

# A pilot study on the effects of the toothpaste on reducing dentine hypersensitivity.

Yli-Junnila, P., Kuusilehto, T-L., Vauhkala, M., Kieksi, S., Hankimaa, J., 2015.

**Introduction** Short, sharp pain due to dentine hypersensitivity is the most common type of pain in the facial area. Approximately from 8 to 50 per cent of the population suffer from dentine hypersensitivity. The areas, which are most affected, are the facial surfaces of the premolars and canine teeth.

**The purpose** of the study was to determine how the toothpaste impacts the sensitivity of teeth, gingival bleeding (BOP) and plaque in the study subjects.

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## Methods and Material

### Study subject's history

- Type of pain (short, sharp, etc.)
- Pain stimulus (temperature, contact, air)
- Study subject's willingness to participate in the treatment period
- Study subject's diet (acidic products, fruit, wine, cider etc.)

### Diagnostics

- Air blast
- Temperature test (ice water)
- VRS (Verbal Rating Scale)
- Journal

### Study subject examination

- Exclusion of causes other than dentine hypersensitivity
- Examination of the exposed dentine
- Determination of the connection between the stimulus and pain

### Decision on the treatment period

- Verification of the pain sensation and deciding on the treatment period

Figure 1. Diagnosing dentine hypersensitivity



The study team



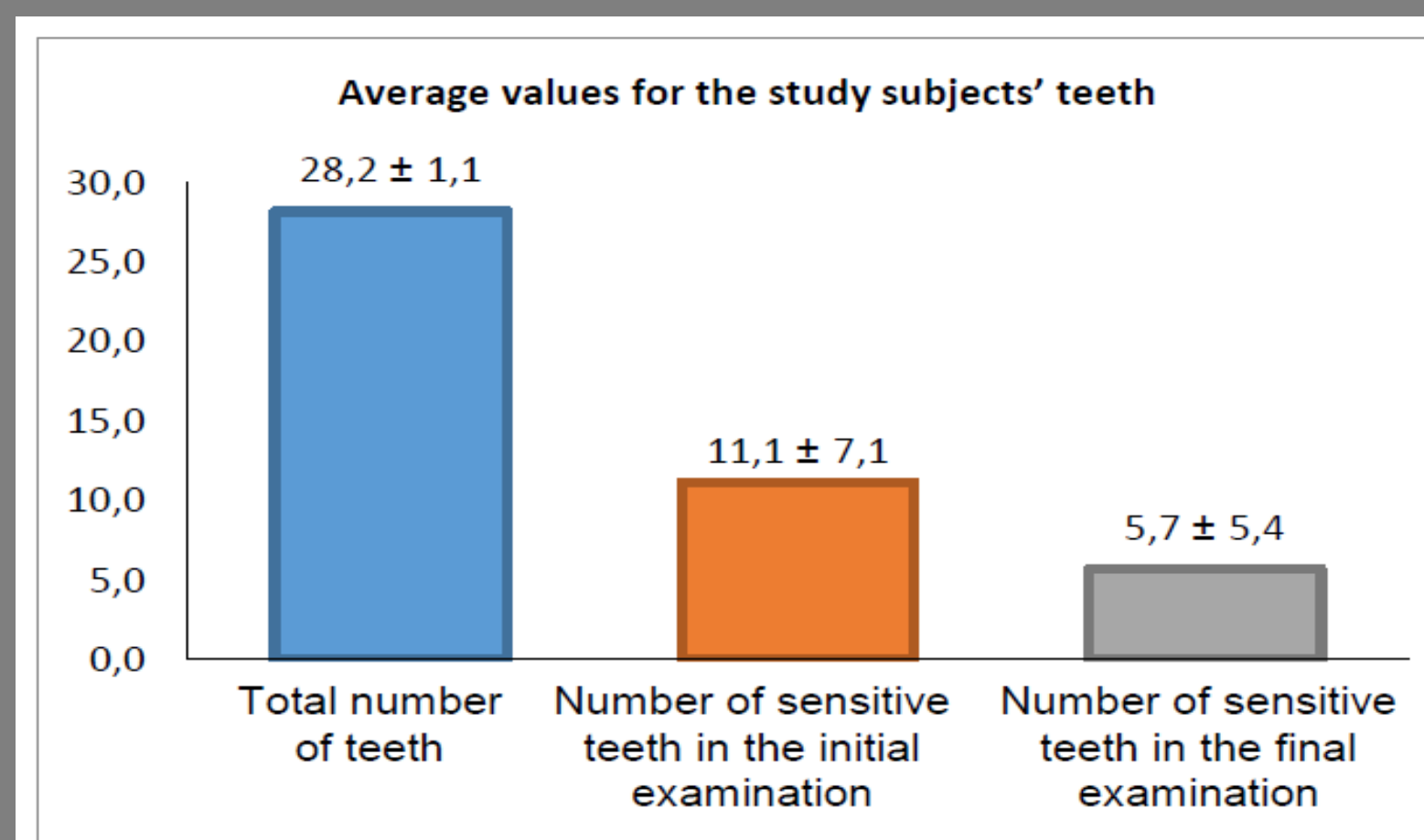
## Results

Table 1. Description of the study group

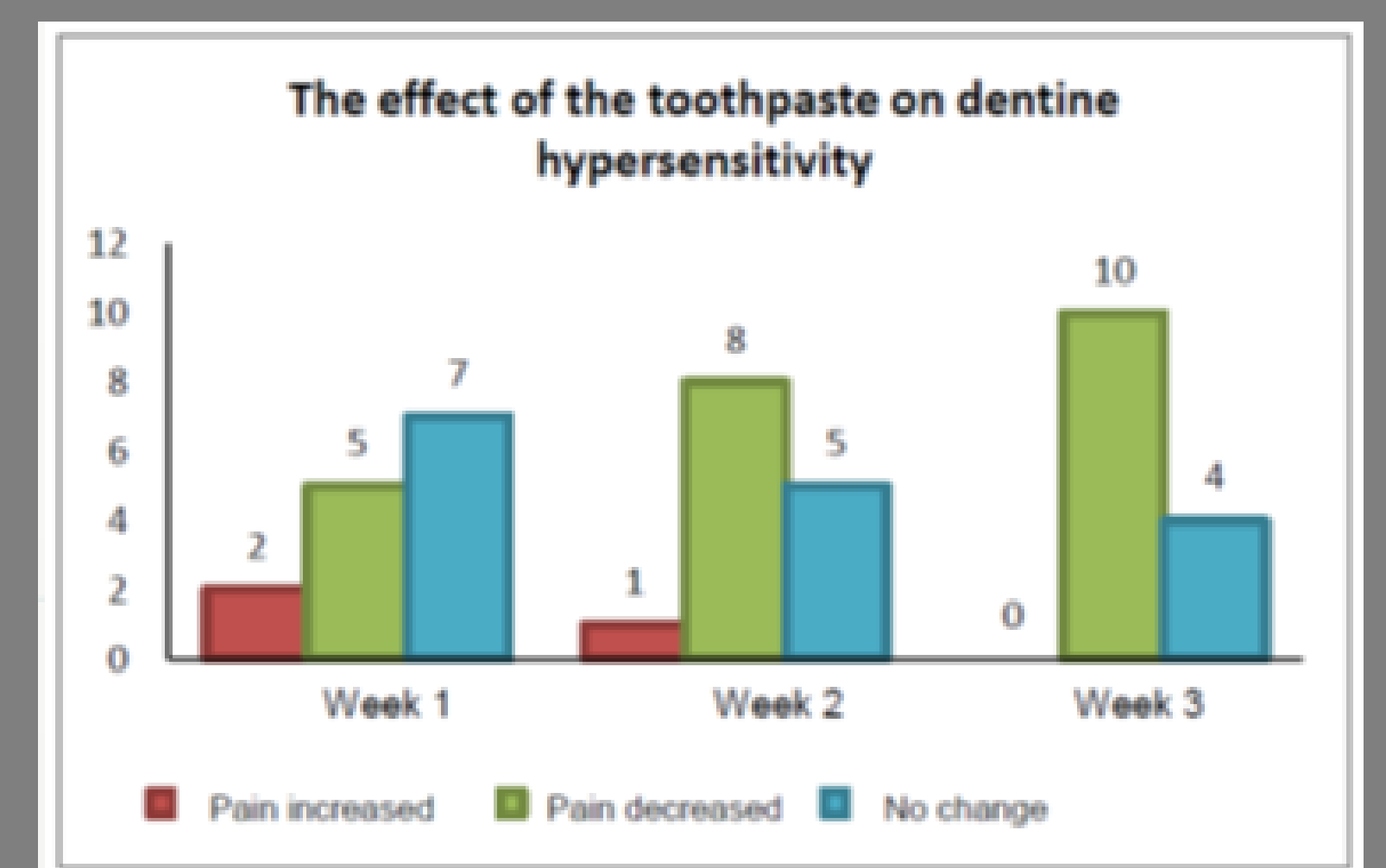
Initial examination	Three-weeks treatment period	Final examination
<b>Subjects</b> 15		14
<b>Gender</b> 14 female 1 male		13 female 1 male
<b>Age</b> 20-69		20-69

Table 2. Averages and standard deviations before and after the use of toothpaste

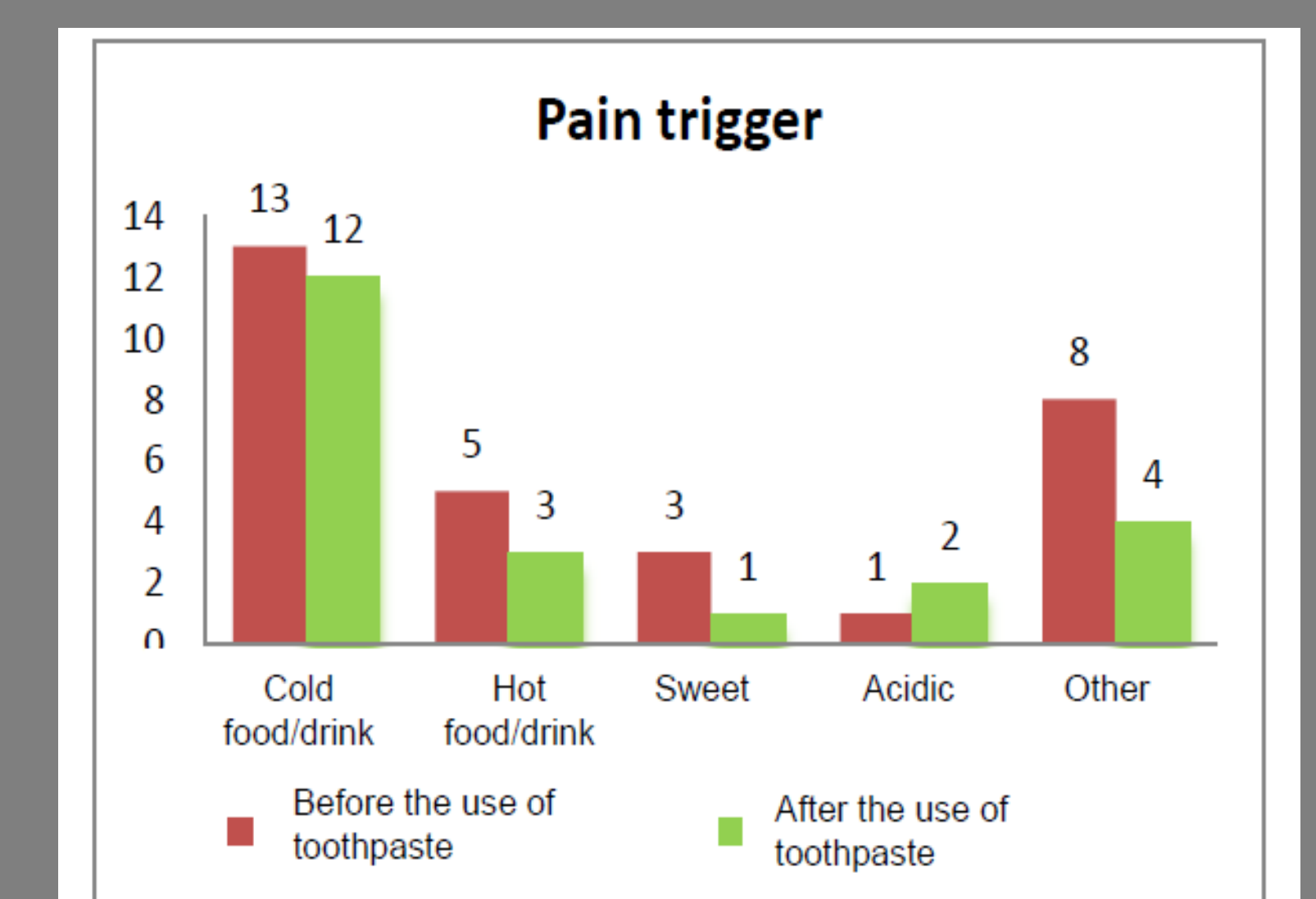
	Av	SD
<b>Sensitive teeth, number (n=14)</b> The reduction in the number of sensitive teeth was statistically highly significant (p=0.000)		
Before the use of toothpaste	11.1	7.1
After the use of toothpaste	5.7	5.4
<b>Gingival bleeding, BOP (n=5), a Subjective Pain Assessment Tool</b> Reduction of gingival bleeding was statistically almost significant (p=0.017)		
Before the use of toothpaste	2.6	1.3
After the use of toothpaste	0.2	0.4
<b>Biofilm plaque VPI % (n=13), a Subjective Pain Assessment Tool</b> The reduction in the amount of plaque was statistically highly significant (p=0.000)		
Before the use of toothpaste	14.5	7.6
After the use of toothpaste	3.0	2.9



Graph 1. Average values of the teeth of the study subjects and dentine hypersensitivity



Graph 2. Study subjects' experiences of changes in the dentine hypersensitivity



Graph 3. Study subjects' experiences of the performance of the toothpaste and the cause of the pain sensation

## Discussion

The number of sensitive teeth decreased, the intensity, degree and duration of pain were reduced as a result of the use of the toothpaste. The results were positive also in terms of the plaque biofilm and gingival bleeding.

The results are similar to earlier studies, in which reduction of dentine hypersensitivity has been observed in connection with the use of toothpaste containing potassium chloride. (Silverman et al. 1994, Cummins 2009, Poulsen et al. 2006.)

## Conclusion

The study provided new information on the effect of an ecological and fluoride-free toothpaste on dentine hypersensitivity.

## References

Evidence-based oral care. 2015. [www.stal.fi](http://www.stal.fi), [www.theseus.fi](http://www.theseus.fi)

The study subjects' experiences of the consistency and appearance of the toothpaste were as follows:

- Positive evaluations: *“Interesting, the colour was truly surprising. The consistency of the toothpaste was softer and fluffier than that of your usual toothpaste.” “The consistency was soft, good... Gives a nice foam with a regular toothbrush”*
- Negative evaluations: *“Absolutely awful colour, feels oddly ‘dry’”, “looks disgusting and has repulsive consistency”*
- Neutral evaluations: *“Runny, thin, greyish-brown”, “Brown and slightly watery, does not froth”*

N O.	Ingredients	Mass fraction, %
1	Dicalcium Phosphate Dihydrate	24.0–28.0
2	Glycerin	10.0–14.0
3	Sorbitol	10.0–14.0
4	Silica	4.0–6.0
5	Potassium Chloride	3.0–5.0
6	Laminaria Saccharina Salt	2.5–3.5
7	Xanthan gum	0.9–1.2
8	Calcium Glycero-phosphate	0.9–1.2
9	Glycyrrhiza Glabra Root Extract	2.0–3.0
10	Cocamidopropyl Betaine 100%	1.0–2.0
11	Sodium Benzoate	0.3–0.4
12	Magnesium Chloride	0.2–0.4
13	Dipotassium Glycyrrhizate	0.2–0.4
14	Eugenia Caryophyllus (Clove) Leaf Oil	0.1–0.3
15	Eucalyptus Globulus Leaf Oil	0.1–0.3
16	Aqua	Up to 100%

Table 3. Consistency and ingredients of the ROCS Bionica Sensitive® toothpaste (Fatkulina, E. 2014).

#### References:

- Berman LH. Dentinal sensation and hypersensitivity. A review of mechanisms and treatment alternatives. J Periodontology. 1985. (56) 216-22.
- Charantimath, S. & Oswal, R. 2011. Herbal Therapy in Dentistry: A Review. Innovative journal of medicinal and health science. 2011. (1) No. 1. 1 – 4.
- Cummins, D. 2010. Recent advances in dentin hypersensitivity: clinically proven treatments for instant and lasting sensitivity relief. American Journal of Dentistry. May 2010. (23 Spec) No. A: 3A-13A).
- Fatkulina, E. 2014. Ingredients of the ROCS Bionica Sensitive® -dentifrice. Privat Information. DRC –group.
- Gillam, D., G. & Newman, H.N. 1993. Assessment of pain in cervical dentinal sensitivity studies. A review. Journal of clinical periodontology. Jul 1993. (20) No.6. 383-94.
- Hooper S., Seong, J., Macdonald, E., Claydon, N., Hellin N., Barker ML, He. T. and West, NX .2014. A randomised in situ trial measuring the anti-erosive properties of a stannouscontaining sodium-fluoride dentifrice compared with a sodium fluoride/potassium nitrate dentifrice. International dental journal. 2014. (64) Suppl. 1. 35.
- Karim, B., F., A. & Gillam, D., G. 2013. The Efficacy of Strontium and Potassium Toothpastes in Treating Dentine Hypersensitivity: A Systematic Review. International Journal of Dentistry. 2013. Article ID 573258.
- Kontturi-Närhi, V. & Närhi, M. 2007. Sensitive teeth. In Autti, H., Le Bell, Y., Meurman, J. & Mustomaa, H. (Ed.) Manual of dentistry. 2. Second, revised edition. Helsinki: AcademicaKustannus Oy.
- Kumar, P., Ansari, S., H. & Ali, J. 2009. Herbal Remedies for the Treatment of Periodontal Disease - A Patent Review. Recent Patents on Drug Delivery & Formulation. Nov 2009. Vol 3. No.3. Bentham Science Publishers. 221-228.
- Nieminen, A. 2008. Researching periodontium In Autti, H., Le Bell, Y., Meurman, J. & Mustomaa, H. (ed.) Manual of dentistry. 2. Second, revised edition. Helsinki: AcademicaKustannus Oy.
- Poulsen, S., Errboe, M., Lescay Mevil, Y. & Glennly, A-M. 2006. Potassium containing toothpastes for dentine hypersensitivity. Cochrane Oral Health Group. DOI: 10.1002/14651858.CD001476.pub2 <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD001476.pub2/abstract>
- Ricarte, J.M., Matoses, V.F., Llácer, V.J.F., Fernández, A.J.F. & Moreno, B.M. 2008. Dentinal sensitivity: Concept and methodology for its objective evaluation. Mar 1 2008. (13) No. 3. Medicina Oral Patología Oral y Cirugía Bucal. 201-6.
- Rösing, C.K., Fiorini, T., Liberman, D.N. & Cavagni, J. 2009. Dentine hypersensitivity: analysis of self-care products. Brazilian Oral Research. 2009. (23) No.1. 56-63.
- Sarap, L.R., Zhilenko, O.G., Podzorova, E.A. & Lesnykh, I.V. 2012. Medicinal-andprophylactic effectiveness of the natural extract based toothpastes among patients suffering from inflammatory parodontium diseases. Referenced on 7 October 2014. [www.rocs.ru](http://www.rocs.ru) > To Experts > Scientific articles > 2013.
- Silverman, G., Gingold, J. & Curro, F.A. 1994. Desensitizing effect of a potassium chloride dentifrice. American Journal of Dentistry 1994. (7) No.1. 9-12.
- Walters PA. 2005. Dentinal Hypersensitivity: A Review. J Contemporary Dental Practice. May 2005. (6) No. 2.107-117.
- West, N.X., Lussi, A., Seong, J & Hellwig. H. 2012. Dentin hypersensitivity: pain mechanisms and aetiology of exposed cervical dentin. Clinical Oral Investigations. Mar 2012. (17) Suppl.1. 9-19.

## Conclusions

The study subject group consisted of young and elderly persons, mainly women (n=14). One person had to withdraw from the study after the initial examination in the beginning of the treatment period. The duration of the treatment period was three weeks. The main ingredient reducing pain associated with dentine hypersensitivity in the ROCS Bionica Sensitive® toothpaste is potassium chloride. The results were obtained by dental hygienist students at the end of their studies under the supervision of instructors, by means of examinations, questionnaires, journals and case history information.

The ROCS Bionica Sensitive® toothpaste reduced dentine hypersensitivity in the study subjects, measured using objective and subjective indicators. The number of sensitive teeth decreased, the intensity, degree and duration of pain were reduced as a result of the use of the toothpaste. The results are similar to earlier studies, in which reduction of dentine hypersensitivity has been observed in connection with the use of toothpaste containing potassium chloride. (Silverman et al. 1994; Cummins 2009; Poulsen et al. 2006.) The ROCS Bionica Sensitive® toothpaste used in the test does not contain fluoride, so the study provided new information on the effect of an ecological and fluoride-free toothpaste on dentine hypersensitivity.

The results were positive also in terms of the plaque biofilm and gingival bleeding: both indicators showed clear signs of reduced dentine hypersensitivity following the use of the toothpaste. The results obtained for these two indicators are similar to those achieved in earlier studies. (Cf. Kumar et al. 2009; Sarap et al. 2012; Charantimath & Oswal 2011.) The ROCS Bionica Sensitive® toothpaste contains clove and liquorice extract, among others, and these have been shown to reduce plaque and inflammation.

The study provided new information on the user experiences and properties of the toothpaste. It can be concluded that nearly all of the study subjects, who were used to using regular “basic toothpastes”, were satisfied with the ROCS Bionica Sensitive® toothpaste used in the study. Thus, the toothpaste can be recommended for individuals suffering from dentine hypersensitivity, who want to make ecological choices. The sustainable ecological approach covers the entire product, including packaging and appearance.

The reliability of the study was increased by the researcher, method and material triangulation. Due to the small target group of the study, the study can be considered a pilot study. The treatment period of three weeks can also be considered to be too short for achieving results. The most common duration of the treatment periods of dentine hypersensitivity studies has been 4 to 8 weeks. In addition, different studies have focused on toothpastes with different ingredients and also with fluoride, and this makes comparisons between studies more difficult (Karim & Gillam 2013; Hooper S. et al 2014; Walters, PA 2005.). The results benefit both oral care professionals, who have an important role in guiding clients in various issues concerning oral health, and ecologically conscious persons who, for example, want to use a fluoride-free toothpaste.

In the future, the ROCS Bionica Sensitive® toothpaste should be studied using a comparative research frame and a larger number of study subjects.