Identification of marker proteins by orthodontic treatment : relationship of RANKL in the gingival crevicular fluid and of amylase in whole saliva with orthodontic treatment

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Abstrak

Orthodontic medical treatment is performed to move a tooth to the optimal position to obtain optimal occlusion. Orthodontic treatment is accompanied by mechanical stress due to orthodontic force and by psychological stress that is experienced as pain or displeasure. The purpose of this study was to identify stress marker proteins during orthodontic treatment. Levels of receptor activator of NFκB (RANKL) and heat shock protein 70 (HSP70) in the gingival crevicular fluid (GCF) were analyzed as markers of mechanical stress, and levels of chromogranin A (CgA) and amylase in whole saliva were analyzed as markers of psychological stress. GCF was collected from control and experimental teeth at initiation of treatment and 24 h after treatment. Whole saliva was collected before treatment, at initiation of treatment and 24 h after treatment. RANKL was expressed at 24 h after treatment in the experimental GCF, but not in the control GCF. HSP70 appeared to be constitutively expressed in GCF, and its levels showed no major change between the control and experimental groups from initiation of treatment to 24 h after treatment. Amylase activity in whole saliva was enhanced at 24 h after treatment compared to control, but CgA levels showed little change between the groups. These results indicated that RANKL and amylase may be the candidate markers for mechanical and psychological stress, respectively, during orthodontic treatment, even though the total protein concentration and amylase activity displayed a large standard deviation among subjects. Further studies are therefore required to establish these markers for clinical use.