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# Muscle Activity Comparisons In Dental Hygiene Students When Using Different Fulcrums While Scaling

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## **Muscle Activity Comparisons In Dental Hygiene Students When Using Different Fulcrums While Scaling**

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*The high incidence rate of cumulative trauma disorders in dental hygienists attests to the musculoskeletal problems experienced by dental hygienists. Research is ongoing to investigate ergonomic practices that will minimize muscle trauma when providing scaling and root debridement. The purpose of this study was to determine differences in the activity of four forearm muscles, (extensor carpi radialis longus, flexor carpi ulnaris, biceps brachii and pronator teres) when using five different finger fulcrums while scaling in dental hygiene students.*

*A convenience sample of 29 consenting senior dental hygiene students participated in the study. Using a 4 x 5 counterbalanced research design, participants used a Gracey 11/12 curet to scale artificial calculus from each permanent first molar tooth on a typodont. While scaling, each participant had sEMG sensors attached to each muscle under investigation to measure muscle activity via electromyography. Participants scaled using one of 5 finger fulcrums (opposite arch, standard intra-oral, basic extra-oral, cross arch and finger on finger) on 5 different typodonts resulting in a total of 20 sEMG readings per participant. The highest amount of muscle activity was observed in the pronator teres ( $X=28.73$ ) and the least in the biceps brachii ( $X=13.39$ ).*

*Data analysis with two-way ANOVA revealed a statistically significant difference only in the activity of the biceps brachii muscle when a change in fulcrum occurred. ( $p=0.0002$ ). Using an average of all four muscles ANOVA revealed no statistically significant differences when comparing scaling with different fulcrums and the amount of muscle activity generated ( $p=0.0776$ ) In this clinical study that measured the activity of four forearm muscles when scaling, only the biceps brachii was affected by a change in fulcrumming technique.*

*Results suggest that similar muscle activity is produced when scaling regardless of the muscles measured and the type of fulcrum used. More research is needed to clarify the role of fulcrums and individual muscle activity in the ergonomic practice of dental hygiene.*

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