Research Article

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Selective Mirror Image Layering & Editing (S.M.I.L.E.) - Proposing a new digital tool for diagnosis, treatment planning & patient education. Part 2: Aesthetics Cognition Study

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ABSTRACT

Aim: To evaluate the difference in esthetic perception between genders and between years of training .

Materials and methods: 160 dental students 40 per year 20 boys and girls were chosen as the subjects. They were shown a smile that had a unilateral esthetic imperfection and were asked to evaluate which side of the smile was better or aesthetically dominant. Using S.M.I.L.E. in phone with Adobe Ps Express and Adobe Photoshop mix two composite images having the left smile with left mirror image and the right smile with right mirror image were created and these were shown to the student after their evaluation to help assess their perception.

Result: There was no statistical difference between the esthetic evaluation made by boys and girls but the number of years of study showed a statistical improvement in esthetic perception.

Conclusion: S.M.I.L.E. is a convenient tool in helping dentists and patients understand their esthetic preferences and may also help outline certain limitations to proposed esthetic corrections.

Keywords: Aesthetics, Symmetry, Esthetic handedness, Cognition, S.M.I.L.E., smile designing.

INTRODUCTION

Most patients who visit a dentist not out of pain, have actually come seeking some advice towards bettering their appearance. Esthetics from a dental standpoint is limited to the dental composition but is influenced by the lips (the dento facial composition) and to an extent the face (the facial composition)

The esthetic outcome of a treatment depends on what the patient wants and whether we as practitioners are equipped to understand and deliver what is required providing it is reasonably feasible to execute clinically. The underlying problem is one of differing esthetic preferences due to varied exposures and training and also due to a difference in social or cultural backgrounds. The next obstacle is one in which the patient or dentist is unable to pin point an esthetic deviation. To avoid such a vague approach, it is proposed that Selective Mirror Image Layering and Editing be used to create two composite images based on a patient's original smile. One composite image is a blend of the left half of the smile along with the left mirror image and the other composite image is a blend of the right side of the smile along with the right mirror image. Having now concentrated these visual extremes into two separate compartments it is possible to understand esthetic perception and preferences better when all three photographs are compared. The objective of this study was in trying

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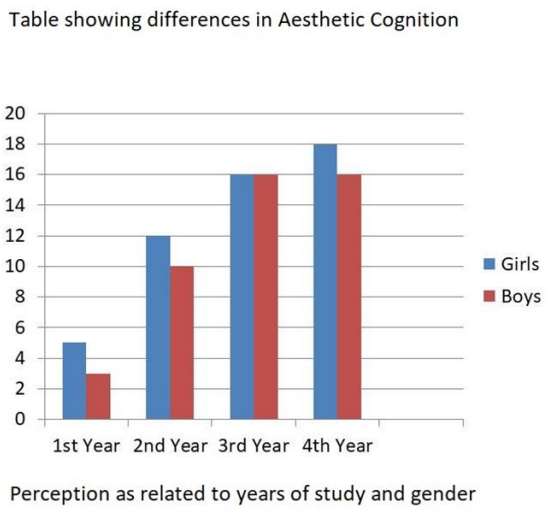
Fig 1: The original photograph used for evaluation along with the composite SMILE images of left + mirror left & right & mirror right smile components.



Graph 1: Showing differences in esthetic perception to see if there was any difference in esthetic perception based on the training received and whether there was any difference in perception based on gender.

MATERIALS AND METHODS

A set of three photographs were prepared by capturing a smile of a volunteer using an iPhone6 and then using Adobe Photoshop express and Adobe Photoshop Mix in phone to perform Selective Mirror Image Layering and Editing to generate two composite images of the original. These images were one with the left smile blended with the left mirror image and the right smile blended with the right mirror image.(Figure 1)

160 dental students, 40 per year, (20 boys and 20 girls) were informed that they would have to evaluate a smile for esthetic balance or side specific dominance. They were each shown the original smile for 10 seconds after which they were asked their opinion. After their opinion was recorded they were shown the composite images alongside the original either helping to reinforce what they had noticed and mentioned or helping to point out what they had missed.

The compiled data was analysed to assess differences in perception based either on gender or years of study.

RESULTS

The data was compiled based on years of study and also gender and were subjected to Z-Score statistical analysis. Out of the 160 students across the four academic years 96 could spot the esthetic aberration of which the higher number was girls at 51.(Bar Graph 1) The results (Tables 1 & 2) had p-values that indicated that there was no statistically significant gender based difference between the ability to evaluate but the number of years made a significant difference. Also interestingly the difference remained between immediate successive years only till the point of exit from preclinical training (1st & 2nd years) to the clinical training (3rd & 4th years). There was no significant statistical difference between the ability to evaluate when compared between junior and senior clinical students.

Statistical analysis of both parameters inter-related by way of Binary Logistic Regression using gender as a categorical covariate resulted in an Exp(B) value indicative that the odds of female students improving in their esthetic evaluation by way of training over the years was .736 times more than the male students.(Table 3)

DISCUSSION

Esthetics is important as one of the first thing the patient desires is a treatment outcome that will make them look better.[1] A child can be thought to be essentially esthetically blind. Over the years as the child grows there are numerous influences which mold the intellect including the perception of esthetics. These may be cultural or social or of the child's own innate preference. This visual learning also alters how we perceive things subsequently

and results in perceptual learning.[2,3,4,5,6,] This perceptual learning is seen to be slightly higher in

Table 1 and 2: The results had p-values that indicated that there was no statistically significant gender based difference between the ability to evaluate but the number of years made a significant difference.

TABLE -1

S.No	Gender (F/M)	Z-score	P-value	significance
1	1 year	0.7906	0.21476	Not significant
2	2 year	0.6356	0.26109	Not significant
3	3 year	0	0.5	Not significant
4	4 year	0.8856	0.18673	Not significant
5	total	0.9682	0.16602	Not significant

TABLE -2

S.No	period	Z-score	P-value	significance
1	1 vs 2 yr	-3.2332	0.00062	significant
2	1 vs 3 yr	-5.3666	0	significant
3	1 vs 4 yr	-5.8211	0	significant
4	2 vs 3 yr	-2.387	0.00842	significant
5	3 vs 4 yr	-0.5885	0.2776	**Not significant**

girls probably due to a slightly higher pressure on girls to maintain a neat appearance of themselves and their immediate surroundings than boys. This cultural and social variant has also been demonstrated by way of tests that indicate that women perceive shades of colour far better than men.[7] Basic training in geometry and the skills of drawing including learning to write in any language develops the basic foundation of perceiving symmetry. Nature all around us demonstrates development stemming from basic symmetry.[8] When dealing with a person's smile there again exists an intellectual conflict in choosing between perfect symmetry and a slightly asymmetrical symmetry.[9.10] A lay person may sometimes overlook much finer deviations from the bilateral symmetry of a smile than a dental professional indicating that specific training has specific alteration in certain aspects of esthetic perception.[11,12,13,14,15,16,17] In our study it was seen that a first BDS student was almost like a layperson in terms of analysing a smile , much like a regular patient. The second years fared better on account of their training in dental anatomy, tooth morphology and in the principles of teeth setting. With more experience the speed and skill of detecting the aberration in the smile was seen to increase almost as if perception was a split second reflex act of eye-intellect coordination.

Table 3: Statistical analysis of both parameters inter-related by way of Binary Logistic Regression using gender as a categorical covariate.

VARIABLES IN THE EQUATION						
	B	S.E.	Wald	df	Sig	Exp(B)
Step 1[a] gender(1)	-.306	.377	.660	1	.447	.736
years	.754	.183	16.920	1	.000	2.126
Constant	-.637	.468	1.854	1	.173	.529
a. Variables entered on step 1 : gender, years						

CONCLUSION

Training in any particular discipline increases the precision of performance. Dental training imparts a configured pattern of esthetic perception that a lay person may not be able to understand unless visual examples could be shown. S.M.I.L.E. allows the generation of such visual deviants from the normal to both extremes of esthetic deviation and esthetic dominance allowing the patient and dentist to confirm the final choice of treatment planning or acceptance as best compromise treatment completion.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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