Gingivitis is the most common type of periodontal disease, established by local factors such as biofilm, majorly increased by orthodontic treatment. It is reversed by thorough mechanical and chemical plaque control. One of the chemical agents used to control plaque formation is chlorhexidine. The purpose of this study is to compare the clinical benefits of the adjunctive use of two chlorhexidine gels of different concentrations upon inflammation caused by fixed orthodontic appliances. Results show that efficacy of different concentrations of chlorhexidine are still under debate, depending more on the patient’s compliance upon plaque control.

Keywords: chlorhexidine, plaque control, orthodontic treatment, gingival inflammation

This study was conceived as a prospective clinical trial. Twenty-six patients aged between 20 and 30 years receiving fixed appliance orthodontic treatment in a private practice, were selected to take part in this study. The nature of this trial was undoubtedly explained and understood by each patient before signing a written consent. The approval of the Ethics Committee was obtained.

Only clinical healthy patients were included. Subjects with medication or previous periodontal treatment were excluded, as well as smokers. The patients were undergoing either upper or both upper and lower fixed appliance with a 018 standard edgewise system with brackets. They were undergoing treatment for at least 6 months. One of the mandatory conditions for the subjects to take part in this study was to have at least one site with signs of active gingival inflammation on the basis of the following criteria: bleeding on probing (BOP) at least 30% and a gingival index GI (LBé and Silness) greater than 0.5.

The patients were split in two groups. Each subject was clinically examined and plaque index (PI), simplified oral hygiene index (OHI-S), bleeding on probing (BOP), gingival index (GI) and probing depth (PD) were assessed.

The first group (3 males and 10 females) received after scaling, a subgingival application of 10 mL 0.2% chlorhexidine gluconate gel (Glucosite, Cerkamed). Subjects in the second group (4 males and 9 females) received after scaling, a subgingival application of 10 mL 0.1% chlorhexidine digluconate gel (RxPeriouch, Dental Life Sciences). Subjects in both groups were then instructed for correct oral hygiene, and further applications of the chlorhexidine gels for the next 2 weeks. The gels were applied twice daily, after tooth brushing and mouthwash, 10 mL each time for 1 min. Instructions regarding oral hygiene and how to use the study products were explained by an individual who wasn’t involved in the examination procedure. On day 14, subjects were clinically examined again and PI, OHI-S, BOP, GI and PD were assessed by the same periodontist.

T-test and Mann-Whitney U test for 2 samples were used to compare differences between the two groups and sessions. A p<0.001 was considered as statistically significant.
Results and discussions

Table 1 shows the means of PI, OHI-S, BOP, GI and PD for the two chlorhexidine gels at baseline and 4 weeks. T-test was used to compare differences in assessed values within group and Mann-Whitney U test for 2 samples for the comparison between groups. No statistically significant differences were found for baseline parameters between groups. At the 4 weeks examination, there was a significant decrease in BOP, GI and PD in both groups, compared to baseline (p<0.001). However, there was only a slight decrease, not statistically significant, for PI and OHI-S in the experimental group where the 0.2% chlorhexidine gel was applied, in comparison to the group using the 0.1% chlorhexidine gel, which showed significant decreases (p=0.000). A notable statistically significant difference (p=0.000) was found for GI, between groups, after 4 weeks. Subjects that used the 0.2% chlorhexidine gluconate gel had a major decrease in GI values. Even though, BOP might not have had such a spectacular evolution, a decrease in GI values might mean that a higher concentration of chlorhexidine has a stronger effect on gingival inflammation. The evolution of clinical parameters is represented in figure 1.

In a longitudinal clinical study on the gingival condition of young patients (aged 11–13 years) treated with fixed orthodontic appliances, it was determined that despite repeated motivation in tooth brushing technique and sodium fluoride rinses twice weekly, most of the children developed generalized gingivitis within 1–2 months after the placement of appliances [3]. The concept of a chemical agent to enhance oral health has long been considered and the importance of such an agent is even greater in orthodontic patients with established gingivitis. Chlorhexidine is an important therapeutic agent in controlling gingival inflammation due to its antimicrobial activity [17-19].

Conclusions
Within the limits of this study, we showed that usage of chlorhexidine gels in patients undergoing orthodontic treatment reduce PI, GI and BOP and PD, but no significant difference exists, except for the initial phase of the inflammatory process of the gingival tissue. Thus, this study showed that additional chlorhexidine usage can reduce gingival inflammation and dental plaque, but this effect is slightly depended upon the concentration used.

References