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Opinions on Dental Fluorosis, Knowledge of Diagnosis, and Treatment Strategies among Visnagar Dentists: A Questionnaire Survey

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Abstract

Purpose: To investigate dentist's general experience, knowledge about diagnosis and treatment of dental fluorosis in Visnagar population.

Material and method: A questionnaire consisting of 10 questions was used to assess the level of the knowledge and awareness among the dentists in Visnagar and preferred treatment modality of dentist for dental fluorosis. The questionnaire was given to 76 dentist and responses of all questions were noted.

Results: Results indicated that most of dentists (73.7%) noticed dental fluorosis, majority of the subjects were noticed moderate (40.8%) fluorosis followed by mild (36.8%) and severe fluorosis (14.5%) respectively. 39.5% subjects wanted treatment for fluorosis. 75% subject replied that they will go for the fluorosis treatment. 67.1% subjects followed fluorosis treatment protocol according to different fluorosis stages. Majority of the subjects preferred laminate veneers(32.9%) followed by bleaching(28.9%), crowns (15.8%), Bleaching & Laminate Veneers and micro abrasion (6.6%), other 4 (5.3%) and bleaching & micro abrasion (1.3%) respectively. 48.7% patients were called for follow up and 35.5% among them preferred follow up after 6 months followed by 9 months (28.9%), 1 year (26.3%) and 2 years (6.6%) respectively.26.3% subjects noticed failure treatment and 72.4% didn't.

Conclusion: The majority of the dentists were treated patients with dental fluorosis according to requirement. In general, the survey suggests that the dentists are comparatively up to date regarding the clinical recording, diagnosis, and treatment of dental fluorosis.

Keywords: Dental Fluorosis, Diagnosis, Awareness, Knowledge, Treatment, Bleaching, Micro abrasion, Laminate veneers, Crown, Questionnaire Survey.

Introduction

Dental fluorosis, which is a hypo-mineralization of enamel due to the effects of excessive fluoride intake, results in white opaque areas or discolorations ranging from yellow to dark brown together with surface porosities on the enamel surface.[1] Dental fluorosis becomes a cosmetic concern particularly if it affects the anterior teeth. Although the causes and characteristics of dental fluorosis have been widely described, fewer studies have discussed the proper treatment of fluorosed teeth. The selection of an appropriate treatment plan depends on the severity of fluorosis.[2] The unaesthetic aspect of dental fluorosis remains its most prominent feature. So, the number of conservative or restorative techniques have been proposed such as porcelain or composite veneers or crowns, enamel microabrasion, vital bleaching, or combinations of enamel microabrasion and bleaching.[3-5] The discoloration is often so unsightly that it causes psychological problems in patients, mainly the younger ones, making the discovery of an adequate remedy all the more urgent. So five solutions have been proposed[6]:

1. **Porcelain crowns**, which are expensive and require excessive mutilation of the teeth were suggested.
2. The masking of visible areas by multiple coats of different colors and constitution of **composite resins,** e.g. masking, tints, opaquers, and so forth were proposed. This no mutilating restoration needs long sessions and the medium to long term results are not always satisfactory. The over thickness of the material, mainly in the cervical area, is biologically objectionable.
3. The use of **porcelain or microfill resin veneers** was also suggested. This is an intermediate method between the two listed above. Its technique require highly accurate laboratory work, and the acid-proof qualities of the fluorotic enamel greatly affect its durability.[6] Ceramic veneers are the restoration of choice for moderate to severe cases of fluorosis given their color systainability, wear resistance, and biocompatibility.[7]
4. **Bleaching technique** - currently in wide use for both vital and non-vital teeth. Although there are many techniques, their basic principle is roughly the same. They use the same product, a 35% stabilized hydrogen peroxide solution, whose bleaching action has been known for years. Upon breaking down, it releases a great amount of oxygen which reacts with staining molecules.[6]
5. **Microabrasion** that uses an acid (erosive agent) and abrasive agent, which together result in weariness of few microns on the staining and surface irregularities of the enamel without the need to use diamond burs and drills. It is associated with an abrasive and erosive agent, began with the use of muriatic acid and heat in the removal of dental fluorosis stains. Since then, many techniques have been described, such as the use of 18% hydrochloric acid associated with fine-grit pumice to form an abrasive paste.[8] Therefore, the aim of the present study was to perform a survey on public dental practitioners asking them about their experiences, awareness, knowledge of diagnosis, and choice of treatment options for dental fluorosis.

Material and method

Study design and study population

This study adopted cross sectional descriptive study, to know the knowledge of dental fluorosis among the population and its treatment option given by Dentist in Visnagar Gujarat. Data was collected from randomly selected 76 the private practitioners (Dentists) who practice since 2 years and agreed to participate in survey. In this study, a questionnaire was sent personally to all dentists in Visnagar. Data was collected from respondents

who were involved in the diagnosis and treatment for dental fluorosis. The dentists were asked to record their choice of treatment for dental fluorosis.

The questionnaire

Que 1.Have you noticed high prevalence of fluorosis in your area? a) Yes b) No Que 2. If yes, which type of fluorosis have u noticed mostly? a) Mild b) Moderate c) Severe Que 3. Do you think patient is aware of fluorosis? a) Yes b) No Que 4. If yes, do they want treatment? a) Yes b) No Que 5. will you be willing to go for the fluorosis treatment, if required? a) Yes b) No Que 6. Are you doing fluorosis treatment according to requirement? a) Yes b) No Que 7. If yes, which treatment you prefer? a) Bleaching b) Micro abrasion c) Laminate Veneers d) Crowns e) other Que.8 Do you call patients for follow up? a) Yes b) No. Que. 9 If yes, what is interval time for follow up? a) 6 months b) 9 months c) 1 year d) 2 year Que. 10 Do you noticed any failure of treatment? a) Yes b) No.

Statistical analysis

The data was entered into the computer (MS-office, Excel) version 10.0 and The results were given as pie chart and proportions as percentages.

Results

Out of 76 dentists, 56 (73.7%) dentists noticed high prevalence of fluorosis in their area. majority of the dentists noticed moderate 31 (40.8%) fluorosis followed by mild 28 (36.8%) and severe fluorosis 11 (14.5%) respectively. 5 (6.6%) dentists replied that patients were aware of fluorosis. 30 (39.5%) dentists replied that patients wanted treatment for fluorosis. Out of 76 dentists, 57 (75%) dentists replied that they will go for the fluorosis treatment, if required and 51 (67.1%) dentists will go for do fluorosis treatment according to Requirement. majority of the dentists preferred laminate veneers 25 (32.9%) dentists followed by bleaching 22 (28.9%) dentists, crowns 12 (15.8%) dentists, Bleaching and Laminate Veneers and micro abrasion 5 (6.6%) dentists, other 4 (5.3%) dentists and bleaching and micro abrasion 1 (1.3%) dentists respectively. 37 (48.7%) dentists were called for follow up. majority of the dentists 27 (35.5%) preferred 6 months for follow up. 20 (26.3%) dentists noticed failure of treatment.

Table-1: All questions and answers

Questions & answers Options	Number	Percentages
1. Have you noticed high prevalence of fluorosis in your area?		
Not Answered	1	1.3
Yes	56	73.7
No	19	25.0
2. If yes, which type of fluorosis have u noticed mostly?		
Not Answered	6	7.9
Mild	28	36.8
Moderate	31	40.8
Severe	11	14.5
3. Do you think patient is aware of fluorosis?		
Not Answered	2	2.6
Yes	5	6.6
No	69	90.8
4. If yes, do they want treatment?		
Not Answered	11	14.5
Yes	30	39.5
No	35	46.1

5. Will you be willing to go for the fluorosis treatment, if required?		
Yes	57	75.0
No	19	25.0

6 Are you doing fluorosis treatment according to requirement?		
Not Answered	2	2.6
Yes	51	67.1
No	23	30.3

7. If yes, which treatment you prefer?		
Not Answered	2	2.6
Bleaching	22	28.9
Micro abrasion	5	6.6
Laminate Veneers	25	32.9
Bleaching + Micro abrasion	1	1.3
Bleaching + Laminate Veneers	5	6.6
Crowns	12	15.8
Other	4	5.3

8 Do you call patients for follow up?		
Yes	37	48.7
No	39	51.3

9. If yes, what is interval time for follow up?		
Not Answered	2	2.6
6 months	27	35.5
9 months	22	28.9
1 year	20	26.3
2 year	5	6.6

10. Do you noticed any failure of treatment?		
Not Answered	1	1.3
Yes	20	26.3
No	55	72.4

Discussion

Endemic fluorosis resulting from high fluoride concentration in groundwater is a public health problem in India.15 States in India are endemic for fluorosis (fluoride level in drinking water >1.5 mg/l), five of these have category III (>50% of the districts affected) which includes Gujarat.61 Gujarat Water Supply and Sewerage Board (GWSSB) has surveyed all the villages in Gujarat and reported 15.8 per cent of the villages having fluoride level more than 1.5 mg/l (personal communication, GWSSB).[9]

In this present study, (73.7%) dentist were noticed the prevalence of dental Fluorosis and 40.8% dentists were noticed moderate fluorosis, followed by 36.8% mild fluorosis and 14.5% severe fluorosis in Visnagar city. Majority patients (90.8%) were not aware of the dental fluorosis and very less patients were willing for the treatment of dental fluorosis. The questionnaire used in this study was aimed at dentists working in Visnagar who were currently involved in the diagnosis and treatment of dental fluorosis in their clinical practice. Measures were taken to ensure a high response rate in accordance with a systematic review of questionnaires.[10] The questionnaire was styled in a personal manner, and a realistic and interpretative case with background information was presented early in the questionnaire, as was proven successful in a previous questionnaire-study on dental caries.[11] The cosmetic defect from tooth discoloration of severe fluorosis in endemic countries may affect the quality of life.[12] In most other countries, however, dental fluorosis tends to be mild or very mild, in spite of the

increasing prevalence of the condition due to the use of fluoride in preventive dentistry. Mild fluorosis may require no therapeutic intervention.

In this present study, majority of dentist preferred the laminate veneers followed by bleaching (28.9%), crowns (15.8%), Bleaching & Laminate Veneers and micro abrasion(6.6%), other treatment (5.3%) and bleaching & micro abrasion (1.3%).

In line with the current trend toward minimally invasive dentistry, many clinicians advocate that teeth with cosmetically objectionable mild-to-moderate fluorosis be treated by bleaching.[13-16] In some cases, bleaching was preceded by etching with 35-37% phosphoric acid. Clinicians appreciate the fact that a bleaching agent may not easily penetrate the hypermineralized surface enamel to remove stains entrapped in the subsurface porosities of fluorosed teeth. Hence, bleaching is often preceded by etching or microabrasion.[14,15,16] Because the slurry used for microabrasion contains acid, there may be no need for etching as a separate step. Thus, there seems to be a consensus that esthetically objectionable fluorosed teeth, without surface enamel loss, should be treated by a combination of microabrasion and bleaching. It should be noted that microabrasion results in the loss of about 100 μm of surface enamel. **Penumatsa *et al.*[17]** in 2015 also have shown that bleaching procedure can be considered a treatment for dental fluorosis. Another consequence of a bleaching procedure is that, it will whiten the teeth color but also the white spots of fluorosis, which may appear even brighter due to bleaching causes the opaque spots to become dehydrated, making then appear whiter than they really are, which can be hidden on mild dental fluorosis, but it would be more noticeable for moderate cases. **Wallace *et al.*[18]** in 2015**, Slaska *et al.*[19]** in 2015**, PM *et al.*[20]** in 2014**, Tau *et al.*[21]** in 2014, and **Shanbhag *et al.*[22]** in 2013 are also in agreement with this fact.**Train *et al.*[23]** reported marked enamel surface irregularities following treatment of severe fluorosis by microabrasion. **Park *et al.*[24]** in 2016 have shown that patients with mild to moderate fluorosis can be treated with microabrasion technique. Advantage of microabrasion is that it is a much faster procedure in achieving the desired result measured to other treatment options, however; the disadvantage is that microabrasion uses rotary instruments and high concentrations of acid which can lead to excessive removal of tooth. Microabrasion technique can be successfully recruited for discoloration presented as single line or patchy discolorations. In agreement with this study **Sundfeld *et al.*[25]** in 2011 and 2014, **Schmidlin[26]** in 2003, **Rodrigues[27]** in 2013, **Fragoso[28]** in 2011, and **Wang[29]** in 2013 published their case reports and agreed that moderate dental fluorosis can successfully be treated by microabrasion. **Farid *et al.*[30]** in 2012, **Sherwood[31]** in 2010, **Khandelwal *et al.*[32]** in 2013, **DenBesten *et al.*[33]** in 2014 and other studies including the most recent one published by **Joshi et al.[34]** in 2015 have shown that patients with severe dental fluorosis and loss of vertical dimension of occlusion might be good candidates for porcelain veneer or ceramic crowns. In addition, advances in ceramic materials have facilitated this process. Ceramic veneers provide both predictable and long-lasting aesthetic rehabilitation.[35,36] The durability and clinical success of porcelain veneers have been widely investigated in the literature. It has been reported that ceramic veneers provide durable and successful restoration with an estimated survival probability of 93.5% over 10 years.53 Full crown preparation was selected over labial veneers because of their clinical longevity and survival rate, this is in agreement with **Shillinburg *et al.*[37]** in 1997, and those concluded that full crown restoration is the most type of preparation with long services calculated by years.[35]

Conclusion

Despite the limitations of gathering information using a survey of this type, the results tend to suggest that the responding dentists are relatively up to date regarding the clinical recording and diagnosis of dental fluorosis. This study reported that dentist noticed dental fluorosis and they do treatment according to requirement for the mild, moderate and severe dental fluorosis. Preferences of the treatment are laminates veneers followed by bleaching followed by crowns than microabration.

References

1. Aoba T, Fejerskov O. Dental fluorosis: Chemistry and biology. Crit Rev Oral Biol Med 2002;13:155-70.
2. E. S. Akpata, "Occurrence and management of dental fluorosis," International Dental Journal, vol. 51, no. 5, pp. 325–333, 2001.
3. Strassler HE. Clinical case report: Treatment of mild-to-moderate fluorosis with a minimally invasive treatment plan. Compend Contin Educ Dent 2010;31:54-8.
4. Price RB, Loney RW, Doyle MG, Moulding MB. An evaluation of a technique to remove stains from teeth using microabrasion. J Am Dent Assoc 2003;134:1066-71.
5. Limeback H, Vieira AP, Lawrence H. Improving esthetically objectionable human enamel fluorosis with a simple microabrasion technique. Eur J Oral Sci 2006;114(Suppl 1):123-6.
6. Belkhir MS, Douki N. A new concept for removal of dental fluorosis stains. Journal of endodontics. 1991;1;17(6):288-92.
7. Loyola-Rodriguez JP, de Jesus Pozos-Guillen A, Hernandez-Hernandez F, Berumen-Maldonado R, Patiño-Marin N. Effectiveness of treatment with carbamide peroxide and hydrogen peroxide in subjects affected by dental fluorosis: a clinical trial. Journal of Clinical Pediatric Dentistry. 2004;1;28(1):63-7.
8. Bussadori SK, do Rego MA, da Silva PE, Pinto MM, Guedes Pinto AC. Esthetic alternative for fluorosis blemishes with the usage of a dual bleaching system based on hydrogen peroxide at 35%. Journal of Clinical Pediatric Dentistry. 2005;1;28(2):143-6.
9. Vieira KO, Garcia FC, Nolasco GM, Gonzaga CC, Roseira PM, Teixeira FD, Cunha LF. Microabrasion and composite resin for re-establishing smile esthetics: a case report. RSBO (Online). 2015;12(4):383-8.
10. P. J. Edwards, I. Roberts, M. J. Clarke et al., "Methods to increase response to postal and electronic questionnaires," *Cochrane Database of Systematic Reviews*, no. 3, Article ID MR000008, 2009.
11. S. Vidnes-Kopperud, A. B. Tveit, and I. Espelid, "Changes in the treatment concept for approximal caries from 1983 to 2009 in Norway," *Caries Research*, vol. 45, no. 2, pp. 113–120, 2011.
12. 25. Chakanka O, Levy SM, Warren JJ, Chalmers JM. A literature review of esthetic perception of dental fluorosis and relationship with psychological aspects/oral health-related quality of life. Community Dent Oral Epidemiol 2010;38:97-109.
13. Wright JT. The etch-bleach-seal technique for managing stained enamel defects in young permanent incisors. Pediatr Dent 2002;24:249-52.
14. Flores AC, Flores Reyes H, Gordillo Moscoso A, Castanedo Cázares JP, Pozos Guillén Ade J. Clinical efficacy of 5% sodium hypochlorite for removal of stains caused by dental fluorosis. J Clin Pediatr Dent 2009;33:187-91.
15. Strassler HE. Clinical case report: Treatment of mild-to-moderate fluorosis with minimally invasive

treatment plan. Compend Contin Educ Dent 2010;31:54-8.

16. 29. Ardu S, Stavridakis M, Krejci I. A minimally invasive treatment of severe dental fluorosis. Quintessence Int 2007;38:455-8.
17. Penumatsa NV, Sharanesha RB. Bleaching of fluorosis stains using sodium hypochlorite. Journal of pharmacy & bioallied sciences. 2015 Aug;7(Suppl 2):S766.
18. 31. Wallace A, Deery C. Management of opacities in children and adolescents. Dental update. 2015;2;42(10):951-8.
19. 32. Slaska B, Liebman AI, Kukleris D. Restoration of fluorosis stained teeth: a case study. Dental Clinics. 201; 1;59(3):583-91.
20. 33. Dixon PM, Savill D, Horbyl A, Reardon RJ, Liuti T. Critical evaluation of ex vivo restoration of carious equine maxillary cheek teeth infundibulae following high-pressure gas and micro-particle abrasion. The Veterinary Journal. 2014;1;200(3):368-74.
21. 34. Tau L, Kurthy R. Minimally invasive treatment of brown spot fluorosis. Dentistry today. 2014;33(5):140-2.
22. 35. Shanbhag R, Veena R, Nanjannawar G, Patil J, Hugar S, Vagrali H. Use of clinical bleaching with 35% hydrogen peroxide in esthetic improvement of fluorotic human incisors in vivo. The journal of contemporary dental practice. 2013;1;14(2):208.
23. Train TE, mcwhorter AG, Searle NS, Wilson CE, Guo IY. Examination of esthetic improvement and surface alteration following microabrasion in fluorotic human incisors in vivo. Pediatr Dent 1996;18:353-62.
24. Park TY, Choi HS, Ku HW, Kim HS, Lee YJ, Min JB. Application of quantitative light-induced fluorescence to determine the depth of demineralization of dental fluorosis in enamel microabrasion: a case report. Restorative dentistry & endodontics. 2016; 1;41(3):225-30.
25. Sundfeld RH, Sundfeld-Neto D, Machado LS, Franco LM, Fagundes TC, Briso AL. Microabrasion in tooth enamel discoloration defects: three cases with long-term follow-ups. Journal of Applied Oral Science. 2014;22(4):347-54
26. Schmidlin PR, Göhring TN, Schug J, Lutz F. Histological, morphological, profilometric and optical changes of human tooth enamel after microabrasion. American journal of dentistry. 2003;16:4A-8A.
27. Rodrigues MC, Mondelli RF, Oliveira GU, Franco EB, Baseggio W, Wang L. Minimal alterations on the enamel surface by micro-abrasion: in vitro roughness and wear assessments. Journal of Applied Oral Science. 2013;21(2):112-7.
28. Fragoso LS, Lima DA, De Alexandre RS, Bertoldo CE, Aguiar FH, Lovadino JR. Evaluation of physical properties of enamel after microabrasion, polishing, and storage in artificial saliva. Biomedical Materials. 2011;13;6(3):035001.
29. Rodrigues MC, Mondelli RF, Oliveira GU, Franco EB, Baseggio W, Wang L. Minimal alterations on the enamel surface by micro-abrasion: in vitro roughness and wear assessments. Journal of Applied Oral Science. 2013;21(2):112-7.
30. Farid F, Hajimiragha H, Jelodar R, Mostafavi AS, Nokhbatolfoghahaie H. In vitro evaluation of the effect of core thickness and fabrication stages on the marginal accuracy of an all-ceramic system. Journal of dentistry (Tehran, Iran). 2012;9(3):188.
31. Sherwood, “Fluorosis varied treatment options,” Journal of Conservative Dentistry, vol. 13, no. 1, pp. 47–53, 2010.

32. Khandelwal V, Nayak UA, Nayak PA, Ninawe N. Aesthetic management of dental fluorosis. BMJ case reports. 2013;22;2013:bcr2013010029.
33. Nakano Y, Den Besten P. Fluoride effects on the dentin-pulp Complex. Inthe Dental Pulp 2014 (pp. 191-199). Springer, Berlin, Heidelberg.
34. Joshi SB. An overview of vital teeth bleaching. Journal of Interdisciplinary Dentistry. 2016;1;6(1):3.
35. Peumans M, Van Meerbeek B, Lambrechts P, Vanherle G. Porcelain veneers: a review of the literature. Journal of dentistry. 2000;1;28(3):163-77.
36. Beier US, Kapferer I, Burtscher D, Dumfahrt H. Clinical performance of porcelain laminate veneers for up to 20 years. International Journal of Prosthodontics. 2012; 1;25(1).
37. Shillinburg, Sumiya, H., Lowell, W., Richard, J Susan, B. (2012). Fundamentals of Fixed Prosthodontics 4thed Herbert T, Quintessence Publishing Co.