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COMPARISON OF TOOTH CONTACTS BETWEEN PROGRAMMED AND AVERAGE-VALUE SETTINGS ON A FULLY ADJUSTABLE ARTICULATOR

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Aims and objectives

The study was designed to assess the reproducibility of excursive tooth contacts on a commonly used articulator and facebow system and also to determine if programming the articulator using the CADIAX Compact Computer Axiographic data would have any affect on the accuracy of tooth excursive contacts. It was also hoped to be able to quantify the accuracy of the chosen articulator (D5a) both when programmed and set to average values giving some clinical relevance to each procedure.

Materials and methods

Intraoral excursive tooth contacts were compared with contacts made on both an unprogrammed and programmed Denar D5a articulator. 20 subjects were used to obtain study models which were mounted using a facebow transfer in Intercuspal Position. Cadiax Data was used to customise the Horizontal Condylar Inclination, the Saggital Condylar Inclination, Immediate side shift together with top wall and rear wall settings. Left and right intraoral excursive contacts were examined and transferred from the mouth to the articulator using wax bites. Comparison was made of the percentage correlation of the contacts seen on both articulator settings with the contacts recorded on wax in the mouth. The null hypothesis states that there is no statistically significant difference between the excursive tooth contacts reproduced on the average value and programmed Denar D5a articulator when compared with the same excursive recorded in the mouth.

Results and discussion

The results of the study show that there is a statistically significant difference in the correspondence between the excursive tooth contacts reproduced on the Denar D5a articulator set to average values and the same articulator programmed using data obtained from a Cadiax when compared with the excursive contacts recorded on wax in the mouth.

The results for correspondence of left and right lateral excursive tooth contacts is as follows.

Right lateral

Median (range)

Average: 2.1 (0, 60)

Programmed: 14.2 (0, 41.8)

[Significantly greater percentage of overlap by Programmed method; Wilcoxon paired signed ranks test $p=0.003$]

Left lateral

Median (range)

Average: 3.5 (0, 60)

Programmed: 18.5 (0, 80)

[Significantly greater proportion of teeth overlapping by Programmed method; Wilcoxon paired signed ranks test $p=0.001$]

Using the Wilcoxon paired signed ranks test both the proportion of corresponding tooth contacts and the percentage of corresponding tooth contacts are significantly better, or closer to the contacts produced in the mouth when examined on the programmed articulator. The null hypothesis can thus be rejected.

Due to the constraints of using a rigid mechanical framework in attempt to reproduce a the dynamic movements of a biological system, the articulator will never completely replicate the anatomy and physiology of the temporomandibular joint. However, notwithstanding the limitations of the articulator itself, the clinical relevance of these conclusions would suggest that where restorations are made for a patient using articulated models then the occlusal guiding surfaces of the restorations will be closer to the desired occlusal scheme which is planned for the restoration if the work is completed on a programmed articulator.