



Assessment of Knowledge and Perception of Mini- And Micro-Esthetics Among Orthodontists

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<p>KEYWORDS Mini esthetics, Micro esthetics, Orthodontists, Gingival black triangles, Smile arc, White spot lesions</p>	<p>ABSTRACT: Introduction: Esthetics as an entity is one of the major reasons for patients to undergo orthodontic treatment. With the advent of digital world and selfie era, patients primarily seek orthodontic treatment with the concern of an enhancement in esthetics. The important goal of orthodontic treatment is to provide that enhancement to the patient by also attaining functional balance and harmony of the facial and oral soft tissues. Aim and Objectives: The aim of this study was to assess the knowledge, perception and the importance given to mini- and micro-esthetics among orthodontists. Methods: A questionnaire prepared via google forms was sent to the orthodontists across the country. The questions were framed in a way, that it could provide the insight of the knowledge of mini and micro esthetics among orthodontists. The responses were then tabulated. Results: The study concluded that with the increase in esthetic demands along with the broadened horizon of the orthodontic procedures, majority of the orthodontists follow the interdisciplinary approach to achieve mini and micro esthetics. Around 98% of them are aware of the black triangles and 84% of them do crown reshaping procedures to overcome them. Around 64% suggest periodontal procedures so that the cases can be completed with ideal gingival shape and contour by achieving Morley's ratio. 98% orthodontists insist on completing the cases with coinciding midlines along with 97% of them also correcting the smile arc. 75% were able to achieve ideal lateral negative space. 53% were able to manage white spot lesions and only 12.2% were in favour of using positioners for finishing the case. Conclusions: In orthodontic diagnosis and treatment planning the important parameters of the mini and micro esthetics are assessed. These parameters influence the esthetic enhancement of the patient. An increased cosmetic demand from the profession and patients has resulted in more emphasis on the gingival esthetic procedures.</p>
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1. Introduction

In the early 1900s, Dr E. H. Angle suggested that an intact dentition when arranged in an optimum occlusion, causes the soft tissues to assume a harmonious position¹. Patients who are seeking esthetic treatment are looking for enhancement of their appearance for the purpose of

improved quality of life (QOL). For a successful orthodontic treatment, it is essential to make an accurate orthodontic diagnosis. A systematic examination of the facial and dental appearance which defines the esthetic characteristics of the patient should be noted. The predominant notable characteristic of the smile includes the dental hard and soft tissues which are at fault and for



which subsequent orthodontic opinion are sought. The esthetic characteristics should not be considered as rigid boundaries, but as artistic guidelines for the orthodontist². Evaluation of the facial appearance as part of orthodontic diagnosis and treatment planning may be divided into three divisions: (1) Macro Esthetics includes the profile and vertical facial dimensions, i.e. the face. (2) Mini Esthetics includes the smile attributes. (3) Micro Esthetics included tooth to tooth proportions and relationships³. Thus, the goal of modern orthodontics is to establish occlusal harmony along with either maintaining or enhancing the facial esthetics. From an orthodontist point of view, successful orthodontic treatment concerns about finishing the case according to the dental relationships like dentition in maximum intercuspation with functional efficacy, parallel roots on panoramic radiograph along with an esthetic soft tissue profile. But on the contrary, the patient views only the esthetic soft tissue profile and few visible dental features upon smiling. Currently, there has been a shift from Angle's paradigm of traditional treatment goals, which included ideal occlusion and cephalometric standards to soft tissue paradigm, which include goals like embodying principles of micro esthetics and soft tissue harmony. This has resulted in the progress of treatment along with the greater emphasis on gingival esthetics, tooth form, and on interdisciplinary care in general.

2. Objectives

The aim of this study was to assess the knowledge, perception and the importance given to mini- and micro-esthetics among orthodontists.

3. Methods

The study was conducted with the main objective to assess the knowledge and perception of mini- and micro-esthetics among orthodontists across the country. A questionnaire was prepared, on the google forms which consisted of questions related to the mini and micro esthetics aspect of the treatment protocols. The options given were either a simple Yes or No. Data was collected through google forms and the statistical analysis for the same is done for the same. The final results were obtained from 189 forms submitted. Data management was performed by using a simple bar chart with percentage levels.

Questionnaire:

1. Do patients complain about the black triangle? (Yes/No)
2. Do you do any reshaping of tooth structure for the correction of black triangle? (Yes/No)

3. Do you suggest any adjunct periodontal procedures after orthodontic treatment for enhancing esthetics? (Yes/No)
4. Do you complete the cases with proper gingival shape and contour? (Yes/No)
5. Do you follow Morley's ratio? (Yes/No)
6. Do you complete the cases with coinciding midlines? (Yes/No)
7. Do you complete the cases with a consonant smile? (Yes/No)
8. Do you finish the cases with the ideal lateral negative space? (Yes/No)
9. Do you manage to avoid white spot lesions? (Yes/No)
10. Would you prefer positioners for ideal finishing of the case? (Yes/No)

4. Results

Table 1 gives the responses and their percentage level as obtained from the orthodontists across the country.

S. No	Yes	No
1	98.1	1.9
2	84	16
3	64.1	35.9
4	64.7	35.3
5	68.5	31.5
6	98.1	1.9
7	97.3	2.4
8	74.1	25.9
9	53.7	46.3
10	12.2	87.8

Table1: The percentage of the answers as obtained from the orthodontists

5. Discussion

In this study, 98.1% of the orthodontists have mentioned that they do get patients who complain about the black triangle. 84% of them do reshaping procedures for the correction of the same. The gingival black triangle, dramatically jeopardize the esthetic outcome⁴. The gingival black triangle also called "open gingival embrasure" is formed due to the loss of interdental papilla⁵. The etiology is multifactorial, which include morphology of the tooth, the distance of inter-proximal contact to the alveolar bone crest, patient's age, gingival phenotype and history of periodontitis⁶. The prevention of gingival black triangle formation by preserving the interdental papilla, especially in the esthetic zone, must be considered during orthodontic treatment planning⁷. The treatment involves mechanical elimination of a small amount of enamel by reshaping them, between two adjacent teeth. It is used to relieve crowding or reduce black triangles. Partially removal of very small thickness



of enamel. Approximately 2.5 mm of enamel can be removed from the maxillary or mandibular six anterior teeth (0.25 mm from each surface).

64.1% of orthodontists have responded that they suggest adjunct periodontal procedures for enhancing the esthetics. Post orthodontic periodontal interdisciplinary treatment procedures includes gingivoplasty, gingivectomy, frenectomy, circumferential supracrestal fibrotomy, papilla split technique, flap surgeries. Gingivoplasty/ Gingivectomy describes the surgical recontouring of the gingiva in order to achieve a physiologic contour. It is used to treat gingival enlargements in orthodontic patients. In this procedure, the reshaping of attached gingiva is done to provide more esthetic and functional contours⁸. Frenectomy is advised when an abnormal frenal attachment between the two central incisors resists orthodontic forces and is responsible for the relapse of space closure⁹. Circumferential supracrestal fibrotomy (CSF) is used to prevent the relapse of severely rotated teeth which occurs as a result of rebound of elastic fibres in the supracrestal tissues. The procedure consists of the insertion of a surgical blade into the gingival sulcus and sectioning the epithelial attachment surrounding the involved teeth. Clinical healing usually completes by 7-10 days¹⁰.

Complete oral prophylaxis is advised immediately post orthodontic care. 64.7% orthodontists have responded that they indeed complete the treatment with proper gingival shape and contour. In healthy subjects, orthodontic treatment is associated with transient inflammation^{11,12} which might mask the proper appearance of the gingiva. Furthermore, a healthy periodontium can withstand tooth movements during orthodontic tooth movement without any deterioration of periodontal tissues¹³. The curvature of the gingiva near the tooth's margin is referred to as gingival shape. The gingival contour of the maxillary lateral incisors should be symmetric half-oval or half-circle for optimal appearance. The gingival contour of the maxillary centrals and canines should be more elliptical and are orientated distally to the long axis of the tooth. When optimum dental proportions and dimensions are determined, the relationships between the heights of the crowns of upper anterior teeth also define the adequate gingival contour¹⁴.

An esthetically attractive smile is the one in which 80% to 100% of the maxillary anterior teeth are visible and are positioned below the intercommisural line. It is called as Morley's ratio¹⁵. This ratio tends to give a young look for the patients. 68.5% orthodontists have responded that they complete the cases with Morley's ratio.

In this study, 98.1 % of orthodontists try to complete the cases with coinciding midlines. Midline deviations are a common and persistent problem that all orthodontists face. Miller et al¹⁶ indicates that the maxillary midline is situated in the exact middle of the mouth in approximately 70% of the individuals, but the maxillary and mandibular midline coincide in only one fourth of the population. Sarver's classification¹⁷ evaluates the facial symmetry under the following reference planes: (1) Nasal tip to the mid sagittal plane. (2) Maxillary dental midline to the mid sagittal plane. (3) Maxillary dental midline to mandibular dental midline. (4) Mandibular dental midline to mid symphysis, (5) Mid symphysis to the mid sagittal plane. The midline correction will be the ultimate goal. The treatment mechanics further include cantilevers, asymmetric extractions, asymmetric mechanics, usage of TADs.

Sarver *et al.*¹⁸ stated that an optimal smile arc is described as "consonant", when the curvature of the maxillary incisal edges coincides with or parallels the border of the lower lip on smiling. In a "non-consonant" smile arc, the maxillary incisal edges are either flat or reversed relative to the curvature of the lower lip. According to Miller,¹⁹ this curvature of the incisal edges appears to be more pronounced in women than men, which tends to flatten with age. In this study, 97.3% response were accordingly that for esthetic enhancement, a consonant smile arc has to be achieved.

Lateral negative space is the buccal corridor between, the posterior teeth and the corner of the mouth in smiling. Orthodontists refer to buccal corridors as "negative" spaces to be eliminated by transverse maxillary expansion. 16% of lateral negative space is considered ideal. In this study, 74.1% of the orthodontists have responded that the cases are completed within the ideal negative space.

White spot lesions are areas of demineralized enamel that usually develop because of prolonged plaque accumulation. To prevent development of white spot lesions, orthodontists should assess each patient's risk factors before and during treatment. Oral hygiene instruction is important, along with some additional measures, including fluoride varnish procedures, chlorhexidine mouthwash, xylitol, dietary modification, or calcium-containing remineralization products that can help prevent enamel demineralization, enhance remineralization, and modify biofilm factors²⁰. In this study, 53.7% of them were able to manage the white spot lesions with all the necessary prophylactic measures along with proper counselling of the patient about maintaining the oral hygiene.



Tooth positioners are well-known orthodontic appliances formed as an arch-shaped body of a (Silastic) resilient material fitting within a patient's mouth²¹. This brings about two changes, namely, settling and relapse. Its disadvantages may be that it might increase overbite and requires good patient compliance. Maintenance of oral hygiene and the appliance is tedious for the patient as it requires continuous use initially²². In this study, 87.8% of orthodontists do not prefer the use of positioners owing to its disadvantages.

6. Conclusion:

In orthodontic diagnosis and treatment planning the important parameters of the mini and micro esthetics are assessed. These parameters influence the esthetic enhancement of the patient. An increased cosmetic demand from the profession and patients has resulted in more emphasis on the gingival esthetic procedures. Interdisciplinary approach augmented by patient education and good oral hygiene care transform patients smile. Therefore, orthodontic and periodontal considerations should be properly addressed for stable and esthetic outcome.

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