## G27 The Prevalence of Morphological Variations of the Maxillary Sinus in Panoramic Radiographs of Caucasian Individuals

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**Learning Overview:** After attending this presentation, attendees will understand morphologic classifications of the maxillary sinuses and the surrounding morphological features observed in panoramic radiographs.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by providing insights into the frequency and variability of anatomic parameters of the maxillary sinuses observed in panoramic radiographs and will allow quantifying of their identifying performances.

**Introduction:** In contemporary comparative forensic dental identification practice, the collected Antemortem (AM) evidence contains mainly descriptive registrations and 2D radiographic images. Therefore, certain anatomical characteristics of the maxillary sinus that are visible in 2D radiographs can contribute to the positive identification of unknown individuals.[1,2]

**Purpose:** The goal of this study was to classify specific morphologic parameters of the maxillary sinuses on panoramic radiographs and to quantify their variability for human identification purposes.

**Materials and Methods:** Retrospectively, 500 digital panoramic radiographs from Caucasian male (250) and female (250) individuals between 10 and 70 years old were collected. The following parameters of the maxillary sinuses were analyzed: unilateral or bilateral presence; the peripheral shape; the symmetry of the peripheral contours; the geometry of the medial walls; the unilateral or bilateral visibility of the infraorbital canal, the pterygomaxillary fissure and the infraorbital ethmoidal air cells; the shape of the innominate line of the zygomatic process and the antral septa; the topographic relation between the roots of posterior teeth and the sinus floor; and the presence of alterations in the mucous membrane and cortical bone. Moreover, the maximal height, maximal length, and the area and distance between the right and left sinuses were also measured using GIMP 2.10.4 for Windows®. For inter- and intra-observer reliability tests, randomly 40% of the radiographs were re-assessed and analyzed with Kappa statistics. Analysis of Variance (ANOVA) statistics were applied to quantify the variability of each parameter and to classify them in function of their identifying ability. The analyses were performed sex-specific and compared between left and right maxillary sinus.

**Results:** Currently, not all collected data has been analyzed, but intermediate results and this study hypotheses indicate that: (1) there is a significant prevalence of present maxillary sinuses; (2) the overall peripheral shape of the maxillary sinus has significant variability, with asymmetrical sinuses being more prevalent; (3) the medial walls have mainly oblique medial orientations; (4) there is a high prevalence of visibility of the infraorbital canal, the pterygomaxillary fissure, and the innominate line of the zygomatic process; (5) there is a low prevalence of infraorbital ethmoidal air cells and alterations in the mucous membrane and the cortical bone; (6) the prevalence of antral septa is statistically significant in edentulous or partially edentulous maxillae compared to dentate maxilla; (7) the prevalence of roots projecting in the maxillary sinus is significant; and (8) there is no statistically significant difference in the measures between female and male and right and left sinuses. Certain morphologic parameters of the maxillary sinuses observed in panoramic radiographs can be considered as additional odontological identifiers.[3-6]

**Reference(s):**


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