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Dimensional Changes of Masticatory Muscles Following Camouflage Orthodontic Treatment in Skeletal Class III Patients: A Pilot MRI-Based Clinical Trial

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Abstract

Objectives: To evaluate dimensional changes in masticatory muscles, dentoskeletal relationships, and correlations between muscular and vertical skeletal changes following Class III camouflage treatment.

Methods: This clinical trial included ten participants with skeletal Class III malocclusion who met the eligible criteria and provided them non-extraction camouflage treatment using Class III elastics. MR images (T1W) and lateral cephalograms were taken before treatment (T0) and after achieving normal occlusion (T1). Length, width, and cross-sectional area (CSA) of the masseter (MM), temporalis (TM), lateral pterygoid (LPM), and medial pterygoid (MPM) muscles were measured using MicroDicom DICOM viewer software. Dentoskeletal changes were assessed by Dolphin® imaging software. Statistical analyses were conducted using IBM® SPSS® software to analyze differences between T0 and T1, and correlations.

Results: Significant changes were observed in jaw-closing muscles, with increased length (MM 1.0±0.4 mm, TM 0.7±0.2 mm, MPM 0.5±0.5 mm), decreased thickness (MM 1.3±0.7 mm, TM 0.2±0.2 mm, MPM 0.8±0.6 mm), and decreased CSA (MM 79.3±70.5 mm^2, TM 16.2±14.9 mm2, MPM 16.2±8.8 mm^2). Minimal changes were noted in lateral pterygoid muscles. No significant correlations were found between muscular changes and vertical skeletal changes.

Conclusions: Masseter, temporalis, and medial pterygoid muscles exhibited significant changes following Class III camouflage treatment using Class III elastics, but no significant correlations were observed between muscular dimensional changes and vertical skeletal changes.

Keywords: camouflage treatment, Class III elastics, masticatory muscles, MRI, skeletal Class III