

A 19-year-old girl with sharp, severe, and stabbing pain for 2 days

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Presentation of Case

Dr. Roshnee Rizwana Marium (FCPS trainee): A 19-year-old female presented with severe, sharp, and stabbing pain on her lower left posterior segment for 2 days. The pain was poorly localized and it transferred to the head and ear region. The pain was stimulated by the application of heat. The patient also complained about a significant rise in the intensity of the pain on lying posture. She also complained about having tooth sensitivity on other segments of the arch. On clinical examination, the lower-left 2nd molar tooth was found to be broken down. There was also significant brownish and yellowish discoloration of all the teeth of the patient (Figure 1A). There was no sign of discharge.

Dr. Mozammal Hossain (Associate Professor): Pre-operative radiograph showed radiolucency on the crown of the tooth involving the pulp chamber (Figure 1B). Besides, the region of the pulp revealed nothing unusual. The periodontal ligament space surrounding the lower left 2nd molar tooth appeared normal.

Dr. Marium: After application of local anesthesia, the access cavity was prepared using a round bur followed by a fissure bur. A rubber dam could not be placed as the crown of the tooth was badly broken. A sharp endodontic explorer was used to identify the canal orifices. The canals were mesiobuccal, mesiolingual, and distal canals. Then the canals were negotiated using a 10 K file. Then the coronal portion of

the canals was flared using the N1 file of the Neoendo rotary system. The working length of the canals was determined using the apex locator and then radiovisiography was used to visualize the working length (Figure 1C). Then the canals were prepared using hand instruments using 15 K file and 20 K file. The N2 and the N3 files of the Neoendo rotary series were used for the biological preparation of the canals. For the chemical preparation, normal saline was used as the irrigating solution. Sodium hypochlorite solution (5.25%) was not used as the rubber dam was not placed. Then the canals were dried with paper points and the gutta percha points were inserted and a radiograph was taken. The canals were obturated with gutta percha and sealapex (Figure 1D). The coronal portion was given a temporary restoration and the patient was kept under follow-up for a week or more. When the tooth was found to be asymptomatic, a final restoration, light cure composite resin was given and the patient was referred to the Prosthodontic department for crown placement.

Provisional Diagnosis

Pulpitis of lower left second molar tooth

Differential Diagnosis

Reversible and irreversible pulpitis

In reversible pulpitis, there is a pulpal infla-

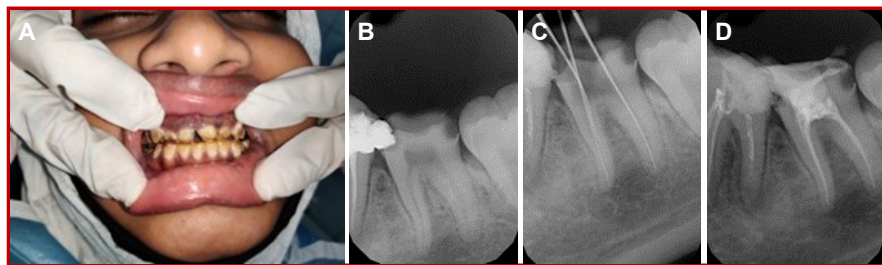


Figure 1: The preoperative view showed an amelogenesis imperfect associated with brownish and yellowish discoloration of all the teeth of the patient. The left lower second molar tooth was broken (A); Radiovisiographic examination showed radiolucency on the crown of the tooth involving the pulp chamber (B); Three radiopaque reamers were inserted into the canal for determination of working length C; The root canal of the affected tooth was obturated with gutta-percha point and sealer (D)



mmation which is usually derived from defective restoration or dental caries and pain can be relieved following the removal of the cause.^{1, 2} It is also associated with non-lingering pain to temperature or osmotic changes. On the other hand, in the irreversible pulpitis, there is pulpal inflammation but would not resolve once the etiology is removed.^{3, 4} Furthermore, it is also associated with intense and lingering pain to temperature changes, and having spontaneous pain either diffuse or referred pain.^{5, 6} However, the present case was associated with a significant rise in the intensity of the pain on lying posture. Therefore, the chance of reversible pulpitis is minimum in the present case.

Trigeminal neuralgia

Patient with trigeminal neuralgia comes with the complaint of a rare, episodic facial pain which is unilateral.^{7, 8} Furthermore, the patient may feel an electric shock-like pain and provoked by light touch.^{9, 10} Therefore, it should be differentiated from dental causes of pain because it is often misguided as a tooth problem due to its presence in the two lower branches of the trigeminal nerve. In this situation, patient may undergo unnecessary and sometimes irreversible dental treatment before the condition is recognized. In the present case, the pain was continuous and lasted for hours, and on the application of local anesthesia, the pain disappeared and was excluded from the diagnosis of the study.

Dentin hypersensitivity

Dentin hypersensitivity is a type of dental pain that is sharp and of short duration.^{11, 12} Previous studies reported that it occurs when there is an exposure of the dentin surfaces in response to stimuli such as thermal, evaporative, tactile, osmotic, chemical, or electrical.^{13, 14} This condition is not attributed to any other dental disease. A degree of dentin sensitivity is normal, but the pain is not usually experienced in everyday activities like drinking something cold. However, as the duration of the pain was longer and the radiograph revealed radiolucency of the crown involving the pulp chamber of the tooth, it was excluded from the diagnosis.

Amelogenesis imperfecta

This is a genetic disorder that may be autosomal dominant or recessive or x-linked. This is often associated with pitted enamel (hypoplastic).^{15, 16} There may be brownish or yellowish discoloration (hypomaturation) and if it is associated with extensive features it occurs due to hypocalcification. The pulp chamber and canals do not show any unusual calcification.

Dentinogenesis imperfecta

Dentinogenesis imperfecta is considered a genetic disorder of tooth development.^{17, 18} This causes a dentin dysplasia and presents with either discoloration of the tooth (most often a blue-gray or yellow-

brown color) or translucency or an opalescent shine.^{19, 20} Although genetic factors are the main provider of the disease, any environmental or systemic trouble may also cause calcification or metabolism of calcium, and results in anomalous dentine.^{21, 22} Furthermore, teeth are also weaker than normal and they are prone to rapid wear, breakage, and loss.^{23, 24} Moreover, these problems can affect both primary (deciduous) and permanent teeth that may also develop a brownish and yellowish discoloration of all the teeth of the patient. Previous studies also reported that teeth with dentinogenesis imperfecta did not show any morphological deformity of the teeth of the arches and the radiograph observation revealed calcification and obliteration of the pulpal region.^{25, 26} On the other hand, in the present case, the radiograph reveals no obliteration of the pulp chamber and the canals

Dr. Marium's Diagnosis

Acute irreversible pulpitis on lower left 2nd molar tooth

Discussion

Dr. Marium: Though amelogenesis imperfecta does not show any kind of tooth deformity, it only causes discoloration of the teeth. Therefore, the patient failed to identify food accumulation which resulted in caries followed by fracture.

Regarding the etiology of the pain

Dental pain is caused when the nerve is irritated by decay, injury, or loss of a tooth and it may also occur after an extraction.^{27, 28} It sometimes radiates to the jaw, jaw joint (e.g. temporomandibular joint), ear, sinuses, and even occasional cardiac problem.^{29, 30} Bacteria in the oral cavity can also contribute to gingivitis and dental decay, both of which can initiate pain.^{31, 32} Furthermore, the continuous irritation of the pulp may also result in pulpitis (reversible or irreversible). In the present case, pulpitis was developed due to amelogenesis imperfecta which is considered a developmental disorder.

Regarding the diagnosis

This case was diagnosed as amelogenesis imperfecta because all the teeth of the dentition showed yellowish to brownish discoloration. The morphological appearance of the teeth was favorable because the pulpal and the radicular pulp chamber showed no calcification or other abnormality. These features helped to exclude dentinogenesis imperfecta. Other investigations such as histopathological examination may be needed for confirmatory diagnosis.

Regarding the treatment options

Nonsurgical endodontic treatment followed by the crown prosthesis and intentional replantation is the treatment options. Here, in this case, nonsurgical endodontic treatment was performed. However, a proper endodontic treatment depends upon correct access cavity preparation. The distance between the occlusal surface and the pulp chamber is to be measured from a preoperative radiograph. Coronal flaring of the canal orifices with rotary orifice shaper improves the advancement of the root canal instruments into the canal system and proper disinfection. The use of accurate burs is important for the preparation of the access cavity. In this case, the main aim was to manage the pain of the patient and the proper restoration was also important. The use of anesthesia made the procedure easier and the complete removal of the pulpal tissue ensured no further flare-ups. Besides, maintaining the working length throughout the procedure is also important. And lastly ensuring a hermetic seal from all sides is necessary.

Prognosis of the case

In most cases, pulpal infection may spread to the surrounding bone or other areas of the body.^{33,34} In these cases, an endodontist must perform a root canal to remove the dying pulp, which will stop the pain. The only other option besides a root canal is the tooth extraction, which is usually not the treatment of choice.

Final Diagnosis

Amelogenesis imperfecta with acute irreversible pulpitis on lower left second molar tooth

Follow-up

After the seventh day of the root canal therapy, the patient was symptomless and wanted to correct her discolored teeth. However, we referred her for orthodontic correction of malocclusion before the correction of the discolored teeth.

Dr. Ram Udgar Yadav: Can enamel of the teeth grow back?

Dr. Mariam: Enamel can never be regenerated. As it grows from ameloblast cells which only develops twice during deciduous and permanent dentitions.

Dr. Dilrukhsana Afroz Sumi: How the enamel can be restored?

Dr. Mariam: It can be restored either by direct tooth-colored restorative material or a full veneer crown.

Conflict of Interest

Authors declare no conflict of interest

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