ROOT PIECES ON DENTAL RADIOGRAPHS: INCIDENTAL FINDINGS WITH DIFFERENTIAL DIAGNOSIS

Case Report

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ABSTRACT

Radiographs often reveal hidden lesions other than those related to the patient's chief complaint. The expected frequency with which a dentist can make such incidental findings of pathology or abnormality in a patient is of special interest to the clinician because in many cases such findings may require medical or dental management. The present case series reports three cases wherein retained root pieces remained undetected.

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INTRODUCTION:

Many pathologic conditions remain asymptomatic and are observed only when they cause soft or hard tissue expansion or are secondarily infected. This delay in detection increases morbidity and mortality associated with the disease and treatment.[1]

Health care professionals, dentists in particular, rely on radiographic examinations to assess the pathology and dental anomalies of their patients and to refine their identification of the problems and the treatment plans. [2]Radiographs allow easy observation of pathology and dental anomalies and lesions in the oral and maxillofacial region and they have occasionally led to the discovery of incidental findings other than those involved in a patient's chief complaint at an initial visit. There have also been sporadic case reports of such incidental discovery of lesions.[1,2] The expected frequency with which a dentist can make incidental findings of pathology or abnormality in a patient is of special interest to the clinician because in many cases such findings may require medical or dental management.[2]

It is prudent to evaluate indicated cases with radiographs prior to dental treatment which might reveal incidental pathologies/findings helping to achievetheir early diagnosis and treatment.1 Despite these facts, most clinics do not routinely take radiographs of patients at their initial visit. [2]During the past decades, dentistry has seen a dramatic expansionand refinement of the technology used to identify dentaland intraosseous disorders. [3]However, even after development of many modern imaging modalities, radiography still remains the most important mode of investigation for the evaluation of jaw lesions. [4]Intra-oral radiographs, includingperiapical, bitewing and occlusal projections, are the basic (and often the only) imaging technique required for most dental pathologies. [3]Intraoral radiographs offer a highly detailed view of the teeth and bone in the area exposed.[4]

Retained roots are a common finding in edentulous jaws and may appear on radiographs. Most retained roots are asymptomatic and occur in 6.1% of patients. A retained root is identified by its shape, associated root canal, and surrounding periodontal ligament space. They are usually without any symptoms or complaints.[5]

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The goal of present literatureis to report three cases where retained root pieces remained undetected and to stress the value of differential diagnosis.[1,2]

CASE REPORTS

CASE -1

A 45 yearsold female patient from Sertha came to oral medicine and radiology department with the chief complaint of pain in relation to lower right back tooth (47) regionwhich was dull and continuous. Tooth(47) was tender on percussion.Based on the clinical examination diagnosis of apical periodontitis was kept in relation to 47.An intraoral periapical radiograph (fig.1) was taken that showed complete image of 47 and partial image of 46. 46 appeared to be normal and loss of lamina dura was seen in mesial root of 47.Correlating clinical and radiographic features diagnosis of chronic periapical abscess was kept in 47.An isolated radiopaque mass with a surrounding radiolucent rim was present distal to 47 that seemed to be a root piece of 48. Patient was unaware and asymptomatic about the root piece. Root canal treatment was advised in 47 along with the extraction of the root piece of 48.

Fig.1 shows periodontal ligament space widening and loss of lamina dura in 47 and root piece of 48.

After the surgical extraction root piece (fig.2.a) was sent for histo pathological examination and ground section preparation (fig.2.b) to oral pathology department and it was confirmed to be root piece.

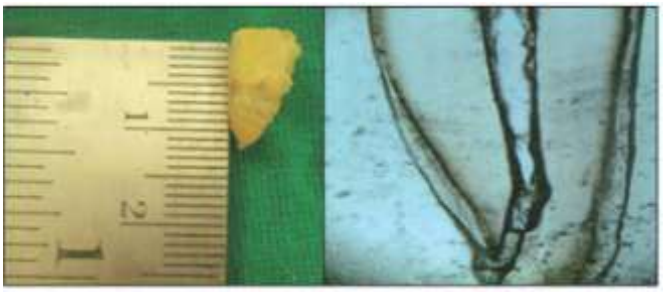

Fig. 2(a) Post extraction specimen of the root piece.
2(b) Ground section image of the root piece.

CASE- 2

A 32 years old female patient from Gota came to oral medicine and radiology department with the chief complaint of pain in lower right back tooth (46) region that was dull and continuous. Tooth was tender on percussion. Patient had undergone restoration in 46 before one year. Based on clinical examination diagnosis of apical periodontitis was kept in relation to 46. An intraoral periapical radiograph(fig.3.a) was taken that showed complete images of 44, 46, 47 and partial image of 43. Both roots of 46 showed loss of lamina dura. An additional finding of an isolated oval mass of uniform radiopacity with a surrounding radiolucent rim, mesial to 46 was present that seemed to be a root piece of 45. Patient was asymptomatic and unaware about the presence of root piece. Patient was not willing for root canal treatment in 46 so extraction of 46 was done and also root piece of 45 was removed. A post-surgical radiograph (fig.3.b.) was taken for confirmation of complete removal of root piece.

Fig. 3.(a) Chronic periapical abscess in 46 and root piece 45.
(b) Post extraction radiograph of the same region.

A 45 year old male patient from Santej came to oral medicine and radiology department with the chief complaint of spacing in upper anterior region (fig.4.a) leading to unaesthetic appearance. Patient was giving history of exfoliation of 12 before 5 years. An intraoral periapical radiograph (fig.4.b) was taken to confirm the absence of 12, which showed complete images of 11,21 and partial image of 13,22. Between 11 and 13 a radiopaque structure was seen surrounded by radiolucent line of PDL space and surrounding radiopaque line of lamina dura. A thin radiolucent line was seen in the middle of the root depicting the root canal. So the final diagnosis was kept as a root piece of 12.Patient was unaware and asymptomatic about the root piece. Extraction of the root piece of 12 (fig.5.a) was done and was sent to the oral pathology department for the histopathological examination and ground section preparation (fig.5.b) and it was confirmed to be a root piece.

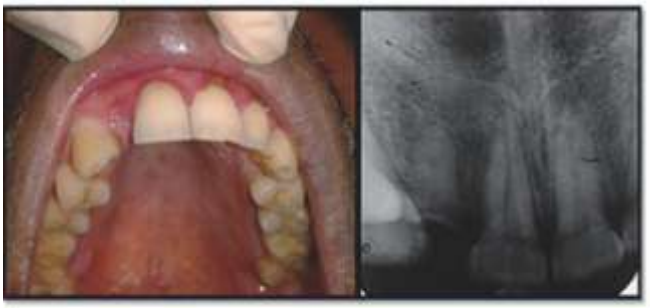

Fig.4 (a) Clinically missing tooth in upper anterior region(12).
(b) Radiograph showing root piece of 12

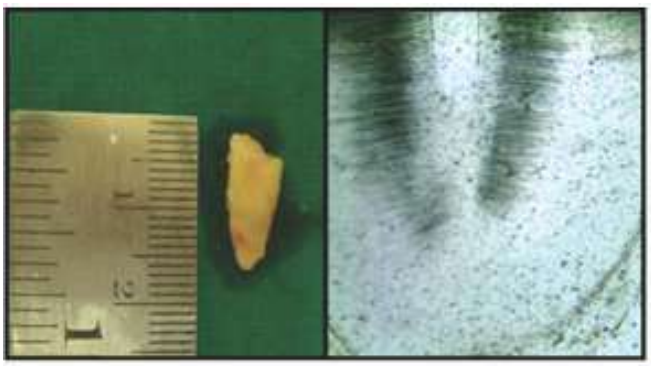

Fig.5(a) Postextraction specimen of the root piece.
5(b)Ground section image of the root piece.

DISCUSSION:

Recent studies have discussed the risk of unnecessaryradiation exposure, which has become a major issue.6Radiographs are often used as the initial evaluation image that can provide the required insight and assist in determining need for other projections.1 Patients with radiopaque lesions in the jaws are often referred to outpatient clinic for diagnosis.6 Inmany cases, asymptomatic radiopaque lesions other thanbenign tumors have been observed over a long period,which allows their behaviour to be predicted.6 There have been only sporadic casereports of lesions discovered incidentallyin adults or children.[3]

In all three of my cases patients had visited dental clinics for various dental problems other than root piece. Patients were not aware about the presence of root piece. Patients had taken routine dental treatments like oral prophylaxis, restorations, root canal treatments and extractions.1When presented with a case, it is important to differentiate it from other similarly appearing lesions and additionally rule out any underlying systemic causes. It is important to identify the need for invasive management. Additionally, such cases may present an endodontic or orthodontic challenge, which has to be managed accordingly.[7]

Despite development of various cross-sectional imaging modalities, the radiograph still remains the first and the most important investigation. Many lesions that occur in the jaw have a similar radiographical appearance and it is often difficult to differentiate among them. Radiographical evaluation of jaw lesion characteristics, which include location, margin, density, relation to tooth, along with knowledge of the clinical data, generally helps in narrowing the differential diagnosis.[4]

A systematic approach for examining dental

radiographs for pathology and dental anomalies has been suggested which requires the ability to discriminate the variants of normal from the abnormal and recognizing atypical patterns in the image to raise clinical diagnostic suspicions. The evaluation of a potential lesions requires describing the findings, including location, size, borders, opacity and texture, and its impact on local structures. Accurate radiographic interpretation and diagnosis from an image should follow consistent principles.[2]

It is always important to differentiate the pathology from other similarly appearing pathologies. In my cases two main differential diagnosis can be considered for retained root piece are:

a) Socket sclerosis
b) Idiopathic osteosclerosis

Tooth extraction is the most common type of bone injury, following which bone healing takes place in an orderly sequence. One of the altered patterns of socket healing is referred to as socketsclerosis. It is characterized by lack of lamina dura,resorption and deposition of sclerotic bone within the confines of lamina dura. On radiographic examination, the density of the osteosclerotic bone resembles the root dentin, while the central radiolucent area can mimic a root canal. As healing progresses, the deposition continues in the center, resulting in an entire socket of uniform density within the confines of the unresorbed lamina dura.8Being nothing more than hyperplastic tissue, socket sclerosis is usually asymptomatic and does not require any treatment.[8,9]

Idiopathic Osteosclerosis (IO) is an area of increased bone production in the jaw and generally appears to be round, elliptical or irregular and radiopaque in shape.These asymptomatic lesions are generally discovered as incidental findings on radiographs taken for other reasons.[10]On radiographic evaluation, IO may be detected in various sizes, ranging from 2 or 3 mm to 1 or 2 cm in diameter, or the lesions may be very large, almost the entire height of the body of the mandible. They may occur at root apices, between the roots or in a separate location away from the teeth, primarily in the premolar/molar region and with a predilection for the mandibular arc.[10, 11] Although the cause and biologic behavior of IO is unknown, the suggested causes include retained primary root fragments, bone deposited in response to unusual occlusal forces or anatomic variations analogous to tori.[11]

There are two treatment options for the retained root piece:

a) Maintenance
b) Removal

The goals of maintenance of roots are to preventalveolar bone resorption, provide better load transmission of the prosthesis to the underlying structures, maintain sensory feedback, and achieve better stabilityof the dentures. Maintaining naturalroots may prevent or retard alveolar bone loss inthe mandible and that oral tactile sensibility is enhanced. There are 3 conditions for leaving root fragments in the extraction socket wound. These include: first, the root fragment must be <4-5 mm in length; second, the root fragment must be embedded in the bone structure deeply without exposure; and third, the root fragment should not be associated with inflammation or infection.[12]

If root fragments unexpectedly remained in the socket during extraction of the tooth, they might cause traumatic injury to the surrounding tissue or bone structure during the surgical exposure so it should be removed as soon as it is diagnosed.[12]

The number of remarkable pathologic findings on radiographs in the secases suggests that dentists should be aware of the potential for pathology in their treatments. Early treatment of this type of

lesions could help patients avoid subsequent complications.1Treatment usually consists of observation and finally extraction of teeth in advance lesions.[13]

CONCLUSION:

Radiographs are indeed a valuable tool in early detection of lesions in the oral and maxillofacial area. Considering the low radiation dose involved in the intraoral radiograph, and its diagnostic yield, routine examination by intraoral radiograph on the initial clinical visit may be useful in early detection of various pathologic conditions.If a well-defined, radiopaque mass isobserved on intra oral radiographs, the dentist should firstattempt to determine the diagnosis and etiology of thelesion and treat appropriately. In conclusion, oral radiologistsshould be aware of the incidentalfindings like retained root piece and comprehensively evaluatethe possibility of treatment of the same.

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