Prosthodontic Philosophy of Smile V/S Visual Perception of the Beholder- A Correlation.

Dr. Bhavya Bharathi.M [*], Dr. Shwetha Poovani [**], Dr. Gautam Shetty [***], Dr. Madhuri V [****]

[*] Post graduate student (Department of Prosthodontics Crown and Bridge and Implantology)- Rajarajeswari dental college and hospital – Bangalore
[**] MDS, Professor (Department of Prosthodontics Crown and Bridge and Implantology), – Rajarajeswari dental college and hospital – Bangalore
[**] MDS, Professor and Head (Department of Prosthodontics Crown and Bridge and Implantology),– Rajarajeswari dental college and hospital – Bangalore.
[**] MDS, Senior Lecturer (Department of Prosthodontics Crown and Bridge and Implantology), – Rajarajeswari dental college and hospital – Bangalore

DOI: 10.29322/IJSRP.10.05.2020.p101107
http://dx.doi.org/10.29322/IJSRP.10.05.2020.p101107

***Abstract*- STUDY OBJECTIVES:** To evaluate the smile photographically using parameters and to assess the parameters using model and also to correlate the smile with the visual perception of the beholder.

METHODS: The study sample consisted of 10 subjects from the institution and we categorised into 2 groups- according to Gender. Photographs were taken and diagnostic models was made for assessment of the Smile. Questionnaire was prepared and distributed to 2 groups- 20 Dentists and 20 Prosthodontist

RESULTS: Results indicate that both dentist and prosthodontist rated overall smile differently, and statistically significant difference were found among dentist and prosthodontist.

CONCLUSION: Different parameters have an impact on the Smile Perception. In this study compared to Dentist subjective perceptions, Prosthodontic philosophies have played an important role in significant smile perception.

***Index Terms*-** Smile perception, Smile esthetics, Golden proportion

I. INTRODUCTION

Smile design refers to the many scientific and artistic principles that considered collectively can create a beautiful smile. The principles of Smile design require an integration of esthetic concepts that harmonize facial esthetics with the dental facial composition and dental composition.Thus Smile design includes evaluation and analysis of both the hard and soft tissues of face and smile.[1]

Smile, a person's ability to express a range of emotions with the structure and movement of the teeth and lips, can often determine how well a person can function in society .Smile is one of the facial expressions that are essential in expressing, friendliness, agreement and appreciation .This demand for a pleasant smile drives us to a field of dental esthetics and thus the role of a prosthodontist become significant.[2]

Aesthetic dental procedures are often sought by patients to impart positive changes to their smile. Traditionally, aesthetic dentistry has primarily focussed on addressing the aesthetic parameters of the teeth and soft tissues encompassed in the 'aesthetic zone' – the 'dental hard and soft tissues surrounded by the lips that are visible during the act of smiling. However, a smile is a complex dynamic expression involving many aspects of the face beyond the 'aesthetic zone'.[3]

Pleasant dental esthetics represents a main concern for patients and dentists and it is a contributing factor for physical well being of individuals.Smile is one of the most important determinants of dental aesthetics.[4]

Esthetic criteria and perception of beauty vary from one person to another and are influenced by the social characteristics as well as the professions of individuals. Several components play a role in creation of a beautiful smile including a proper smile arc, the status of buccal corridors, the golden ratio and the proportionality and symmetry of the smile components. In order to provide esthetic dental treatments, clinicians should have adequate knowledge of these principles of orofacial and dental esthetics understanding the needs of patient.[5]

The main objectives of this study was to evaluate the smile photographically using parameters and to assess the parameters using diagnostic model and to correlate the smile with visual perception of beholder.

II. METHODOLOGY

The present study was conducted in the Department of Prosthodontics, Rajarajeswari Dental College and Hospital, Bangalore. The study sample consisted of 10 subjects(18 years and above) from the institution. Categorised into 2 groups- according to Gender-5males (M1,M2,M3,M4,M4,M5) and 5 Females(F1,F2,F3,F4,F4,F5). Informed consent was obtained from each subject before inclusion of study. Subjects having adequate and harmonious gingival architechture with the surrounding dentition and Subjects with Gingival index score of 0 were included in the study. Subjects with Poor oral hygiene,Smoking and Subjects with history or Symptoms of Periodontitis were excluded from the study.

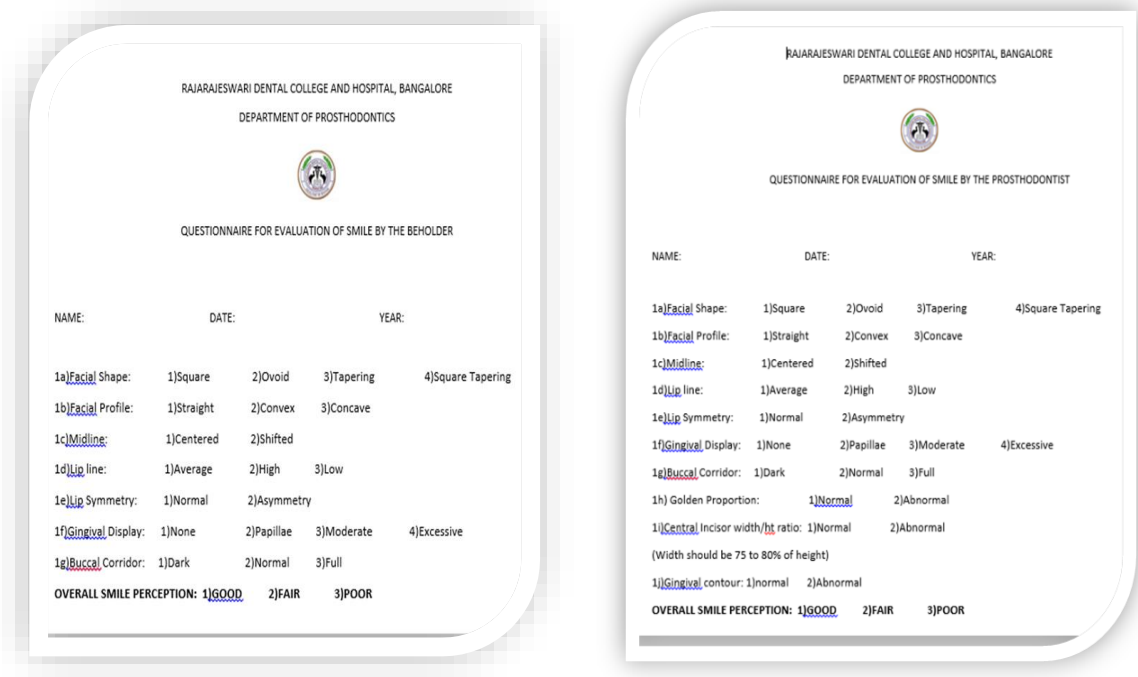
Photographs were taken in frontal view, lateral view, smile at rest.(fig 1,2). Diagnostic Impressions were made and Models were obtained from the patient(fig-3). A total of 10 pictures of

smile of 10 subjects were taken were arranged in slides using Microsoft PowerPoint 2010 software. Questionnaire was prepared for the observers.(fig-4).The observers were allowed to mention their opinions about each answer in the questionnaire. The observers consisted of 40 subjects including 20 Dentist and 20 Prosthodontist.(fig-5). Perception of Dentist and Prosthodontist were obtained and statistically analysed.

- The parameters were divided into facial composition namely Facial Profile,Facial Shape and Midline and dentofacial composition namely gingival display,lip line, lip symmetry,buccal corridor. The facial and dentofacial composition were displayed to the 1st raters the Dentist and were asked to rate the overall smile based on their persception.
- After assessing the facial and dentofacial composition the parameters like Golden Proportion,Central incisor width/height ratio and Gingival contour were measured through the model by the 2nd raters the Prosthodontits and assessed the overall smile.

Figure1,2: Photographs taken in frontal view, lateral view, smile at rest

Figure 3:Diagnostic Impressions and Models were obtained



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DEPARTMENT OF PROSTHODONTICS

QUESTIONNAIRE FOR EVALUATION OF SMILE BY THE BEHOLDER

NAME: DATE: YEAR:

1a)Facial Shape: 1)Square 2)Ovoid 3)Tapering 4)Square Tapering

1b)Facial Profile: 1)Straight 2)Convex 3)Concave

1c)Midline: 1)Centered 2)Shifted

1d)Lip line: 1)Average 2)High 3)Low

1e)Lip Symmetry: 1)Normal 2)Asymmetry

1f)Gingival Display: 1)None 2)Papillae 3)Moderate 4)Excessive

1g)Buccal Corridor: 1)Dark 2)Normal 3)Full

OVERALL SMILE PERCEPTION: 1)GOOD 2)FAIR 3)POOR

RAJARAJESWARI DENTAL COLLEGE AND HOSPITAL, BANGALORE

DEPARTMENT OF PROSTHODONTICS

QUESTIONNAIRE FOR EVALUATION OF SMILE BY THE PROSTHODONTIST

NAME: DATE: YEAR:

1a)Facial Shape: 1)Square 2)Ovoid 3)Tapering 4)Square Tapering

1b)Facial Profile: 1)Straight 2)Convex 3)Concave

1c)Midline: 1)Centered 2)Shifted

1d)Lip line: 1)Average 2)High 3)Low

1e)Lip Symmetry: 1)Normal 2)Asymmetry

1f)Gingival Display: 1)None 2)Papillae 3)Moderate 4)Excessive

1g)Buccal Corridor: 1)Dark 2)Normal 3)Full

1h) Golden Proportion: 1)Normal 2)Abnormal

1i)Central Incisor width/ht ratio: 1)Normal 2)Abnormal

(Width should be 75 to 80% of height)

1j)Gingival contour: 1)normal 2)Abnormal

OVERALL SMILE PERCEPTION: 1)GOOD 2)FAIR 3)POOR

Figure 4: Questionnaire for the observers

Figure 5:Questionnaire were distributed to Observers

III. RESULTS

- The values thus obtained were subjected to statistical analysis. Statistical Package for Social Sciences [SPSS] for Windows Version 22.0 Released 2013.Descriptive analysis includes expression of study parameters using frequency and proportions.
- Chi Square Test was used to compare different study parameters between Dentist and Prosthodontist in Male & Female study samples for determining Overall Smile Perceptions.(Table 1 and Graph 1). The level of significance was set at $P<0.05$. The results of this study shows that the overall smile rating between the dentist and prosthodontist were different.The factors that had impact on smile among dentist were midline, facial profile,gingival display and buccal corridor. Among Prosthodontist various factors that had an impact of smile include midline,lip line, gingival contour, golden proportion,central incisor width to height ratio.
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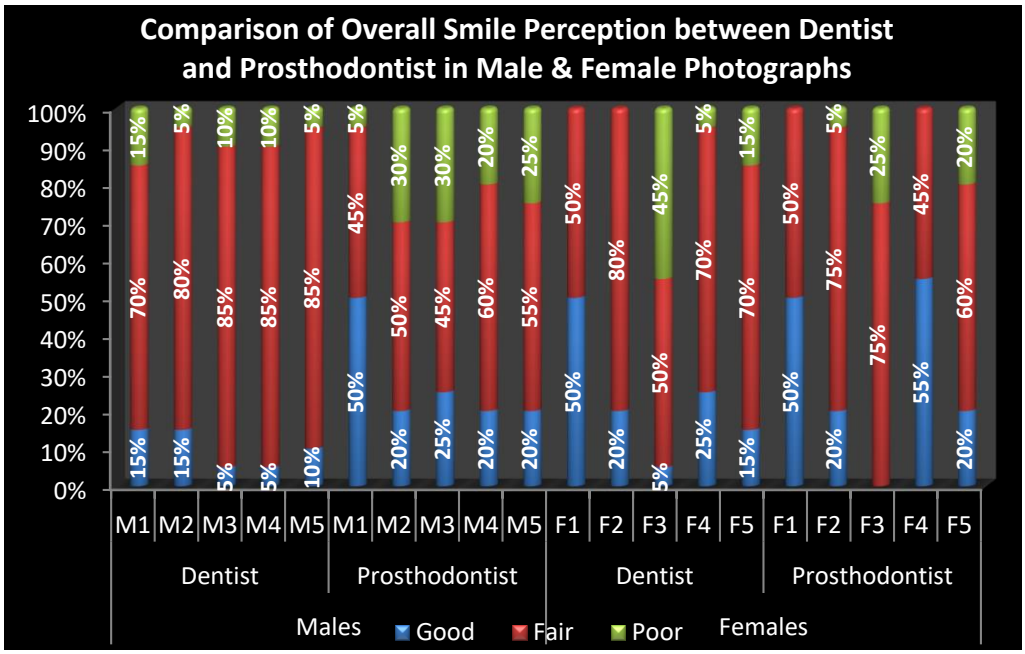
Comparison of Overall Smile Perception between Dentist and Prosthodontist in Male & Female Photographs using Chi Square Test						
Samples	Overall Smile Perception	Dentist		Prosthodontist		P-Value
		n	%	n	%	
M1	Good	3	15%	10	50%	0.04*
	Fair	14	70%	9	45%	
	Poor	3	15%	1	5%	
M2	Good	3	15%	4	20%	0.08
	Fair	16	80%	10	50%	
	Poor	1	5%	6	30%	
M3	Good	1	5%	5	25%	0.03*
	Fair	17	85%	9	45%	
	Poor	2	10%	6	30%	
M4	Good	1	5%	4	20%	0.19
	Fair	17	85%	12	60%	
	Poor	2	10%	4	20%	
M5	Good	2	10%	4	20%	0.10
	Fair	17	85%	11	55%	
	Poor	1	5%	5	25%	
F1	Good	10	50%	10	50%	1.00
	Fair	10	50%	10	50%	
	Poor	0	0%	0	0%	
F2	Good	4	20%	4	20%	0.60
	Fair	16	80%	15	75%	
	Poor	0	0%	1	5%	
F3	Good	1	5%	0	0%	0.21
	Fair	10	50%	15	75%	
	Poor	9	45%	5	25%	
F4	Good	5	25%	11	55%	0.11
	Fair	14	70%	9	45%	
	Poor	1	5%	0	0%	
F5	Good	3	15%	4	20%	0.80
	Fair	14	70%	12	60%	
	Poor	3	15%	4	20%	

*Statistically Significant

Graph 1: Comparison of Overall Smile Perception between Dentist and Prosthodontist in Male & Female Photographs using Graphs.

Table 1:Comparison of Overall Smile Perception between Dentist and Prosthodontist in Male & Female Photographs using Chi



IV. DISCUSSION

- Esthetics has become increasingly important in the practice of modern dentistry. The demand for esthetics motivates the patient to seek dental treatment which is often dictated by cultural, ethnic and individual preferences.[2] An attractive smile enhances the appearance and acceptance of an individual in our society. Smile is one of the facial expressions that are essential in expressing friendliness, agreement, and appreciation. This demand for a pleasant smile drives us to the field of dental esthetics and thus the role of a prosthodontist become significant.[6] The perception of esthetics varies from person-to-person and is influenced by personal experiences and social environment.
- This study focused on these aspects of smile esthetics: facial shape, Facial profile,gingival display, midline, lip line, lip symmetry,buccal corridor,Golden proportion,Central incisor width/ height ratio, Gingival contour. In this study, the raters were of two groups: Dentist and Prosthodontists to investigate the effect of these variables on smile attractiveness rating and evaluated the smiles differently.
- The facial and dentofacial composition were displayed to the 1st raters the Dentist and were asked to rate the overall smile based on their persception. After assessing the facial and dentofacial composition the 2nd raters the Prosthodontits were given the model to assess the overall smile.
- Table 1 and Graph 1 shows the comparison of overall smile perception between dentist and Prosthodontics in male and female photographs. Male samples were divided as M1,M2,M3,M4,M5 and Female samples were divided as F1,F2,F3,F4,F5.Overall Smile perception were categorized as Good, Fair and Poor.
- Among M1 there was a statistically significant difference in overall smile perception between Dentist and Prosthodontist. In M1 sample among 20 Dentist, who had assessed the overall smile using only facial and dentofacial composition, 15%(no-3) rated as Good,70%(no-14) rated as Fair and 15%(no-3) rated as Poor.In M1 sample among 20 Prosthodontist, who had assessed the overall smile using facial , dentofacial composition and their philosophies using model, 50%(no-10) rated as Good,45%(no-9) rated as Fair and 5%(no-1) rated as Poor.
- Among M3 there was a statistically significant difference in overall smile perception between Dentist and Prosthodontist. In M3 sample among 20 Dentist, who had assessed the overall smile using only facial and dentofacial composition, 5%(no-1) rated as Good,85%(no-17) rated as Fair and 10%(no-2) rated as Poor.In M3 sample among 20 Prosthodontist, who had assessed the overall smile using facial , dentofacial composition and their philosophies using model, 25%(no-5) rated as Good,45%(no-9) rated as Fair and 30%(no-6) rated as Poor.
- In other samples M2,M4,M5,F1,F2,F3,F4,F5 there was no statistically significant difference in overall smile perception between dentist and prosthodontist.
- In this study age did not have an affect the rating of smile attractiveness, whereas profession of the raters had an effect. However the fact that the evaluators in this study were all adults may explain the lack of age influence. This is in agreement with the findings of **Gracco et al.** [10]and **Martin et al**[11] who reported that the age of the rater did not affect attractiveness rating of buccal corridor space.
- In this study the profession of the raters affected the smile attractiveness scores and ratings. This is in aggrement with the findings of Abu Alhaija et al,[9] who revealed a significant difference in the judgment of professionals

and laypeople. Such differences in the results may be due to the effect of cultural differences on esthetic perception. This is in contrary to the findings of **Krishnan et al,**[7] found no difference in the perception of specialists and laypeople of smile arc and buccal corridor measurement and **Parekh et al**[8] assessed the variations in the acceptability of smile arc and buccal corridor space and reported no significant difference in the preferences of laypeople and orthodontists in this regard and **Kavil Sanchita Raju et al** [5] who conducted a study on Perception of Lay Persons and Prosthodontist on Characteristics of Pleasant Smile and was observed that Laypersons had similar esthetic perception as Prosthodontist and correctly detected the reason behind an unaesthetic smile to some extent.

- Esthetic perception is a subjective experience and may change based on the common beliefs and standards of a community. Prosthodontist should work together with the patient to create "front teeth" (i.e. porcelain veneers or crowns) with lengths that are appropriate for the individual, esthetically pleasing and allows the patient to function and speak properly.Consideration of only the subjective perception does not determine the overall smile appearance,rather inclusion of prosthodontics philosophies adds better esthetic values to determine overall smile perception.

V. CONCLUSION

- Different parameters have an impact on the Smile Perception.
- Hence crafting of an ideal smile requires an evaluation of the face,lips,gingival tissues and teeth and an appreciation of how they appear collectively.
- In this study compared to Dentist subjective perceptions, Prosthodontic philosophies have played an important role in significant smile perception.

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AUTHORS

First Author – Dr. Bhavya Bharathi.M, Post graduate student (Department of Prosthodontics Crown and Bridge and Implantology)- Rajarajeswari dental college and hospital – Bangalore

Second Author – Dr. Shwetha Poovani, MDS, Professor (Department of Prosthodontics Crown and Bridge and Implantology), – Rajarajeswari dental college and hospital – Bangalore

Third Author – Dr. Gautam Shetty, MDS, Professor and Head (Department of Prosthodontics Crown and Bridge and Implantology),– Rajarajeswari dental college and hospital – Bangalore.

Fourth Author – Dr. Madhuri V, MDS, Senior Lecturer (Department of Prosthodontics Crown and Bridge and Implantology), – Rajarajeswari dental college and hospital – Bangalore

Address: Rajarajeswari dental college and hospital, No : 14, Ramohalli cross, Kumbalgodu, Mysore road, Bangalore - 560074

INSTITUTION – Rajarajeswari dental college and hospital – Bangalore

All authors have seen and approved the manuscript

No conflicts of interest