



Pulp Stone—An Endodontic Challenge: Successful Retrieval of Exceptionally Long Pulp Stones measuring 14 and 9.5 mm from the Palatal Roots of Maxillary Molars

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ABSTRACT

Pulp stones are nodular, calcified masses commonly appearing in the coronal pulp and occasionally extending in radicular pulp. Retrieval of pulp stones remains a challenge for the endodontist as complete cleaning and shaping of root canal system is the bases for successful endodontic therapy. The aim of this case report is to show the retrieval of long pulp stones measuring 14 and 9.5 mm by utilizing synergistic effect of ultrasonics and sodium hypochlorite from the palatal roots of maxillary molars. Such case has not been reported in the literature so far.

Keywords: Pulp stones, Retrieval, Palatal root, Molar, Ultrasonic.

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INTRODUCTION

Pulp stones are discrete calcifications and are among changes that include more diffuse pulp calcifications, such as dystrophic calcifications.¹ They are reported to occur more often in the coronal region but are also found in the radicular pulp.² A single tooth may have 1 to 12 or even more stones with sizes varying from minute particles to large masses which occlude the pulp space.¹

Pulp stones are classified based on structure and location.³ Structurally, there are true and false pulp stones. True pulp stones are made up of dentin and lined by odontoblasts, whereas false pulp stones are formed by degenerating cells which mineralize. A third type 'amorphous' or 'diffuse' pulp stones are irregular in shape occurring in close association with blood vessels.⁴ Based

on location, pulp stones can be free, embedded and adherent. Free pulp stones are found within the pulp tissue and most commonly seen on radiographs. Embedded stones are found frequently in the apical portion of the root and the presence of odontoblasts and calcified tissue resembling dentin can occur on peripheral aspect of these stones.¹ Adherent pulp stones are never fully enclosed by dentin and are less attached to dentin than embedded pulp stones. Adherent and embedded pulp stones can interfere with root canal treatment, if they cause significant occlusion of canals or are located at a curve.

Common etiological factors implicated in pulp stone formation include pulp degeneration, age, circulatory disturbances, orthodontic tooth movement, long standing irritants, such as caries, deep fillings and chronic pulp inflammation. Apart from these factors, pulp stones can also be associated with systemic conditions, like gout, renal disease and cardiovascular diseases.^{5,6}

Successful root canal treatment needs thorough cleaning and shaping of the root canal system. Obstruction due to calcification or pulp stones often creates difficulties during meticulous instrumentation. Hence, negotiation of calcifications and retrieval of pulp stones is of paramount importance for the successful root canal therapy.

The following case report shows retrieval of exceptionally long pulp stones measuring 14 and 9.5 mm from the palatal roots of maxillary molars.

CASE REPORTS

Case 1

A 40-year-old female patient reported to the Department of Conservative Dentistry and Endodontics with pain in the upper right back region of mouth since 1 month. A patient's

dental and medical history was noncontributory. Clinical examination revealed deep caries with upper right second molar, which was tender on percussion. Vitality test showed no response indicating nonvital tooth. Radiographic examination revealed caries involving the pulp and presence of large pulp stone (Fig. 1).

Case 2

A 28-year-old male patient reported to the department of conservative dentistry and endodontics with a complaint of food lodgement and pain in the upper right back region of mouth since 6 months. A patient dental and medical history was noncontributory. Clinical and radiographic examination revealed deep caries and pulp stone with upper right first molar (Fig. 2), which was tender on percussion. Vitality test showed no response.

Treatment plan for both cases included root canal treatment followed by crown.

Technique used for the Retrieval of Pulp Stone

During access cavity preparation, pulp chamber was modified with a thin tapered fissure diamond point to gain access to the pulp stone and then it was freed from the surrounding dentinal walls. Followed by this, copious irrigation was done using sodium hypochlorite (5.2%) and ultrasonic file was negotiated through the palatal canals to dislodge the radicular part of the pulp stone which was later retrieved with the help of tweezers, measuring 14 mm in case 1 (Fig. 3) and 9.5 mm in case 2 (Fig. 4).

After the removal of pulp stone, root canal treatment was completed (Figs 5 and 6) and the pulp stones were sent for the histopathological analysis.



Fig. 1: Radiograph showing proximal caries involving the pulp and presence of large pulp stone in maxillary molars (case 1)

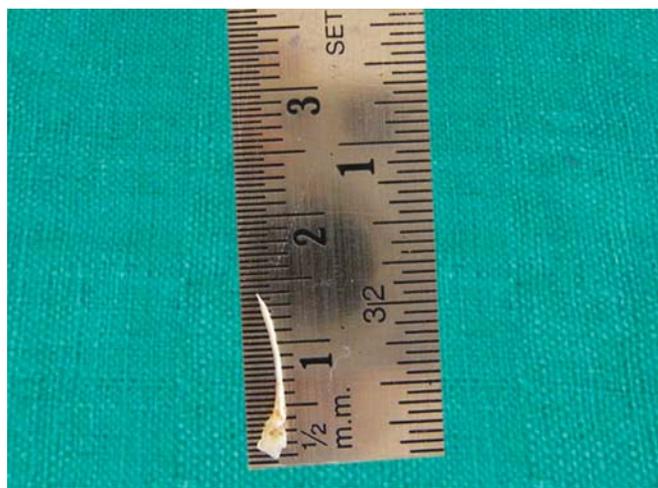


Fig. 3: Pulp stone measuring 14 mm (case 1)

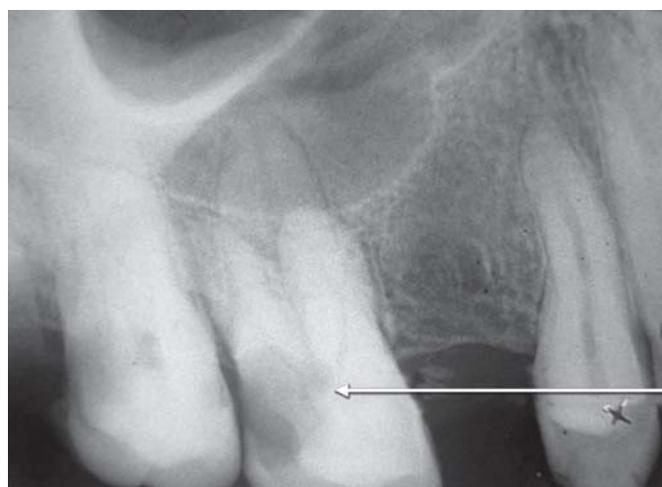


Fig. 2: Radiograph showing proximal caries involving the pulp and presence of large pulp stone obliterating the pulp chamber in maxillary molar (case 2)

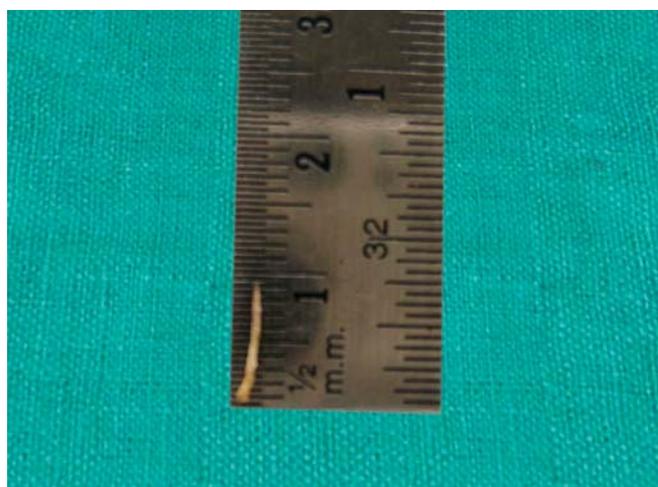


Fig. 4: Pulp stone measuring 9.5 mm (case 2)



Fig. 5: Postobturation radiograph of case 1



Fig. 6: Postobturation radiograph of case 2

DISCUSSION

The discussion regarding the clinical relevance of pulp stones would be important in terms of their effect upon root canal treatment. Large pulp stones in the pulp chamber may block access to canal orifices and alter internal anatomy. Attached pulp stones may deflect or engage the tip of exploring instruments preventing their easy passage through the canal.⁷ Preoperative radiographs are important aid in detecting the pulp stones as they indicate their presence, size and location. However, pulp stones extending into the radicular portions are sometimes confusing as they appear like canal obliteration seen in calcific metamorphosis.

In the present case, preoperative radiograph shows obliteration of pulp chamber due to large pulp stone. Utmost care was taken to preserve the coronal as well as radicular dentin during pulp stone retrieval as discussed in the text. Histopathology report of case 1 showed a single large denticle which was completely calcified with areas of preferentially stained tissue, suggestive of pulp stone. Report

of case 2 showed large and small areas of calcification seen throughout the length of radicular pulp tissue, indicating total pulp calcification.

Occasionally, a large pulp stone can be dissected out of an access cavity using burs, but ultrasonic instrumentation with the use of special tips make their removal far easier.^{8,9} Within narrow canals ultrasonic should ideally be coupled with dissolving action of sodium hypochlorite to produce a synergistic effect.¹⁰ Potential complications during retrieval may include perforation or weakening of tooth due to excess removal of tooth structure. Ultrasonic vibration definitely helps in dislodging and safe removal of adherent pulp stones.

CONCLUSION

Knowledge of root canal morphology, use of proper armamentarium and operator's skill are critical for successful retrieval of pulp stones.

CLINICAL SIGNIFICANCE

Large pulp stones are clinically significant because they may block access to canals or the root apex during root canal treatment. Synergetic effect of ultrasonic vibration and sodium hypochlorite helps in effective retrieval of large pulp stones.

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