

## To Assess the Validity of Leon Williams Facial Forms and Visagism: A Photographic Study

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**Abstract:** A study was performed to re-evaluate Leon Williams theory and concept of visagism among the undergraduate dental students in our institution. 100 dental students comprising of 50 males and 50 females age group 18-30 years were selected randomly for the study. Two photographs were taken for each student (facial and intraoral photograph) later the dominant temperament of each student was determined using a self-reporting questionnaire which reveals their outlook towards life and hence their personality thus validity of visagism theory was assessed. On the other hand, outline of photograph was traced using adobe photoshop CS5 and Leon Williams typal theory was assessed for its validity. Statistical analysis showed that both theories were relevant for selection of tooth form. But the concept of visagism was proved more appropriate for selection of tooth form compared to Leon Williams typal theory.

**Keywords:** Facial outline, Leon Williams theory, Tooth form, Visagism.

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Date of Submission: 10-07-2018

Date of acceptance: 27-07-2018

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### I. Introduction

A smile enhances the facial esthetics. Dentist is popularly known to be smile architect who plays an important role in creating a natural looking restoration which allow completely uninhibited smile.<sup>[1]</sup> The prime requisite to achieve good dental aesthetics is the harmonious relationship between facial form and tooth shape.<sup>[2]</sup> The selection of teeth becomes far more difficult for the patients with no pre-extraction records available. Thus, prosthodontist must rely on his/her own clinical judgement, along with the patient's aesthetic preferences for teeth selection. Thus, an ultimate goal of an esthetic makeover is to develop a stable masticatory system, teeth, tissues, skeletal structures, muscles and joints all function in harmony.<sup>[3]</sup> Several theories and concepts have been put forward to aid in artificial teeth selection among which the temperamental theory (VISAGISM) which classified patients into four categories upon their temperament to achieve a desired aesthetics and Leon Williams concept which stated that the outline of the face, when inverted, may correspond to the shape of maxillary central incisor called typal theory were most popular.<sup>[4]</sup> Many authors studies were in congruence with these theories, but few lead to the opposite results. Thus, a study was conducted to re-evaluate Leon Williams typal theory and visagism to find the degree of correspondence between the face and the tooth form.

### II. Material And Methods

In this study 100 undergraduate dental students studying in our institution were randomly selected including 50 males and 50 females

Ethical committee clearance and informed consent from the selected subjects were obtained.

#### Inclusion criteria:

1. Age group 18-30 years
2. Completely dentate arch with presence or absence of third molars
3. Natural maxillary anterior teeth in good alignment

#### Exclusion criteria:

1. Extensive carious lesion, incisal wear, tooth fracture, gingival hyperplasia of the maxillary anterior teeth.
2. Previous orthognathic surgery
3. Congenital or surgical defects or any anomalies of the tooth.
4. Restoration of maxillary anterior teeth and complete or partial veneer
5. Facial asymmetry

### Procedure

Each subject was seated upright on a chair with occlusal plane parallel to the floor. Two standardized photographs were taken for each subject using a Digital camera (DSLR, Canon, Ota, Tokyo, Japan)

1) Facial photographs

2) Maxillary central incisors

For each photograph standardized distance of 150cm was maintained. A full-face photograph with the lips closed was obtained with lens positioned parallel to the subject's face {figure 1}. Similarly, an intraoral photograph of the maxillary central incisor was obtained using cheek retractors {figure 2}. The images were then transferred to the computer and edited using Adobe photoshop CS5. The outline tracings for facial form and tooth form were taken separately {figure 3}.

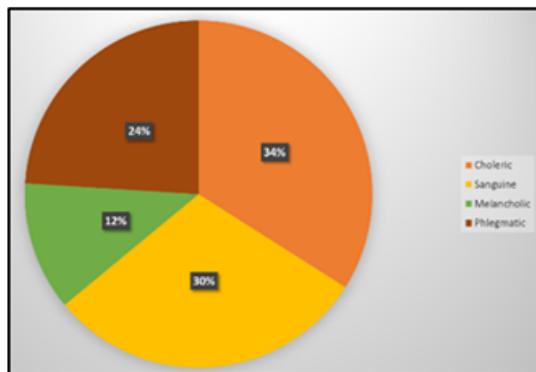
To evaluate temperament a questionnaire [Appendix 1] was given to each subject. <sup>[1]</sup> The subjects need to answer yes/no. The dominant temperament was determined by their answers. The temperament which scored the maximum out of the list of answers given at the end of the questionnaire was found out to be dominant in that subject which revealed their outlook towards life and helps to visualize their personality.

### III. Result

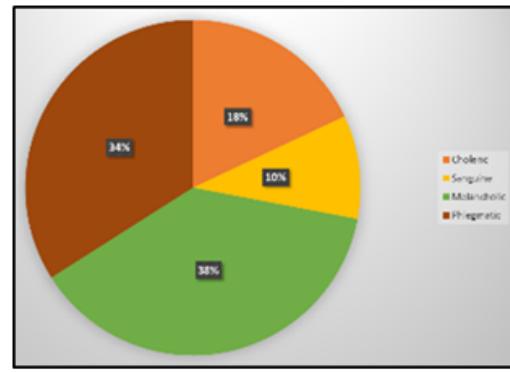
Total number of subjects falling in to different categories were tabulated and then these values were statistically analyzed to determine the value of correlation.

- Among the male population most common temperament found to be choleric accounting for about 34% whereas in female population it was found that melancholic was the common temperament accounting about 38%
- Statistical analysis of temperament to tooth form revealed  $p<0.01$  which means a significant correlation existed in both male and female population.
- Statistical analysis of temperament to face form revealed  $p<0.01$  which means a significant correlation existed in both male and female population.
- Statistical analysis of Leon Williams facial form to tooth form revealed  $p<0.01$  which means a significant correlation existed in both male and female population.

### Graphs & Tables



**Graph 1:** Distribution of temperaments in male population



**Graph 2:** Distribution of temperaments in female population

|   | Choleric | Sanguine | Melancholic | Phlegmatic |
|---|----------|----------|-------------|------------|
| Ovoid                                     | 22       | 40       | 74          | 12         |
| Square                                    | 34       | 0        | 16          | 35         |
| Angular                                   | 33       | 40       | 5           | 35         |
| Rectangular                               | 11       | 20       | 5           | 18         |
| Chi-square value=137.42 Df=9 P-value<0.01 |          |          |             |            |

**Table 1:** Correlation between temperaments and facial forms in female population

|  | Choleric | Sanguine | Melancholic | Phlegmatic |
|--|----------|----------|-------------|------------|
| Ovoid                                    | 12       | 26       | 51          | 42         |
| Square                                   | 41       | 1        | 17          | 26         |
| Angular                                  | 18       | 27       | 16          | 16         |
| Rectangular                              | 29       | 46       | 16          | 16         |
| Chi-square value=93.86 Df=9 P-value<0.01 |          |          |             |            |

**Table 2:** Correlation between temperaments and facial forms in male population

|  | Choleric | Sanguine | Melancholic | Phlegmatic |
|--|----------|----------|-------------|------------|
| Ovoid                                    | 45       | 20       | 21          | 18         |
| Square                                   | 22       | 20       | 16          | 30         |
| Angular                                  | 11       | 40       | 42          | 30         |
| Rectangular                              | 22       | 20       | 21          | 22         |
| Chi-square value=43.15 Df=9 P-value<0.01 |          |          |             |            |

**Table 3:** Correlation between temperaments and tooth forms in female population according to VISAGISM theory

|  | Choleric | Sanguine | Melancholic | Phlegmatic |
|--|----------|----------|-------------|------------|
| Ovoid                                    | 29       | 27       | 17          | 33         |
| Square                                   | 41       | 20       | 33          | 8          |
| Angular                                  | 12       | 47       | 33          | 42         |
| Rectangular                              | 18       | 6        | 17          | 17         |
| Chi-square value=58.16 Df=9 P-value<0.01 |          |          |             |            |

**Table 4:** Correlation between temperaments and tooth forms in male population according to VISAGISM theory

|  | Choleric | Sanguine | Melancholic | Phlegmatic |
|--|----------|----------|-------------|------------|
| Ovoid                                    | 45       | 27       | 16          | 50         |
| Square                                   | 25       | 17       | 16          | 17         |
| Angular                                  | 20       | 25       | 42          | 0          |
| Rectangular                              | 10       | 33       | 26          | 33         |
| Chi-square value=79.88 Df=9 P-value<0.01 |          |          |             |            |

**Table 5:** Correlation between facial form and tooth forms in female population according to LEON WILLIAMS theory

|   | Choleric | Sanguine | Melancholic | Phlegmatic |
|---|----------|----------|-------------|------------|
| Ovoid                                     | 79       | 9        | 0           | 31         |
| Square                                    | 7        | 18       | 11          | 13         |
| Angular                                   | 7        | 45       | 33          | 31         |
| Rectangular                               | 7        | 28       | 56          | 25         |
| Chi-square value=199.55 Df=9 P-value<0.01 |          |          |             |            |

**Table 6:** Correlation between facial form and tooth forms in female population according to LEON WILLIAMS theory

#### IV. Discussion

“Beauty is power; a smile is its sword”. Just a simple smile on your face can help people feel better. To stay positive from inside out a pleasing oral and facial expression is important. The overall esthetic impact of a smile can be improvised by cosmetic restorative procedure and a door way to this is a successful prosthodontist who replaces the denture aesthetically. The term esthetics is originated from the Greek word aisthetikos, meaning perceptive.<sup>[5]</sup> The most imperative factors contributing to esthetics are the size, shape, and arrangement of the maxillary anterior teeth, particularly the maxillary central incisors from frontal aspect.<sup>[6]</sup>

Many techniques have been used in the past for the selection of artificial teeth to achieve desirable aesthetics such as the temperamental theory, law of harmony and the dentogenic concept. However, among all law of harmony was the most commonly utilized method for selection of teeth. This theory states that the outlines of a face when inverted may correspond to shape of maxillary central incisor and desirable aesthetics, commonly known as geometric theory.<sup>[7]</sup> The main drawback is lack of scientific data and hence an attempt was made to relate the personality and tooth form. Visagism is a unique concept that applies the principles of visual art to the composition of a customized smile. With this concept, person personality can be categorized in to four temperaments and based on it clinicians can design a smile that balances the patient's physical appearance with his personality and desires.<sup>[8]</sup> Choleric/strong: This type of individual has a rectangular face formed by well-defined angles, have a personality characterized by strong leadership qualities, determination, daring, and fearlessness. Visually dominant rectangular central incisors are seen. Sanguine/dynamic: This type of individual has an angular face formed by slanting lines, individual is very active, communicative, and demonstrative. Visually dominant triangle or trapezoidal central incisors are seen. Melancholic/sensitive: This type of individual has close-set eyes and an oval face with features that are either rounded or formed by thin lines. The personality is characterized by gentleness and a capacity for awareness and intellectual thinking. Visually dominant oval central incisors are seen. Phlegmatic/peaceful: This type of individual is gentle, inconspicuous, and diplomatic, he or she has a round or square face. Visually dominant square and small central incisors are

seen. Many studies were in congruence with these theories, but few studies done by Berksun et.al and Sellen et.al revealed that the William's concept was not applicable as facial contours differ widely with the shape of the teeth.<sup>[4]</sup> Thus this study was planned to re-evaluate the validity of William's theory and concept of visagism and find the degree of correspondence between the face and the tooth form.

The results of this study were in congruence with the study done by Sharma A, Luthra R, and Kaur P. They concluded that a positive correlation was found between the temperament and the constraints of a smile. And, the parameter of tooth form was more diligently related to the personality.

As aesthetics is the primary consideration for patients seeking prosthetic treatment. The prosthodontist needs to understand beauty, harmony, balance, and proportion as perceived by society while planning the restoration design.<sup>[9]</sup>

## V. Conclusion

Quite a good number of theories have been proposed on selection of artificial teeth in dentistry each being considering the correlation of facial forms, anatomical landmarks and teeth form. But soft tissues tend to have more age changes compared to hard tissues. Hence to place undue importance on the relationship between the teeth and face is not defensible. The selection has to be based on individual temperament rather than on the mere outline form of the face alone which is the main concept behind the visagism theory. However, the final outcome to certain extend may depend on the artistic talent of the operator also.

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## Figures



**Fig 1:** Full face photograph



**Fig 3a:** Facial outline traced



**Fig 2:** Intra-oral photograph



**Fig 3b:** Tooth form outline traced

## **Appendix 1**

### **Questionnaire**

To help you discover your temperament. Be completely honest in answering the questions. They refer to your natural inclination rather than your present practice, acquired by effort and self-control. Answer yes/no or doubtful. The numbers at the end will give the key to the respective temperament.

1. Are you quickly excited at offenses and inclined to retaliate and oppose an insult immediately?
2. Do you look at life always from the serious side?
3. Do you easily lose confidence in your fellow men?
4. Are you greatly inclined to flatter those whom you love?
5. Are you won by a quiet explanation of reasons and motives, but embittered and driven to strong resistance by harsh commands?
6. Do you love company and amusements?
7. Does your thinking easily turn into reflection which may stir you up profoundly, yet not let your excitement be noted outwardly?
8. Are you vehemently provoked by disorder or injustice?
9. Do you have, and show, very little interest in what goes on about you?
10. Do you find it hard to trust people, and are you always afraid that others have a grudge against you?
11. Do you dislike prolonged reflection, and are easily distracted?
12. Do you usually not feel offense at the moment, but feel it so much more keenly a few hours later, or even the next day?
13. Is it very hard for you to deny yourself some favorite food?
14. Do you easily get angered by an offense, but soon are pleasant again?
15. Are you a person of enthusiasm, that is, are you not satisfied with the ordinary, but aspire after great and lofty things, temporal or spiritual?
16. Are you unwilling to admit a weakness or defeat, and consequently try to deceive others, even by outright lies?
17. Do you love silence and solitude and seclusion from the crowds?
18. Do you easily become jealous, envious, and uncharitable?
19. Do you feel happy when in a position to command?
20. Do you spend much time deliberating, yet reach decisions only with difficulty?
21. Do you like to be flattered?
22. Do you easily complain of insignificant ailments, constantly fear grave sickness?
23. Are you very much inclined to ease, to eating, and drinking?
24. Do you feel discouraged by difficulties in your undertakings?
25. Do you find it difficult to form new acquaintances, to speak among strangers, to find the right words to express your sentiments?
26. Do you pay keen interest to your appearance and that of others; to a beautiful face, to fine and modern clothes?
27. Do you persevere under great difficulties until you reach your goal?
28. Do you become suspicious and reticent by a rude word or unfriendly men?
29. Is it very hard to guard your eyes, ears, tongue, and keep silent?
30. Are you loathe to appear in public and to be praised?
31. Do you allow others to be preferred to you, but at the same time feel slighted because you are being ignored?
32. Do you dislike even hate, caresses, and sentimentality?
33. Can you be heartless, even cruel, in regard to the sufferings of others, even trample cold-bloodedly upon the welfare of others, if you cannot otherwise reach your goal?
34. Do you have little inclination to work, preferring repose and leisure?
35. Do you lack perseverance; does interest in things fade quickly?
36. Are you inclined to inordinate intimacy and flirtation?
37. Do you lack courage in correcting people; it may show itself in these two forms: (a) You go about it so carefully and tenderly that it can hardly be called a correction, or (b) you shout your correction excitedly and angrily?
38. Do you see everything, hear, and talk about everything?
39. Do you love light work which attracts attention, where there is no need of deep thinking or great effort?
40. Do you consider yourself as somebody; as extraordinary, as always right, and not needing the help of others?
41. Do you belittle, or by remarks and unfair means even persecute those who dare oppose you?
42. Can you quickly pass from tears to laughter, and vice versa?
43. Are you easily captivated by every new idea or mood?
44. Do you love variety in everything?

45. Do you remain composed, thoughtful, and deliberate, with a sober and practical judgment, in the face of suffering, failure, offenses?

46. Do you like to poke fun at others, tease them or play tricks on them?

47. Does a strong aversion easily take root in your heart against persons from whom you have suffered or in whom you find fault, sometimes so strong that you do not want to speak to them or cannot stand the sight of them without new excitement?

48. Do you get vehemently excited by contradiction, resistance, and personal offenses and do you show this excitement in harsh words which may be, and sound like being polite, yet hurt to the core?

49. Which of these bad dispositions are yours (check one or two): (a) Obstinacy, anger, pride? (b) Sloth, lack of energy? (c) Lack of courage, the dread of suffering? (d) Talkativeness, inconsistency?

50. Which of these good traits come naturally to you (check one or two): (a) Good nature, repose of mind? (b) Sympathy for others, love for solitude and prayer? (c) Strong will, energy, fearlessness, ambition? (d) Cheerfulness, the facility to get along well with difficult people?

Some of the preceding questions refer to two or more temperaments; they are overlapping.

The choleric temperament is indicated by the affirmative answer to the following numbers: 1, 5, 8, 15, 16, 19, 27, 32, 33, 40, 41, 47, 48, 49a, 50c.

The sanguine temperament: 4, 6, 11, 13, 14, 20, 21, 24, 26, 29, 34, 35, 36, 38, 39, 42, 43, 44, 46, 49d, 50d.

The melancholic temperament: 2, 3, 5, 7, 10, 12, 13, 17, 18, 20, 22, 24, 25, 28, 30, 31, 37, 47, 49c, 50b.

The phlegmatic temperament: 9, 23, 34, 35, 45, 49b, 50a.

Note: Answer the questions first, honestly, simply, and sincerely; then try to classify according to the numbers.

Srujana Zakkula<sup>1</sup>" To Assess the Validity of Leon Williams Facial Forms and Visagism: A Photographic Study."IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 7, 2018, pp 18-23.