H35   Contribution of the Maxillary Sinus Analysis for Human Identification

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After attending this presentation, attendees will understand and appreciate how maxillary sinus analysis can contribute to human identification in forensic cases.

This presentation will impact the forensic science community by showing one more human identification method, the maxillary sinus analysis.

The goal of this study is to evaluate the possibility of individual human identification and sex identification by means of maxillary sinus and propose three identification methods using the referred structures.

The sample was composed of 656 panoramic radiographs, from 328 adult individuals of both sex, more than 20 years, and divided in: Group I/ control: formed by radiographs of patients submitted to orthodontic treatment, but that did not need dental extraction in posterior teeth; and, Group II/experimental: formed by radiographs of patients submitted to orthodontic treatment that needed dental extraction in any posterior teeth. The radiographs had been randomly selected for the sample composition.

Two radiographs were used from each individual, one from the beginning of treatment and the other after a two-year-orthodontic treatment. After that, three methods were employed in each radiograph, in both groups.

In the manual technique I, the configuration of the right and left maxillary sinus was performed, using an acetate sheet on the panoramic radiography and after that.

Using the trace of maximum height and width in the transparency on the panoramic radiography from the previous reported technique, in manual technique II, the aerial cavity of the maxillary sinus was divided into four quadrants (Q1, Q2, Q3 and Q4). Based on that division, the quadrant morphology was compared using overlapping of the acetate sheet related to the radiographs of the same individual.

In the computerized technique, after panoramic digitalization, the configurations of the maxillary sinus were computer-generated and the respective areas and perimeters were calculated, using an image acquisition and analysis software. Besides the previously mentioned measures, the form factor measurement was also used. The form factor value is calculated through the relation between area and perimeter, and expresses how much the morphology of maxillary sinus was preserved if compared to the radiographs of the same individual.

In the analysis of the results, descriptive statistics techniques were used (average and standard deviation), Student's t-test with similar and non-similar variants and paired Student's t-test to quantitative variables. The level of significance used in the statistics tests was 5.0%. Statistical analysis software was used to obtain statistics calculations. The quadrant analysis was performed by visual comparison.

In the manual technique I, the measurement results in the initial radiography and in the radiography after a two-year- treatment were evaluated separately. In both radiographs, regarding all the variables, the averages were higher in male than in female sex.

Between sexes, the only significant difference was observed in the "left width" variable in the experimental group. Differences between the groups were observed in "right width" in both sex and "left width" in female. Regarding those variables, it was observed that the averages were positive in the experimental group and negative in the group control, except for "left width" in female sex.

In the comparison of the quadrant morphology of maxillary sinus in both kinds of radiographs, absence of alteration in the registered individuals as group control was observed. In the experimental group, the presence of alteration in the sinus morphology was observed in eight individuals, all of them in inferior quadrants, related to the loss of dental units.

The computerized technique results shown that in the initial radiograph and in the one after a two-year-treatment, in most of the variables, the averages were higher in male than in female sex.

In the experimental group, except from the "form factor" variables, in both sexes – that presented negative values, all the other averages were positive. Differences between the groups were checked for "right perimeter" in both sex; and "right area" in female. Regarding those variables, it was observed that the averages were positive in the experimental group and negative in the control group.

The present research techniques can be used in human identification cases where only skull fragment is available for anthropological analysis. The incorporation of the analysis added to other evidences may contribute in a decisive way to cases of forensic human identification.

Forensic Odontology, Human Identification, Maxillary Sinus