Surgical control of pitch, roll, and yaw maxillary

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Introduction

The Fox plane plate (FPP) has been used since the beginning of the 20th century to analyze the inclination of the occlusal plane in prosthodontics[1]. In orthognathic surgery the three-dimensional location of the maxilla is one of the primary goals for the success of this procedure, complications associated with alterations in maxillary pitch, roll and yaw have been reported.[2]

Objective

Propose the use of a modified Fox platine witch a lasser light and an occlusal registration to transfer the occlusal plane to an extraoral reference that allows us assess more accurately with the different facial planes.

Materials and methods

An occlusal registration is made using adhesion silicone of a 3D model of the patient, which is supported on a modified Fox plane plate with a red cross-shaped laser There must be a symmetrical contact of the occlusal surfaces of all teeth, without any inclination in the model(Figure 1,2,3). Once the registration is obtained, it is ratified with the patient's occlusal marks, the FPP is inserted after fixation of the maxilla, and proceeds to the roll, yaw and pitch evaluation are performed in different planes.

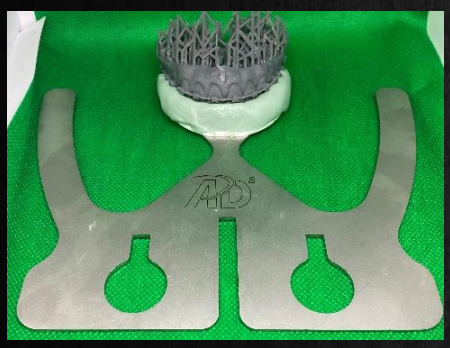

Figure 1 registration of a 3D model

Figure 2 oclusal registration

Figure 3 modified Fox plane plate

Roll

A frontal view shows the parallelism between the superciliary arches, l, nasal base with the anterior border of the FPP determining if there is any alteration in the transverse plane.

Figure 4 frontal view

Yaw

In a superior view, the midline of the footplate must coincide with the midface, the border of the PFF must be parallel to the floor without any inclination.

Figure 5 superior view

Pitch

In a lateral view, the inclination of the occlusal plane is evaluated in relation to the Camper and Frankfort planes, determining alterations in the anteroposterior axis

Figure 6 lateral view

Discussion

Achieving an adequate three-dimensional position of the jaw is a key goal in orthognathic surgery. Alterations in this position can compromise the results or even require a new operation. Intraoperative measurement techniques such as the use of an extraoral Kirschner wire or marks on the zygomaticomaxillary buttresses and the pyriform edges are not exact.[3] Heufelder et all analyzed the precision of custumize surgical guides in maxillary positioning between the surgical plan and postoperative position, finding a general mean deviation of 0.39 mm in all axes. The mean deviations on the X, Y and Z axis were 0.30, 0.33, and 0.72 mm respectively.[4]

Conclusion

By adding an occlusal registration to the FPP, transferring and amplifying the occlusal plane to an extraoral reference, the laser light allows us to more accurately assess the success of our movements. In the case of alterations, they can be corrected in the same surgical act.

Conflicts of interest

The authors declare no conflicts of interest

Bibliography

1)Sadr K, Sadr M. A study of parallelism of the occlusal plane and ala-tragus line. *J Dent Res Dent Clin Dent Prospects*. 2009;3(4):107-109.

2)Kim S., Lee K., Yu H., Jung Y., Baik H. Three-dimensional effect of pitch, roll, and yaw rotations on maxillomandibular complex movement. *J Craniomaxillofac Surg*. 2015;43(2):264-273. doi:10.1016/j.jcms.2014.11.022

3)Van Sickels J.E., Larsen A.J., Triplett R.G. Predictability of maxillary surgery: a comparison of internal and external reference marks Oral Surg Oral Med Oral Pathol, 61 (6) (1986), pp. 542-545

4)Heufelder M., Wilde F., Pietzka S. Clinical accuracy of waferless maxillary positioning using customized surgical guides and patient specific osteosynthesis in bimaxillary orthognathic surgery J Craniomaxillofac Surg, 2017;45 (9):1578-1585