ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
Index Copernicus Value: 49. 23
PubMed - National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 3, Issue – 5, September - 2018, Page No. :208 - 211

Milk powder as a desensitizing agent for dentinal hypersensitivity

Dr. Prasad Sonar, Post graduate student
Dr. Swapna Mahale, Professor and head of department
Dr. Ayushya Warang, Post graduate student
Dr. Lavanya Kalekar, Post graduate student
Department of Periodontology, MGV's KBH Dental College and Hospital, Nashik, India. 422003

Corresponding Author: Dr. Prasad Sonar, Post graduate student, Department of Periodontology, MGV's KBH Dental College and Hospital, Nashik, India. 422003

Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Aims and Objectives: The aim of the present study was to evaluate the use of milk powder as a desensitizing agent for dentinal hypersensitivity.

Material and Methods: A total of 30 patients diagnosed with dentinal hypersensitivity were selected for the study and were randomly divided into 2 groups. Group A was (test group) were advised to use bovine whole milk powder and Group B (control group) was advised to placebo powder, for 15 days. Dentinal sensitivity was scaled using Visual Analogue Scale at baseline, 10th day and on 15th day.

Results

The mean value of 10 pointer VAS score at baseline in test group was 7.1±1.1 and on 15th day, the mean value reduced to 3.5±1.08 which was statistically significant (p value=0.002).In the control group, at baseline, mean value was 6.3 ± 1.5 and on 15th day, the mean was 6.4±1.63 which was not statistically significant (p value of >0.999).When both test and control groups were compared by unpaired t-test, at baseline, p value on baseline was 0.269, on 10th day was 0.081 and on 15th day was 0.0013 (statistically significant). Also when non-parametric repeated measures ANOVA test was performed from baseline to 15th day, in test group, the p value was < 0.0001 (statistically significant) and in control group it was 0.8669 (statistically not significant).

Conclusion

Milk powder can be used as a desensitizing agent for treatment for dentinal hypersensitivity.

Introduction

Dentinal sensitivity is one of the most frequently occurred symptoms in dental practice. Dentinal hypersensitivity is also mentioned as root dentine sensitivity (RDS), root dentine hypersensitivity (RDH) or cervical dentine sensitivity (CDS), cervical dentine hypersensitivity (CDH), dentine sensitivity (DS).[1] According to the Canadian consensus document (2003) DH (dentinal hypersensitivity) has been defined as “pain derived from exposed dentin in response to chemical, thermal, tactile or osmotic stimuli which cannot be explained as arising from any other dental defect or disease.”[2] .According to various studies ,the prevalence rate of DH ranges from 2-8% to 74%.[3] Considering the prevalence rate of DH, it affects the

patients daily routine life by interfering in oral hygiene procedures, dietary habits and has an overall negative impact on quality of life.[4]

The proposed theories for dentinal sensitivity are Odontoblastic transduction theory, neural theory and Hydrodynamic theory. [8] Amongst these, the fluid movement/hydrodynamic theory proposed by Brannstrom (1964) [8] is the most accepted theory. The theory states that if the fluid in dentinal tubules is disturbed by osmotic, temperature or physical changes, the baroreceptors gets stimulated which leads to neural discharge, causing dentinal sensitivity.[8]

The current treatment options available for dentinal sensitivity are the one which acts by nerve desensitization (potassium nitrate), by protein precipitation (silver nitrate, zinc chloride), by plugging dentinal tubules (sodium fluoride, stannous fluoride), dentin adhesive sealers (fluorides, varnishes) and lasers.[6]

Need for alternative densensitizing agent

Vashisht R et al (2010)[13] in an ex-vivo study showed that casein phosphopeptide (CPP) remineralizes early enamel lesions. Casein is a protein found in milk. Casein phosphopeptide (CPP) is being used as a remineralizing agent in GC Tooth Mousse. CPP attaches with ACP (amorphous calcium phosphate) of tooth, which stabilizes and forms CPP-ACP complex.[1] This CPP-ACP complex maintains a supersaturated solution of bioavailable calcium and phosphates and prevents dissolution of calcium and phosphate ions. Lozenges containing CPP-ACP are shown to remineralize sub surface enamel lesions.[7]

But amongst all the available treatment options for dentinal sensitivity, a need arises for a cheaper, natural, easily available and a more patient friendly option. Mohammad Sabir et al[1] found that milk as a mouth rinse was found to treat dentinal hypersensitivity which occurs post periodontal treatment. But bovine milk powder is not still evaluated as a treatment option for dentinal hypersensitivity.

Aims and Objective

To evaluate milk powder as a desensitizing agent for dentinal hypersensitivity.

Materials and methods

Total of 30 patients diagnosed with dentinal hypersensitivity were included in the study. Dentinal hypersensitivity was diagnosed by a blast of cold air and by scraping the tip of straight probe. The inclusion criterion for the study was systemically healthy patients and not undergoing professional and at-home densensitizing treatment. The exclusion criteria were patients with unrestored carious lesions. After selecting patients with dentinal hypersensitivity and taking informed consent, they were grouped into two, test and control with 15 patients in each group. Test group was advised to use commercially available bovine whole milk powder and control group was advised to use placebo powder. Both the powders were directed to apply as a tooth powder after tooth brushing twice daily, for 15 days. Patients were advised not eat or drink for 30 minutes after applying respective powders and not to use any desensitizing agents during the entire 15 days study period. Dentinal sensitivity was evaluated at baseline, 1st day, 10th day and 15th day using a 10 pointer Visual Analogue Scale, where 0 score denoted no pain and 10 score denoted severe pain.

Statistical Analysis

The data analysed from baseline to 15th day in test and control group using SPSS statistical software.

Results

For comparison within the test and control group, paired t-test was used. In the test group, at baseline, mean value was 7.1±1.1. On 10th day, the mean value reduced to 4.6±1.17 (p value=0.002) and on 15th day, the mean value was 3.5±1.08 (p value=0.002) which were statistically

significant. In the control group, at baseline, mean value was 6.3 ± 1.5. On 10th day the mean value was 6.2± 1.9 (p value= 0.75) and on 15th day, the mean was 6.4±1.63 (p >0.999), which were statistically not significant. When both test and control were compared by unpaired t-test, at baseline, p value was 0.269, on 10th day it was 0.081 and at 15th day was 0.0013 which were statistically significant. (Table 1)

Also when one way ANOVA test was performed from baseline to 15th day, in test group, the p value was < 0.0001 which was statistically significant and in control group it was 0.8669, statistically not significant. Graphical representation shows 49.29 % reduction in dentinal hypersensitivity in the test group, while in the control group, dentinal hypersensitivity was increased by 1.01%. (fig.1)

Parameters	Baseline	10th Day	15th Day
TEST GROUP			
Mean ± S.D.	7.1±1.1	4.6±1.17	3.5±1.08
P value	-	0.002*	0.002*
CONTROL GROUP			
Mean ± S.D.	6.3 ± 1.5	6.2± 1.9	6.4±1.63
P value	-	0.75	>0.999
BETWEEN TEST AND CONTROL			
P value	0.269	0.081	0.0013*

Table 1: (S.D. – standard deviation; *- statistically significant)

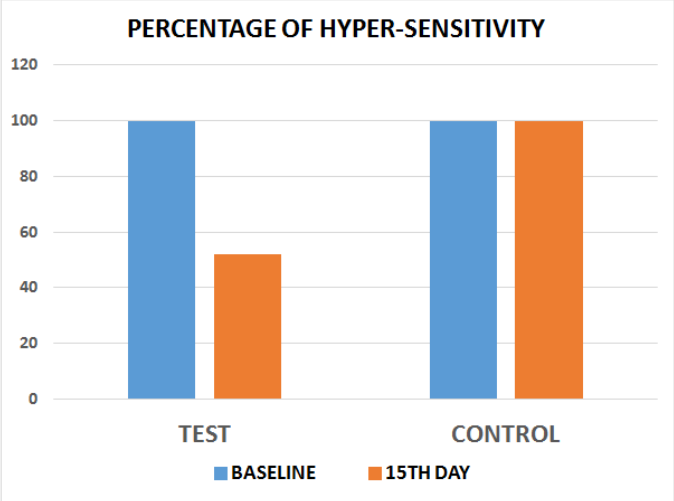

Figure 1: percentage of hypersensitivity on baseline and on 15th day in test and control group**.**

Discussion

The present study was one of its kind which implicated use of a natural, easily available product. Dentinal sensitivity is one of the most common dental symptoms which patient experiences and causes a lot of discomfort and pain which interferes with daily life, which is a significant problem. Dentinal sensitivity can be caused by a variety of factors but the underlying mechanism lies the same, i.e. the dentin gets exposed to outer environment if the outer protective layer is lost causing dentinal hypersensitivity.[8]

The etiopathogenesis for DH has been stated to occur in two phases: lesion localization and lesion initiation.[5] When the protective covering of dentin is lost, it gets exposed to external environment leading to lesion localization. The protective covering gets lost due to abrasion, attrition, erosion, abfraction. Gingival recession due to faulty tooth brushing, periodontal surgery, tooth preparation for crown, excessive flossing can also lead to lesion localization. For dentinal sensitivity to occur lesion localization should be initiated. Once the protective smear layer on dentin is removed, the underlying dentinal tubules get exposed to external environment, causing dentinal sensitivity.

Considering the prevalence rate of dentinal sensitivity, many treatment options are introduced ranging from tubule sealers to lasers. But amongst all these options, there is a need for an easily available, natural and a cheap option.

The non-cariogenic property of bovine milk has been stated in literature. An in-vitro study in 2005 by Bowen and Lawrence concluded that milk is essentially non-cariogenic.[9] Danielsson Niemi et al. (2009) showed the caries preventive effect of casein milk protein.[12]An in-vivo study by Walker et al. (2006, 2009) proved milk added with CPP-ACP remineralizes previously demineralized enamel slabs.[10,11]

Conclusion

The study showed that using bovine whole milk powder as a tooth powder gave promising results to treat dentinal hypersensitivity. Compared to other available options to treat dentinal hypersensitivity, milk powder provides a cheap, natural and more patient friendly option. The limitation of the study is that bovine whole milk powder needs to be used and not the commonly available dairy whitener. Further long term studies with larger sample size can validate the present study.

References

1. Mohammad Sabir, Mohammad Nazish Alam.Milk as Desensitizing Agent for Treatment of Dentine Hypersensitivity Following Periodontal Treatment Procedures. J Clin Diagn Res 2015 Nov; 9(11): ZC22-ZC25.

2. Canadian Advisory Board on Dentin Hypersensitivity Consensus-based recommendations for the diagnosis and management of dentin hypersensitivity. J Can Dent Assoc 2003; 69: 221-26.

3. Que K, Guo B, Jia Z, Chen Z, Yang J, Gao P. A cross sectional study: non-carious cervical lesions, cervical dentine hypersensitivity and related risk factors. J Oral Rehabil 2013; 40: 24-32.

4. Chu CH, Lo ECM. Dentin hypersensitivity: a review. Hong Kong Dent J 2010; 7: 15-22.

5. Orchardson R, Gilliam D. Managing dentin hypersensitivity. J Am Dent Assoc 2006; 137(7):990-98.

6. Miglani S, Aggarwal V, Ahuja B. Dentin hypersensitivity: Recent trends in management. J Conserv Dent. 2010; 13(4):218–24.

7.Cai F, Shen P, Morgan MV, Reynolds EC. Remineralization of enamel subsurface lesions *in-situ* by sugar free lozenges containing casein phosphopeptide – amorphous calcium phosphate. Aust Dent J. 2003; 48:240–43.

8. PM Bartold.Dentinal Hypersensitivity. A review. Aust Dent J. 2006; 51 :(3):212-218.

9. Bowen WH, Lawrence RA. Comparison of the cariogenicity of Cola, honey, cow milk, human milk, and sucrose. Pediatrics.2005; 116(4): 921-6.

10. Walker, G et al. Increased remineralization of tooth enamel by milk containing added casein phosphopeptide-amorphous calcium phosphate. J. Dairy Res. 2006 ; 73(1): 74-8.

11. Walker, G., Cai, F., Shen, P., Bailey, D. L., Yuan, Y. et al. Consumption of milk with added casein phosphopeptide-amorphous calcium phosphate remineralizes enamel subsurface lesions in situ. Aust. Dent. J.2009; 54:245-249.

12. Danielsson Niemi, L., Hernell, O., and Johansson, I. Human milk compounds inhibiting adhesion of mutans streptococci to host ligand-coated hydroxyapatite. Caries Res. 2009; 43: 171-178.

13. Vashisht R, Kumar A, Indira R, Srinivasan MR, Ramachandran S. Remineralization of early enamel lesions using casein phosphopeptide amorphous calcium Phosphate: An ex-vivo study. Contemp Clin Dent. 2010; 1(4):210–13.