Journal of Dental Sciences (2014) 9, 265–271

Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.e-jds.com

ORIGINAL ARTICLE

Influence of Cervitec gel on periodontal health of patients wearing fixed orthodontic appliances

Burcu Özdemir [a*], Ahu Uraz [a], Duygu İşcan [b], Şeyma Bozkurt [a], Burcu Balos Tuncer [c], Doruk Engin [d], Selcen Pehlivan [e], Hakan İşcan [c]

[a] Department of Periodontology, Faculty of Dentistry, Gazi University, Ankara, Turkey
[b] Department of Orthodontics, Faculty of Dentistry, Marmara University, Istanbul, Turkey
[c] Department of Orthodontics, Faculty of Dentistry, Gazi University, Ankara, Turkey
[d] Institute of Biotechnology, Ankara University, Ankara, Turkey
[e] Department of Biostatistics, School of Medicine, Ankara University, Ankara, Turkey

Received 6 March 2012; Final revision received 18 September 2012
Available online 5 July 2013

KEYWORDS
chlorhexidine;
dental plaque;
fixed orthodontic appliances;
gel;
Porphyromonas gingivalis;
Treponema denticola

Abstract *Background/purpose:* This double-blinded randomized placebo-controlled study aimed to evaluate the efficacy of 0.2% chlorhexidine containing Cervitec gel on periodontal health during orthodontic treatment.
Materials and methods: Twenty-five patients undergoing fixed orthodontic treatment were randomly assigned to the Cervitec ($n = 13$) or control ($n = 12$) groups. After clinical examination at first visit, all patients received professional prophylaxis, and 2 weeks later baseline (B) evaluations are performed. Later, oral hygiene procedures were refrained for 3 days until Day 0, during which the participants in the Cervitec group were instructed to brush with standard toothpaste (ST) (1×1) and Cervitec (1×1), whereas the control group received placebo (1×1) until Day 14. Between Day 14 and Day 28, patients returned to brushing with ST (2×1). The clinical measurements were recorded and subgingival plaque samples were collected at first visit, B, Day 0, Day 14, and Day 28. Subgingival plaque samples were analyzed for total bacteria, *Porphyromonas gingivalis* (P.g.), and *Treponema denticola* (T.d.) using real-time polymerase chain reaction. The data were statistically analyzed.
Results: After receiving professional prophylaxis and oral hygiene instructions, remarkable improvements was seen in clinical and microbiological variables of the study. Although there was a significant reduction in the Quigley–Hein Plaque Index (mQHI) score at Day 14 in only the Cervitec group ($P < 0.01$), both the Cervitec group and the control group revealed significant

* Corresponding author. Department of Periodontology, Faculty of Dentistry, Gazi University, 86. Sokak, Emek 06510 Ankara, Turkey.
E-mail address: burcucakilci@yahoo.com (B. Özdemir).

http://dx.doi.org/10.1016/j.jds.2013.05.003

reductions in the mQHI score at Day 28 compared with Day 0 ($P < 0.001$ and $P < 0.01$, respectively). Intragroup and intergroup evaluations revealed no statistically significant alterations for P.g. and T.d.

Conclusion: The present data suggested that brushing with Cervitec gel once a day has the potential to reduce bacterial accumulation around teeth and fixed appliances in patients undergoing orthodontic treatment. However, within the limits of this study, Cervitec seems to have no significant effect on total bacteria, P.g., and T.d. levels of subgingival dental plaque.

Introduction

Maintaining a good or acceptable oral hygiene is a difficult task for patients undergoing orthodontic treatment with fixed appliances. Previously, fixed orthodontic appliances were associated with the development of white-spot lesions and impaired periodontal health due to increased dental plaque accumulation around appliances such as bands, braces, archwire ligation, and elastomeric ring.[1,2] The rough surfaces and the presence of distinct gaps around the bracket bases are reported to be critical sites for bacterial plaque accumulation.[1] Furthermore, following tooth banding, increase of pocket probing depths (PDs), decrease of anaerobe-to-facultative bacteria ratio, and increase of black-pigmented bacteroides, *Bacteroides intermedius* (*Prevotella intermedia*), and *Actinomyces odontolyticus* species were reported.[2] It was suggested that regular advices and routine instructions in oral and fixed appliance hygiene given to this group of patients are not sufficient and did not completely overcome the possible detrimental effects of plaque accumulation.[3]

Chlorhexidine digluconate (CHX) is a well-known cationic bisbiguanide with powerful antimicrobial activity.[4] Several *in vitro* and *in vivo* studies have proven the efficacy of CHX mouthrinses[5,6] and 0.2% CHX was accepted as the gold standard.[4] Despite great benefits, its side effects, such as extrinsic tooth and tongue staining, enhanced calculus formation, taste aberrations, and rarely painful desquamations of the oral mucosa, are associated with its concentrations and duration of applications and led to the research of new formulations as well as new treatment regimens.[7–11]

Gel form is one of the several different CHX formulations that clinicians are interested in. Among the CHX gel studies, there are only limited number of reports on the influences and clinical importance of 0.2% CHX gel. Lander et al[12] reported that even a single irrigation of 0.2% CHX gel had a marked effect in decreasing the percentage of spirochaetes and motile bacteria at sites with moderate to advanced periodontal disease. Vianna et al[13] showed that 0.2% CHX gel, *in vitro*, eliminated *Porphyromonas endodontalis*, *Porphyromonas gingivalis* (P.g.), and *P. intermedia* in 15 seconds. The CHX gel at 0.2% concentration has also been reported for reducing pain after oral mucosal biopsy[14] and removal of mutans streptococci infection in preschool children.[15]

In this study, we aimed to evaluate the effect of 0.2% CHX containing Cervitec gel on periodontal health by investigating the clinical and microbiological parameters on patients undergoing orthodontic treatment with fixed orthodontic appliances.

Methods and materials

Patient selection

Twenty-five patients (mean age: 15.24 years; range: 10–24 years) with at least 20 teeth present, who have been undergoing fixed orthodontic treatment at Gazi University Faculty of Dentistry were randomly assigned to age- and sex-matched two groups, namely, the Cervitec gel group (Ivoclar Vivadent AG, Liechtenstein) ($n = 13$) or the control group ($n = 12$). The patients had different malocclusions, and all have been undergoing fixed orthodontic treatment for at least 6 months. Roth straight wire brackets (0.018 in. × 0.025 in. slot; GAC International Inc., Bohemia, NY, USA) were placed on both the upper and the lower jaw of all patients. All were at the end of the leveling stage with 0.016 × 0.022 inch or 0.017 × 0.022 inch stainless steel archwires placed on both arches.

Individuals did not reveal any sign of periodontal destruction at the clinic and during a radiographic examination. Patients were excluded if they had received periodontal therapy, antibiotics, or an antimicrobial product in the previous 3 months. All of the patients were systemically healthy and patients with any diagnosed systemic disease and condition that might interfere with the results of our study were also excluded. All of the participants were nonsmokers. The study was performed in accordance with the Helsinki Declaration of 1975, as revised in Tokyo 2004. The study protocol has been reviewed and approved by the Ethical Board of Gazi University School of Medicine, and all participating adult patients and parents of minors were asked to give an informed written consent to participate, after a thorough explanation of the safety and potential efficacy of Cervitec gel, and the probability of receiving Cervitec or placebo gel.

Study design

This was a double-blinded study, characterizing a randomized placebo-controlled trial. The study protocol is summarized in Fig. 1. During their first visits, before the professional prophylaxis, clinical periodontal parameters of the patients were recorded and subgingival plaque samples were collected. Later, all patients received professional prophylaxis and were given detailed oral hygiene instructions as well as the same type of standard toothpastes (STs; Colgate, Istanbul, Turkey) and toothbrushes (Banat, Istanbul, Turkey). The patients were instructed to brush their teeth two times a day with modified Bass technique. Patients