



ORIGINAL RESEARCH PAPER

Dentistry

RETRIEVAL OF A SEPARATED ENDODONTIC INSTRUMENT AND SUBSEQUENT NON-VITAL BLEACHING: AN INTEGRATED APPROACH TO FUNCTIONAL AND ESTHETIC REHABILITATION.

KEY WORDS:
Dr Shreya K N

Postgraduate Student, Department of Conservative Dentistry and Endodontics, Dayananda Sagar College of Dental Sciences, Bangalore, Karnataka, India

Dr Vedavathi B

Professor and Head of the Department, Department of Conservative Dentistry and Endodontics, Dayananda Sagar College of Dental Sciences, Bangalore, Karnataka, India

Dr. Ranjini M A

MDS, Professor, Department of Conservative Dentistry and Endodontics, Dayananda Sagar College of Dental Sciences, Bangalore, Karnataka, India

ABSTRACT

Background: Separated endodontic instruments pose a significant challenge during root canal treatment and may compromise adequate canal disinfection and prognosis if left unaddressed. Discoloration of endodontically treated anterior teeth further presents an esthetic concern, often requiring a conservative approach to restore the natural appearance of the tooth. **Case Report:** This case report describes the management of a previously endodontically treated anterior tooth with a separated endodontic instrument and subsequent intrinsic discoloration. The separated instrument was successfully retrieved using an ultrasonic technique under magnification, allowing preservation of the remaining radicular dentin and facilitating appropriate endodontic management. Following completion of the endodontic treatment, a glass ionomer cement (GIC) barrier was placed in the cervical region to protect the root canal filling and minimize the risk of bleaching agent penetration into the periodontal tissues. Intracoronary bleaching was subsequently performed using Opalescence Endo, employing the walking bleach technique. The bleaching material was placed within the pulp chamber and replaced as required until a satisfactory shade improvement was achieved. **Conclusion:** The combined approach of conservative ultrasonic retrieval of a separated instrument followed by intracoronary bleaching provided both functional and esthetic rehabilitation of the affected anterior tooth. Careful placement of a cervical barrier and controlled application of the bleaching agent are essential for predictable esthetic outcomes and minimizing complications.

INTRODUCTION

Instrument separation is an unfortunate complication that may occur during root canal treatment and can interfere with effective cleaning, shaping, and disinfection of the root canal system.^{1,2} The presence of a separated instrument does not necessarily indicate treatment failure; however, its management requires careful assessment of the fragment's location, canal anatomy, root curvature, accessibility, and the amount of remaining dentin.² Treatment options include retrieval, bypassing, or incorporation of the fragment within the obturation, depending on the individual clinical circumstances.^{2,3} Among the available retrieval techniques, ultrasonic instrumentation has gained considerable importance because it permits controlled troughing around the separated fragment and facilitates its loosening while allowing conservative preservation of the surrounding dentin.^{3,4} Nevertheless, excessive dentin removal during retrieval may compromise root strength and increase the risk of procedural complications, emphasizing the importance of a minimally invasive approach.^{4,5}

Discoloration of endodontically treated anterior teeth is another common esthetic concern and may result from the incorporation of blood products, necrotic tissue remnants, endodontic materials, or other chromogenic substances into the dentinal structure.⁶ Intracoronary bleaching, particularly the walking bleach technique, is considered a conservative treatment option for discolored non-vital teeth and can provide satisfactory esthetic improvement without extensive removal of sound tooth structure.^{6,7} The technique involves placement of a bleaching agent within the pulp chamber following adequate endodontic treatment and establishment of a cervical barrier.⁷

An appropriate cervical barrier is important to limit the apical migration of bleaching agents and reduce their contact with periodontal tissues.^{7,8} Although internal bleaching is

generally considered a predictable and minimally invasive procedure, external cervical resorption has been reported as a potential complication, making careful case selection, cervical sealing, and controlled application of bleaching agents essential.^{8,9}

The present case report describes the conservative ultrasonic retrieval of a separated endodontic instrument followed by intracoronary non-vital bleaching using the walking bleach technique with Opalescence Endo, after placement of a glass ionomer cement cervical barrier, demonstrating an integrated approach to both endodontic and esthetic rehabilitation of an anterior tooth.

CASE REPORT

A 40-year-old female patient reported to the Department of Conservative Dentistry and Endodontics with the chief complaint of discoloration of a maxillary anterior tooth. The patient gave a history of root canal treatment of the concerned tooth approximately 15 years previously. Seeking esthetic correction of the same discolored tooth, she subsequently visited another dental clinic, where nonsurgical endodontic retreatment was initiated. During the retreatment procedure, multiple hand H-files were separated within the root canal.

Clinical and radiographic examination revealed a previously endodontically treated and discolored tooth with separated endodontic instruments within the root canal. Considering the accessibility and location of the separated fragments, an attempt was made to retrieve the instruments using an ultrasonic technique under magnification. A fine endodontic ultrasonic retrieval tip ET20 from NSK was used to selectively trough around the coronal aspect of the separated H-files, with intermittent ultrasonic activation and copious irrigation. Care was taken to minimize unnecessary removal of surrounding radicular dentin. The separated H-files were successfully retrieved, and their complete removal was confirmed radiographically.

Following successful instrument retrieval, the existing gutta-percha was carefully removed from the root canal. Biomechanical preparation was subsequently performed using the hand filling till #45 2% followed by step back preparation till #60 2%, under copious irrigation with 3.25% sodium hypochlorite and normal saline. Following completion of biomechanical preparation, the canal was thoroughly irrigated, dried with sterile paper points, and calcium hydroxide was placed as an intracanal medicament. The access cavity was sealed with a temporary restorative material.

At the subsequent visit, the patient was asymptomatic. The calcium hydroxide medicament was removed, and the root canal was thoroughly irrigated with 3.25% sodium hypochlorite and normal saline before being dried with sterile paper points. The canal was subsequently obturated with gutta-percha and a resin-based endodontic sealer under lateral compaction. A postoperative radiograph confirmed satisfactory obturation of the root canal system.

Following completion of endodontic retreatment, intracoronary bleaching was planned to address the persistent discoloration. A glass ionomer cement (GIC) cervical barrier was placed over the root filling to provide an adequate protective seal. Opalescence Endo was then placed within the pulp chamber using the walking bleach technique. The bleaching agent was left in situ for one week, after which it was removed and replaced with fresh bleaching material. The same protocol was repeated for a total of three cycles, with each application maintained for one week. Progressive improvement in tooth color was observed following each cycle, and a satisfactory esthetic outcome was achieved after the third application.

Following completion of intracoronary bleaching, the bleaching agent was removed and the pulp chamber was thoroughly irrigated and dried. The access cavity was subsequently restored using SwissTEC Universal Composite, with appropriate adhesive procedures, followed by finishing and polishing to achieve a satisfactory coronal seal and esthetic outcome.

DISCUSSION

Instrument separation is a recognized procedural complication of endodontic treatment and may compromise canal debridement when the fragment prevents adequate access to the apical portion of the canal.¹⁰ The decision to retrieve a separated instrument should be based on its location, canal anatomy, degree of curvature, accessibility, and the amount of remaining dentin rather than on retrieval alone.¹¹ In the present case, the separated H-files were successfully retrieved using an ultrasonic technique. Ultrasonic tips allow controlled troughing around the coronal aspect of the fragment and facilitate its loosening through vibration, while potentially allowing a more conservative approach than aggressive mechanical retrieval techniques.¹² Preservation of radicular dentin is particularly important because excessive dentin removal during instrument retrieval may compromise root integrity.¹³ Following retrieval, removal of the existing gutta-percha permitted adequate biomechanical preparation and subsequent re-obturation of the canal.

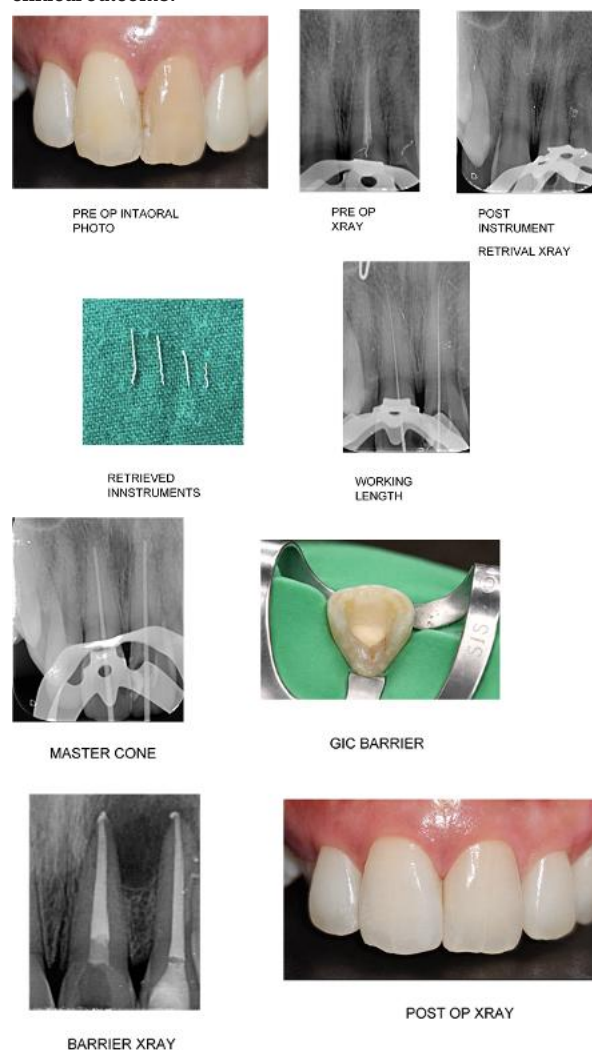
The long-standing discoloration of the endodontically treated anterior tooth presented an additional esthetic challenge. Internal bleaching is a conservative treatment modality for discolored non-vital teeth and avoids unnecessary reduction of sound tooth structure associated with full-coverage restorations.¹⁴ The walking bleach approach has been widely described as a predictable method for intracoronary whitening of root-filled teeth.^{14, 15} In the present case, Opalescence Endo was applied for three consecutive weekly cycles, resulting in

progressive improvement in tooth color. Establishment of a cervical barrier before bleaching is an important precaution because penetration of bleaching agents toward the cervical periodontal tissues has been associated with external cervical resorption.^{15, 16} The use of a GIC barrier in the present case provided an additional protective seal over the root filling. Avoidance of thermocatalytic activation and controlled replacement of the bleaching agent are also consistent with recommendations aimed at reducing bleaching-related complications.¹⁵

Thus, the combination of conservative ultrasonic instrument retrieval, thorough endodontic retreatment, and controlled intracoronary bleaching provided both biological and esthetic rehabilitation while preserving the tooth.

CONCLUSION

Conservative retrieval of separated H-files using ultrasonics, followed by adequate endodontic retreatment and intracoronary walking bleaching, provided successful functional and esthetic rehabilitation of the discolored tooth. Appropriate dentin preservation, cervical barrier placement, and controlled bleaching cycles contributed to the favorable clinical outcome.



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