Orthodontist's Perceptions of Smile Esthetics- A Questionnaire Based Study

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Abstract:-

➤ *Objective*

The objective of the present study is to assess the of orthodontists perceptions of smile esthetics. This study attempted to determine what orthodontists find important when treatment planning a case, finishing a case, and generally improving a patient's smile esthetics.

➤ *Materials and method*

This study was performed by presenting a closed questionnaire to a random sample of participants who were practicing orthodontics. The questionnaire was distributed through personal contact and e-mail. A total of 102 orthodontists participated in the survey. The survey was composed of eight questions relating to important aspects of smile esthetics and two questions that established the survey demographics.

➤ *Results*

Among 102 responders, 68.3%[n=69] were practicing between 1 to 5 years, 69.6%[n=71] were female,33.3%[n=34] considered smile arch is the important extraoral feature of smile, 30.4%[n=31] considered tooth size and shape is the important intraoral feature of smile, 80.4%[n=82] considered arch expansion have effects on smile esthetics , 57.4%[n=58] considered there is no effect of four premolar extractions on smile esthetics, 80.2%[n=81] considered centering the maxillary midline with facial midline is more important than centering the maxillary and mandibular midlines with each other, 50%[n=51] considered the acceptable amount of gingival display during smiling is about 1 mm, 55.9%[n=57] considered Hypodontia, Reversed curvature of occlusal plane, Diestema, Gingival smile[All the above] to be totally unacceptable aesthetics. 75.2%[n=76] considered 3-Dimensional smile design software is the most accurate method to do smile analysis

➤ *Conclusion*

According to this survey, over 80 % of orthodontists considered arch expansion have effects on smile esthetics and centering the maxillary midline with facial midline is more important than centering the maxillary and mandibular midlines with each other. In addition, many (57.4%) orthodontists feel that four premolar extractions will not cause harm to smile esthetics. Most of the orthodontists [75.2%[n=76] considered 3-Dimensional smile design software is the most accurate method to do smile analysis However, the above results are based on individual perceptions on smile esthetics and it seems to be varying among individuals. Hence evidence-based studies on smile esthetics will be more reliable to study the smile esthetics

I. INTRODUCTION

Orthodontists can have different definitions and understandings of the various aspects of smile esthetics, which they believe are important for orthodontic diagnosis and treatment planning. Kaya, et al., wrote that ideas of facial esthetics are thought of as being subjectively based rather than evidence based[1].Therefore, this makes it difficult to determine the essential features of the smile that should be considered when treatment planning. Isiksal, et al., state that even though the occlusal relationship is the primary basis of orthodontic treatment, more emphasis is being placed on the paramount dentofacial features necessary for facial esthetics[2]. *Stedman's Medical Dictionary* defines esthetics as a branch of philosophy that is focused on art and beauty[3]. It has been found that when patients are pursuing orthodontic treatment, they are looking for an improvement of their appearance, hoping to increase their quality of life[4]. Therefore, it is important for orthodontists to include smile esthetics as a part of diagnosis and treatment planning

II. METHODS

The present study was a questionnaire-based survey conducted among orthodontists. A 10 -item questionnaire was included in the study to evaluate the perception of smile esthetics among orthodontists. The questionnaire was in English language. The Ethical approval was obtained from

the Ethical committee KVG dental college Sullia, Dakshina Kannada. Soft copy of questionnaire was delivered through whatsapp groups and email to maximum possible number of orthodontists. A total of 102 responses were included in the study.

A sample size of 102was taken using the following formula

$$n = \frac{(Z_{1-\alpha/2})\,2\,SD^2}{d^2}$$

where, Sd= Standard Devation = 1.87
$Z_{1-\alpha/2}$ = 1.96 at 95% Confidence Interval
d = Absolute Error or Precision- 0.20,
Substituting the Values, We Get n = 95
To compensate for any possible errors', the sample size was increased to 102

The survey was composed of eight questions relating to important aspects of smile esthetics and two questions that established the survey demographics.

Following were the components of the questionnaire
1) Number years in practice
a) 1-5 years
b) 6-10 years
c) 11-15 years
d) 15+ years
2) Gender
a) Male
b) Female
3) which one you would consider as the most important extra oral feature of smile
a) Incisal display
b) Gingival display
c) Smile arch
d) Buccal corridor
e) Smile symmetry
4) which one you would consider as the most important intra oral feature of smile
a) Tooth size and shape
b) Gingival margin
c) Tooth shade
d) Black triangles
5) Do you think arch expansion have effects on smile esthetics
a) Yes
b) No
6) Do you think four premolar extractions cause negative effects on smile esthetics
a) Yes
b) No
7) Do you think centering the maxillary midline with facial midline is more important than centering the maxillary and mandibular midlines with each other?
a) Yes
b) No
8) How much do you think is the acceptable amount of gingival display during smiling?

a) 1mm
b) 2mm
c) 3mm
9) Which factor do you consider to be totally unacceptable aesthetics
a) Hypodontia
b) Reversed curvature of occlusal plane
c) Diestema
d) Gingival smile
e) All the above
10) Which one do you think the most accurate method to do smile analysis
a) By using 2-Dimensional photographs of patients
b) By using 3-Dimensional smile design softwares

III. RESULTS

The study included 102 participants and there were 10 questions. The results of the study is as follows.
1. The following chart shows that number of years in practice of orthodontist. Here 69 out of 102 participants having experience between (1 to 5 years), 14 out of 102 participants having experience between (6 to 10 years), 13 out of 102 participants having experience between (11 to 15 years), 5 out of 102 participants having more than 15+experience.
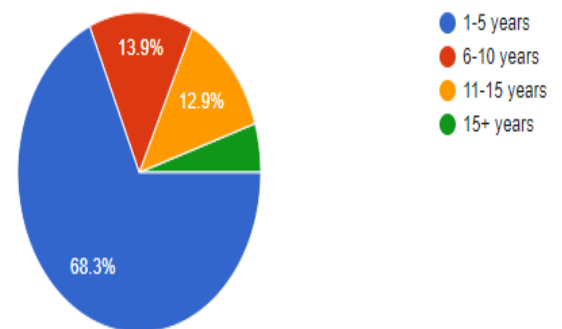

Fig 1: Number years in practice

2. Among 102 participants, 71 out of 102 are females and 31 out of 102 are males
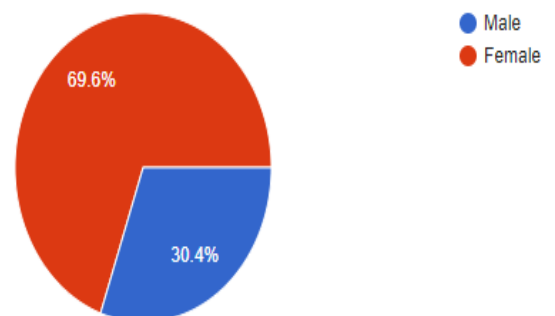

Fig 2: Gender of participants

3. Among 102 participants, 34 participants considered smile arch as the most important extra oral features of smile esthetics, 20 participants considered gingival display as the most important extra oral features of smile esthetics, 16 participants considered incisal display as the most important

extra oral features of smile esthetics, 21 participants considered smile symmetry as the most important extra oral features of smile esthetics, 11 participants considered buccal corrider as the most important extra oral features of smile esthetics
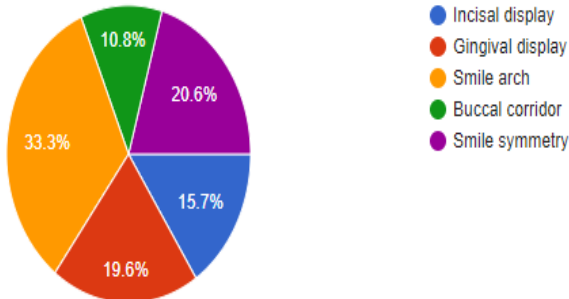

Fig 3: The most important extra oral feature of smile

4. Among 102 participants, 25 participants considered tooth shade as the most important intra oral features of smile esthetics, 21 participants considered gingival margin as the most important intra oral features of smile esthetics, 31 participants considered tooth size and shape as the most important intra oral features of smile, 25 participants considered black triangles as the most important intra oral features of smile esthetics esthetics
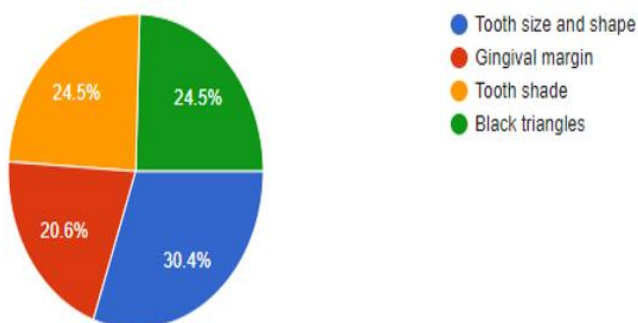

Fig 4: The most important intra oral feature of smile

5. Among 102 participants, 82 participants considered arch expansion have effects on smile esthetics and remaining 20 participants considered arch expansion have no effects on smile esthetics
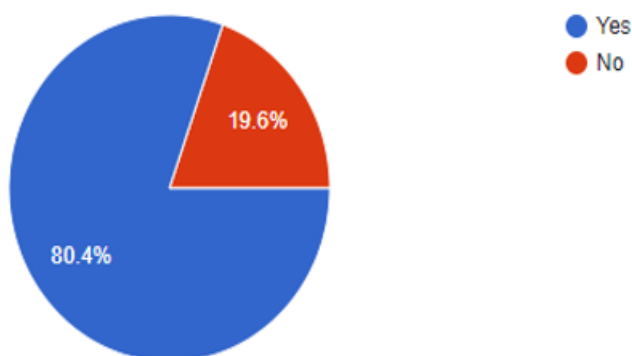

Fig 5: Arch expansion effects on smile esthetics

6. Among 101 participants, 43 participants considered four premolar extractions cause negative effects on smile esthetics and remaining 58 participants considered four premolar extractions will not cause negative effects on smile esthetics
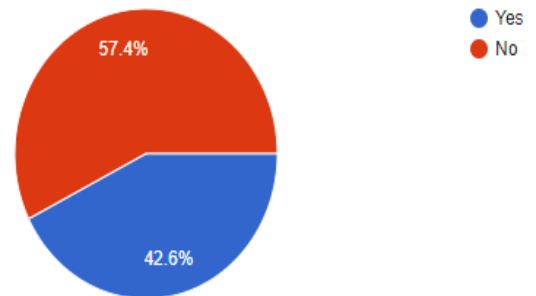

Fig 6: Four premolar extractions cause negative effects on smile esthetics

7. Among 101 participants, 81 participants considered centering the maxillary midline with facial midline is more important than centering the maxillary and mandibular midlines with each other and remaining 20 participants considered this is noy tmportant.
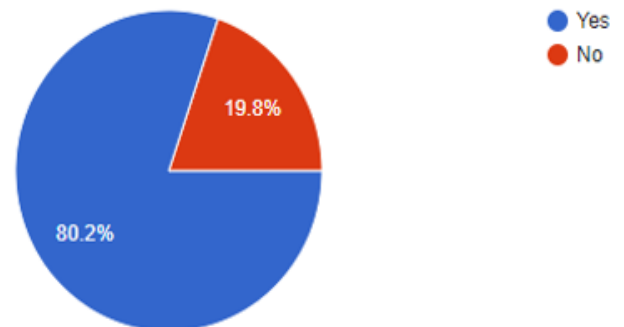

Fig 7: centering the maxillary midline with facial midline is more important than centering the maxillary and mandibular midlines with each other

8.Among 102 participants, 37 participants considered 2 mm as acceptable amount of gingival display during smiling, 51 participants considered 1 mm as acceptable amount of gingival display during smiling , 14 participants considered 3 mm as acceptable amount of gingival display during smiling
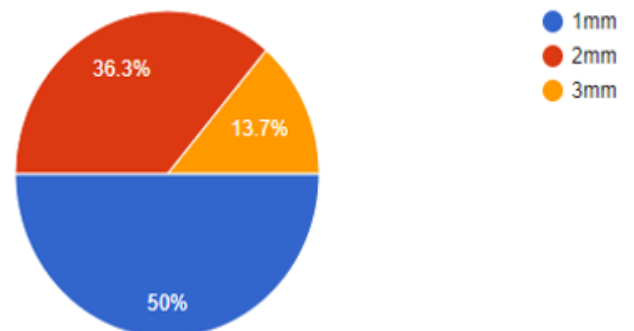

Fig 8: The acceptable amount of gingival display during smiling

9. Among 102 participants, 10 participants considered gingival smile to be totally unacceptable aesthetics, 14 participants considered diestema to be totally unacceptable aesthetics , 13 participants considered reversed curvature of occlusal plane to be totally unacceptable aesthetics, 8 participants considered hypodontia to be totally unacceptable aesthetics and remaining 57 participants considered all of the above to be totally unacceptable aesthetics
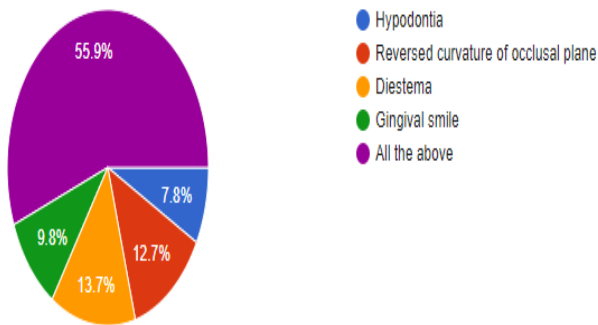

Fig 9: Totally unacceptable aesthetics

10. Among 101 participants, 76 participants considered 3-dimensional smile design software is the most accurate method to do smile analysis, and remaining 25 participants considered 2-dimensional photographs of patients is the most accurate method to do smile analysis
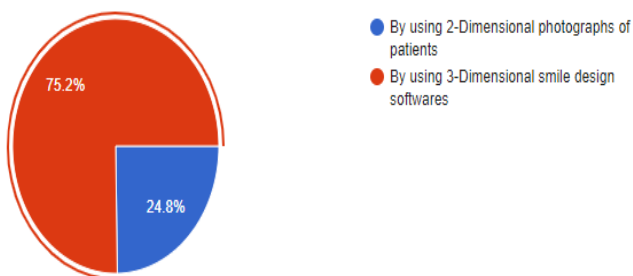

Fig 10: The most accurate method to do smile analysis

IV.   DISCUSSION

The purpose of the present study is to assess the of orthodontists perceptions of smile esthetics. With a shift in trend towards the soft tissue paradigm and analysis of micro and mini esthetics features helps in better understanding of an individuals' perception of these features and thereby help us evaluating and planning accordingly[4]. In the above study, most of the orthodontists [68.3%] have experience between 1 to 5 years and most of them are females[69.6%].

Janson, et al., published a systematic review, including articles of average and high quality. They described a set of certain features related to smile attractiveness, which should be considered when preparing an orthodontic treatment plan. The list ranges from maxillary gingival display, buccal corridors, smile arc, and maxillary to mandibular midlines, overbite, occlusal plane, maxillary midline in relation to the face, and maxillary gingival height discrepancies. There is

controversy in the literature concerning which features are most important for the ideal smile. Orthodontists continue to debate which aspects of smile esthetics should be focused on to help improve a patient's smile[5]. In the above survey smile arch[33.3%] is considered as most important extraoral feature and tooth size and shape[30.4%] is considered as most important intra oral feature of smile From the above survey 80.4% of total participants said arch expansion have effects on smile esthetics.arch expansion directly affects the buccal corridors Parekh, et al., state that individuals who have excessive buccal corridors and flat smile arcs are shown to be less attractive[6]. Whereas, in another study, McNamara, et al., showed that buccal corridors, smile arc, and posterior corridors have no correlation with smile esthetics[7]. Another controversy that greatly affects the practicing orthodontist is extraction versus non-extraction, and the impact this has on the overall smile appearance. Some studies showed in patients with ideal occlusions or Class I malocclusions, the treatment modality, whether it be extraction or non-extraction, did not cause a difference in smile esthetics[1, 8]. From above survey, 42.6% considered four premolar extractions cause negative effects on smile esthetics and remaining 57.4%considered premolar extractions do not cause negative effects on smile esthetics

A study by Geron and Atalia found that a 1 mm display of upper gingiva during smiling was considered unattractive, while lip coverage of the upper incisors between 0–2 mm was found to be the most pleasing esthetically[9]. From the above survey most of the [50%] participants considered 1 mm as acceptable amount of gingival display during smiling with recent advances in imaging technology, the complex structure of facial morphology can be evaluated three dimensionally[10]. The measurements on 3D stereophotogrammetric images have been observed to be accurate and reliable compared to direct anthropometry and 2D photogrammetry[11].From the above survey most of the orthodontists [75.2%]considered 3-dimensional smile design software is the most accurate method to do smile analysis.

V.   CONCLUSIONS

There have been numerous definitions of what defines the ideal orthodontic outcome. The inconsistency among different schools of thought seems to make the topic of smile esthetics a continuous debate. The purpose of this study was to survey orthodontists to assess their thoughts and beliefs of smile esthetics, their importance in our profession, and their relevance to the current evidence-based literature.

The respondents in this survey demonstrated:

Majority of orthodontists [33.3%] considered smile arch as the most important extra oral features of smile esthetics and 30.4% considered tooth size and shape is the most important intraoral feature of smile esthetics

Majority of orthodontists [80.4%] considered arch expansion will have effects on smile esthetics

Majority of orthodontists [57.4%] considered four premolar extractions will not cause negative effects on smile esthetics

Majority of orthodontists [80.2%] considered centering the maxillary midline with facial midline is more important than centering the maxillary and mandibular midlines with each other

Majority of orthodontists [50%] participants considered 1 mm as acceptable amount of gingival display during smiling

Majority of orthodontists [55.9%] considered Hypodontia, Reversed curvature of occlusal plane, Diestema, Gingival smile [All the above] to be totally unacceptable aesthetics.

Majority of orthodontists [75.2%] considered 3-dimensional smile design software is the most accurate method to do smile analysis.

With a constant influx of differing information throughout the literature, it is easy to see why there is not an accepted standard of key features that define smile esthetics, and maybe there cannot be for every patient. Sarver has divided facial esthetics into three categories. First, he defines macroesthetics "to include the profile and vertical dimension, in other words the face." Next, are mini-esthetics which are "smile attributes such as buccal corridors, smile arc, incisor display, etc." Finally, Sarver describes microesthetics as "the tooth and their many attributes such as contacts and connectors, embrasures, gingival shape and contour[5]." These may be considered when analysing facial and smile esthetics.

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