

## Analysis of an Automated Bite Creation Tool for 3D Dental Software

David A. Chenin, DDS  
Ayse Turley, DDS, MPH

### Background:

Accurate occlusal relationships are paramount for many types of 3D dental software applications. The accuracy of a software tool used to automatically set two dental arches into a centric occlusion (CO) relationship was investigated. The study compared automated bite creation software tool CO end product to a CO relationship produced through a rigidly controlled gold standard process.

### Summary of study protocol:

- A. Cases were collected randomly from a large pool of cases & selected on the basis of complete records and excluded based on specific exclusion criteria such as those possessing anterior openbites.
- B. Each case was digitized into a "non-occluded" 3D virtual models. (See below)



- C. Next, each case had the CO articulated through a "gold standard" process. The "gold standard CO" file was saved for later analysis. (See below)



- D. Last, the original "non-occluded" models were articulated via automated software tool which maximizes contact through software algorithms creating a CO. The "automated CO" file was saved for later analysis. (See below)

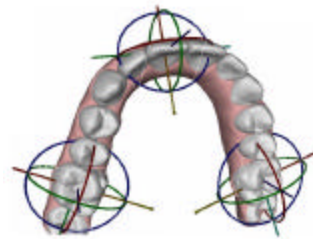


### Summary of method for CO analysis:

- E. The two files were compared in 3D through a superimposition technique. The lower arches were superimposed and locked to one another in 3D space. As a result, any difference between the two CO relationships would be expressed in the upper arch. (See below)



- F. Three reference points of analysis were chosen for each case: Tooth #3, #8, & #14. (see below)



- G. The differences between the two CO relationships were then analyzed by computer resulting in 3 data points (X, Y, Z) measurement for each tooth selected in the upper arch. (see below)

Case 1	X axis (BL)	Y axis (MD)	Z axis (OG)
Tooth #3	-0.11088	-0.136868	-0.035098
Tooth #8	-0.212403	0.025477	-0.007961
Tooth #14	-0.030275	0.176118	0.051817

### Summary of results:

- H. The data collected from the study indicated that the automated bite creation software tool is reliable in many cases.

