Influence of nasal deviation on perception of maxillary dental centreline position

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Introduction

An important aim of orthodontic treatment is to achieve a coincident dental midline which corresponds with the facial midline. The nose, as a result of its central position within the face, has a major influence on both the appearance and more importantly the perception of symmetry of the face, with deviations resulting in a disturbance of both facial harmony and balance.

The aim of this study was to investigate the impact of nasal deviation on the perception of the maxillary dental centreline position as judged by orthodontists, general dental practitioners (GDPs) and lay people.

Materials and Methods

This was a cross sectional study which aimed to assess the impact of variations in the position of both the dental centreline and nose on facial aesthetics. An image of a smiling female was digitally manipulated with varying degrees of nasal deviation and dental centreline position (Fig 1). Raters from 3 different subgroups were requested to rate the attractiveness on a Visual Analogue Scale (VAS) following incremental changes in dental centreline and nasal position by 1.5mm and 3mm to the right and left.
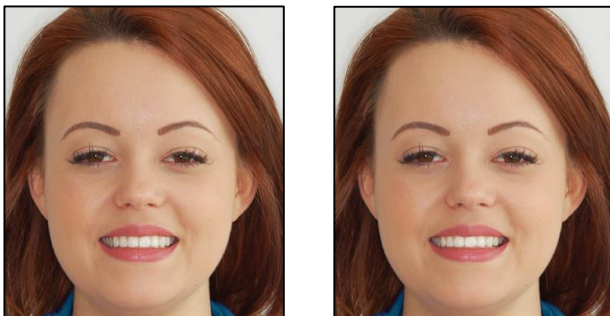

Figure 1. Manipulated images with changes in nose and dental centreline.

Results

Due to evidence for raters having different scales of attractiveness (mean and variance across the same set of images) the scores for each rater were standardised by subtracting their sample mean and dividing by their sample standard deviation (Fig 2).
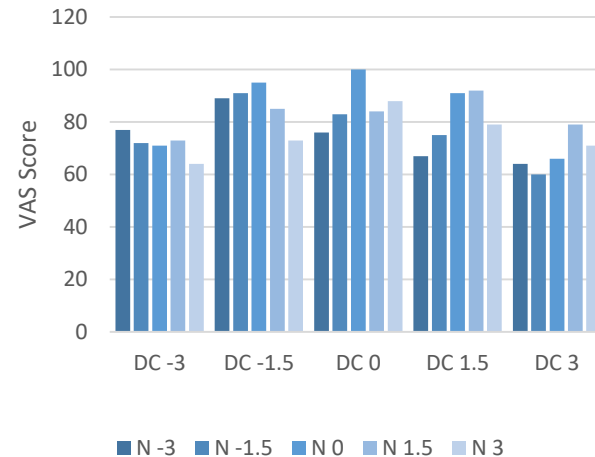

Figure 2. Standardised scores for each rater.

Multiple regression analysis was undertaken to determine estimates of the coefficients β, which indicate the spread of the raters scores in standardised terms (Table 1). This allows a measurement of how far in standardised terms the raters scores deviate from what would be expected if the nose and dental centreline had no manipulation. Therefore, a small coefficient β would indicate that the raters perceived that image to be attractive compared to a large coefficient β, which indicates that the image is considered more unattractive.

Confidence intervals were calculated to assess for differences between groups and provided a range of the observed effect size.

Change (mm)	Coefficient β	95% CI
	DC	
-3	-1.70 (0.12)	-1.46 to -1.94
-1.5	-0.35 (0.12)	-0.11 to -0.59
0	0.00 (0.00)	0
+1.5	-0.54 (0.12)	-0.30 to -0.78
+3	-1.73 (0.12)	-1.49 to -1.97

Table 1. Estimates of the coefficients β.

GDPs and orthodontists were more sensitive to changes associated with the dental centreline, whereas lay people were more sensitive to nasal changes. Nasal deviation to the left by 1.5mm was perceived as more attractive if the dental centreline was also deviated to the left by 1.5mm by GDPs (95% CI, 0.4-13.5), orthodontists (95% CI, 7.6-20.0) and lay people (95% CI, 1.7-15.8). As the degree of nasal deviation was increased to 3mm, it was also rated more attractive if the dental centreline was deviated by 1.5mm in the direction of the nasal deviation. The gender of the rater had no influence on perception (p=0.20), however professionals with less experience were more critical of deviations associated with both the nose and dental centreline (p=0.0081).

Discussion

Overall, there was a preference for the symmetrical dental centreline and nose position. GDPs and orthodontists were more sensitive to changes associated with the dental asymmetry, whereas lay people were more sensitive to nasal changes. Attractiveness scores were influenced by experience, with recent graduates more sensitive to deviations. However, ratings were not affected by gender or ethnicity. The results of the study suggest that clinicians should aim to correct the dental centreline to within 1.5mm of the facial midline as this is the threshold before it is considered unaesthetic.