Original Article

SNA and SNB Measurements: A Comparative Assessment between Measurements in Conventional 2D Cephalogram and 3D Cone-Beam Computed Tomography-Generated Values

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Abstract

Background: The aim of the investigation was to clearly locate subspinale (point A) and supramentale (point B) on three-dimensional (3D) cone-beam computed tomography (CBCT) images and to compare the angular and linear measurements that are dependent on these anatomic landmarks with two-dimensional (2D) manual and digital cephalometric tracings. **Materials and Methods:** A sample of 30 North Indian subjects between 13 and 22 years of age who required CBCT imaging for treatment planning was taken. For each patient, standardized film and digital cephalograms were taken. Standardized head positioning was done for CBCT imaging. The following four groups were evaluated for statistical analysis: Group 1: Dolphin, Group 2: CBCT, Group 3: Manual tracing 1, and Group 4: Manual tracing 2. Analysis of variance was applied to find out the differences in parameters among groups. **Results:** The results showed that the differences between most of the measurements derived from the landmarks identified on film and digital 2D cephalometric radiographs compared with CBCT-derived cephalograms were statistically significant. Point A, which is difficult to locate on 2D cephalograms, could be identified and measured accurately and more reliably on 3D CBCT-generated cephalograms. **Conclusion:** 3D CBCT-generated cephalograms can be successfully used for accurate and reliable cephalometric analyses.

Keywords: Cephalogram, CBCT, subspinale, supramentale

Introduction

In orthodontics, diagnosis is of an anatomic or morphologic nature because dentofacial anomalies that concern the orthodontist are, in their final analysis, deviations from an accepted anatomic norm. These anatomic deviations may be pathognomonic of, or sequelae to certain local and general bodily disturbances of prenatal or postnatal origin, or both.[1] Two-dimensional (2D) cephalometric measurements from lateral and frontal cephalograms have been widely studied, since the advent of cephalometrics by Broadbent[2] and Hofrath[3] in 1931. Since the development of cephalometric radiology, numerous cephalometric analyses have been proposed. Nevertheless, a cephalometric analysis is a 2D representation of a three-dimensional (3D) structure. Thus, these measurements on radiographic images are subject to projection and/or measurement errors, and personal variations.[4]

Craniometric landmarks are easily distinguishable in skulls but not in cephalograms. Wrong identification of the landmarks may lead to wrong measurements of variables, both angular and linear, which are dependent on those landmarks. This may result in an error in the

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