



# CEFALOHOF: variation of the cheekbone contour angle with aging – implications for orofacial harmonization: a research study

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## ABSTRACT

**Introduction:** Cephalometric and profilometric studies are fundamental for facial analysis based on objective and clear criteria that can aid clinical decision-making in Orofacial Harmonisation. We present the results of a research study on the variation of cheekbone contour with ageing and its relationship with cephalometric parameters, objective facial analysis and Patient Reported Outcomes.

**Objectives:** To evaluate the variation in the cheekbone contour angle across different age groups using soft-tissue cephalometric analysis, and to investigate its association with age-related morphological changes in the malar region. Additionally, to compare the values obtained across age groups and with the reference values reported in the literature, assessing the clinical utility of this parameter for objective facial analysis and treatment planning in Orofacial Harmonization.

**Methods:** This was an observational, cross-sectional, prospective research study approved by the Ethics Committee of Fernando Pessoa University. Seventy-five women were evaluated and divided into five age groups (18-24; 25-34; 35-44; 45-54; >55). Each participant voluntarily signed three free and informed consent forms (participation in the study, telerradiography, and use of photographs). A cephalometric analysis of the soft tissues was performed using parameters previously described in the literature to assess morphological changes associated with ageing. Among the parameters evaluated, the cheekbone contour angle was analysed to determine the projection and contour of the

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cheekbones in the different groups. The values obtained were compared taking into account the reference limits described for this parameter. Inclusion criteria: over 18 years of age, agreement to terms and consent, X-ray and photographs. Exclusion criteria: previous cosmetic treatments, medical conditions that limited exposure to radiation, deformation in the analysed region, and other conditions not mentioned that prevented the use of the methodology.

**Results:** The cheekbone contour angle tends to decrease with age, indicating a progressive reduction in the projection and definition of the cheekbones. This trend is consistent with the biological processes associated with ageing: bone remodelling of the zygomatic region, redistribution of fat compartments, and loss of soft tissue elasticity. Despite this trend, it was found that most age groups had mean values within the established reference limits, suggesting that age-related changes occur gradually and may vary significantly between individuals. The youngest group had a mean value slightly above the maximum reference limit, a result that was influenced by an extreme value observed in one of the participants. These observations reinforce the idea that, although ageing is associated with a decrease in malar projection, there are additional factors — genetic characteristics, individual anatomical variations, and environmental influences — that may contribute to the observed variability. From a clinical point of view, the decrease in malar contour may be related to other changes in the midface, such as deepening of the nasolabial fold and ptosis of facial tissues.

**Conclusion:** Analysis of the cheekbone contour angle shows that there is a tendency for this parameter to decrease with ageing, reflecting the progressive loss of projection and definition of the zygomatic region. However, in most cases, the values remain within the reference limits, highlighting the existence of individual variability. Thus, the evaluation of this angle is a useful tool in the analysis of morphological changes in the face and can contribute to a better understanding of the ageing process, as well as to the planning of clinical interventions aimed to harmonizing and restoring malar volume.

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