the supporting tissues of an osseointegrated implant must be organized not only to anchor the implant in the bone, but also to provide functional and esthetic dental rehabilitation. Where esthetic rehabilitation is concerned, it is governed by multiple patient and surgical factors defining the esthetic risk in the anterior region (esthetic zone). The aim is to rehabilitate smile esthetics which is decided to a great extent by the soft tissue esthetics in implant dentistry.

PATIENT EVALUATION

Facial and Dental Symmetry

Nasal midline, upper lip philtrum and chin midline are evaluated for coincidence with facial midline. After evaluation of the facial midline, dental symmetry is checked by determining whether the papilla between the maxillary central incisors as well as

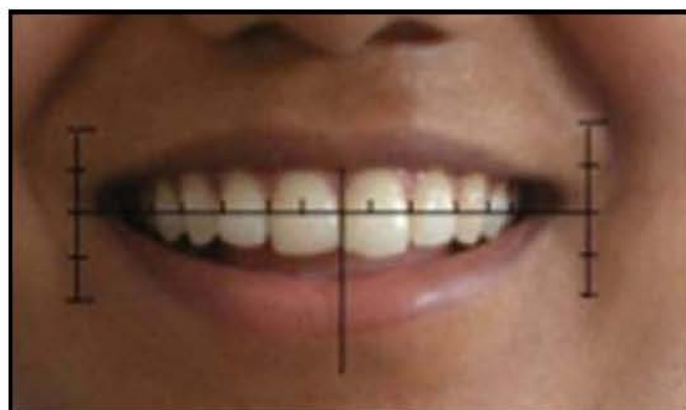


Figure 1: Determining dental midline.

maxillary and mandibular dental midlines are coincident with or parallel to the facial midline (Figure 1).

Height of the Lip Line Upon Smiling

High lip line patients often display their maxillary anterior teeth as well as significant portion of supporting soft tissues (Figure 2a). The esthetic risk of these patients is greatly increased, mostly asso-

Table 1: Diagnostic Factors for Esthetic Risk

- | |
|---|
| ● Patient treatment expectations. |
| ● Patient smoking habits. |
| ● Height of the lip line on smiling. |
| ● Gingival biotype in the treatment area. |
| ● Shape of the missing or surrounding teeth. |
| ● Infection at the implant site and bone level at adjacent teeth. |
| ● Restorative status of the teeth adjacent to the edentulous teeth. |
| ● Character of the edentulous space. |
| ● Width of the hard and soft tissues in the edentulous space. |
| ● Height of the hard and soft tissues in the edentulous space. |



Figure 2a: High lip line.



Figure 2b: Medium lip line.



Figure 2c: Low lip line.



Figure 3: Incisal plane.

ciated with gingival tissue display. It can be difficult to develop healthy, symmetric and contoured soft tissues and any failures will be readily visible.

Medium lip line patients display most of their anterior maxillary teeth and very little periodontal structures (Figure 2b). Here esthetic risk is increased associated with tooth size, color, shape, texture as well as shape and appearance of the incisal and gingival embrasures.

The low lip line patients display a predominance of mandibular teeth or an equal mix of maxillary and mandibular teeth (Figure 2c). Here esthetic risk is reduced as the lips effectively mask the outcomes associated with the appearance of the gingival tissues, tooth proportions and the apical aspects of the restoration.

Tooth Proportion

Central incisors dominate the smile with width-length ratio of 75% to 80%. Central incisors wider than the lateral incisors and lateral incisors wider than the canine from a frontal view is a pleasing tooth-tooth relationship. Medial tipping of the lateral incisors from central to canine enhances esthetics.

Gingival Outline

Two esthetically pleasing outline patterns are:

- **Sinuus pattern:** Occurs when lateral incisor gingival margin is just coronal to the neighboring central incisor and canine unilaterally (Figure 5).



Figure 4: Tooth ratios.



Figure 5: Sinuous pattern.



Figure 6: Straight pattern.

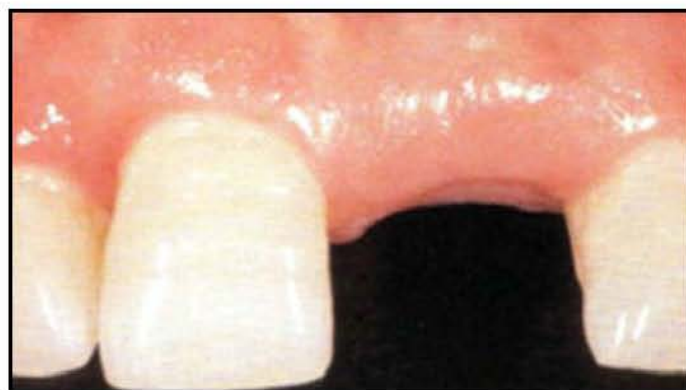


Figure 7a: Thick gingival biotype.

- **Straight pattern:** Gingival margin of central incisors, lateral incisors are of same level unilaterally (Figure 6).
- **Combination pattern:** Both patterns can exist on either side of the midline.

Gingival Biotype

Thick Gingiva Biotype (Figure 7a)

- Low risk.
- Thick gingiva resistant to recession.
- Masks the colour of the implants and any subgingival metallic components.
- Favors long term stability of esthetic peri-implant tissue.
- They are more prone to post surgical scarring.

Medium Gingiva Biotype (Figure 7b)

- More challenging in the long term.
- Esthetic risk is increased.
- They exhibit characteristics of both thick as well as thin gingiva biotype.

Thin Gingiva Biotype (Figure 7c)

- Excellent esthetic single tooth restorations.
- Periodontal health and bone crest of adjacent teeth have to be kept in consideration.
- Increased esthetic risk of recession.
- Special surgical considerations.



Figure 7b: Medium gingival biotype.



Figure 7c: Thin gingival biotype.



Figure 8: Hard and soft tissue deficiency.

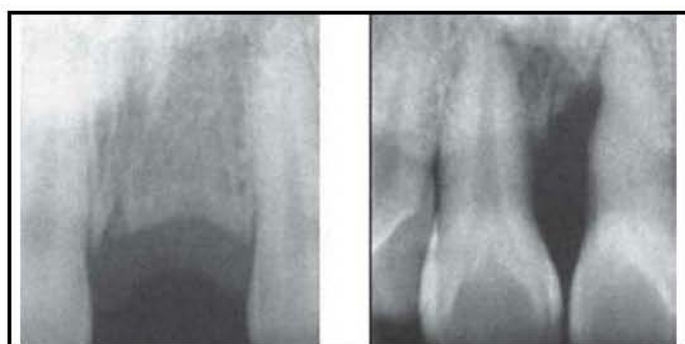


Figure 9: Potential implant sites with different potential bone scenarios.

Hard and soft tissue defects

When horizontal and vertical hard and soft tissues deficiencies exist (Figure 8), appropriate augmentation procedures are carried out. Vertical bone deficiencies pose a greater challenge. To optimize soft tissue volume, complete or partial covering of the healing cap/implant is recommended in anterior maxilla.

Shape of the missing and adjacent teeth

- Influence the risk associated with implant-supported restorations.
- Square teeth reduce the risk.
- Triangular shaped tooth associated with periodontal defects and loss of interdental papilla increases risk (black triangles).

Infection at the Implant Site and Bone Level of Adjacent Teeth

Local infections (periodontal lesions, endodontic lesions, post traumatic lesions, foreign bodies) reduce the quantity and quality of hard and soft tissues at potential implant sites (Figure 9).

Probability of black triangles increases with greater crestal bone loss due to local infections on adjacent roots.

SURGICAL CONSIDERATIONS

Flap design

Curvilinear flap (Figure 10a)

- It is a buccal flap approach.

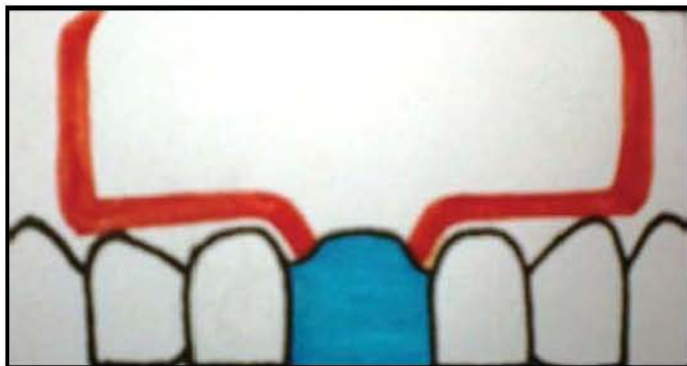


Figure 10a: Curvilinear Flap.

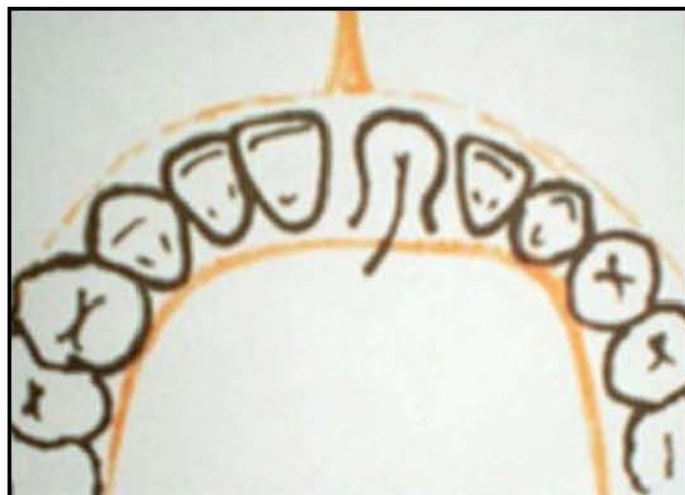


Figure 10b: Peninsula Flap.

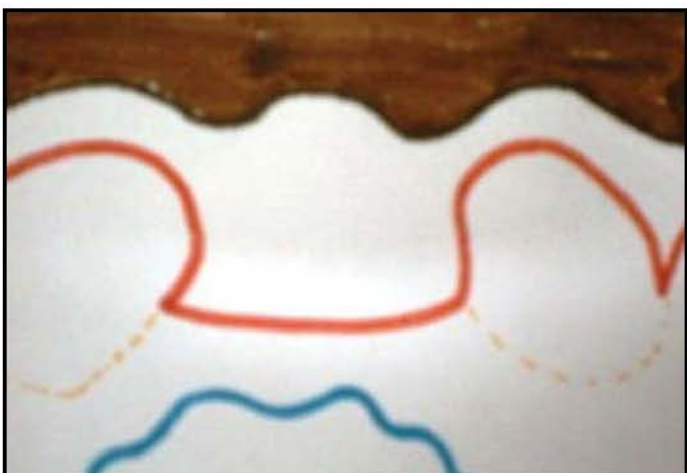


Figure 10c: Crestal Flap.

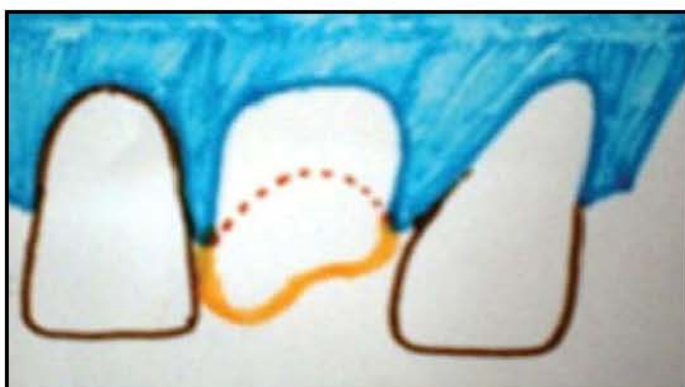


Figure 11: Bone scalloping.

- Indications include visualization of buccal anatomy and hard and soft tissue augmentation.

Peninsula flap (Figure 10b)

- Follows a U shaped path over the area where the implant restoration will emerge.
- Allows visualization of palatal, lingual, and buccal bone crests without the need of buccal flap elevation.
- Useful for submerged, non submerged, semi-submerged approaches.

Crestal flap (Figure 10c)

- Created with a crestal incision located approximately 2-3 mm toward the palatal aspect.
- Avoids the formation of scar tissue in the middle crestal area .
- Ensures sufficient visualization of the facial flap .

Tissue Punch

- Preserves excess soft tissue volume on the facial aspect.
- Available in a variety of diameters to accommodate different sizes of implants.
- Less traumatic.

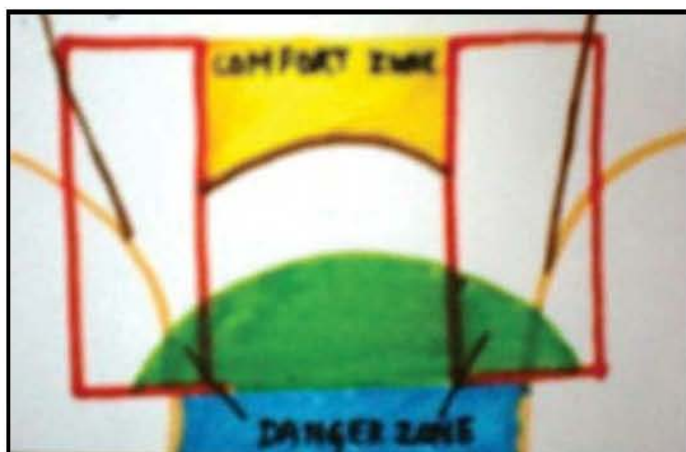


Figure 12a: Mesiodistal.

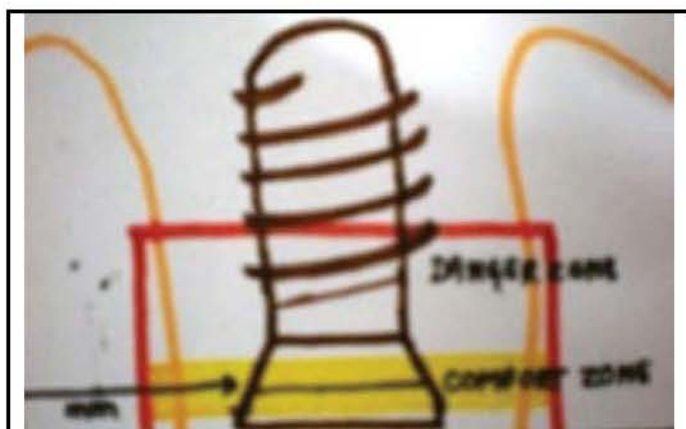


Figure 12c: Coronal-apical.

Bone Scallop (Figure 11)

- Facilitates an easier and more precise preparation of the implant bed.
- Smoothens the alveolar crest and imitates its natural shape.
- No bone should be removed in the proximal areas of the adjacent tooth as it is important for the support and maintenance of the papilla.

Implant Positioning

- Mesiodistal dimension: Danger zone (enclosed in red boundary) is located next to the adjacent root surface and is about 1-1.5 mm wide. (Figure 12a).

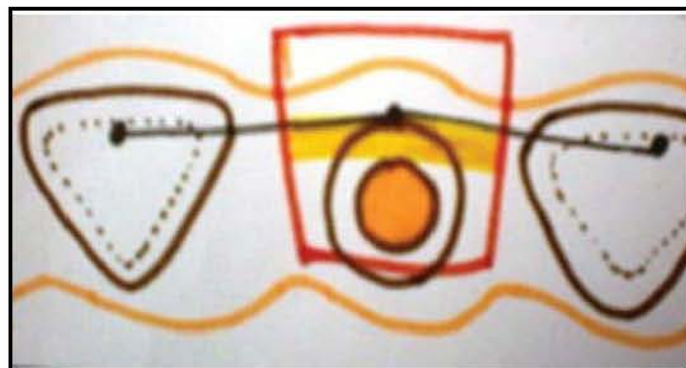


Figure 12b: Orofacial.

- Orofacial dimension: Implant shoulder should be in the comfort zone. Comfort zone measures about 1.5-2 mm in width (Figure 12b).
- Corono-apical dimension: Comfort zone is a narrow band (yellow colored) of about 1 mm apical to the CEJ of the contra lateral tooth (Figure 12c).

Surgical template

Facilitates correct three dimensional implant placement during surgery. Cervical end of the template indicates the desired future soft tissue margin.

PROSTHETIC CONSIDERATIONS

- **Essex retainer:** It is used in immediate post operative period. Its fabrication requires the restorative team to obtain impressions to create a master cast as well as shade selection prior to surgery procedure.
- **Resin bonded:** It provides superior function, esthetics and also protects the underlying surgical site. It can also be designed to maintain the scalloped soft tissue architecture.

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● **Figure 13**



● **Figure 14**



● **Figure 15**



● **Figure 16**

Figure 13: Pre-operative view.

Figure 14: Implant placement.

Figure 15: Harvesting palatal graft.

Figure 16: Placement of graft.



● **Figure 17**



● **Figure 18**



● **Figure 19**



● **Figure 20**

Figure 17: Graft secured with 3-0 PTFE sutures.

Figure 18: Gingival cuff at 4 months exhibiting excellent peri implant soft tissue.

Figure 19: Retracted view.

Figure 20: Final smile, CZAR, (zirconia crown).

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Disclosure

Dr Lanka Mahesh lectures for Biohorizons implant systems whose products are mentioned in this article.

References

1. Chiche G, Pinault A. artistic and scientific principles applied to esthetic dentistry. In: Chiche G, Pinault A(ale). Esthetics of anterior fixed prosthodontics. Chicago: Quintessence, 1994: 13-32
2. Morley J. smile design- specific considerations. J Calif Dent Assoc. 1997;25:633-637
3. Levin EL Dental esthetics and the golden proportion. J Prosthet Dent 1978;40: 244-252.
4. Sclar Anthony. Soft tissue and esthetic considerations in implant therapy. Quintessence, 2008;2:13-48
5. ITI Treatment guide,VOL1, Implant Therapy in the Esthetic Zone,Single Tooth Replacements:Quintessence,2007