Case Series

Dental Fluorosis: A Community-Clustered Case Series

Jagrati Bahrani[1], Bidushi Mishra[2], Nidhi D Sinha[2], B. N. Mishra[1], Sapna Rathore[1], Nitin Bhargava[1], Raghvendra S. Baghel[1]*

Background: Dental fluorosis, a condition resulting from excessive fluoride intake during tooth development, is a preventable public health problem. This case series examines this in a rural community in the Ujjain district in Madhya Pradesh, India, identified through a postgraduate community adoption program.

Methods: Cases of dental fluorosis were detected from Lambikhedi village in the Mahidpur block, Ujjain District, through routine school health survey and subsequently confirmed at the dental department. The severity of fluorosis was assessed using the ICMR and Dean's Indices. All drinkable water sources of the concerned village were checked for fluoride content. The study was conducted between December 2023 and March 2024.

Results: This study detected five children aged 5 to 11 years, with varying degrees of dental fluorosis: two cases classified as grade III, two as grade II, and one as grade I according to the ICMR index. Analysis of all three drinking water sources revealed fluoride levels between 1.51 mg/L and 1.65 mg/L, which exceed acceptable limits (1.0 mg/L) and permissible limits (1.5 mg/L). This case series includes clinical findings, fluorosis grades, water quality reports, and individualized treatment plans.

Conclusion: This study highlights the endemic nature of dental fluorosis and high fluoride levels in rural India's drinking water. Effective screening, water defluoridation, and community-based oral health education are essential. A community adoption program for postgraduate students at medical colleges can greatly enhance these efforts.

Access this article online

Website: www.cijmr.com

DOI: 10.58999/cijmr.v5i01.319

Keywords: Community health, Dental fluorosis, Water fluoride content, ICMR Index, Dean's Index

Introduction

Community Adoption Program for Postgraduates (CAPP), initiated by the Department of Community Medicine, Ruxmaniben Deepchand Gardi Medical College, Ujjain, Madhya Pradesh, is the first of its kind in India. The program aims to enhance the practical learning of postgraduate students in Community Medicine. This program involves conducting community needs assessments, implementing health promotion programs, and fostering community involvement.[1-5]

Case reports and case studies contribute to medical education by highlighting rare or novel clinical occurrences, generating hypotheses, and informing clinical practice.[6,7] Fluoride, at optimal levels (0.8-1.0 mg/L), aids in tooth and bone ossification, but excessive intake (above 1.5 mg/L) can lead to dental and skeletal fluorosis.[8-10]

In India, fluorosis affects millions, with a national prevention and control program in place.[9-11] Dental fluorosis can negatively impact children's social perceptions.[9,12,13]

A primary school survey in western Madhya Pradesh revealed dental staining and poor oral hygiene, leading to further investigation. The World Health Organization and the Bureau of Indian Standards recommend fluoride limits of 1.5 mg/L and 1.0 mg/L, respectively. [10] Dental fluorosis is classified using the ICMR and Dean's Indices.[14,15] The nomenclature of teeth is done using the FDI tooth numbering classification system.[16]

Methods

Study Design

A community-clustered cross-sectional study, the outcome of which is reported as a case series, was conducted.

[1]Department of Community Medicine, R.D. Gardi Medical College, Ujjain, Madhya Pradesh, India

[2]Department of Dentistry, R.D. Gardi Medical College, Ujjain, Madhya Pradesh, India

Correspondence to: Jagrati Bahrani, Department of Community Medicine, R.D. Gardi Medical College, Ujjain, Madhya Pradesh, India. E-mail: jagratibahrani@gmail.com

Submitted: 20/02/2026 Revision: 05/03/2026

Accepted: 20/03/2026 Published: 20/04/2026

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

How to cite this article: Bahrani J, Mishra B, Sinha ND, Mishra BN, Rathore S, Bhargava N, Baghel RS. Dental Fluorosis: A Community-Clustered Case Series. Central India Journal of Medical Research. 2026;5(1):93-102.

Setting

The study took place in a village in the Mahidpur block, Ujjain District, Madhya Pradesh, India.

Participants

All the Anganwadi and school children were screened for eye, ear and oral wellness. Eight children aged 5 to 11 years, identified during a village health and wellness camp, were included.

Data Collection

- Dental examinations were performed by dental consultants at C.R. Gardi Hospital, Ujjain.
- Severity of fluorosis was assessed using the ICMR and Dean's Indices
- OPG radiographic examinations were conducted to rule out underlying dental anomalies and possibly associated jaw defects.
- Water samples were collected from three sources (two wells and one hand pump) and analysed for fluoride content by the Pollution Control Board, Ujjain.

Data Analysis

Descriptive analysis was used to summarize the clinical findings and water quality data.

Fluorosis severity was categorized according to the ICMR and Dean's index.

Ethical Considerations

The study was conducted following ethical guidelines and principles.

Approval was obtained from the Institutional Ethics Committee of R. D. Gardi Medical College, Ujjain; [Letter no. IEC Ref. No- 01/2025]. Informed verbal consent was obtained from the parents or legal guardians of all participating children before their inclusion in the study. The confidentiality of the children's data was maintained throughout the study.

Results

Five of the eight children were diagnosed with Dental Fluorosis. The case reports detail the clinical findings, including OPG radiographic examination results, fluorosis grades as per ICMR, Dean's treatment plans, and water quality results.

Distribution of Cases with Respect to Drinking Water Sources

The analysis of fluorosis cases in Lambikhedi village, Mahidpur Block (Ujjain District), revealed a clear spatial association between the occurrence of affected individuals and their proximity to fluoride-contaminated water sources. As depicted in the figure, the majority of fluoride-infected children were clustered around the central and northern zones of the village, corresponding to the areas served by the identified fluoride-contaminated handpump. A smaller cluster of affected cases was noted in the southern part of the village near the well, which also showed elevated fluoride levels. The distribution pattern suggests that exposure to contaminated groundwater is the primary determinant of disease occurrence, with households relying on the handpump showing higher case density compared to those using alternative or treated sources. The spatial overlay underscores the importance of source-based interventions such as defluoridation and promotion of safe community water points to reduce future exposure risk.

Case 1

The first case involved a 5-year-old male child who presented with yellow discoloration of teeth and poor oral hygiene. He appeared healthy and did not report any specific complaints. Neither the child nor his parents expressed concern regarding the discoloration. There was no history of pain, sensitivity, or other dental symptoms. The child had never visited a dentist before this presentation.

On general physical examination, he was alert and oriented to time, place, and person. His school

Figure 1: Spatial distribution of dental fluorosis cases in Lambikhedi village, Mahidpur block, Ujjain district, showing clustering of affected children around fluoride-contaminated drinking water sources

performance was reported to be satisfactory. His mother admitted that he did not maintain a regular toothbrushing routine.

Clinical Examination

Extraoral Examination

- No visible facial asymmetry.
- Cervical lymph nodes were non-palpable and non-tender.
- No abnormalities detected in the temporomandibular joint on both intra-articular and extra-auricular examination.

Intraoral Examination

- Yellowish to light brown intrinsic stains were noted on the maxillary anterior teeth (teeth 51, 52, 61, 62).
- Dental caries was observed in teeth 74, 84, and 85.
- No tenderness on percussion was observed in any tooth.

Radiographic Examination

An orthopantomogram (OPG) was performed to aid in differential diagnosis, assess potential skeletal changes in the jaw due to fluorosis, evaluate developmental status of permanent tooth buds for signs of environmental enamel hypoplasia, and assist in treatment planning.

Provisional Diagnosis

Environmental enamel hypoplasia secondary to fluoride exposure.

Differential Diagnoses

- Incipient smooth surface dental caries.
- Enamel hypoplasia due to nutritional deficiencies.

Final Diagnosis

Grade II Dental Fluorosis (Environmental Enamel Hypoplasia), classified according to the ICMR Fluorosis Index.

Treatment Plan

- Oral prophylaxis to eliminate external stains, plaque, and calculus.
- Aesthetic management through in-office bleaching using 35% hydrogen peroxide combined with micro-abrasion.
- Restorative care, including excavation and subsequent restoration of:
  - Mesio-proximal caries in tooth 85
  - Disto-proximal caries in teeth 74 and 84
- Parental counselling regarding maintenance of oral hygiene and monitoring fluoride intake in the child's diet.
- Oral hygiene education for the child, including training in proper brushing techniques (Fones' technique) and emphasizing the importance of maintaining oral cleanliness.
- Regular follow-up appointments for monitoring and maintenance.

Case 2

The second case involved a 7-year-old male child who presented with yellow to brown discoloration of the teeth, enamel pitting, and poor oral hygiene. Despite these findings, the child appeared in good general health and reported no specific complaints. Neither the child nor his parents expressed concern regarding the tooth discoloration or the irregular shape of the teeth. There was no history of pain, sensitivity, or other dental

Table 1: Patient details, including fluorosis grade according to ICMR, and Dean's.

S. No.	*Age/ Gender*	*Finding*	*Diagnosis (ICMR Index)*	*Diagnosis (Dean's Index)*
Patient 1	5 year/ M	Yellowish light brown intrinsic stain with respect to upper left and right quadrants (51/52/61/62)	Grade II Fluorosis	Mild
Patient 2	7 year/ M	Chalky white to Yellowish brown discoloration seen with intrinsic stain with respect to upper and lower left and right quadrants (52/53/54/62/63/64/83/84)	Grade III Fluorosis	Severe
Patient 3	7 year/ F	Chalky white spots seen with respect to upper and lower left and right quadrants (51/52/61/62/71/72/73/81/82)	Grade I Fluorosis	Very Mild
Patient 4	11 year/ M	Light yellowish-brown spots seen with respect to upper left and right quadrants (11/52/21/62/63/31/32/73/75/36/41/42/83/44)	Grade III Fluorosis	Severe
Patient 5	13 year/ M	Chalky white appearance to yellow stain seen with respect to upper left and right quadrants (11/12/13/21/22/23/31/32/33/34/36 /41/42/43/44)	Grade II Fluorosis	Mild

Table 2: Water testing report

Type of Sample	*pH (6.5 – 8.5)*	*TDS (mg/L) A = 500 P = 2000*	*Temp. (°C)*	*Fluoride (mg/L) A = 1.0 P = 1.5*	*Microbiological testing A = zero E. coli per 100 mL/ <1 coliform bacteria/ 100 mL*
LK001 (well)	8.2	933	22	1.652	>1800 Coliform; 63 E. coli in 100 ml of sample, Unsatisfactory for drinking
LK002 (well)	8.0	990	22	1.606	>1800 Coliform; 63 E. coli in 100 ml of sample, Unsatisfactory for drinking
LK003 (handpump)	6.9	954	27	1.478	0 Coliform; 0 E. coli; Safe for drinking

symptoms. Notably, the child had never received any prior dental consultation.

On general physical examination, he was well-oriented to time, place, and person. His academic performance was reported to be satisfactory. His mother noted that he was often reluctant to brush his teeth and required daily reminders due to frequent forgetfulness.

Clinical Examination:

Extraoral Examination

- No noticeable facial asymmetry.
- Cervical lymph nodes were non-tender and non-palpable.
- Temporomandibular joint (TMJ) examination revealed no abnormalities on both intra-articular and extra-auricular evaluation.

Intraoral Examination

- Intrinsic staining with a chalky white to yellowish-brown appearance was observed in the upper and lower quadrants, specifically involving teeth 52, 53, 54, 62, 63, 64, 83, and 84.
- Deep distoproximal caries were present in teeth 84 and 85.
- Tooth 54 was grossly decayed.
- No abnormalities were detected in the soft tissues.

Radiographic Examination

An orthopantomogram (OPG) was conducted to assist in differential diagnosis, identify any skeletal manifestations of fluorosis affecting the jaws, evaluate developmental alterations in the permanent tooth buds due to environmental enamel hypoplasia, and aid in comprehensive treatment planning.

Provisional Diagnosis

Environmental enamel hypoplasia secondary to fluoride exposure.

Differential Diagnoses

- Enamel hypoplasia due to nutritional deficiencies

Figure 2: Collection, testing and defluoridation of drinking water samples from wells and handpump sources in Lambikhedi village for estimation of fluoride concentration

- Smooth surface caries in teeth 52, 53, 54, 62, 63, 64, 83, and 84 are consistent with early childhood caries

Final Diagnosis

Grade III Dental Fluorosis (Environmental Enamel Hypoplasia), based on the ICMR Dental Fluorosis Index.

Treatment Plan

- Comprehensive oral prophylaxis to remove extrinsic stains, plaque, and calculus from all teeth.
- Aesthetic management through in-office bleaching using 35% hydrogen peroxide combined with micro-abrasion.
- Extraction of tooth 54 followed by placement of a band and loop space maintainer to preserve arch integrity.
- Pulp therapy:
  - Pulpotomy of tooth 84
  - Pulpectomy of tooth 85
  - Followed by placement of stainless-steel crowns
- Parental education regarding oral hygiene practices and monitoring of dietary fluoride intake.

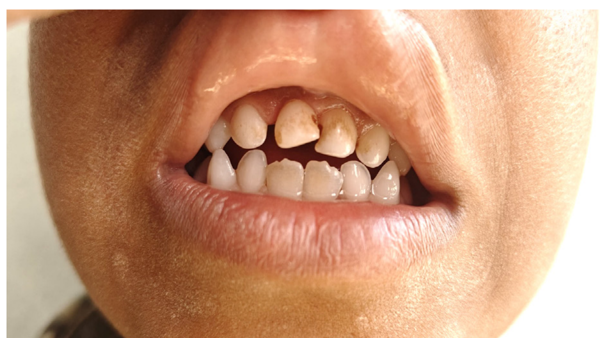

Figure 3: Clinical photograph showing yellowish-brown intrinsic staining of maxillary anterior teeth consistent with dental fluorosis (Case 1)

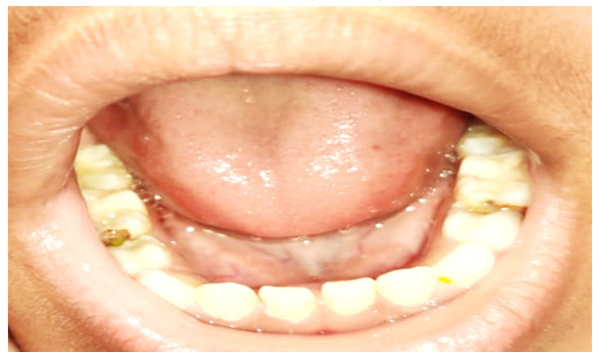

Figure 4: Intraoral view showing enamel discoloration and intrinsic staining involving the primary anterior teeth in a child diagnosed with dental fluorosis (Case 1)

Figure 5: Orthopantomogram (OPG) demonstrating developing permanent tooth buds with no associated skeletal abnormalities in Case 1

Figure 6: Intraoral photograph demonstrating enamel pitting and intrinsic discoloration of teeth associated with dental fluorosis (Case 2)

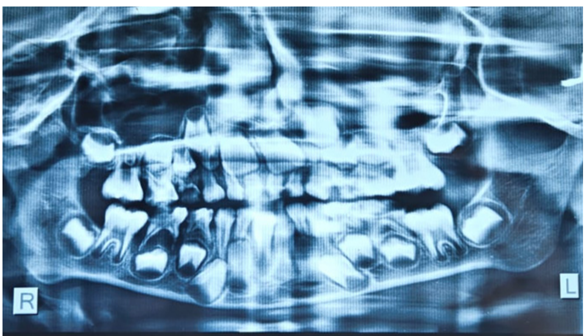

Figure 7: Orthopantomogram (OPG) obtained for evaluation of dental development and exclusion of associated maxillofacial abnormalities in Case 2

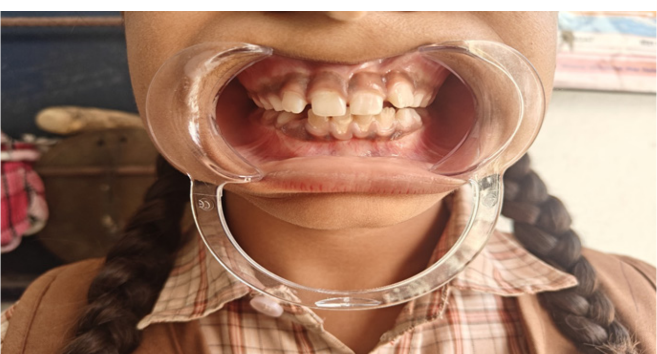

Figure 8: Clinical photograph showing chalky white to yellowish-brown enamel discoloration affecting multiple teeth in Case 3

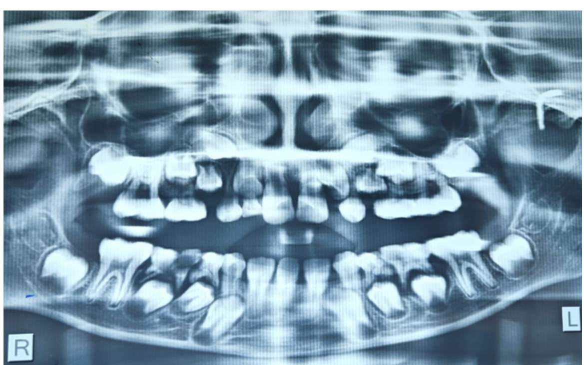

Figure 9: Orthopantomogram (OPG) demonstrating mixed dentition stage without evidence of skeletal pathology in Case 3

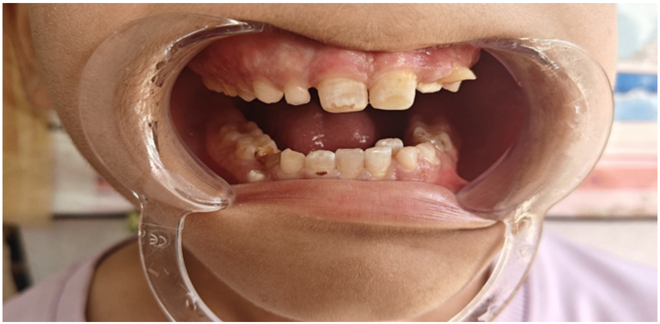

Figure 10: Intraoral view showing fluorosis-related enamel defects affecting anterior and posterior teeth in Case 4

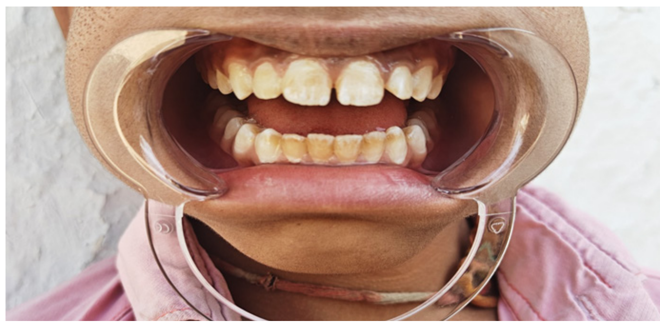

Figure 11: Clinical photograph showing chalky white enamel spots characteristic of mild dental fluorosis in Case 5

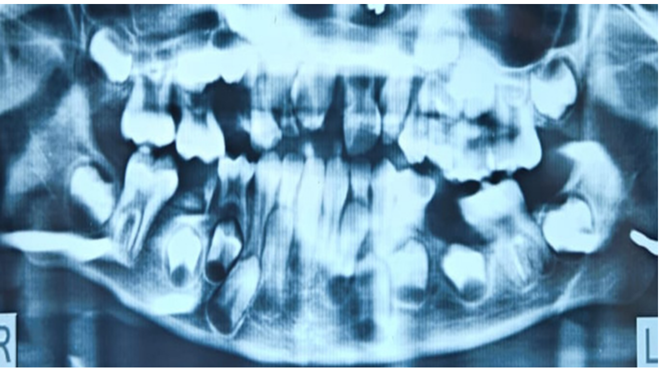

Figure 12: Orthopantomogram (OPG) showing normal maxillofacial structures and developing dentition in a patient diagnosed with Grade I dental fluorosis (Case 5)

- Oral hygiene training for the child, focusing on proper brushing technique (Fones' method) and the importance of maintaining dental cleanliness.
- Regular follow-up visits to ensure treatment success and continued oral health maintenance.

Case 3

The third case involved a 7-year-old female child who presented with chalky white to yellowish discoloration of the teeth, along with poor oral hygiene. The child appeared to be in good overall health and had no specific dental complaints. Neither she nor her parents expressed any concern about the discoloration. There was no history of pain, sensitivity, or other dental symptoms, and she had never previously visited a dentist.

On general physical examination, the child was alert and oriented to time, place, and person. Her academic performance was reportedly satisfactory. According to her mother, the child brushes her teeth regularly.

Clinical Examination

Extraoral examination

- No gross facial asymmetry was noted.
- Cervical lymph nodes were non-tender and non-palpable.
- No abnormalities were detected in the temporomandibular joint upon intra-articular and extra-auricular assessment.

Intraoral Examination

- Multiple chalky white spots were observed in the maxillary and mandibular anterior regions, specifically on teeth 51, 52, 61, 62, 71, 72, 73, 81, and 82.
- Deep mesio-proximal caries was present in tooth 85, and disto-proximal dentinal caries in tooth 84.
- No signs of periodontal disease or other soft tissue lesions were observed.

Radiographic Examination

An orthopantomogram (OPG) was obtained to evaluate any underlying dental abnormalities, maxillofacial anomalies, or other relevant conditions.

Provisional Diagnosis

Environmental enamel hypoplasia secondary to fluoride exposure.

Differential Diagnosis

- Incipient smooth surface caries involving teeth 51, 52, 61, 62, 71, 72, 73, 81, and 82

Final Diagnosis

Grade I Dental Fluorosis (Environmental Enamel Hypoplasia), as per the ICMR Dental Fluorosis Index.

Treatment Plan

- Oral prophylaxis for the removal of external stains, plaque, and calculus.
- Aesthetic treatment via in-office bleaching using 35% hydrogen peroxide.
- Restorative procedures:
    - Excavation and restoration of tooth 84
    - Extraction of tooth 85, followed by the placement of a band and loop space maintainer
- Parental counselling on maintaining optimal oral hygiene and managing dietary fluoride exposure.
- Oral hygiene education for the child, including proper brushing techniques (Fones' technique) and reinforcement of daily dental care practices.
- Scheduled follow-up visits for ongoing monitoring and oral health maintenance.

Case 4

The fourth case involved an 11-year-old male patient who presented with discoloration of the teeth, ranging from chalky white to light yellow and brown, accompanied by enamel pitting. The child appeared systemically healthy and reported no specific dental complaints. Neither

the child nor his parents expressed concern about the discoloration or the enamel defects. There was no history of associated symptoms such as pain, sensitivity, or other dental problems, and he had never sought prior dental consultation.

On general physical examination, the child was well-oriented to time, place, and person. His academic performance was considered satisfactory. According to his mother, he brushes his teeth five to six times a week but occasionally needs prompting due to reluctance.

Clinical Examination

Extraoral Examination

- No obvious facial asymmetry.
- Cervical lymph nodes were non-tender and non-palpable.
- Temporomandibular joint (TMJ) assessment revealed no abnormalities on intra-articular or extra-auricular examination.

Intraoral Examination

- Chalky white to yellowish-brown intrinsic stains were observed on multiple teeth in both maxillary and mandibular arches, specifically involving teeth 11, 52, 21, 62, 63, 31, 32, 73, 75, 36, 41, 42, 83, and 44.
- No signs of periodontal disease or other soft tissue lesions were noted.

Radiographic Examination

An orthopantomogram (OPG) was performed to assess for any underlying dental pathology or developmental anomalies.

Provisional Diagnosis

Environmental enamel hypoplasia due to chronic fluoride exposure.

Differential Diagnosis

- Incipient smooth surface caries affecting teeth 11, 52, 21, 62, 63, 31, 32, 73, 75, 36, 41, 42, 83, and 44.

Final Diagnosis

Grade III Dental Fluorosis (Environmental Enamel Hypoplasia) according to the ICMR Dental Fluorosis Index.

Treatment Plan

- **Oral prophylaxis** for the removal of plaque, calculus, and extrinsic stains.

Aesthetic management

- Provisional facial composite build-up for affected teeth to improve appearance and function.
- Continued monitoring of the restorations through regular follow-up appointments.
- Definitive treatment (veneering) will be planned post-puberty, once the pulp horns have receded.
- Extraction of tooth 85, with no space maintainer indicated, as the eruption of tooth 45 is anticipated within the next year.
- Parental counselling on appropriate oral hygiene practices and control of fluoride intake from dietary sources.
- Child education on correct brushing technique (Fones' technique) and the importance of maintaining oral health.
- Regular follow-up for clinical monitoring, restoration assessment, and reinforcement of oral hygiene practices.

Case 5

The fifth case involved a 13-year-old male patient who presented with chalky white to yellowish discoloration of teeth along with poor oral hygiene. The child appeared systemically healthy and had no active complaints. Neither he nor his parents expressed concern regarding the dental discoloration. There was no history of associated symptoms such as pain, sensitivity, or other dental issues, and the child had never consulted a dentist previously.

On general physical examination, the patient was alert and oriented to time, place, and person. His academic performance was reported as satisfactory. According to his mother, although he is somewhat reluctant, he usually brushes his teeth on a regular basis.

Clinical Examination

Extraoral Examination

- No gross facial asymmetry was observed.
- Cervical lymph nodes were non-tender and non-palpable.
- No abnormalities were noted in the temporomandibular joint (TMJ) on intra-articular or extra-auricular assessment.

Intraoral Examination

- Chalky white to yellowish discoloration was observed involving multiple teeth in the maxillary and mandibular anterior and posterior regions (11, 12, 13, 21, 22, 23, 31, 32, 33, 34, 36, 41, 42, 43, 44).
- Presence of dental caries was noted.
- No signs of periodontal disease or other soft tissue abnormalities were detected.

Provisional Diagnosis

Environmental enamel hypoplasia secondary to chronic fluoride exposure.

Differential Diagnosis

- Incipient smooth surface caries involving teeth 11, 12, 13, 21, 22, 23, 31, 32, 33, 34, 36, 41, 42, 43, and 44.

Final Diagnosis

Grade II Dental Fluorosis (Environmental Enamel Hypoplasia) as per the ICMR Dental Fluorosis Index.

Treatment Plan

- Oral prophylaxis for the removal of extrinsic stains, plaque, and calculus.
- Aesthetic management:
  - Provisional facial composite build-up on affected teeth.
  - Regular monitoring of the restorations through follow-up.
  - Definitive veneering is to be considered post-puberty once pulp horns have receded.
- Recommendation to switch to a non-fluoridated toothpaste to reduce further fluoride exposure.
- Parental counselling on maintaining oral hygiene and monitoring dietary fluoride intake.
- Oral hygiene education for the patient, emphasizing proper brushing techniques (Fones' technique) and the importance of consistent oral care.
- Regular follow-up for clinical evaluation, restoration assessment, and reinforcement of preventive practices.

Intervention

Following the identification of dental fluorosis cases during the school health camp and confirmation of elevated fluoride concentrations in local drinking water sources, a community-based intervention was conducted in the village. The primary aim was to demonstrate feasible household-level water treatment options and to strengthen awareness regarding fluorosis prevention.

A practical session on the Nalgonda technique, a widely accepted defluoridation method in rural India, was organized. Villagers were shown the step-wise process of preparing defluoridated water using alum, lime, and bleaching powder in a ratio of 1:5:20, respectively. The amount was lime was determined based on the alkalinity of the drinking water source. The treatment mixture was added to fluoride-rich water and left to settle, enabling coagulation, flocculation, and sedimentation. The clarified supernatant water was then demonstrated as suitable for drinking purposes after proper filtration.[13]

This activity was conducted as part of an Information, Education, and Communication (IEC) programme, wherein the participants were also sensitized to alternative safe water practices. The session covered:

- Different methods of household water treatment (boiling, cloth filtration, candle filters, reverse osmosis units).
- The importance of periodic water quality testing.
- Simple disinfection practices such as chlorination of stored water.

The demonstration was participatory, with villagers actively involved in each step. Feedback indicated that community members found the method easy to adopt with locally available resources. The intervention not only introduced a practical solution but also empowered the community with knowledge and skills to mitigate fluoride exposure.

Discussion

The study highlights the relationship between fluoride exposure from water and toothpaste and the severity of dental fluorosis. Our findings indicate a differential susceptibility to dental fluorosis among tooth types. Incisors and canines showed more severe fluorosis, likely due to earlier calcification during periods of higher fluoride exposure.[14-17]

As fluorosis is a recognised public health problem, the observations from this case series were shared with the concerned public health officials to support surveillance, community-level interventions, and mitigation strategies in the affected area.

While our study found more severe fluorosis in anterior teeth, such as incisors and canines, likely due to early calcification during peak fluoride exposure, this contrasts with findings from other studies where posterior teeth were more severely affected. This discrepancy may reflect differences in regional fluoride levels, timing and duration of exposure, or dietary and oral hygiene habits.[18-21]

The spatial clustering of fluorosis cases around contaminated groundwater sources in Lambi Khedi village aligns with findings from other endemic regions of India, where dependence on high-fluoride aquifers is a major determinant of disease distribution.[22-25] Several GIS-based studies have demonstrated that households located within 100–200 m of high-fluoride handpumps or shallow wells exhibit significantly higher prevalence

of dental and skeletal fluorosis, underscoring the role of hydrogeological variation and inadequate water source management in perpetuating exposure. In our study, most affected children resided near a handpump later confirmed to have fluoride levels exceeding the permissible limit of 1.5 mg/L. The clustering pattern reflects the strong spatial dependency between fluoride exposure and disease occurrence, similar to patterns reported in Andhra Pradesh, Rajasthan, and Gujarat.[25-27.]

Following identification of these high-risk pockets, a community-based mitigation intervention was implemented using the Nalgonda technique, involving sequential addition of alum, lime, and bleaching powder in a 1:5:20 ratio for defluoridation, accompanied by information-education-communication (IEC) activities on safe water handling, filtration, and behavioural practices. Such participatory interventions have been reported to substantially reduce fluoride concentration and improve awareness levels in rural populations.[28-30] The active community involvement observed in our study not only facilitated acceptance of defluoridation practices but also highlighted the effectiveness of combining spatial surveillance with low-cost, locally adaptable mitigation measures for sustainable fluorosis control.

Conclusion

This case series demonstrates a significant prevalence of dental fluorosis associated with high fluoride levels in drinking water. Effective water fluoridation control and community-based oral health education are crucial. Further research is needed to assess long-term impacts and develop comprehensive prevention strategies.

Strengths

A comprehensive water quality analysis beyond solely fluoride assessment was done to check the drinking water quality. Multiple Fluorosis indices were taken into consideration for accurate assessment.

Limitations

The sample size taken into the study was small, therefore, the case series design limits generalizability. There could be potential recall bias in reporting oral hygiene practices.

Recommendations

Further research with larger sample sizes and longitudinal designs is required to establish causal relationships and assess long-term impacts. There is a need for the implementation of community-wide interventions to reduce fluoride exposure.

Conflict of Interest

The authors declare no conflicts of interest related to this study. No financial or material support was received from any industry, organization, or individual that could have influenced the study design, data collection, analysis, or interpretation of results. The research was conducted as part of the Community Adoption Program for Postgraduates (CAPP) under R.D. Gardi Medical College, Ujjain, with no external commercial involvement.

Funding

Self-Funded

Acknowledgements

The author would like to thank the faculty and staff of the Department of Community Medicine, Department of Microbiology, Department of Dentistry, and Department of Radiology, R.D. Gardi Medical College, Ujjain, for technical and administrative support.

References

1. Mishra B, Sinha N, Mishra B, Mishra G. Pioneering public health through “Community Adoption Program for Postgraduates”. Cent India J Med Res. 2025;4(3):45-46. doi:10.58999/cijmr.v4i03.294.
2. Bahrani J, Mishra BN, et al. Dental fluorosis: a community clustered case series. In: Editor(s), editor. eSouvenir. New Delhi: AIIMS New Delhi; 2024 Nov 9.
3. Bhargava N, Mishra BN, et al. Water quality assessment of usable water sources in the 7 adopted villages under Village Adoption Programme for Postgraduates. In: Editor(s), editor. eSouvenir. New Delhi: AIIMS New Delhi; 2024 Nov 9.
4. Rathore S, Mishra BN, et al. Village adoption program for postgraduates: public health and beyond. In: Editor(s), editor. eSouvenir. New Delhi: AIIMS New Delhi; 2024 Nov 9.
5. Gound S, Mishra BN, et al. Assessment of the nutritional status of school children from adopted villages in the rural field practice area of R D Gardi Medical College, Ujjain (MP). In: Editor(s), editor. eSouvenir. New Delhi: AIIMS New Delhi; 2024 Nov 9.
6. Sayre JW, Toklu HZ, Ye F, Mazza J, Yale S. Case reports, case series—from clinical practice to evidence-based medicine in graduate medical education. Cureus. 2017 Aug;9(8):e1546. doi:10.7759/cureus.1546.
7. Dwivedi SN. Understanding of study designs in clinical research: major prompting points. Cent India J Med Res. 2024;3(3):3-11. doi:10.58999/cijmr.v3i03.211.
8. DenBesten P, Li W. Chronic fluoride toxicity: dental fluorosis. Monogr Oral Sci. 2011;22:81-96.
9. World Health Organization. Fluorides. Geneva: WHO; 2002. Available from: https://www.who.int/docs/default-source/wash-documents/wash-chemicals/fluoride-background-document.pdf
10. Sirigala L, Ramani P, G P, Ramalingam K. Prevalence of dental and skeletal fluorosis among school children in rural areas of YSR Kadapa district, Andhra Pradesh, India. Cureus. 2023 Dec 29;15(12):e51288. doi:10.7759/cureus.51288.PMCID: PMC10824368.
11. Dion KK. Physical attractiveness and evaluation of children’s

transgressions. J Pers Soc Psychol. 1972;24(2):207-213.
12. Verma A, Shetty BK, Guddattu V, Chourasia MK, Pundir P. High prevalence of dental fluorosis among adolescents is a growing concern: a school-based cross-sectional study from southern India. Environ Health Prev Med. 2017 Apr 4;22(1):17. doi:10.1186/s12199-017-0624-9.
13. Sudhakar VS, Naik SS. Pretreatment, hydrolysis and fermentation of lignocellulosic biomass for bioethanol. Curr World Environ. 2022;17(1).
14. Majumdar KK. Health impact of supplying safe drinking water containing fluoride below permissible level on fluorosis patients in a fluoride-endemic rural area of West Bengal. Indian J Public Health. 2011;55(4):303-308. doi:10.4103/0019-557X.92411.
15. Fejerskov O. Dental fluorosis. In: Oxford Reference. Oxford: Oxford University Press; 2011. Available from: https://www.oxfordreference.com/display/10.1093/oi/authority.20110803095825451
16. Willis J, Todorov A. First impressions: making up your mind after a 100-ms exposure to a face. Psychol Sci. 2006;17(7):592-598.
17. Cornelius CP, Audigé L, Kunz C, Rudderman R, Buitrago-Téllez C, Frodel J, et al. The comprehensive AOCMF classification system: mandible fractures—Level 3 tutorial. Craniomaxillofac Trauma Reconstr. 2014;7(Suppl 1):S031-S043. doi:10.1055/s-0034-1389558.
18. Kumar S, Chauhan D, Dwivedi J, Gowhar O. Comparative evaluation of three different recording criteria of dental fluorosis in a known endemic fluoride area of Haryana. J Family Med Prim Care. 2018;7(5):1075-1080.
19. Baskaradoss JK, Narayanan A, Ramasubramanian V. Distribution pattern of dental fluorosis in the permanent dentition of children from an endemic fluorosis area in India. Indian J Public Health. 2012;56(2):122-124.
20. Wong MC, Clarkson J, Glenny AM, Lo EC, Marinho VC, Tsang BW, et al. Clinical changes in the severity of dental fluorosis: a longitudinal evaluation. BMC Oral Health. 2021;21(1):69. doi:10.1186/s12903-021-01729-3.
21. Ranjan R, Ranjan A, Mehrotra D, Singh A. Fluoride toxicity: a review on dental fluorosis and its prevalence in India. Med Res Chron. 2017;4(6):619-625.
22. Yadav KK, et al. GIS-based assessment of fluoride contamination and health risk in groundwater of Rajasthan, India. Environ Sci Pollut Res Int. 2020;27:22355-22369.
23. Brindha K, Elango L. Geochemistry of fluoride in groundwater of India: a review. Environ Geochem Health. 2011;33(4):543-559.
24. Bhargav N, Mishra BN, Kale S, Chouhan DS, Rathore S, Bahrani J, et al. A cross-sectional assessment of the potability of water quality from available water sources in the villages of the Palwa field practice area, Ujjain. Cent India J Med Res. 2025;4(3):35-44. doi:10.58999/cijmr.v4i03.281.
25. Reddy DV, et al. Fluoride distribution and contamination sources in groundwater of Telangana region. Environ Earth Sci. 2015;73:3635-3644.
26. Gupta S, et al. Groundwater fluoride concentration and associated human health risk in parts of central Gujarat, India. Environ Monit Assess. 2019;191:335.
27. Choubisa SL. Endemic fluorosis in Rajasthan, India. Fluoride. 2018;51(1):13-33.
28. Rajiv Gandhi National Drinking Water Mission. Technology for defluoridation of drinking water: Nalgonda technique. New Delhi: Government of India; 2007.
29. Rango T, et al. Community-based fluoride mitigation approaches and their sustainability in India and Ethiopia. Sci Total Environ. 2019;651:1246-1256.
30. Singh AK, et al. Impact of community awareness and defluoridation intervention on fluorosis mitigation in rural India. Environ Monit Assess. 2021;193:165.
31. Craig SA, Baker SR, Rodd HD. How do children view other children who have visible enamel defects? Int J Paediatr Dent. 2015;25(6):399-408.
32. Shaw WC. Factors influencing the desire for orthodontic treatment. Eur J Orthod. 1981;3(3):151-162.
33. Denmark SW. The influence of children's dentofacial appearance on their social attractiveness as judged by peers and lay adults. Am J Orthod. 1981;79(4):399-415.
34. World Health Organization. Guidelines for drinking-water quality. 3rd ed. Geneva: WHO; 2004.
35. Gupta AK, Singh TP, Agrawal PK, Singh D, Sachan M, Agarwal V. Quadriparesis—a rare presentation of skeletal fluorosis. J Indian Acad Clin Med. 2008 Jul-Sep;9(3):201-204.
36. Meenakshi, Garg VK, Kavita, Renuka, Malik A. Groundwater quality in some villages of Haryana, India: focus on fluoride and fluorosis. J Hazard Mater. 2004;106(1):55-60.
37. Marinho VC. Evidence-based effectiveness of topical fluorides. Adv Dent Res. 2008;20(1):3-7.
38. Chandrashekar J, Anuradha KP. Prevalence of dental fluorosis in rural areas of Davangere, India. Int Dent J. 2004;54(5):235-239.
39. Mishra B, Mishra B, Sinha ND, Mishra G. Secret to success in medical research: a concise directive. J Adv Res Med Sci Tech. 2020;7(4):8-12.