INTRODUCTION

Craniofacial estimation combines art and science in a discipline that assists in the identification of unknown individuals, in which the technician uses the skull to create and approximation of what the deceased might have looked like when they were alive. Facial Approximation accuracy in children is often uncertain due to the lack of research in this area. \[^{1}\]

While there are currently several methods available to predict the pronasale position, Gerasimov’s two-tangent method is the oldest that is still in use today.\[^{2}\] This study tests Gerasimov’s method to determine whether or not it is precise and accurate enough to use when performing facial approximations on juveniles.

MATERIALS & METHODS

Gerasimov’s method was performed on lateral cephalograms on a sample of 20 12-year-old subjects, consisting of 10 males and 10 females from the AAOF Craniofacial Growth Legacy Collection.\[^{3}\] Gerasimov’s method is as follows (Figure 1): “The first straight line is the prolongation of the general direction of the 1/3 of the lower region of the nasal bones; second straight line is the prolongation of the general direction of the subnasal thorn.” \[^{1}\]

The X-rays were imported into Photoshop 7 and sized to 3000 by 2400 pixels. Some were adjusted for brightness, contrast, and balance.

Two additional layers were added to the file: one with a white point to indicate the location of the actual pronasale, and the other a blackout layer to obscure the soft outline of the nose and the pronasale point during testing.

Gerasimov’s method was applied over the blackout layer, which was subsequently removed and the actual and predicted pronasale were compared. The distance from the actual to predicted pronasale were then measured in pixels in the X and Y axis using the actual pronasale as the origin (0,0). The measurements were then standardized by dividing the X and Y coordinates by the height of the nasal aperture height to account for the X-rays having different proportions and scale. T-tests were performed in Excel to compare the distances against 0.

RESULTS

When comparing the spread of predicted versus actual pronasale positions, females (Figure 2) displayed a bias towards positive X and Y, whereas males (Figure 3) displayed a bias towards positive X and an apparently towards negative in Y, with one instance of the predicted pronasale exactly matching the actual pronasale.

Males also displayed a more even spread overall than females (Figure 2 and 3). The mean of the X and Y values for females and males indicated that only the males were on average closer to the actual pronasale in the X and Y values (Table 1). Females were further away in the X values from the actual pronasale, and males were about equal distance away in both the X and Y values (Table 1).

DISCUSSION

This study has shown that in testing Gerasimov’s method on 12-year-old males and females, the predicted pronasale is not statistically different from the actual pronasale. The exception to this is the X dimension for females. While on average the predicted pronasale location is similar to the actual pronasale, the distance between the predicted and actual can be substantial with Gerasimov’s method, in general, overshooting the actual pronasale position especially in females. While further testing is needed, this might jeopardize the quality of the nose reconstruction, and the expert should utilize this method with that understanding.

WORKS CITED

