

REVIEW ARTICLE

CORRELATION BETWEEN THE FORM OF THE MAXILLARY CENTRAL INCISOR AND THE INVERTED FORM OF THE FACE (PART II: STATISTICAL STUDY ON A MOROCCAN SAMPLE)

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ABSTRACT

In this second part we will publish our results of the study of the correlation on a sample of the Moroccan population in order to illustrate, to compare and discuss our observations with those of the literature. The objective of our study was to evaluate the correlation between the shape of the face and that of the inverted upper central incisor. **Objective:** The purpose of this study was to assess the correlation between central incisor form and the inverted form of the face form in a Moroccan sample of 200 subject and to investigate if there was agreement with the Leon's William theory. **Method and materials:** A total of 200 subjects of North-african ethnicity ranging between 25 and 35 years of age were selected. Digital photographic records were made, 1 full-face and 1 intraoral view of the maxillary right central incisor. The outline tracings of the tooth and face images were obtained using Key notesoftware. The outline tracings were assessed by superimposition. weclassified the central incisor forms and the face form into square, ovoid, tapering, following Williams' method of classification, and then the chi-square test was provided to study the correlation between these two forms. **Results:** The chi-square statistic was equal to 106.6996. The p -value is < 0.00001 . The result is significant at $p < .05$. Which confirms the presence of high correlation between the shape of face and that of the central maxillary incisor. **Conclusion:** There is a highly defined correlation between central incisor form and face form in this racial group studied. So, the shape of the face can serve as a guide for the selection of prosthetic teeth, or the form of the anterior teeth in the smile design softwares.

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INTRODUCTION

This paper should be considered as a direct continuation of the preceding one, it is the second part of a two-parts publication. The central incisor is a tooth that dominates the anterior region in terms of shape, size and location. This makes it the key to the success of any aesthetic rehabilitation. In addition, it is the only tooth to completely face the smile, which reinforces the impression of dominance (Crétôt, 2015; Etienne, 2007).. James Leon William in 1914 advanced a theory, in which he assumes that there is a harmony between the shape of the face and that of the inverted upper central incisor (Crétôt, 2015) Leon Williams had classified the central incisors into 3 main forms: "Ovoid", "square / rectangular", "triangular" This theory remains, today, the most accepted in the field of choice of prosthetic teeth as well as in the smile design softwares [Ibrahimagi, 2001]. In this second part we will publish our results of the study of the correlation on a sample of the Moroccan population in order to illustrate, to compare and discuss our observations with those of the literature.

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The objective of our study was to evaluate the correlation between the shape of the face and that of the inverted upper central incisor.

MATERIALS AND METHODS

We selected a sample of 200 patients, aged between 25 and 35, for maxillofacial growth to be completed. These patients are of a very mixed North African ethnicity.

The inclusion criteria were:

- The face should be free of damage (congenital or surgical);
- Permanent dentition;
- Central incisor without malposition, malformation or loss of substance;
- Absence of gingival hyperplasia (hiding the collar of the incisor).

With regard to taking digital standardized photography, we used a NIKON @D90 digital camera with a 105mm macro lens; cheek retractors were used to optimize mouth opening

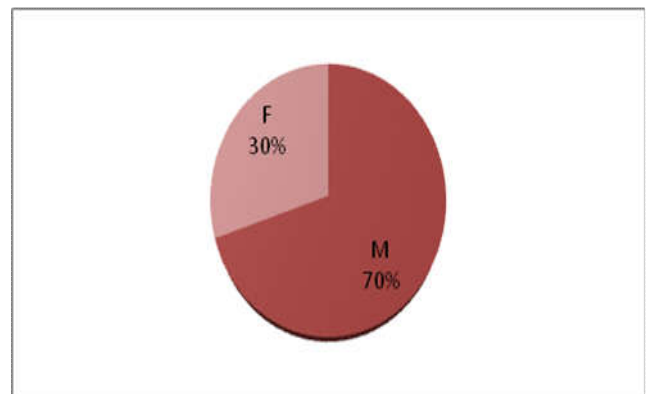
and to better discover the central incisors. The images were processed by the key-note software ® on a Mac'os system. We have drawn, on the one hand, the outer contour lines of the upper right central incisor which correspond to the proximal lines, incisal edge and collar line, on the other hand, those of the face which start from the birth of the hair in top and descend by joining the outermost point laterally (at the level of the zygomatic arch) and then along the outer contour of the cheeks to finish at the chin area. After collecting the data, we classified the central faces and incisors, according to the Leon Williams theory, in 3 main forms: "Ovoid", "square", "triangular".

RESULTS

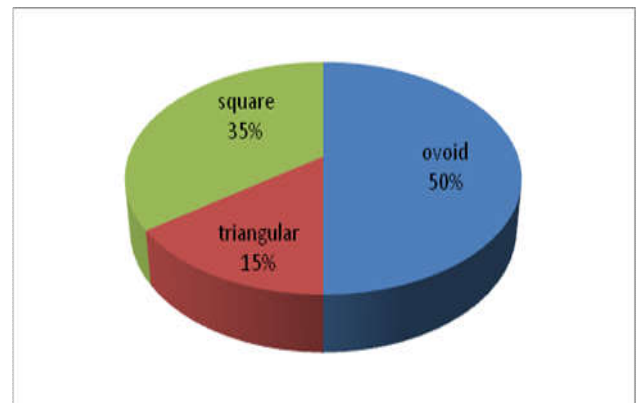
First of all, we will remember that in our work we are interested in the study of a qualitative variable, which, as its name suggests, expresses a quality, here it is the form. The variable is called nominal qualitative when its values are elements of a non-hierarchical category.

So that, its elements can not fall into a logical gradation. It is for this reason that we are interested only in calculating the Chi-square testifying the similarity of form between the face and the upper central incisor in the same patient. Which would confirm or not the theory of Leon Williams.

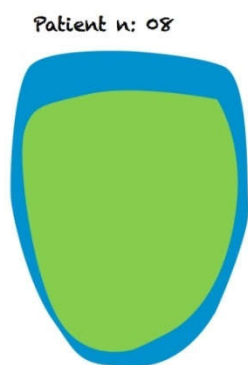
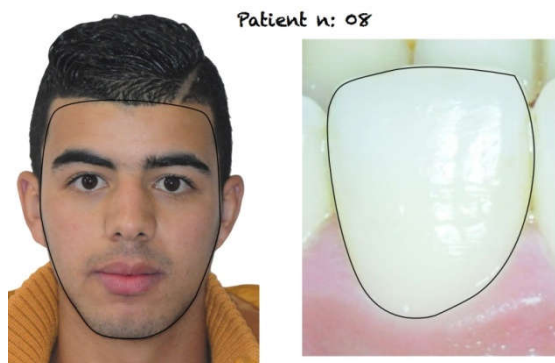
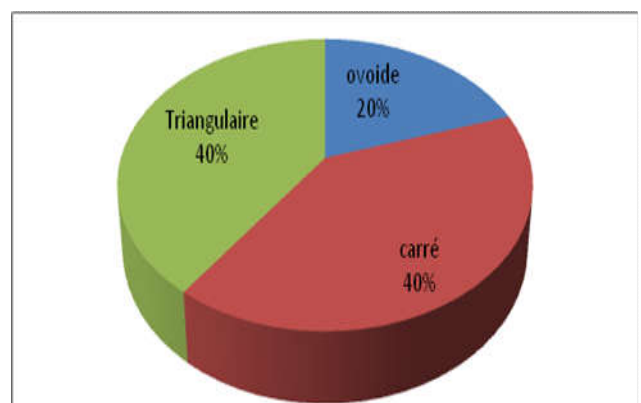
Distribution of patients by gender



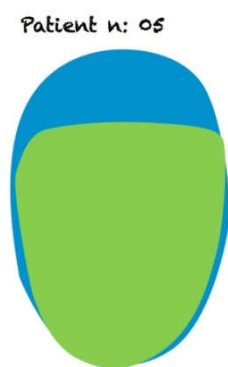
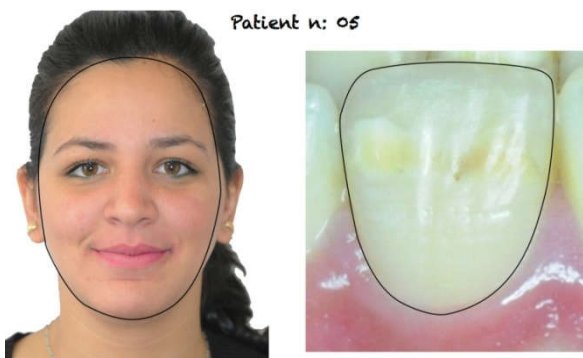
Distribution of patients by the form of the face



Distribution of patients by the form of the central maxillary incisor



- Forme du visage
- Forme de l'incisive supérieure droite



- Forme du visage
- Forme de l'incisive supérieure droite

Chi-square test

	Ovoid face	Square face	Triangular face	Row Totals
Ovoid incisor	30 (20.50) [4.40]	10 (12.30) [0.43]	1 (8.20) [6.32]	41
Square incisor	30 (40.00) [2.50]	49 (24.00) [26.04]	1 (16.00) [14.06]	80
Triangular incisor	40 (39.50) [0.01]	1 (23.70) [21.74]	38 (15.80) [31.19]	79
Column Totals	100	60	40	200 (Grand Total)

The chi-square statistic was equal to 106.6996. The p -value is < 0.00001 . The result is significant at $p < .05$. Which confirms the presence of high correlation between the shape of face and that of the central maxillary incisor.

DISCUSSION

The prosthetic integration of a superior central incisor is a constant challenge for the operator. The choice of the shape of this tooth causes always a problem. Several authors have proposed theories concerning the choice of the shape of the teeth, among which the most retained is that of Leon William's [Lasserre, 2008; Vajao, 2006]. The purpose of our study, was to estimate the correlation between the shape of the face and that of the central incisor, this evaluation is relatively complex because it is a question of comparing two totally different structures and thus confirming or invalidating this theory which dates of 1914 and still remains famous today. In visual perception it is accepted that the "good forms" are those that follow the laws of symmetry, continuity, simplicity and homogeneity. They tend to substitute for "bad forms", influencing aesthetic preferences, which makes visual information subject to the influence of the mind, therefore subjective and not logical, so we tend to confirm no longer doubting our assumptions, we are unable to properly use the principles of implication and calculate probability. We consider an event more likely just because it is easier to imagine. Indeed, neither the face nor the central incisors constitute geometric figures themselves.

So, in ideal terms, we should use evaluation criteria based on geometric calculations. Among the limitations of our study, we evaluated a predominantly male (70%) sample of young and healthy, without marked changes in facial shape and incisors. But in the population in reality there is a considerable prevalence of facial asymmetry and a great variability in facial forms. In addition the gingival environment influences the visual perception, for example the absence of an interdental papilla on an oval tooth gives it a triangular appearance. One way to overcome this clinically would be to conceal the absence of a papilla with a delicate increase in the cervical volume. This could indicate a characteristic square, which indicates that even when the contour shape of the incisor is changed, a satisfactory aesthetic result can be achieved.

The analysis of the results indicates a similarity the chi-square statistic was equal to 106.6996. The p -value is < 0.00001 . although the similarity among women was not as preponderant as detected in men. This can be attributed to sexual dimorphism in the contours of the face. Nevertheless, the similarity between the facial contours and the maxillary central incisor reported in the current study was in agreement with similar results presented by other recent studies (shaweesh et al., 2015) [Björn Maier, 2012] On the other hand our results do not agree with other studies (de oliveira et al., 2010). The use of different approaches in analytical studies, including

quantitative ones, may explain some of the disagreement. The less powerful similarity between the face and upper central incisor in women compared to men is in agreement with Korlakunte and Budihal, [Pavankumar, 2012] although the latter said that this form of study is not reliable for the selection of teeth because no strong association was detected between the shape of the face and that of the upper central incisor.

Conclusion

Within the limitations of our study, it can be concluded through the analysis of the results, that the forms of the teeth and the face were linked. So, the shape of the face can serve as a guide for the selection of prosthetic teeth, or the form of the anterior teeth in the smile design softwares. Nevertheless, before such results become useful for manufacturers in the production of artificial teeth that are aesthetically appropriate for face shapes, further examinations may be needed to see exactly how to correlate different tooth shapes. The most important aspect in this case would not be the form of the incisor itself, but the overall harmony of the result. Understanding the limits of visual perception should prompt us to look for more criteria to classify the shape of the central incisor, in order to reduce the risk of error caused by a subjective misinterpretation. In addition, we must take into account the elements that can harmonize the shape of the tooth with periodontal, perioral structures and the shape of the face as a whole. The sum of all these elements makes the classification of the facial forms and the central incisor more prone to failures [de Oliveira Farias, 2010]. This study showed a relationship between the face and central incisor, serving as a support for the "Williams Law of Harmony". However, further researches are required to analyze and compare other morphological structures, in order to improve the aesthetics and quality of life of patients with dental prosthetic restorations [Vasanth Kumar, 2011].

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