

*An Evaluation of Craniofacial Reference Planes in
Natural Head Position while Standing and Sitting
(A comparative Photographic and Cephalometric study)*

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By:

Laith Hamood Aswad AL-Salmany

B.D.S.

Supervised by:

Prof. Dr. Akram Faisal Al-Huwaizi

B.D.S, M.Sc., Ph.D.

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Abstract

Traditionally, many reference lines and planes of the human skull have been used in an attempt to depict the head in a natural head position (NHP), which is a relaxed/balanced position when looking ahead at their eye level. Several authors have, however, questioned the validity of intracranial reference because of their variability to the horizontal plane, related to the head in NHP. Therefore, the aim of this study was to perform a cephalometric analysis to evaluate the variability of craniofacial reference planes in relation to true horizontal plane in standing and sitting positions.

Eighty six Iraqi adult subjects (30 males and 56 females) with an age ranged between 18-25 years having normal occlusion and no facial deformity were chosen. NHP was obtained by asking the subject to look straight into his eyes in a mirror 1 meter away after performing neck bending exercises. A digital lateral photograph was taken at NHP in standing and sitting positions and a lateral cephalogram was taken for each subject in standing position with the head oriented by the aid of a cephalostat. The photographs and cephalograms were analyzed using AutoCAD program to measure ten angles formed by lines connecting different hard and soft tissue landmarks and N'-A'/TVL angle was chosen to represent the rotational position of the head.

Results of the study can be summarized as:

- Non-significant difference in NHP between standing and sitting positions but with a high individual variation.
- The horizontal craniofacial reference planes (SN, FH, KW, PP, NHA and ala-tragus planes) showed high variability to true horizontal plane.
- Suggested bisecting lines of the angles SN/FH, SN/KW and SN/PP showed remarkable approximation to true horizontal plane in this sample.

- And lastly but not the least, the bisecting line of the angle SN/FH is almost horizontal and strongly correlated with all intracranial reference planes measured in this study and hence can be used to orient the head in natural head orientation in cases of doubt.