

very sophisticated and expensive. The virtual articulator developed by Szentpétery, from the Martin-Luther University of Halle [Szentpétery, 1997], [Szentpétery, 1998], [Padros, 2006] is based on a mathematical simulation of the movements that take place in an articulator. It is a fully adjustable three-dimensional virtual dental articulator, capable of reproducing the movements of an articulator. In addition, mathematical simulation contributes to offer some possibilities not offered by some physical dental articulators, such as the curved Bennett movement or different movements in identical settings. This makes it more versatile than a physical dental articulator.^{4,9}

Advantages of Virtual Articulator

- Provides best quality of communication between the dentist and dental technician
- Simulating real patient specific data
- Analyses both static and dynamic occlusions⁸.

Limitations of Virtual Articulator

- Cost effective as it requires the digital scanners, digital sensors, software, and different types of virtual articulator models mimicking the mechanical ones according to the patient need.
- Knowledge about the CAD/CAM technology, mechanical articulators, designing and modeling of virtual articulators is technique sensitive⁹.

Validation

The virtual articulator has also been compared with the mechanical articulator in orthognathic surgery, to establish ideal

maxillary position and for preparing surgical splints. Song and Baek carried out a study on 25 patients previously subjected to orthodontic treatment and who were programmed for Le Fort 1 fracture in the maxilla and a sagittal osteotomy in the mandible. The authors compared the precision of the surgical model and of the splints, concluding that the virtual method is more precise than the conventional approach – though there were no significant differences between them. In this same line, Ghanai et al on 6 patients programmed for repositioning of one or both Maxilla, compared the deviation between the two methods using Micro scribe G2X (Immersion Corporation, San Jose, CA, USA)^{9,10}. The authors concluded that the virtual articulator can precisely reproduce conventional planning and help inexperienced surgeons to obtain good results.

Conclusion

The virtual articulator is a precise software tool dealing with the functional aspects of CAD/CAM systems substituting mechanical articulators. Haptic based virtual reality System's touch enabled virtual articulators allow lab technicians to actually feel how the teeth, including new restorations produced will fit together in patient's mouth.

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