

Use of 3-Dimensional Cephalometric Analyses in Planning and Evaluation of Orthognathic Surgery

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CASE STUDY

Changes occurring in patient's facial profile as a result of dental movements are very important to know for practitioners (orthodontists and maxillofacial surgeons) as well as for patients. These changes are particularly important in patients indicated for orthognathic surgery. In individuals with severe dento-skeletal alterations in Class III skeletal discrepancies, maxillary advancement and mandibular set back surgery offers improvement in the correction of malocclusion and skeletal disharmonies in terms of improvement of the facial profile¹.

The skeletal changes and stability of orthognathic surgery as assessed in two dimensions using postero-anterior cephalograms, lateral cephalograms, and panoramic radiographs are well documented in published reports²⁻⁵. Recently, there has been increasing interest in the use of cone beam CT (CBCT) for three-dimensional cephalometric analysis and craniofacial reconstruction in orthodontic and orthognathic surgical treatment planning⁶.

A surgical correction of a skeletal Class III deformity was planned for a 20-year-old female patient. A cone beam computed tomography scan (CBCT) was obtained preoperatively using the SCANORA® 3Dx (SOREDEX®, Tuusula, Finland). The acquired CBCT data was imported as DICOM (Digital imaging and communications in medicine) format in InVivoDental software (Anatomage, San Jose, CA). These images were edited by the 3D Analysis software module of InVivoDental. Points of interest for the cephalometric analysis in order to determine the sagittal position of the upper and lower jaw were placed. Cephalometric analysis were processed digitally by software. Preoperatively SNA was 73.21, SNB 81.91, and ANB 8.7 degrees. Bimaxillary surgery (maxillary advancement and mandibular set back) was planned and performed.

A control CBCT scan was taken five months postoperatively. Cephalometric analysis were performed according to the preoperative procedure. Postoperatively SNA was 79.96, SNB 78.71 and ANB 1.25.

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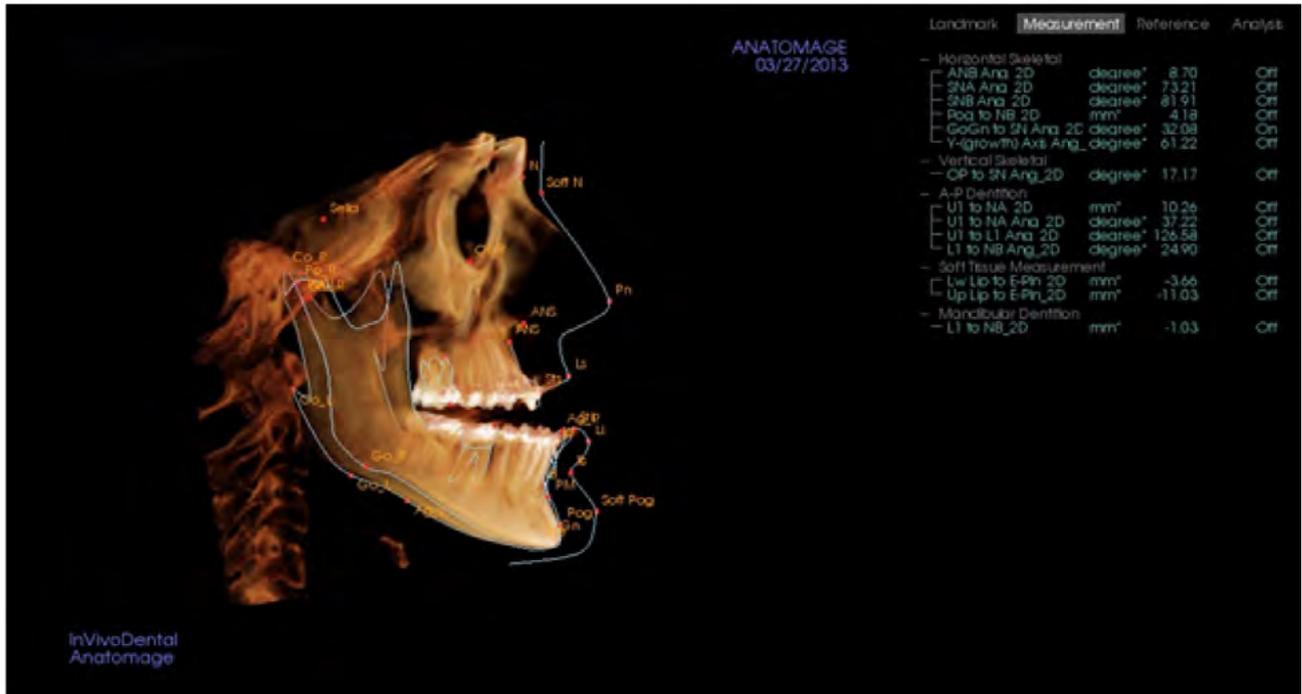


Fig. 1 Preoperative cephalometric measurements.

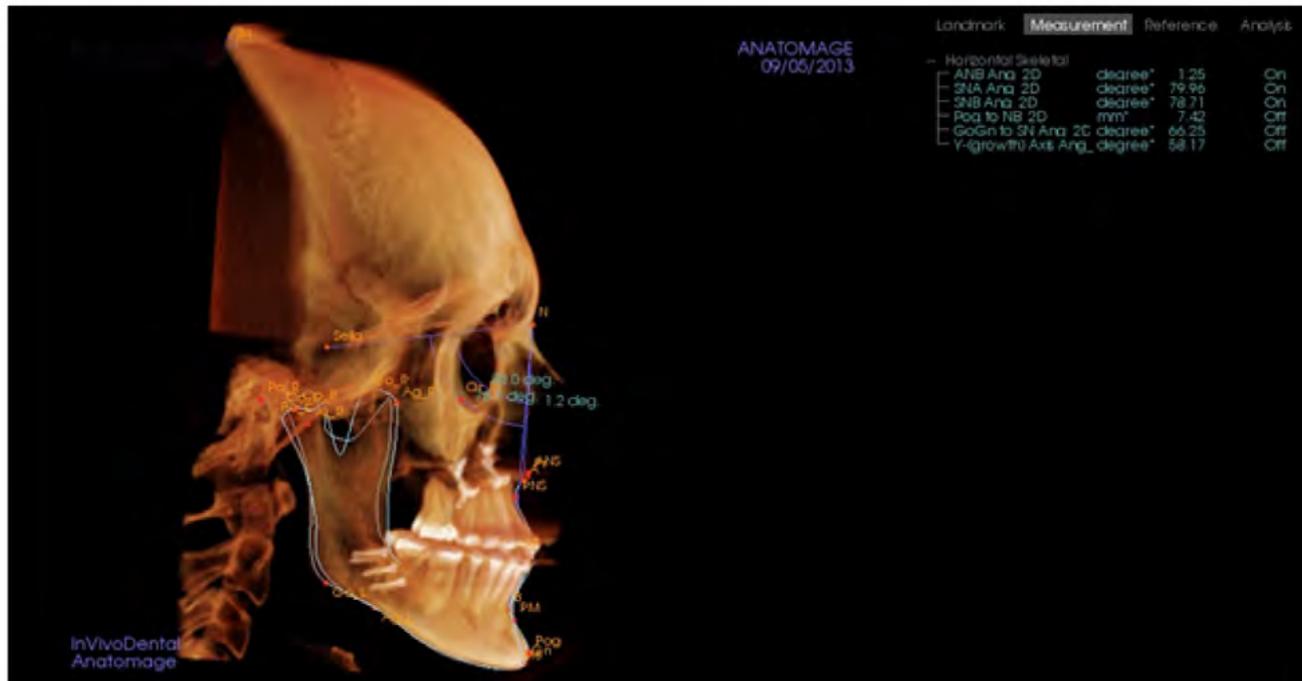


Fig. 2 Postoperative cephalometric measurements.

CASE STUDY

Discussion

The present case is a good surgery example of severe skeletal class III deformity with a good postoperative outcome. Lateral cephalograms are traditionally used for cephalometric analyses in diagnosis and treatment planning. The development in radiography and the possibility of acquiring 3D images offer the opportunity of bilateral positioning of the points of interest as well as automatic software measuring. Those application options save time and deliver a reliable status of skeletal relationships.

Conclusion

The option to use CBCT scans for 3D cephalometric analyses allows the possibility to perform preoperative diagnosis easily and also contributes to the postoperative evaluation of the results of an orthognathic surgical outcome.

However, additional studies with more patients are necessary to provide the reliability and reproducibility of this method.

References

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