Accidental Finding in Orthodontics – Rhinolith

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Abstract

Rhinolith is a calcareous secretion that occurs in the nasal cavity and is usually discovered during routine radiographic examination as it is rare, unilateral, and asymptomatic. It can sometimes lead to nasal obstruction, fetid odor, and purulent secretion. This case report is about the accidental finding of rhinolith during conventional diagnostic procedure. A 10-year-old female had an ovoid radiopacity in the right side of the nasal cavity. Although the patient had no symptoms of prevalence of this mass, it was found during routine radiographic examination. After the complete investigation of the radiopaque mass with the help of cone-beam computed tomography, the rhinolith was endoscopically removed.

Keywords: Cone-beam computed tomography, diagnosis, endoscopy, foreign body, rhinolith

INTRODUCTION

Rhinoliths are calcareous concretions that deposit on an intranasal foreign body which is usually any material in the nose that can act as a potential nidus for the deposition of salts, either exogenous or endogenous.[1] These calcifications are generally single, unilateral, and asymptomatic. It mostly causes nasal obstruction, fetid odor, and purulent secretion. If asymptomatic, they are frequently discovered during routine radiographic examination.[2]

The evolution and advances in diagnostic aids have improved the diagnostic quotient of an orthodontic patient. Consequently, the incorporation of such diagnostic equipment in an orthodontic practice has been varied and nonuniform, due to which many cases go ill diagnosed. Hence, the usage of essential diagnostic aids is a bare minimum for starting treatment of an orthodontic patient. Conventionally used radiographs such as lateral cephalograms and orthopantomogram are important diagnostic aids in orthodontics which sometimes also lead to accidental findings of any gross abnormalities and pathology which may remain undiagnosed in an otherwise normal child. These include the presence of any radiopacities in the cranium, stones, or bony pathologies in the radiograph which maybe radiopaque or radiolucent lesions in the jaw bones, supernumerary tooth/teeth, odontome or any foreign body, and other calcifications. Computerized tomography has proven to provide better images to evaluate this condition and its relationship with adjacent structures.[2]

This case report represents an interesting case of an accidental finding of calcified mass on a foreign body, commonly known as rhinolith (stone) presents in the inferior meatus of nasal fossa on routine radiographic examination.

CASE REPORT

A 10-year-old female reported to the department of orthodontics and dentofacial orthopedics with a chief complaint of backward positioning of the upper left front teeth. On clinical examination, the patient had a normal gait with dolichocephalic shape of the head and leptoprosopic facial form. On profile examination, the patient had a convex profile with posterior facial divergence and recessive chin position. Furthermore, she had a mixed dentition present in both the maxillary and mandibular arch with Angle’s Class II Division 1 malocclusion.

On routine radiographic evaluation done for orthodontic purpose, an ovoid radiopaque image was observed close to the nasal fossa on the right side as shown in Figures 1 and 2.

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The patient presented with no symptoms of the presence of this mass and was totally unaware of this. The radiopacity was found located apical to 13 regions about 5–6 mm in radius. For further investigation, cone-beam computed tomography (CBCT) scan was done of the anterior maxillary region. CBCT findings reported the presence of an irregular, nonhomogeneous, metallic radiopacity occupying the right inferior meatus of the nasal fossa.

Thereafter, the patient was referred to an ENT surgeon for further investigation and also to clinically correlate with the CBCT findings. The ENT surgeon performed nasal endoscopy and removed the foreign body from the inferior meatus of nasal fossa. On further inspection, it was seen that foreign body was a pebble covered with calcareous concretions. It was sent for histopathological investigation which showed a very hard mass (foreign body) surrounded by unhealthy granulation tissue.

After the removal of stone and on further questioning the patient, the parent gave the history of roadside accident about 1.5 years back and it was presumed that probably the stone got lodged in the patient’s nasal fossa at that time.

Continuing with the patient’s dental treatment, it was planned to proceed by giving a $2 \times 4$ appliance to the patient to correct the retroclination of the central incisor and to align the incisors.

**Discussion**

Diagnostic records, which are the most important part before treatment planning especially in orthodontics, are usually being neglected these days, which if done properly is helpful in many pathological findings which are otherwise asymptomatic.

Rhinolith is a mineralized mass which is located inside the nasal cavity, due to the deposition of salts on an intranasal foreign body. It is a rare asymptomatic and unilateral pathologic condition, discovered accidentally during routine radiographic examination.\(^2\) It usually grows slowly and its presence is not perceived for years.

The etiology and pathogenesis of a rhinolith are still not understood. It may originate as exogenous or endogenous, in which various substances may function as a potential nucleus for the deposition of mineral salts. It is thought that a foreign body incites a chronic inflammatory reaction with deposition of mineral salts, similar to other types of calculi that occur at different sites in the human body. Kodaka et al.\(^3\) investigated that rhinolith consists of deposits of calcium phosphate and magnesium phosphates around a nucleus consisting mainly of magnesium-containing whitlockite (Ca$9$ [Mg, Fe$^{++}$] [PO$4$], [PO$_6$]). Furthermore, mineralogic analysis by Nover and Flörke\(^4\) revealed that rhinolith consists of siderite (FeCo$_3$) and ferrihydrite with a high iron content nucleus. The increased growth of rhinolith is caused by its contact with nasal fluid and salt precipitations on their surfaces. The various physical and chemical factors (changes in pH, hypersaturation of secretions, infections, and chronic and acute inflammations) as well as mechanical factors (stasis of nasal secretions and alterations in air flow) together participate in the rhinolith calcification process.\(^2\)

In this case report, the patient’s lesion was an accidental finding present unilaterally in the nasal fossa on the right side. As this is asymptomatic, the diagnosis of rhinolith is usually overlooked. Pinto et al. reported that the rhinolith more frequently affects young women.\(^5\)

This signifies the importance of diagnostic aids such as conventional radiographs (panoramic radiography, posteroanterior radiography, and maxillary occlusal radiography) or computerized tomography in examining such cases with rhinoliths. The radiological evaluation should also include anterior rhinoscopy as CT scan cannot differentiate a rhinolith from any other calcified mass, but it can detect related complications of rhinoliths. The precise location and dimensions of the lesion are limited when conventional radiographs are used, so different radiographic techniques such as CBCT are necessary for the final diagnosis.\(^2\) The differential diagnosis of radiopaque nasal lesions includes a number of benign and malignant pathologies such as rhinolith, calcified polyp, ossifying fibroma, odontogenic tumor, osteoma, osteosarcoma, osteomyelitis, and carcinoma.

The treatment consists of the removal of the rhinolith either surgically or endoscopically depending on the location and the size of the rhinolith.\(^6\)
Conclusions

It can be concluded that cases like these reinforce the importance of diagnostic aids in the orthodontic practice which in addition to performing its conventional use like diagnosis can aid in solving the unforeseen circumstances.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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