Papilla reconstruction revisited – A new approach

Dr. Mahesh Lanka, Dr. Sangeeta Dhair binda

Optimal esthetics for implant-supported restorations in the anterior maxilla may be more difficult to obtain than implant osseointegration. The ability to predictably preserve or reproduce inter-implant papilla is extremely important in the replacement of maxillary anterior teeth. The presence of interproximal papilla around implant-supported restorations allow symmetrical soft tissues and a state of harmony between natural teeth and dental implant components. This harmony & tissue symmetry lead to natural looking restoration that does not obscure vision. On the contrary, slightest change in the level of the interproximal papilla can lead to major esthetic and phonetic complications. Since losing the interproximal papilla leads to black triangles interproximally (black hole disease), this makes the perimplant-supported tissues a delicate clinical issue to handle.

Biological truth

Enqquist et al, 1995 stated that tooth extraction leads to the interdental papilla remodeling in a sloping fashion from the palatal to the more apical facial osseous plate and becomes depressed in comparison with the healthy adjacent marginal tissue. Unfortunately, the lost interdental papilla cannot regenerate to regain its original dimensions.

Biology of the peri-implant mucosa

There is a significant difference between the tissues surrounding the natural teeth and the implants. In implants, due to lack of cementum-like structures, the 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 supracrestal fibers (dentogingival and transseptal fibers) do not exist around the implant abutment. Another, important vital difference is 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 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 considered as “scar-like tissue”.

Factors influencing the outcome of papilla reconstruction

Blood supply

It’s the key factor in predicting the treatment outcome, as sufficient blood supply should be maintained in any flap design.

Implant positioning

Well-placed implants lead to an esthetically successful implant restoration. Three different directions govern the positioning of the implant: apico-incisal, mesio-distal, and labiopalatal.

Periodontal biotype

Periodontal biotype thick or thin affects the dimension of the periodontal tissue and should be carefully evaluated during pre-surgical planning. Thick bio-type is more prone to pocket formation but reconstruction procedures seem to be more predictable due to sturdy nature of the soft tissue and osseous structure. Thin biotype is more prone to gingival recession following mechanical & surgical manipulation.

Bone quality and quantity

The bony support between a tooth and an implant or between two implants has been shown to be an important criterion in creating or preserving the papilla. Tarnow & colleagues reported a mean papillary height between two adjacent implants as 5.4 mm. One difficulty in maintaining or reforming a papilla between two implants is that the biologic width around an implant usually is located apically to the implant abutment junction. In the esthetic zone the distance from the alveolar crest to the adjacent tooth Cem- entoenamel Junction should be 5-5 mm to achieve ideal implant localization & appropriate space for the peri-implant sulcus to form.

Soft tissue quantity and quality

The documented literature unanimously states that sufficiently broad cuff of keratinized mucosa is necessary to allow for predictable manipulation of the soft tissue surrounding the implant and also leads to long-term success of oral endosseous implants and maintenance of the integrity of interproximal papilla. Of all the methods used for soft tissue augmentation and the flap designs used, the underlying concept is to preserve the blood supply to the adjacent papilla and to minimize recession.

Implant size selection

Selection of an implant for an esthetic zone depends on the dimensions of the edentulous crest and proximity of adjacent roots. Implants with larger diameter are of limited use as they compromise the interimplant distance of 5 mm leading to increased crestal bone loss. Hence implants 5.75-4 mm in diameter are preferred in the anterior restoration. Platform switching to a smaller diameter at the interface level favors the biologic width development in the horizontal direction to compensate for vertical one henceforth, minimizing the postoperative bone resorption and maintaining soft tissue margins.

Emergence profile

A proper emergence profile is important for hygiene, gingival health, and appearance. Implant restorations in the esthetic zone should mimic the emergence profile (flat) of the natural tooth. The vertical length of the subgingival portion of the restoration is extremely important as the guided gingival growth is indirectly proportional to the subemergence depth of the implant. The emergence profile of the final prosthesis should be carefully created. If the profile is too narrow, no contralateral pressure or support for the gingival will exist and the interdental papilla will diminish. If the profile is too wide papilla will be vertically compressed, oral hygiene will be difficult or impossible to perform & the papilla will collapse.

Case report

A 21-year-old female patient presented for routine examination with a desire of replacement of missing anterior tooth. Patient was healthy with no significant medical history.

Intraoral examination revealed congenitally missing lateral incisor in relation to left maxillary quadrant (Fig. 1), leading to the mesial migration of canine. Patient's oral hygiene status was found to be adequate. A thorough oral examination, including, charting of oral hygiene scores (plaque index, gingival bleeding index) revealed no significant periodontal disease. Radiographic findings of the mouth revealed normal bone levels. Orthodontic treatment was started with the aim of preparing the edentulous site for receiving an implant-supported prosthesis (Fig. 2).

Preoperative assessment

The concerned site revealed buccolingual width measuring 4.8 mm in the middle 1/3rd and 5 mm in the crestal 1/5th regions and papilla height index of 5.5 mm (Tarnow’s index). Patient had a thick flat periodontal biotype in the area.

The technique

Stage 1 surgery was performed and a 3.8/10.5 mm (tapered internal, Biometics, AL, USA) implant was placed following manufacturer’s protocol (Fig. 5 and Fig. 4).

After 4 months (Fig. 5), Stage 2 surgery of uncovering the implant was performed along with the desired soft tissue augmentation. After securing anesthesia, an esthetic flap design was planned preserving the interdental papilla along the adjacent teeth. A 15c scalpel (HU-FRIEDY, CH, USA) was used to mark the vertical incision extending from the buccal aspect towards the palatal side. The palatal extent was marked about 5.7 mm from away the

Fig. 1: Preoperative

Fig. 2: Orthodontic treatment done to prepare the site for implant

Fig. 3: Stage 1 implant surgery: Force direction indicator (FDI) in position

Fig. 4: Implant in position

Fig. 5: Flat gingival architecture at 4 months

Fig. 6: Stage 2 implant surgery: Palatal site de-epithelialized

Fig. 7: Papilla preserving flap incision, flap reflected buccally

Fig. 8: Palatal flap rolled under the buccal flap
Ford Motor Company President and CEO Alan Mulally revealed the much anticipated new car to be produced in India, the new Ford Figo. "The new Ford Figo is designed and engineered to compete in the India’s small car segment" Mulally commented. Figo leverages Ford's small-car platform architecture, sharing underlying technology with the Ford Fiesta, already familiar to Indian drivers. Press conference held in Delhi on September 25 was the first public preview of the exterior design of the new Ford Figo. Ford is reserving further details about the vehicle until closer to its production launch early in 2010. Design-conscious India inspired the new Ford Figo’s name. Figo is colloquial Italian for “cool”.

Sharing key elements of Ford’s kinetic design language with vehicles like the globally renowned Ford Focus, Ford Mondeo & the Ford Fiesta, Ford Figo features a fresh, contemporary shape that will be a distinctive alternative to traditional brands in this segment. The design language conveys a dynamic spirit of energy in motion.

Quality, substance and generous proportions are clearly evident in the design of the new Ford Figo, which features a solid stance, an invitingly large interior and a vibrant, youthful character. Its package is right-sized for the market, which is predominated by congested urban driving conditions.

From its modern headlamps, grille shapes and sculpted bonnet of its distinctive face to the subtle integrated spoiler and chamfered window shape at the rear, Ford Figo is filled with kinetic design touches. These also include sculpted shapes to the body side – chiseled front fenders, a ‘comet tail’ undercut in the doors & additional light-catching sculpting in the lower bodyside – which combine to communicate the solidity, substance and protective safety of its design.

The bold graphic of Ford Figo’s large side window shape is another key kinetic design feature hinting at the comfort & spaciousness awaiting occupants’ front and rear. The side window graphic is executed with a blacked-out B-pillar, an elegant design touch that unifies the side windows into one shape visually.

With its wheels positioned at the four corners of the vehicle with minimal overhang, Ford Figo’s bold wheel arches self-assuredly signal its agility and solidity.

“We’re confident that the new Ford Figo will be extremely attractive to Indian car buyers,” said Michael Boneham, president and managing director, Ford India.

For more information log-on to www.ford.com.

Source: Corporate Communication, Ford India.

References available on request.