

Concerns, Aesthetics & Management of Gingival Black Triangles

Dr. Sandeep Singh¹, Dr. Mohammad Aleemuddin²

Lecturer¹, Senior Lecturer², Department of Conservative Dentistry & Endodontics, Army College of Dental Sciences, Telangana

Abstract

Nothing will ruin a beautiful smile more than having dark spaces between teeth. The search for improved dentofacial aesthetics persists in modern society.

As we age and many other factors, sometimes unwelcome dark spaces appear between our teeth. Besides adding an older appearance to our smile, these dark spaces may also collect food debris and plaque. Also known as dental black triangles (figure -1) the clinical terminology is gingival embrasures - they can be the result of bone loss, recession of the gum line, or movement of the teeth.

Some people have naturally occurring gaps between their teeth called Diastema. Though not always unhealthy, gaps between the teeth are sometimes the source of embarrassment or low self-esteem, especially for the young population.

Keywords: Black triangle disease, interdental papilla, pink aesthetics, white aesthetics, derma fillers

How to cite this Article: Singh S, Aleemuddin M. Concerns, Aesthetics & Management of Gingival Black Triangles. HTAJOCD. 2019

Introduction

The presence and preservation of the interdental papillae in the esthetic zone is as crucial as the shape and contour of the anterior teeth in achieving an aesthetically pleasing smile. Interdental soft tissues play a critical role in pink aesthetics. Black triangles are unsightly and they typically get bigger over time. Aside from poor aesthetics, these larger gaps also tend to get more food stuck between the teeth, which can make the gaps even more unsightly. Thus, inspired by pretty faces and beautiful smiles, patients have sought treatment modalities to improve dentofacial aesthetics and yield positive changes in their smile. To avoid this smile killer, it's crucial that careful treatment planning factors are considered.



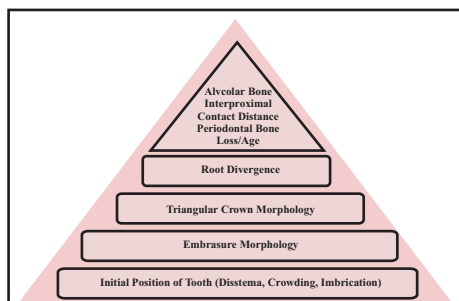
Normal Interdental Papilla



(Figure -1) Gingival Black Triangles

This review article covers the etiology, classification and some aesthetic solutions for treating these gingival black triangles.

Etiology



- * Faulty tooth brushing techniques.
- * Tooth malpositioning (fig. 2)
- * Friction from soft tissues (gingival ablation).
- * Gingival inflammation.
- * Abnormal frenal attachment.
- * As a result of orthodontic treatment (fig.3). Burke and colleagues in a study found that 40 percent of crowded maxillary incisors can be expected to produce a black triangular space at the midline after fixed appliance treatment unless something is done to close this space before appliance removal and the case considered finished. There is high incidence of concave mesial surfaces in crowded maxillary incisors, which become more apparent as the teeth are decrowded orthodontically.
- * Loss of periodontal ligaments due to recessions (fig.4).
- * Triangular crown shape, aging, and mid-line diastema. (Fig-5)



Fig. 2 – Black Triangle due to teeth malpositioning

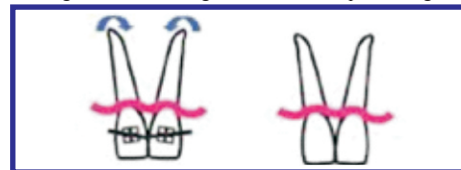


Fig. 3 Root divergence and mesially inclined incisors.



Fig.4- Black Triangle due to Recession



Fig. 5- Diastema associated with shape discrepancy.

Classification of Black Triangles

The loss of the interdental papilla is classified by Nordland and Tarnow. This classification is based on three anatomical signs

- * The interdental contact point,
- * The most coronal point of cemento enamel junction (CEJ) on the interproximal surface a
- * The most apical point of the CEJ on the labial surface.

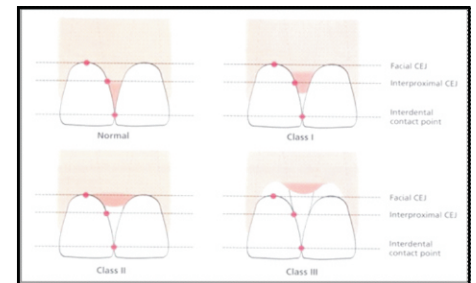


Fig. 6- Classification of Gingival Black Triangles

Four Classes Were Identified (Figure 6):

- 1. Normal:** The interdental papilla fills the niche up to the apical extension of the interdental contact point.
- 2. Class I:** The tip of interdental papilla is placed between interdental contact point and the most coronal point of CEJ at interproximal surface.
- 3. Class II:** The tip of papilla is placed between the most coronal point of ECJ at interproximal surface and the most apical point of CEJ at labial surface.
- 4. Class III:** The tip of the interdental papilla is at the ECJ or it is apically to the most apical point of CEJ at the labial surface.

Management of Cases of Gingival Black Triangle

1. Restorative Approach

For treatment of black triangle through restorative considerations, it should be noted that to change the position of the point of contact, one of them with ceramic veneer or crown. If possible, add pink porcelain to the restoration to manipulate the presence of interdental papilla loss.

In addition, restoration of cervical mesial regions will reduce the presence of gingiva by changing coronal shape. Composite can be inserted near gingival sulcus as a guide for the formation of an interdental papilla. The advantage is that the composite has many colors that are stable and wear resistant; the latest generation of dental bonding agents enables the

bonding of composites to dentine. The disadvantage is that there may be changes in bonding, discoloration, fluid seepage through the dental interface and composite [4].

Dermal fillers (fig.7) are new solution to close the black triangle. In this Hyaluronic acid is injected directly into gum tissue



Fig.7- Dermal Fillers for Black Triangles

2. Orthodontic Approach

Orthodontic treatment is aimed at reducing black triangle space and is done by placing more contact points into the apical region, so that the height of the alveolar bone and papilla can be induced by the movement of orthodontic extrusion. Divergent roots are generally associated with black triangle space. Divergent roots can also be caused by the incorrect mounting of brackets, not perpendicular to the axis of the tooth, so it is important to analyze the periapical radiograph prior to the installation of the bracket [2]. Figure 4.

Interproximal contact will move the point of contact to a larger area, thereby reducing the open gingival embrasure. Gingival embrasures can be caused by the direction of movement of the teeth and the thickness of the labiolingual of the bone and soft tissue, which usually occurs in orthodontic treatment. Volume of soft tissue in the gingival embrasure region depends on the existing bone, the height of the bone, and the severity of the diastema. Closing the diastema by orthodontic compresses the soft tissues then fills the embrasure chamber (Figure-8).

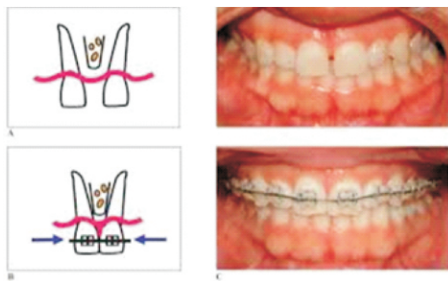


Fig.8- Closure of Diastema and regeneration of papilla

3. Prosthodontic Approach

A very simple but effective procedure for managing the loss of interdental papillae is the use of gingival prosthesis. Gingival prosthesis is a removable mask or aesthetic and functional prosthesis covering the missing gingival tissue.

Advantages:

Noninvasive, easy maintenance, splinting on the teeth can be done, more economical.

Disadvantages:

Require patient's cooperation, food impaction and bacteria growth, possibly can damage or change the color of prosthesis.

Various materials that can be used are: Auto and heat polymerizing acrylic resin, rigid, flexible material, copolyamide, soft silicone material.

Crowns and veneers are popular cosmetic treatments. Crowns work by fitting over the existing tooth to restore proper form and shape.



Fig.9- Crowns and veneers for missing gingival tissue



Fig.10- gingival prosthesis masking the missing gingival tissue.

3. Surgical Approach

To support the success of surgical treatment requires thick gingival biotype characteristics and no loss of periodontal ligament. Patients with a thin gingival biotype are susceptible to recessions that are also susceptible to the occurrence of black triangles. This is due to thicker gingival biotypes having better vascularization that facilitates the healing process [2]. Surgical techniques aim to reshape, maintain, or repair soft tissue between teeth with implant.

Surgical Approaches Include

1. Papilla re contouring to reshape soft-tissue contours.
2. Papilla preservation to reduce and prevent replacement of the gingival margins more apical after surgery, this technique developed by Takei et al and Cortellini et al.
3. Papilla reconstruction after inflammation is removed; the technique is a combination of pedicle flap and papilla preservation.

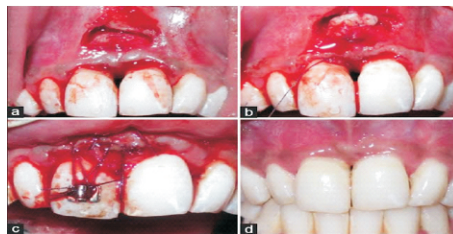


Fig.11- Reconstruction of Interdental papilla using autogenous bone graft.

4. Periodontic Approach-

Lasers can be successfully used in closure of black triangle.

The treatment objective is to remove the scar tissue and promote re-epithelialization of the interdental papilla to return proper form and counter. A Pulsed, free-running Nd-YAG Laser (perioLase), wavelength 1,064nm, can be used for this treatment.

Conclusion

Gingival recession and Loss of the interdental papillae results in a condition known as the black triangle. Interdental papilla is one of the most important factors that clinicians should pay attention to, especially in terms of aesthetic. It is important to observe the vertical distance between the bone crest and the apical point of the intermediate contact area, and the soft tissue

height in the interdental area. If the distance between the bone crest and the contact point is 5 mm and the papilla height >4 mm the surgical procedure to raise the volume of papilla may be performed. If the distance between the bone crest and the contact point is 5 mm due to loss of periodontal tissue support, nonsurgical procedures with a combination of restoration procedures may be performed.

A multidisciplinary approach must be considered mandatory if a successful clinical outcome is to be achieved. All etiological factors and treatment alternative must be discussed with the patient before starting the treatment. It has been proven that by maintaining or trying to correct the height of bone in the interproximal area, an esthetic reconstruction of the papilla can be achieved.



Fig.12- Laser treatment for black triangles.

References

1. A. Kaushik, P.K. Pal, K. Jhamb, D. Chopra, V.R. Chaurasia, V.S. Masamatti, "Clinical evaluation of papilla reconstruction using subepithelial connective tissue graft," *Journal of Clinical and Diagnostic Research*, vol. 8(9), pp. 77-81, 2014.
2. J.D.D. Oliveira, C.M. Storrer, A.M. Sousa, T.R. Lopes, J.D.S. Vieira, T.M. Deliberado, "Papillary regeneration: anatomical aspects and treatment approaches," *RSBO*, vol. 9(4), pp. 448-56, 2012.
3. B.K. Al-Zarea, M.G. Sghaireen, W.M. Alomari, H. Bheran, I. Taher, "Black triangles causes and management: a review of literature," *British Journal of Applied Science & Technology*, vol. 6(1), pp. 1-7, 2015.
4. Y. Ravishankar, K. Srinivas, S.K. Sharma, S.P. Kumar, "Management of black triangles and gingival recession: a prosthetic approach," *Indian Journal of Dental Sciences*, vol. 4(1), pp. 141-145, 2012.
5. P. Palathingal, J. Mahendra, "Treatment of black triangle by using a sub-epithelial connective tissue graft," *Journal of Clinical and Diagnostic Research*, vol. 5(8), pp. 1688-1691, 2011.
6. M. Agarwal, M. Mittal, S. Mehrotra, A. Agarwal, "Black triangle and its reconstruction: a review," *Journal of Dental Sciences & Oral Rehabilitation*, pp. 55-56, 2011.
7. B. Cohen, "Pathology of the interdental tissues," *Dent. Pract.*, vol. 9, pp. 167-173, 1959.
8. V.G. Kokich, Adjunctive role of orthodontic therapy. In: Carranza's clinical periodontology, 11th ed., 2012, pp. 505-506.
9. N. Carranza, C. Zogbi, "Reconstruction of interdental papilla with an underlying subepithelial connective tissue graft: technical considerations and a case report," *Int. J. Periodontics Restorative Dent.*, vol. 31(11), pp. e45-50, 2011.
10. Azzi R, Takei HH, Etienne D, Carranza FA. Root coverage and papilla reconstruction using autogenous osseous and connective tissue grafts. *Int J Periodontics Restorative Dent* 2001;21:141-7.
11. Nordland WP, Sandhu HS, Perio C. Microsurgical technique for augmentation of the interdental papilla: Three case reports. *Int J Periodontics Restorative Dent* 2008;28:543-9.