

Bifluorid 12 – Demineralisation depth with brackets

VOCO GmbH, Knowledge Communication Department

Anton-Flettner-Str. 1-3
27472 Cuxhaven, Germany

Tel.: +49 (0)4721-719-1111
Fax: +49 (0)4721-719-109

info@voco.de
www.voco.com



Bifluorid 12 from VOCO is a fluoridation varnish which has been established on the market for many years now. In Germany, Bifluorid 12 has been approved as a medicinal product for the prevention of caries. The varnish's unique effect is a product of the combination of the salts sodium fluoride and calcium fluoride, which act in different ways on and in the dental hard tissue. A study at the University of Tehran examined the extent to which the application of Bifluorid 12 on bracket wearers influences the demineralisation of the enamel regions around the metal.^[1]

Even today, the development of pre-carious lesions (so-called white spots) around brackets is a commonplace occurrence which poses a risk to the health and aesthetics of the teeth. The formation of advanced dental plaque on enamel and fermenting carbohydrates from the food we eat reduce the pH value of plaque to a critical level, resulting in the demineralisation of enamel which can be recognised as white spots on the surface. Orthodontic bands and brackets make oral hygiene more difficult and allow plaque to accumulate. The duration and frequency of cleaning are all-important in terms of the advancement of plaque formation on the dental hard tissue. Studies have been able to confirm that in up to 50 % of cases, pre-carious white spots were observed on patients with fixed orthodontic appliances within the first four weeks. In addition to good oral hygiene and a switch to a low-sugar diet, the occurrence of white spot lesions can be prevented with the targeted application of fluoride products. To this end, both the quality of oral hygiene and a sensible diet depend on patient compliance. This compliance was only demonstrated by 13 % of orthodontic patients. The application of fluoride products does not depend on patient compliance and aims to strengthen the enamel regions around the orthodontic appliances by means of targeted remineralisation and also make these resistant to white spots and the resulting progressive caries.

Examination of the quality of polymerisation

The aim of this study was to examine the short-term effect of a *SingleDose* application of Bifluorid 12 on demineralisation of the enamel regions around the orthodontic brackets. With this in mind, Farhadian et al. carried out a split-mouth design study at the University of Tehran. The study comprised 15 patients whose orthodontic treatment plan required the extraction of at least two premolars. In addition, the patients had to fulfil the following criteria: a) younger than 20 years old, b) fully emerged premolars without visible defects on the buccal surface and c) moderate to good oral hygiene without known allergies. Bifluorid 12 was applied to one of the patients' premolars, the other served as a control, with no fluoride varnish being applied to this tooth. Following application, standard brackets made of stainless steel were adhered to the test teeth with a conventional luting cement. The patients then had to use toothpaste containing fluoride (250 ppm) for seven days. After one week, Bifluorid 12 was applied around the brackets as per the manufacturer's instructions. Around three months (85 to 95 days) after application of Bifluorid 12, the brackets were removed and the patients' premolars were extracted, dissected and the affected enamel surfaces were examined microscopically under 25-fold magnification. Fig. 1 shows the results of the demineralisation depths.

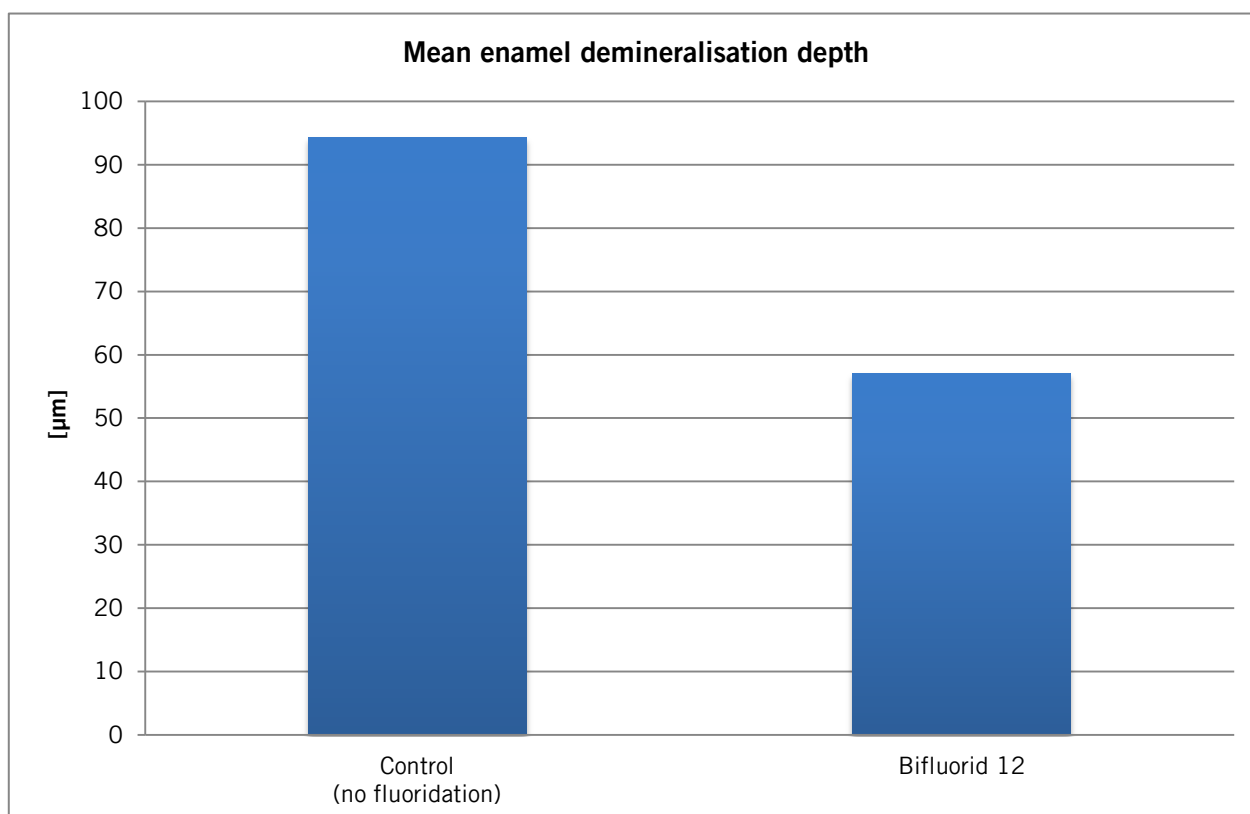


Figure 1: Mean enamel demineralisation depth before and after treatment with fluoride containing materials

Without the application of Bifluorid 12 around the brackets, the demineralisation depth of the enamel is around 95 µm with standard deviation of 7 µm. The demineralisation depth of the enamel after application of Bifluorid 12 is significantly less at 57 µm with a standard deviation of 6 µm. Based on these results, it is clear that the application of a *SingleDose* of Bifluorid 12 considerably reduces the demineralisation depth over the period of three months of wearing orthodontic brackets and, as such, decreases the risk of the formation of white spots and the resulting progressive caries by 40 %. What makes this study special is that in each case both the control tooth and the tooth treated with Bifluorid 12 came from the same patient which means that elements of uncertainty such as gender, oral hygiene, structure of the dental hard tissue, composition of the saliva and fluoride absorption due to other factors can be ruled out.

Conclusion: When applied to the enamel regions around the brackets, Bifluorid 12 reduces the demineralisation depth of the dental hard tissue by around 40%. Thanks to the combination of sodium fluoride and calcium fluoride in addition to the incorporation of fluoride ions into the apatite lattice, Bifluorid 12 also allows fluoride depots to be generated which act as a fluoride reservoir and contribute to remineralisation by releasing fluorides into the oral cavity, even over a period of several months. Particularly for the predilection sites for white spots and progressive caries which brackets and general orthodontic appliances represent, Bifluorid 12 offers very good protection for the dental hard tissue. For the dentist, Bifluorid 12 ensures that the degree of mineralisation is increased over an extended period and, as such, the teeth are well protected against acid and bacteria attacks.

[1] N. Farhadian, A.Miresmaeili, B. Eslami, S. Mehrabi, *Am. J. of Orthodontics and Dentofacial Orthopedics*, Vol. 133, Issue 4, Suppl. 1, 2008.