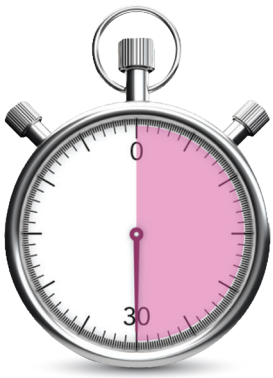
RELIEVES SENSITIVITY IN JUST

30 SECONDS

Clinically proven in 4 studies



SCIENTIFIC PAPER SUMMARIES

#DefeatSensitivity

SENSITIVE EXPERT by Pepsodent

DENTIN HYPERSENSITIVITY: ETIOLOGY, DIAGNOSIS AND TREATMENT: A LITERATURE REVIEW

Davari AR, Ataei E and Assarzadeh H. J Dent Shiraz Univ Med Sci 2013;14:136–145.

Introduction

- Knowledge gaps exist regarding the diagnosis, causes and management of dentine hypersensitivity in clinical practice.

Aim

- The aim of this review was to summarise the current knowledge surrounding the aetiology, diagnosis methods and treatment strategies targeting dentine hypersensitivity.

Data sources

- Keywords including 'dentin', 'teeth', 'tooth', 'hypersensit' and 'desensitiz' were used to search PubMed between 1999 and 2010.
- Abstracts and articles were selected that provided relevant information on prevalence, clinical presentations, aetiology, clinical studies and laboratory research in the field of dentine hypersensitivity.

Results

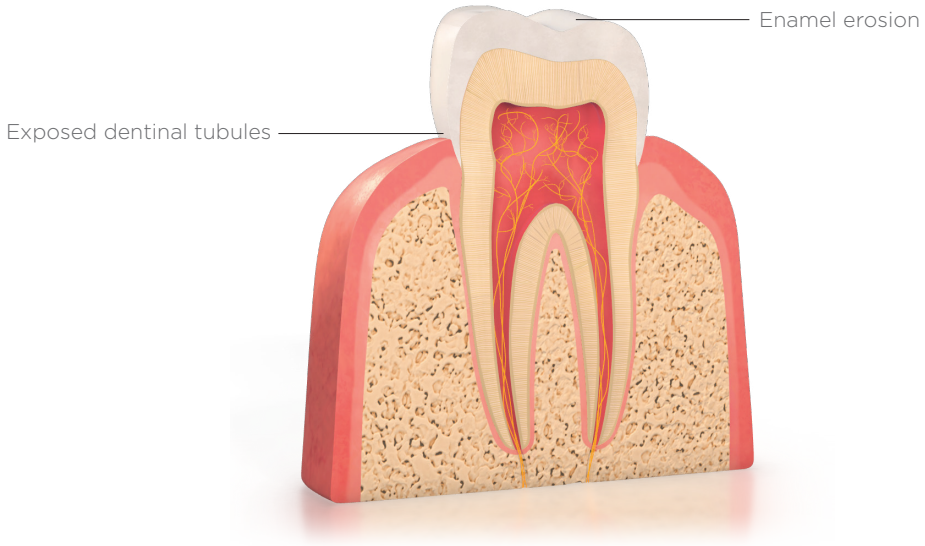
- Dentine hypersensitivity begins with the exposure of dentine through loss of enamel, gingival inflammation or gingival recession. This is followed by dentine sensitisation, in which tubule plugs and the smear layer are removed, and the nerves are exposed.
- After teaching patients correct toothbrushing technique, patients should start their treatment with desensitising products that they are able to use at home; for example, desensitising toothpastes containing calcium, potassium, fluoride (at least 1450 ppm) and arginine. Other at-home treatments that a patient may try are tooth powders, mouth washes and chewing gums.
- If patients are still experiencing pain 2–4 weeks after using at-home therapies, if pain is severe, or if 1 or 2 teeth are involved, in-office treatments could be implemented involving application of fluoride gel, fluoride varnish, desensitising agents, remineralising agents or laser therapy.
- Patients suffering from dentine hypersensitivity should undergo regular treatment and have follow-up appointments with their practitioner.

Conclusions

- Hypersensitivity should be assessed in all patients on a regular basis at clinic visits, with at-home therapies initiated as necessary and follow-up visits organised.

"Dentine hypersensitivity can be detected after removing all the other factors which can possibly cause the pain. The treatment of dentine hypersensitivity should be on a regular basis and initiate with at-home therapy and then continue with complementary therapies."

The underlying causes of hypersensitivity



PERCEPTIONS OF DENTINE HYPERSENSITIVITY IN A GENERAL PRACTICE POPULATION

Gillam DG, Seo HS, Bulman JS and Newman HN. J Oral Rehabil 1999;26:710–714.

Introduction

- Depending on the population, the reported prevalence of dentine hypersensitivity is reported at between 8 and 35%.
- Recent data have shown that the prevalence of dentine hypersensitivity is higher in patients receiving specialist treatment than in general practice.
- Some studies have suggested that the discomfort of dentine hypersensitivity is not perceived by patients as severe enough to self-treat or consult their dentists.

Aim

- The objective of this study was to discover the prevalence in, and perception of dentine hypersensitivity by, patients in general dental practices in the UK.

Methods

- Regular attendees at three NHS dental practices completed a questionnaire on dentine hypersensitivity as part of their visit.
- The questionnaire contained 17 questions. Questions 1–7 related to pain/discomfort felt by the patients; 8–13 related to their oral hygiene habits; and 14–17 to periodontal treatment and discomfort experienced after this treatment.

Results

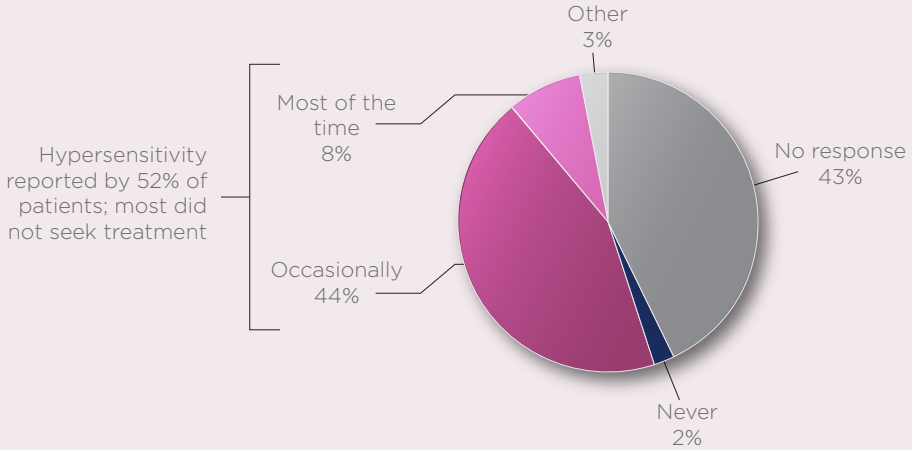
- 277 patients (115 males and 162 females) with a mean age of 41.7 years completed the questionnaire.
- Dentine hypersensitivity was reported by 52% of patients. Significantly more females reported dentine hypersensitivity than males.
- Dentine hypersensitivity was highest in the third and fourth decades of life. Cold was the most common trigger of dentine hypersensitivity.
- The majority of affected patients (75%) did not believe that their discomfort was severe and did not look for treatment solutions. Only 23% used a desensitising dentifrice.

Conclusions

- This study showed that self-reported dentine hypersensitivity is significantly higher in women than men, is most common between the ages of 30 and 40 years, and most patients do not perceive their discomfort as serious enough to warrant treatment.

"Dentine hypersensitivity was regarded by patients as not severe in most cases, and as a consequence, treatment was not generally sought."

Frequency of reported sensitivity in a general practice population



CURRENT DIAGNOSIS OF DENTIN HYPERSENSITIVITY IN THE DENTAL OFFICE: AN OVERVIEW

Gillam DG. Clin Oral Invest 2013;17(Suppl 1):S21–S29.

Introduction

+ Diagnosis of dentine hypersensitivity is a major challenge for clinicians in clinical practice as symptoms may be due to many possible causes.

Aim

+ The aim of this review was to examine the challenges associated with confirming a diagnosis of dentine hypersensitivity and to provide practical information for clinicians on diagnosing and managing the condition.

Data sources

+ MESH terms were used to conduct a PubMed literature search. This involved the words ‘diagnosis’, ‘therapy’, ‘treatment’, ‘therapeutics’, ‘dentin’, ‘dentin hypersensitivity’ and ‘sensitivity’.

Results

+ Studies suggested that many clinicians do not routinely perform checks for dentine hypersensitivity or exclude other possible causes of pain, and instead they may solely depend on patients reporting the problem to them.
+ Some clinicians may lack confidence in successfully treating dentine hypersensitivity.
+ Groups of subjects at risk of dentine hypersensitivity include overenthusiastic brushers and consumers of high-acid food/drinks.
+ More research is needed to clarify the degree to which dentine hypersensitivity is successfully diagnosed, treated and monitored in daily practice, and the impact on patient quality of life.

Conclusions

+ Clinicians need practical guidance on the importance of identifying and correctly diagnosing dentine hypersensitivity in their patients.
+ To expediate a correct clinical diagnosis, clinicians should be made aware of the need to eliminate clinical conditions that may causes similar symptoms to dentine hypersensitivity.

“One of the difficulties facing the clinician when confronted with a patient complaining of dental pain, is that there are a number of clinical conditions that may elicit the same clinical symptoms as dentine hypersensitivity (DHS), and they have to be eliminated before a correct diagnosis of DHS is made.”

Key approaches to the diagnosis of dentine hypersensitivity in dental practice

+ Tactile (probe) evaluation
+ Thermal/evaporative (cold air blast) evaluation
+ Subjective response using a recognised pain scale, e.g. visual analogue scale
+ Simple recording on a 0–10 numerical score

IMMEDIATE AND SUSTAINED REDUCTION OF DENTINE HYPERSENSITIVITY FROM HYDROXYAPATITE TOOTHPASTE

Schafer F, Sun JN, Naeeni MA and Li X. J Den Res 2012;91(C):84.

Introduction

- Hydroxyapatite (HAP) is the natural mineral of tooth enamel.
- Potentially, a toothpaste containing HAP may have utility in relieving sensitivity by remineralising damaged enamel and preventing external stimuli from eliciting pain.

Aim

- This was a double-blind, randomised, parallel study evaluating the efficacy of a toothpaste formulation containing HAP in alleviating dentine hypersensitivity versus a marketed anti-sensitivity toothpaste (positive control).

Methods

- Subjects with good general and dental health, and hypersensitivity according to a Yeaple score < 30 and Schiff score ≥ 2 on exposed roots of two teeth were recruited.
- Subjects applied either the test toothpaste (containing HAP, potassium citrate, zinc citrate trihydrate and 1450 ppm fluoride) or the positive control (containing arginine, calcium carbonate and 1450 ppm fluoride) to exposed dentine for 30 seconds by rubbing with a finger.
- Tooth sensitivity was studied prior to application, immediately after application and 8 hours later using the Yeaple tactile and Schiff air-blast methods.
- Differences between groups were evaluated by paired t-tests and repeated measurement analysis.

Results

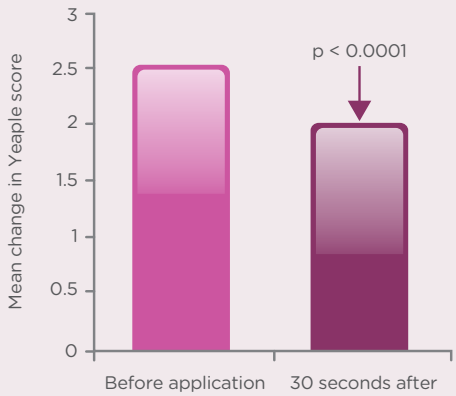
- 102 subjects completed the study. Both toothpastes led to statistically significant reductions in sensitivity immediately and 8 hours after application ($p < 0.0001$).
- The reduction in Yeaple score immediately after application was significantly greater in the test group vs control group ($p < 0.01$). There was no significant difference between the groups in the reduction in Schiff score.
- There was no statistically significant difference between groups 8 hours after application.

Conclusions

- Both test and positive control toothpaste formulations provide significant protection against dentine sensitivity immediately and 8 hours after application.
- This study demonstrates that HAP-containing test toothpaste has a greater immediate effect on sensitivity compared with a positive control anti-sensitivity toothpaste.

"A greater reduction after tactile stimulus was found for the test paste than the positive control immediately after application."

Significantly greater relief from pain at 30 seconds with a toothpaste containing HAP



GUM HEALTH BENEFITS OF A SILICA BASED FLUORIDE TOOTHPASTE CONTAINING ZINC CITRATE, POTASSIUM CITRATE, HYDROXYAPATITE AND VITAMIN E ACETATE

Brading MG, Beasley T, Evans M, Gibson C, Lloyd A, Schafer F and Whittaker J. Int Dent J 2009;59:332–337.

Introduction

- Fluoride and hydroxyapatite improve tooth health, vitamin E acetate and zinc citrate benefit gum health, and potassium citrate protects against sensitivity.
- This study investigated the potential of a novel toothpaste formulation containing these four ingredients, Unilever Anti-Age, in targeting the detrimental effects of ageing on tooth and gum health.

Aim

- The aim of this study was to show that zinc citrate and vitamin E acetate in a new silica-based fluoride toothpaste can be successfully delivered to gingival tissues and to investigate the clinical efficacy of the complete toothpaste formulation *in vivo*.
- Four studies were performed investigating the *in vivo* delivery of zinc, *in vivo* delivery of vitamin E acetate, *ex vivo* delivery and tissue penetration of vitamin E acetate, and *in vivo* efficacy of Unilever Anti-Age on gingival condition.

Methods

- Two double-blinded, randomised, complete crossover studies investigated the *in vivo* delivery of zinc (Unilever Anti-Age vs Colgate Sensitive Multi Protection) and vitamin E acetate (Unilever Anti-Age vs Unilever Nutri-Activ).
- In the first study, zinc levels were assessed in plaque samples immediately before, and 10 minutes after, brushing with the new toothpaste or a similar marketed zinc-containing toothpaste.
- In the second study, vitamin E acetate levels were determined *in vivo* by swabbing gums immediately after brushing with the new toothpaste.
- In the third study, the delivery and ability of vitamin E acetate to penetrate *ex vivo* porcine gingival tissue was evaluated and compared with a marketed vitamin E acetate formulation.
- The fourth study was a two-group, parallel, randomised, controlled, double-blind study investigating the efficacy of Unilever Anti-Age vs Colgate Total (0.3% triclosan) on gingival disease after 3 months.

Results

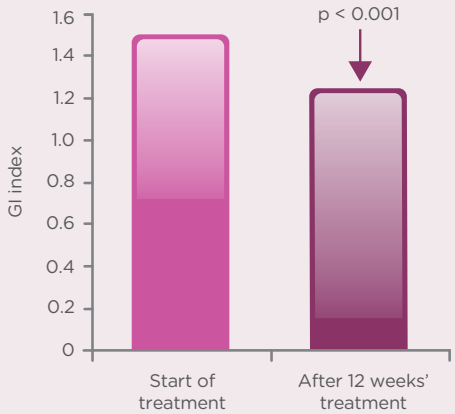
- Zinc delivery from Unilever Anti-Age was significantly higher than for Colgate Sensitive Multi Protection.
- Both the *in vivo* and *ex vivo* studies demonstrated effective delivery of vitamin E acetate by Unilever Anti-Age at a level comparable to that of Unilever Nutri-Activ.
- Both Unilever Anti-Age and Colgate Total led to significant reductions in gingivitis after 3 months' use.

Conclusion

- Unilever Anti-Age contains an effective gum-health formulation that can successfully deliver zinc citrate and vitamin E acetate to gums, and effectively target gingivitis.

"Clinical efficacy has been shown for the new formulation, with a clinical reduction in gingivitis after 3 months' home use."

Significant reduction in gingivitis after 3 months' use of novel toothpaste formulation



ACTION POTENTIAL CONDUCTION BLOCK OF NERVES *IN VITRO* BY POTASSIUM CITRATE, POTASSIUM TARTRATE AND POTASSIUM OXALATE

Peacock JM and Orchardson R. J Clin Periodontol 1999;26:33–37.

Introduction

- Potassium salts are believed to be clinically effective at targeting dentine hypersensitivity by blocking nerve conduction, therefore reducing excitation in response to external stimuli. However, it is unclear which salts are the most effective at attenuating nerve conduction.

Aim

- The objective of this study was to investigate the effectiveness of three potassium salts: citrate, tartrate and oxalate, compared with potassium chloride and nitrate in inhibiting nerve conduction *in vitro*.

Methods

- Potassium citrate, tartrate and oxalate were added to a Krebs solution to elevate the potassium concentration.
- These solutions were added to rat spinal nerves in a bath and the compound action potentials induced by electrical stimulation were measured.

Results

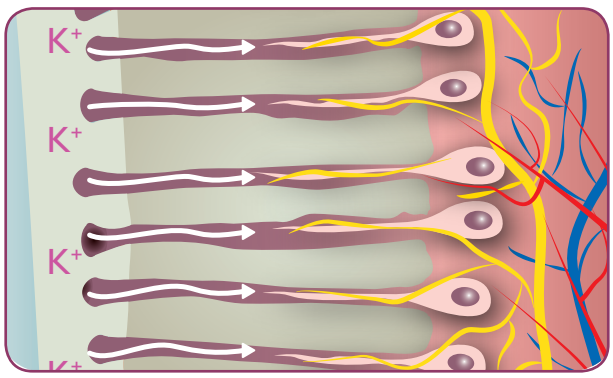
- All potassium salts reduced the compound action potentials in rat spinal nerves in a dose-dependent manner.
- There were no significant differences between the efficacy of potassium tartrate and citrate; however, both were significantly more effective than oxalate at reducing compound potential ($p < 0.05$).

Conclusion

- The potassium salts citrate and tartrate demonstrate greater efficacy than other potassium salts in inhibiting nerve conduction.
- The effectiveness of potassium citrate in attenuating nerve conduction in this *in vitro* study is consistent with its ability to reduce nerve excitability and dentine hypersensitivity in a toothpaste formulation.

"Potassium citrate and potassium tartrate were more effective than other potassium salts in blocking nerve conduction and may be more effective dentinal desensitising agents."

Potassium salts reduce nerve excitation and associated pain



ENAMEL BENEFITS OF A NEW HYDROXYAPATITE-CONTAINING FLUORIDE TOOTHPASTE

Hornby K, Evans M, Long M and Bebington AJ. Int Dent J 2009;59:325–331.

Introduction

- Several processes, such as erosion, abrasion and attrition, cause enamel wear – one of the root causes of sensitivity.
- Recent publications suggest that enamel wear might be addressed by using a fluoride toothpaste containing hydroxyapatite (HAP) as a source of calcium.

Aim

- The aim of this series of *in vitro* studies was to investigate the effects of a new toothpaste formulation containing fluoride and HAP on protection against acid challenges, remineralisation of enamel and calcium uptake in demineralised areas of enamel.

Methods

- Three studies were carried out to test the ability of HAP-containing formulations to protect bovine enamel samples against acid challenges.
  1. Enamel samples (n = 9) underwent six rounds of acid challenge: treatment (either a 2% HAP powder or water), deionised water rinse, acid challenge, deionised water rinse, saliva.
  2. Enamel samples (n = 9) underwent six rounds of acid challenge: slurry treatment (either a toothpaste containing 2% HAP, fluoride and bovine alkaline phosphatase; a toothpaste containing 2% HAP and fluoride; a fluoride-only toothpaste; or water), deionised water rinse, acid challenge, deionised water rinse, saliva.
  3. Enamel samples (n = 7) underwent 12 rounds of acid challenge: slurry treatment (either a toothpaste containing 2% HAP and fluoride; a fluoride-only toothpaste; or a non-fluoride toothpaste), acid challenge, neutral challenge.

  In all three studies, the surface microhardness (SMH) was assessed at the end of the acid cycles.
- A study compared the remineralisation benefit of three formulations: a silica toothpaste containing 2% HAP and fluoride, a silica fluoride-only positive control and a silica non-fluoride negative control. Ten sound bovine enamel samples were demineralised for 14 days using an acid buffer. After demineralisation, the samples were subjected to six cycles of one of the above treatments for eight days. The SMH was determined before and after acid challenges.
- A study examined calcium uptake into labial surfaces of bovine teeth. ^{45}Ca-radiolabelled HAP was used to treat four sound samples and four samples that had been incubated with an acid gel for ten days to create sub-surface lesions. Samples were then subjected to the following cycling regimen for four days: slurry toothpaste, acid buffer, neutral buffer, with deionised water rinse between these steps. Finally, the specific mean ^{45}Ca uptake per mm^2 was determined.

Results

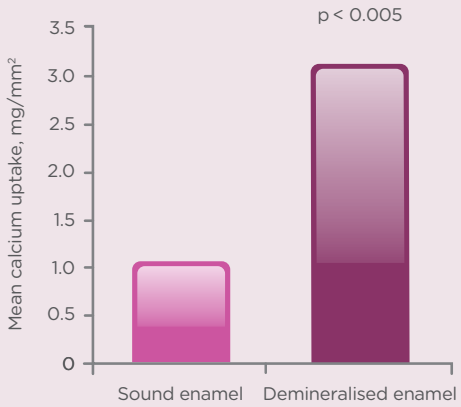
- In all three protection studies, the formulations containing HAP showed a lower reduction of the mean percentage in SMH from baseline compared with either a fluoride-only toothpaste or water ($p < 0.05$).
- In the remineralisation study, no differences were reported between the two fluoride formulations. However, both the HAP-containing toothpaste and fluoride-only toothpaste promoted a significant remineralisation compared with the negative control ($p < 0.05$).
- In the calcium uptake study, the mean ^{45}Ca uptake per mm^2 was significantly higher for the demineralised enamel samples compared with the sound ones, with a reported mean of 3.16 and 1.05, respectively ($p < 0.005$).

Conclusion

+ These studies demonstrate that a toothpaste containing HAP protects against demineralisation of enamel, remineralises damaged enamel following acid challenge and delivers calcium ions in areas of enamel most in need of repair.

"The advantages of delivering a calcium source to the mouth which can give elevated calcium levels in the mouth has the potential to limit acid challenges by reducing enamel demineralisation whilst promoting enamel remineralisation."

Significantly higher uptake of calcium in demineralised enamel



by Pepsodent

FDI World Dental Federation

FDI recognises that twice-daily brushing
with a fluoride toothpaste such as
Sensitive Expert by Pepsodent is beneficial to oral health