ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2017; 3(4): 524-526
www.allresearchjournal.com
Received: 20-02-2017
Accepted: 21-03-2017

Dr. Hitesh Mankad
P.G. Student Department of Periodontics Modern dental college and research centre Indore (M.P.), India

Dr. Rohit Pandey
P.G. Student Department of Periodontics Modern dental college and research centre Indore (M.P.) India

Correspondence
Dr. Hitesh Mankad
P.G. Student Department of Periodontics Modern dental college and research centre Indore (M.P.) India

Efficacy of 2 % Naf and commercially available Apf (1.23%) gel for the treatment of dentinal hypersensitivity using iontophoresis

Dr. Hitesh Mankad and Dr. Rohit Pandey

Abstract
Dentin hypersensitivity is a common clinical condition and age-old complaint, presenting problems to both the patient and the dentist. Besides causing discomfort, the condition may deter a person from establishing or maintaining adequate oral hygiene procedures, further complicating oral health.
Aim: To verify the dentinal hypersensitivity by 1) Light stroke with a dental explorer along the cervical third of the teeth 2) 1-s air blast and 3) Cold water stimuli. Further their responses were recorded on a verbal rating scale.
Material and methods: A total of treated sites from 30 patients were divided into Group A-2% Naf gel iontophoresis; and Group B-APF gel iontophoresis. The teeth were evaluated immediately before and after the treatment and will repeat the same procedure on 7 th and 14 th day i.e. after 1 week and 2 weeks.
Results: When the results of the two groups were compared, there were no significant differences in any of the three stimuli tests. When the mean discomfort score was compared using paired t test group 1 had a lower mean score indicating greater effectiveness of Naf over APF group. At the end of two weeks, there was a marked reduction in the VRS scores in both the groups.
Conclusion: Iontophoresis is an effective treatment modality for treating dentinal hypersensitivity. Agents which were used showed reduction in sensitivity gradually at all the time intervals to all the three test stimuli.

Keywords: Iontophoresis, Sensitivity, rating scale

Introduction
Dentin hypersensitivity is a common clinical condition and an age-old complaint, presenting problems to both the patient and the dentist. Besides causing discomfort, the condition may deter a person from maintaining adequate oral hygiene procedures. The failure to practice satisfactory plaque control has well established consequences on gingival and periodontal health [1].
It could be defined as a short, sharp pain arising from exposed dentin in response to stimuli typically thermal, evaporative, tactile, osmotic, or chemical and which cannot be ascribed to any other form of dental defect or pathology.
Although several hypotheses have been advanced to explain how external stimuli may influence the nerve fibres, the most widely accepted is the hydrodynamic theory, where movement of the fluid within dentin transduces surface stimuli by deformation of pulpal mechanoreceptors which, in turn, causes pain and hypersensitivity [2].
Primary treatment strategies should undoubtedly aim at eliminating these predisposing factors, such as abfraction, abrasive, or erosive components, thus preventing recurrence.
For ready alleviation of mild to moderate symptoms, occlusion of dentinal tubules can be noninvasively achieved by using desensitizing tooth pastes containing strontium salts and/or highly concentrated fluoride lacquers or varnishes [3].
A second approach is to use potassium salt formulation modulating intradental nerve excitability. In case of pronounced severity, a semi-invasive treatment by blocking the tubules in the form of application of a bonding agent or an adhesive restorative material can be used. These different modalities have shown varied results over time [4].

Aims & objectives

The purpose of this study was to evaluate the efficacy of 2% NaF-iontophoresis and a commercially available desensitizing agent i,e, 1.23% APF gel in reducing dentin hypersensitivity.

Materials and methods

This Randomized split mouth trial for comparison of 2 treatment modalities viz iontophoresis using APF(1.23%) gel and 2% NaF solution was conducted in the Department of Periodontics, Modern Dental College and Research centre, Indore, India with the ethical approval of Joint ethics committee of college irrespective of age, gender, or socioeconomic status.

A total of 145 sites in 30 patients were identified and randomly divided into the 2 treatment groups.

Group A- 2% Naf gel iontophoresis and

Group B- APF gel iontophoresis.

Inclusion criteria were as follows

Signed informed consent, subjects above 18 years of age, presence of hypersensitivity to thermal, mechanical, sweet, or sour stimuli in at least 2 teeth comprising of different quadrant and systemically healthy.

Exclusion criteria were as follows

1) Fractured or restored teeth, carious teeth,
2) Subjects undergoing orthodontic treatment,
3) Subjects on analgesics, antibiotics, or desensitizing agents,
4) History of periodontal therapy in the last 6 months
5) Pregnant women or lactating mothers, and
6) Subjects with unshielded cardiac pace maker.

Study design and treatment

Suitability for recruitment was assessed at the screening visit. The potential target sites were identified and informed consent was obtained. The tooth to be tested was isolated using cotton rolls and the 3 stimulus tests were performed in order, with the least painful, that is tactile test first followed by the air blast and finally the cold water test. Each of these tests was performed with an interval of 5 min separating them.

1) Tactile test: A sharp dental explorer (17/23) was passed lightly across the affected area of the tooth, perpendicular to the long axis of the tooth. The test was repeated three times before a score, using the discomfort scale, was noted.

2) Air blast test: A blast of air from a dental syringe at 60 pound/inch^2 pressure was directed onto the affected area of the tooth for 1 second from a distance of 10 mm (measured by taping a scale to the three-way syringe); the adjacent teeth were protected using cotton rolls.

3) Cold water test: A precooled 1 cc disposable syringe was filled with freshly melted ice-cold water. The teeth were isolated with cotton rolls and the stimuli were applied.

For all stimuli tests, patient response was recorded on the following scale:

0 = no significant discomfort, or awareness of stimulus;

1 = discomfort, but no severe pain;

2 = severe pain during application of stimulus; and

3 = severe pain during and after application of stimulus

Application of agents

Group A: The 2% sodium fluoride solution was made by dissolving 200 mg of sodium fluoride powder in 10 ml of distilled water in a plastic bottle; the solution was freshly prepared each time and applied on the sensitive tooth surface.

Cotton soaked in normal saline was wrapped around the other (inactive) electrode which was held firmly between the fingers of the patient's left hand.

The equipment was then switched on and the current knob was slowly turned clockwise until the ammeter read 0.5 mA, and this current was applied for 2 minutes per tooth, for a dosage of 1 mA per minute.

Group B: Iontophoresis-the tooth was isolated with cotton rolls, dried, and a thin layer of APF gel was applied with a brush (one stroke of the brush).

The iontophoresis unit was switched on with the circuit being completed and a progressively increasing current was applied to the tooth until the patient complained of pain or sensitivity. Once this threshold was reached, the APF gel was reapplied and the procedure was repeated at a lower ampere current.

The statistical analysis were performed using paired t test, unpaired t test.

When the results of the two groups were compared, there were no significant differences in any of the three stimuli tests. When the mean discomfort score was compared using paired t test group 1 had a lower mean score indicating greater effectiveness of Naf over APF group. At the end of two weeks, there was a marked reduction in the VRS scores in both the groups.

GRP	Mean (tact)	Mean (Air)	Mean (Cold)
A1	0.6	2.1	3.2
A7	0.3	1.2	2.6
A14	01	0.9	2.2

B1	**0.7**	**2.6**	**3.5**
B7	0.5	1.9	3.1
B14	0.4	1.8	2.

Grps		N	Z	P	
1	B-final	30	0.16	0.21	NS
2	B-final	30	0.52	0.14	NS
3	B-final	30	1.09	0.09	NS

Discussion

The term sensitive or hypersensitive dentin implies an abnormal sensation of an exposed dentin, exhibiting itself in the form of reflex or localized pain, sometimes in the absence of apparent sources of irritation, as a result of an external stimulus [5].

Tooth hypersensitivity can be viewed as a true pain syndrome. Clinically as an exaggerated response to a non-noxious stimulus, an irritant such as tooth brushing, sweet and sour foods and thermal changes. The problem of hypersensitive teeth remains a source of annoyance to both patient and dentist.

Three mechanism have been proposed to explain dentin sensitivity

Direct Innervation theory- The dentin contain nerve that respond when it is stimulated.

Odontoblast deformation theory-The odontoblasts serve as receptors and are coupled to nerves in the pulp.

Hydrodynamic theory- The tubular nature of dentin permits fluid movement to occur within the tubule when a stimulus is applied movement registered by pulpal free nerve endings close to the dentin.

Galvani and volta, two well known scientists working in 18th century, combined the knowledge that electricity can move different metal ions,and that movement of ions produce electricity. The method of administrating pharmacologic drugs by iontophoresis became popular at the beginning of the 20th century due to work of leduc who introduced the word iontotherapy and formulated the laws for this process.

The exact mechanism by which fluoride iontophoresis produces desensitization is not known, but the following hypotheses have been proposed. One mechanism described by Lefkowitz *et al*. involves the formation of reparative dentin following application of electric current to the dentin [6]. This reparative dentin inhibits the passage of stimuli from exposed dentin to the pulp. Another possible explanation is that the electric current produces paraesthesia by altering the sensory mechanism of pain conduction [7].

A third, alternative explanation of iontophoretic desensitization is that the concentration of fluoride ions in the dentinal tubules may be increased due to fluoride iontophoresis. This could cause micro precipitation of calcium fluoride that may act to block hyrodynamically mediated pain inducing stimuli [8].

Conclusion

In the end it can be concluded that the iontophoresis is an effective treatment modality for treating dentinal hypersensitivity. Agents which were used showed reduction in sensitivity gradually at all the time intervals to all the three test stimuli.

Both the agents were effective but 2% Naf showed better results as compared to 1.23 % gel. We can say that clinically iontophoresis technique is extremely effective in reducing dentinal hypersensitivity. Also, iontophoresis treatment was giving progressive results as we increase the current level.

Their appeared to be slight co-relation between amount of current applied and depth of fluoride penetration into the dentin. In future further studies need to be conducted to conform it.

References

1. Economical iontophoresis for dentistry Quintessence International. 1989; 20:11.
2. Sandhu SP, Sharma RL, Bharti V. Comparative evaluation of different strengths of electrical current in the management of dentinal hypersensitivity. Indian J Dent Res, 2010; 21:207-12.
3. Addy Etiology M. and clinical implications of dentine hypersensitivity. Dent Clin North Am. 1990; 34:491, 429-431, 50 514, 565.
4. Joshi V, Bhat KM, Verma BR. Management of dentinal hypersensitivity by iontophoresis using sodium fluoride and saliva: A comparative study. ISP Sp. 1994; 18:17-19.
5. Bamise CT, Olusile AO, Oginni AO. An analysis of the etiological and predisposing factors related to dentin hypersensitivity. J Contemp Dent Pract. 2008; 9:52-9.
6. Gangarosa LP Sr. Iontophoresis in dental practice. Chicago, Berlin, Rio de Janeiro, Tokyo: Quintessence Publishing Co, Inc. 1983.
7. Dowell P, Addy M. Dentin hypersensitivity: A review - aetiology, symptoms and theories of pain production. J Clin Periodontol. 1983; 10:341-50.
8. Dababneh R, Khouri A, Addy M. Dentine hypersensitivity-an enigma? Dental hypersensitivity. J Periodontol. 1964; 35:232-5.