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Individual Patterns Of Anatomical Structure And Architectonics Of The Midfacial Bones: CT And Cephalometric Study

Trauma

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Objectives

To study the individual patterns of normal anatomical structure and architectonics of the midfacial bones (MFB) and relations between the bony elements and airways peculiar of each type or midfacial architectonics using a spiral computed tomography (CT) and 3-D reconstruction of tomographic images.

Methods

30 CT scans of patients with no signs of midfacial pathology were studied. After creating a virtual model of the midfacial bones and airways, the bone thickness at different sites was determined, as well as the volume and surface area of the bone and airways. 3-D cephalometry was performed in all cases and pneumatization index (PI) was calculated (ratio of bone volume to volume of airways). The statistical correlations between the studied parameters were analysed by Pearson correlation coefficient.

Results

The values of anthropometric indices in most cases were within the normal range. The value of PI ranged from 0.8 to 1.9 (average $1,22+0,29$). The index greater than 1.5 indicates sclerotic type of MFB architecture, and less than 0.9 indicates pneumatic. Statistical analysis found that PI and bone volume to surface ratio were significantly associated with bone thickness in certain areas, but not associated with 3-D cephalometric indexes.

Conclusions

The objective evaluation of MFB architectonics can be determined by PI and bone volume to surface ratio. The 3-D cephalometric indexes do not allow the assessment the MFB architectonics and degree of pneumatization and irregularity of their surface.