ASSESSMENT OF MASTICATORY FUNCTION USING BITE FORCE MEASUREMENTS AND CEPHALOMETRICS IN PATIENTS TREATED WITH ORTHOGNATHIC SURGERY – A PROSPECTIVE STUDY

By

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ABSTRACT

Purpose: This study was conducted to assess the masticatory function, using bite force and cephalometrics, in patients treated with orthognathic surgery, and to evaluate the extent to which post surgical changes can be explained by changes in the mechanical advantage of masseter and temporalis muscles.

Method: 20 patients undergoing variety of orthognathic surgery procedures were analysed. Patients were divided in two different ways: Group A: depending upon the jaw involved in surgery and Group B: depending upon the type of surgery performed which involved either advancement (mandibular advancement alone, maxillary advancement or inferior repositioning, alone or combination of these two) or setback (mandibular setback alone, maxillary intrusion or a combination of the two) procedure. Masticatory function was assessed by measuring the maximum bite force using a customised bite force machine, once just before surgery and at 1st month and 3rd month after surgery. The mechanical advantage of temporalis and masseter were determined from landmarks on lateral cephalometric radiographs taken both before and after surgery. The moment arms for both muscles were calculated, before and after surgery, and mechanical advantage was measured. 20 control subjects with normal dentoskeletal relationship were also analysed and compared to patients.

Results: Of all the 20 patients analysed in this study, none were able to recover their pre operative bite force levels even 3 months after corrective orthognathic surgery. Both male and female patients showed lower biting forces when compared to controls, but male patients showed faster recovery, after surgery, when compared to female patients. Patients undergoing only maxillary surgery showed statistically significant improvement and recovery of bite forces, at the

end of 3 months when compared to preoperative levels, as against the patients undergoing only mandibular or combined double jaw surgery. There was no statistically significant difference in the maximum bite forces of patients who underwent advancement surgery, when compared to those who underwent setback surgery. But the recovery from preoperative levels to 3rd month assessment was significantly faster for patients undergoing setback surgery. The mechanical advantage for masseter increased, but the temporalis advantage did not. When the bite force changes were compared to changes in the moment arms and mechanical advantage, there was no evidence to suggest that bite force changes correlated with the extent of mechanical advantage changes.

Conclusion: For patients treated with superior repositioning of maxilla and reduction in mandibular length, mechanical advantage increased. For patients treated with lengthening of mandible, mechanical advantage decreased. There was no statistically significant difference in maximum biting forces between the above two, 3 months after surgery, but the recovery of bite forces were faster for patients treated with maxillary impaction and mandibular setback. Patient's bite forces improved from 1st month to 3rd month after surgery, regardless of changes in mechanical advantage, since there was no statistically significant correlation between the two.

Key words: bite force, masticatory apparatus, orthognathic surgery