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Impact of orthodontic finishing on masticatory function: A preliminary data analysis

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Introduction: Orthodontic finishing and detailing of dental occlusion is the final and an important stage of orthodontic treatment. However, information about the impact of quality of finishing on masticatory function is limited. This study aims to investigate whether superior orthodontic finishing is associated with balanced activation of masticatory muscles and good outcomes for self-assessment of chewing function.

Methods: Eighteen healthy adults who completed orthodontic treatment more than 6 months prior to recruitment were enrolled in the study. The level of orthodontic finishing was measured according to the American Board of Orthodontics (ABO) Cast-Radiograph scoring system. Surface electromyography was used to compare the relative symmetry in muscle activation of right and left anterior temporalis and masseter muscles, and to evaluate the work produced by the masticatory muscles during experimental chewing and clenching tasks. Pearson correlation coefficients were used to test relationship between the study variables.

Results: A positive correlation between the ABO score and the work produced by the temporalis and masseter muscles per unit time was found ($p=0.016$, $r=0.508$). Poor finishing resulted in greater muscular work and muscular balance for both the temporalis ($p=0.036$, $r=0.435$) and the masseter ($p=0.01$, $r=0.544$). The chewing rate correlated inversely with ABO score ($p=0.033$, $r=-0.433$). That is, participants with poor finishing chewed at a lower frequency. ABO scores did not correlate significantly with self-assessment of chewing function.

Conclusion: This preliminary analysis suggests that superior orthodontic finishing is not correlated to patient's self-perception of chewing ability. Superior orthodontic finishing is correlated to decreased muscular work and decreased muscular balance for anterior temporalis and masseter muscles, and higher chewing frequency.