

Remin Pro – Remineralisation after bleaching

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VOCO's Remin Pro offers a protective dental care with fluoride, hydroxyapatite and xylitol for application after the professional tooth cleaning and bleaching. While xylitol stands out to its bacteriostatic properties and simultaneous pleasant sweetening properties, fluoride and hydroxyapatite strengthen the tooth tissue. The efficacy of various remineralisation pastes after bleaching has been evaluated recently in three different studies.^[1-3]

The most common side effect of tooth whitening are temporary sensitivities, which are treated before, during and after the bleaching process with the application of fluoride and potassium nitrate.^[4]

Another documented side effect of bleaching is the slight micro hardness reduction of the enamel.^[5] Therefore the post-treatment with fluoride containing products after bleaching is recommended, in order to support and promote the natural remineralisation.^[6] The dental market offers a wide range of modern and innovative remineralisation pastes with promising effects on the remineralisation of the tooth hard substance.

This scientific report summarises three studies and presents the results of the different pastes regarding their effectiveness after bleaching.

The first *in vitro* study has been conducted at the Shetty Memorial Institute of Dental Sciences, Mangalore, India.^[1] Freshly extracted premolars were collected and sorted out according to predetermined criteria (white spot lesions, caries, fillings, erosions and discoloration). In total 75 test specimens were used, separated into 5 groups with each 15 specimens. The test specimens of group A (control group) remained untreated, specimens of group B, C, D and E were bleached for 8 minutes with 35 % hydrogen peroxide (Pola-office, SDI) and afterwards treated as follows:

- Group B: no post-treatment, only bleaching
- Group C: application of Tooth Mousse Plus (GC Corp.)
- Group D: application of ClinPro Tooth Paste (3M ESPE)
- Group E: application of Remin Pro (VOCO)

All pastes were applied accordingly to the manufacturer's instructions for a maximum of 14 days with subsequent storage in artificial saliva. Afterwards the Micro Vickers' Hardness (MHV) was measured. The results are shown in figure 1.

While the surface hardness of the unbleached tooth hard substance is about 330 MHV, the bleaching process reduces this value to about 300 MHV. All three pastes raise the surface hardness, whereby Remin Pro shows the strongest effect.

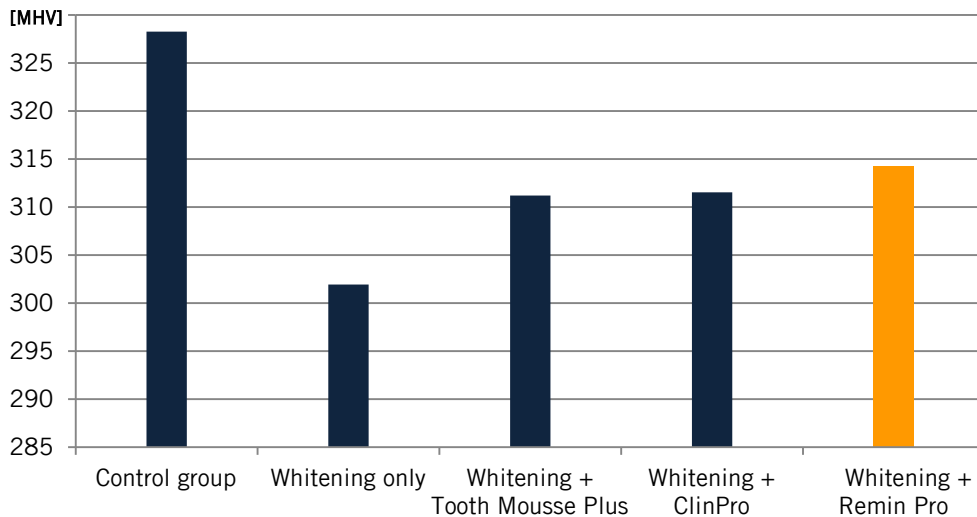


Figure 1: Results of the Vickers surface hardness (MHV)^[1]

The second study of Jayashankra CM et al. from Tumkur, India, deals with the remineralising effect of the bleached tooth hard substance after applying Remin Pro and the fluoride-free sensitive toothpaste SHY-NM with active bioglasses (Novamin®: calcium sodium phosphosilicate)^[2], which is very popular in India.

For the laboratory test, 40 freshly extracted anterior teeth were divided into 4 groups with each having ten teeth, prepared as described below and embedded in acrylic, leaving the labial surfaces free. The groups were group A (control group), group B (only bleaching), group C (bleaching and application of SHY-NM) and group D (bleaching and application of Remin Pro). After preparatory grinding steps (silicon carbide grinding paper) and cleaning, all specimens, except group A (control group), were bleached with 35 % hydrogen peroxide (Pola-Office, SDI) for eight minutes. SHY-NM was applied twice per day for 5 minutes for 20 days on the specimens of group C. Remin Pro was applied onto the specimens of group D in the same way as group C. The specimens of group B remained untreated after bleaching. Afterwards the Vickers surface hardness was measured. Based on the hardness of the control specimens (about 350 MHV), this was reduced to about 310 MHV through bleaching. While SHY-NM has a degree of remineralisation of around 25 % (approx. 320 MHV after application), this study shows that Remin Pro is able to remineralise almost 100 % of the demineralised tooth hard substance (347 MHV). All values are summarized in figure 2.

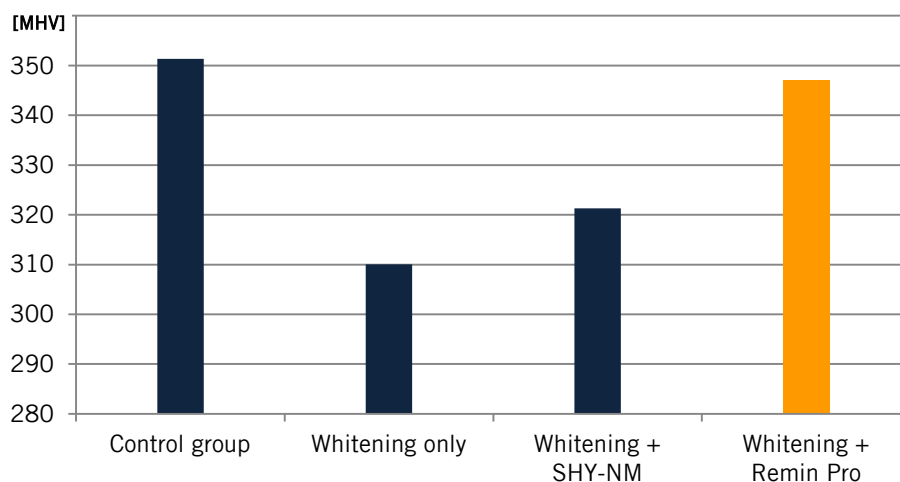


Figure 2: Results of the Vickers surface hardness (MHV)^[2]

The third study on remineralising effects after bleaching comes from Bangalore, India and was conducted by Kamath U et al.^[3] In this *in vitro* study, the investigators have exclusively focussed on Remin Pro and its remineralising effect on bleached tooth hard substance. Here, the Micro Vickers Hardness measurement was also the method used for qualitative evaluation. For the experiment, specimens were prepared from ten extracted, caries-free and cleaned anterior teeth (analogous to the previous study) and stored in artificial saliva.

Three hardness measurements (MHV) were made in total, the first before bleaching (determination of the initial value). The specimens were then touched for five minutes with a McInnes bleaching solution (hydrochloric acid-hydrogen peroxide / anaesthetic ether mixture in a ratio of 5:5:1 similar to micro abrasion therapy, which is used, for example, for discolouration caused by fluorosis, etc.^[5]). Afterwards the surface hardness of the bleached specimens was tested analogous to the first measurement and then stored in artificial saliva for 24 hours.

Remin Pro was applied three times a day for seven days. In-between, the samples were stored in artificial saliva. At the end of the seven days, the Vickers surface hardness was measured again. The results are shown in figure 3.

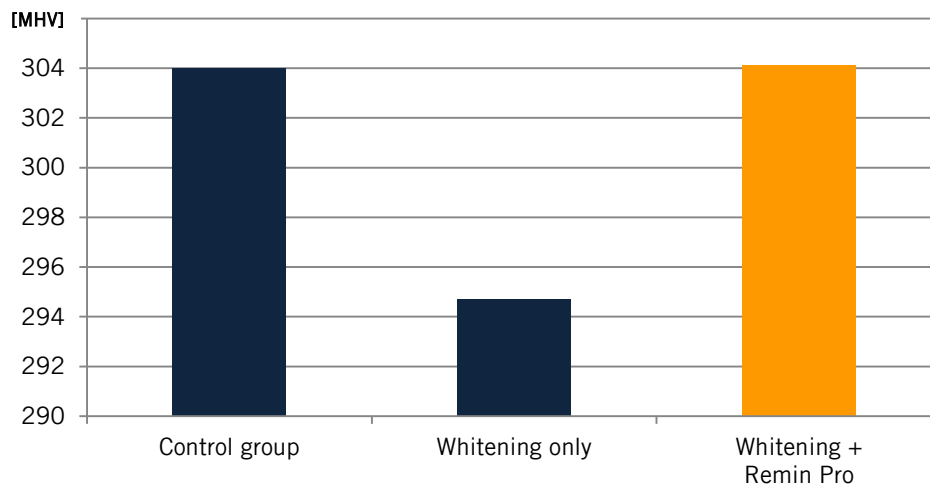


Figure 3: results of the Vickers surface hardness (MHV)^[3]

The weeklong treatment of the tooth hard substance with Remin Pro resulted in a 100 % remineralisation of the demineralised tooth tissue (control group 304 MHV; Remin Pro 304 MHV).

Conclusion: Remin Pro has a proven remineralising effect and strengthens the tooth hard substance after bleaching.

- [1] Sandeep T, Darshana D, Mithra HN; *J Pharm Sci Innov*; **2015**; 4 (6).
- [2] Jayashankara et al; *Intern J Inform Res Rev*; **2016**; 3 (12): 3464-3468.
- [3] Kamath U et al.; *Ind J Dent Res*; **2013**; 24 (6): 690-693.
- [4] Pashley DH et al.; *AEgis Publications*; **2008**; 4(9) Special Issue.
- [5] Hein N, Wrbas K-T; *Schweiz Monatsschr Zahnmed*; **2007**; 177.
- [6] Stösser L, Heinrich-Weltzien R; *Oralprophylaxe&Kinderzahnheilkunde*; **2007**;29 (1).