



RESEARCH ARTICLE

RADIOGRAPHIC FINDINGS ASSOCIATED WITH IMPACTED THIRD MOLARS

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ABSTRACT

BACKGROUND: Dental impaction is defined as cessation of eruption of a tooth caused by a clinical or radio graphically detectable physical barrier in the path of eruption or due to ectopic position of the tooth in the jaw. The aim of this study is to assess the pathologies anomalies associated with impacted third molars and is to enlighten the Dental practitioners about the possible pathologies anomalies that might occur associated with impacted third molars so that these problems could be anticipated and detected earlier for a better quality of treatment and prognosis. It also emphasizes on the necessity to extract impacted third molars as soon as they are diagnosed rather than waiting for the symptoms to arise because by the time the symptoms arise, pathological changes would have already set in.

MATERIALS AND METHOD: 100 OPGs of patients with impacted tooth/teeth were collected. The OPGs are of patients from different age groups and these are randomised samples. The subjects of the study are out patients of Saveetha Dental College and the patients' radiographs were taken at the same place.

RESULTS: Among the 100 OPGs of patients with one or more impacted teeth, it was found that in 51 cases mandibular right third molar(48) was impacted which had the highest occurrence of impaction. Out of 100 cases, 82 cases had radiographic findings associated with the impacted teeth. Incidence of bone loss was found to be highest among the impacted third molars which was 55%. The major pathologies like ameloblastoma and dentigerous cyst was found in 3% which had the least incidence.

CONCLUSION: Considering the problems associated with impacted third molars as observed during the study, retention of such impacted teeth may cause serious pathologies and may increase the risk of postoperative complications. Hence it is advisable to treat impactions at an early stage through prompt diagnosis and explaining the patient regarding such complications. And removal of impacted third molars, whether symptomatic or asymptomatic is recommended as early diagnosis may prevent the onset of pathologies.

INTRODUCTION

The impacted third molars are usually more prone to develop various pathologies. Although impacted third molar extraction is a common procedure, the necessity of extraction for patients who are asymptomatic or without any presence of associated pathologies is debatable. Local complications like food impaction, soft tissue inflammation and pain may develop with retained impacted teeth. However, prophylactic removal of impacted third molars, free from any pathology, is still a common practice and also debatable (Song *et al.*, 1997). Another study explained the decision to extract prophylactic depends on the balance between the likelihood of potential of impacted tooth causing pathology in future and risk of surgery (Naveed Ahmad Khawaja *et al.*, 2015). Regarding early removal of third molars, The American Association of Oral and Maxillofacial Surgeons recommends extraction of all four third molars in young adulthood stage, preferably in adolescence, before the roots are fully formed to

minimize complications such as post extraction pain and infection but there are no randomized controlled studies to compare the long-term outcome of early removal with retention of pathology-free third molars. The incidence of impacted teeth has increased among different populations which might be attributed to soft food diet and lower intensity of the use of the masticatory apparatus (Goldberg *et al.*, 1985). A radiographic examination is an imaging exam is an essential tool for diagnosis and surgical management. So accurate preoperative radiographic examination is therefore considered indispensable before extraction of mandibular third molar (Sinha and Pai, 2015). Panoramic radiography permits diagnosis of impacted teeth. It is also taken post operatively to asses any problems associated with third molar surgery. It is one of the conventional diagnostic aids used in impactions. The ramus, distal bone covering the impacted tooth, relation of mandibular canal to the third molars, etc can be assessed using OPG. It is also of importance in detecting the presence of cysts and tumours in relation to the impacted third molars. The aim of this study was to assess the radiographic findings associated with impacted third molars using orthopantomograph.

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SUBJECTS AND METHODS

100 OPGs of patients with impacted tooth/teeth were collected. The OPGs are of patients from different age groups and these are randomised samples. The subjects of the study are out patients of Saveetha Dental college and the patients' radiographs were taken at the same place.

The radiographic findings considered were

- Radiolucency involving enamel and dentin of the impacted tooth.
- Radiolucency involving pulp of impacted tooth.
- Widening of periodontal ligament space of impacted tooth.
- Periapical Radiolucency in impacted tooth.
- Pericoronal radiolucency in impacted tooth.
- Bone loss associated with impacted tooth.
- Radiopacity involving the impacted tooth.
- Radiolucency involving enamel and dentin of adjacent tooth associated with impacted tooth.
- Radiolucency involving pulp of adjacent tooth associated with impacted tooth.
- Widening of periodontal ligament space of adjacent tooth associated with impacted tooth.

- Periapical radiolucency in adjacent tooth associated with impacted tooth.
- Any other radiolucency/radiopacity involving the jaw associated with impacted tooth.
- These radiographic findings were tabulated and the findings associated with each impacted tooth in each patient were recorded.

RESULTS

Among the 100 OPGs of patients with one or more impacted teeth, it was found that among total number of impacted teeth examined, 33 were maxillary right third molar(18); 28 were maxillary left third molar(28); 49 were mandibular left third molar(38) and 51 were mandibular right third molar(48), the comparison is given in Table 1. The total number of impacted teeth were found to be 161. The occurrence of each type of impaction were 58 mesioangular impactions, 46 horizontal impactions, 30 distoangular impactions and 27 vertical impactions (Chart 1). Out of 100 cases, 18 cases had no radiographic findings associated with the impacted teeth (Table 2). Based on the radiographic findings recorded, the radiodiagnosis of each impacted tooth was done and the occurrence of various pathologies (Table 3) were observed as follows:

PATHOLOGIES	Number	Percentage
Dental caries in impacted tooth	16	9.94%
Pulpitis in impacted tooth	13	8.07%
Apical periodontitis in impacted tooth	11	6.83%
Periapical abscess in impacted tooth	11	6.83%
Dentigerous cyst associated with impacted tooth	2	1.24%
Hypercementosis in impacted tooth	1	0.62%
Bone loss associated with impacted tooth	55	34.16%
Dental caries in adjacent tooth associated with impacted tooth	23	14.29%
Pulpitis of adjacent tooth associated with impacted tooth	16	9.94%
Apical periodontitis of adjacent tooth associated with impacted tooth	7	4.35%
Periapical abscess in adjacent tooth associated with impacted tooth	13	8.07%
Ameloblastoma	1	0.62%

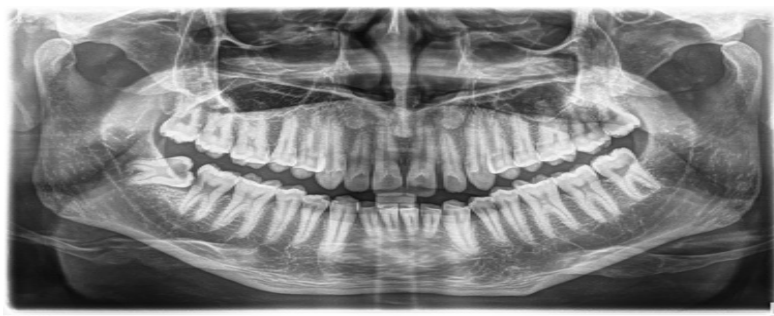


Figure 1. Dental caries involving enamel and dentin of impacted 48



Figure 2. Dental caries involving, enamel, dentin and pulp of 37 associated with impacted 38

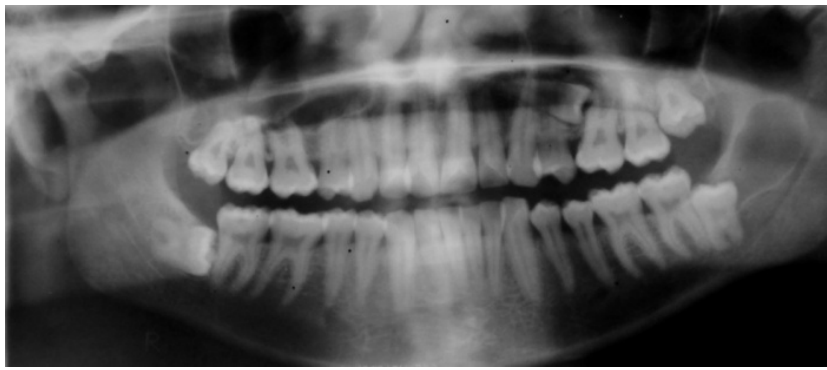


Figure 3. Dentigerous cyst associated with impacted 38



Figure 4. Periapical abscess in impacted 48 associated with dental caries involving enamel and dentin in 48



Figure 5. Bone loss in relation to interdental area between 47 and 48

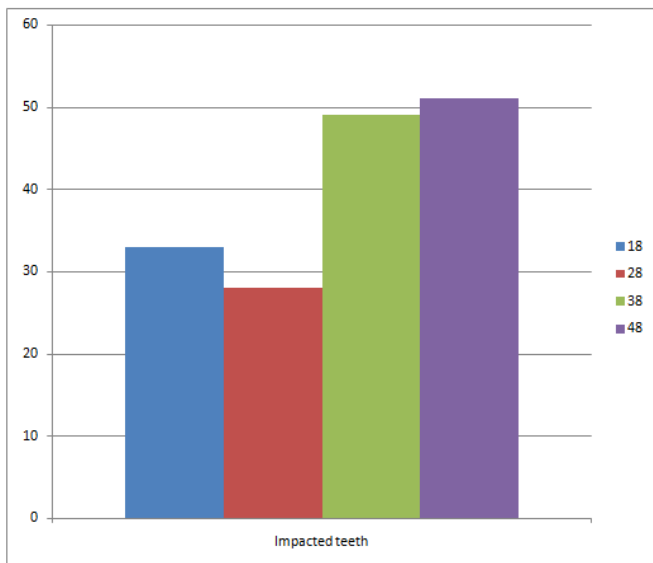


Table 1. This table represents comparison of incidence of impaction among all four third molars

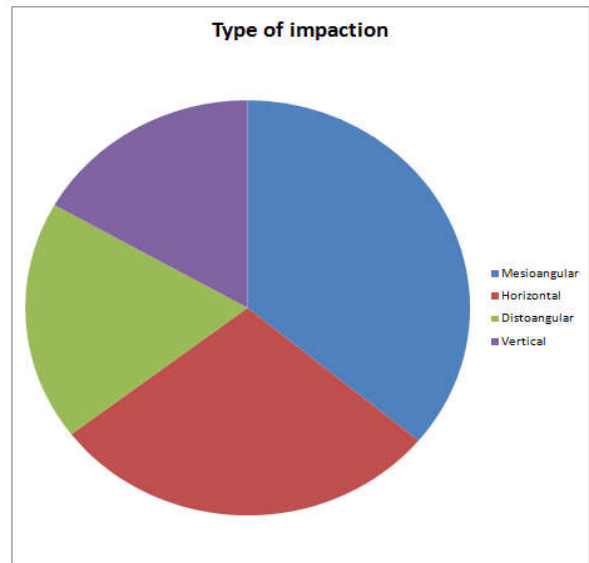


Chart 1. This pie chart represents the occurrence of each type of impaction

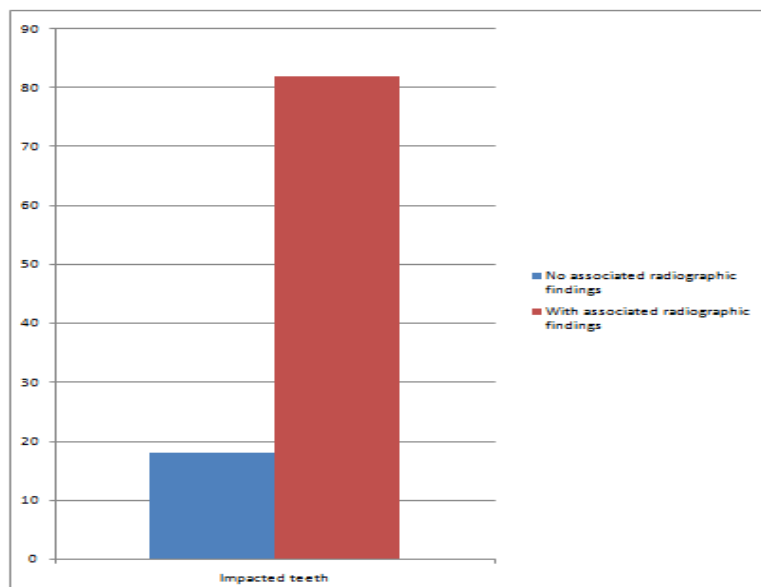


Table 2. This table represents comparison between the number of impacted third molars with and without associated radiographic findings

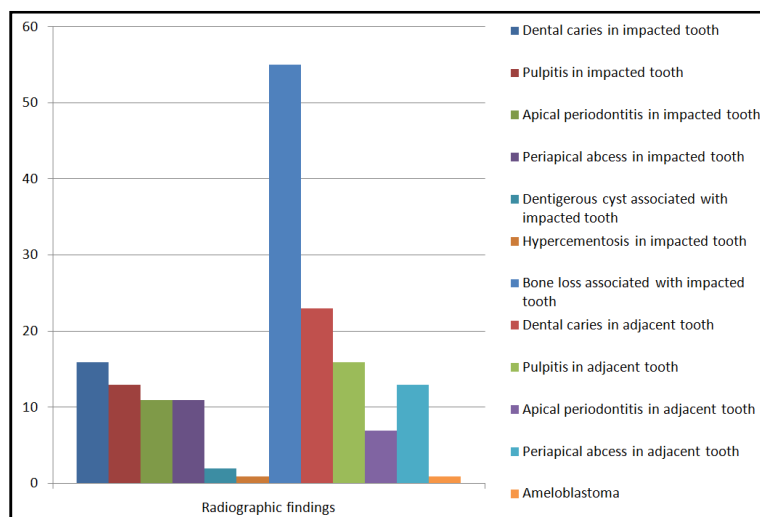


Table 3. This table represents the occurrence of various pathologies associated with impacted third molars

DISCUSSION

The decision about management of asymptomatic impacted third molars are the most common challenge faced by dentists. The controversies regarding differentiating normal and pathological radiolucencies observed in the soft tissue in relation to embedded third molar still exist despite recommendations from the NIH Consensus Conference on third molar removal (Kutsson *et al.*, 1992; Kutsson *et al.*, 1992; Lysell *et al.*, 1993). Although pathological involvement associated with impacted third molars is a clear indication for their removal, prophylactic removal of an asymptomatic impacted molar is controversial. Some authors (Kutsson *et al.*, 1992; Lysell *et al.*, 1993; Fielding *et al.*, 1981; Hinds and Frey, 1980; Laskin *et al.*, 1991) have suggested prophylactic removal as a precautionary measure to prevent further complications while others (Lazare, 1984; Shear, 1984; Stephens *et al.*, 1989; Brooks and Woodfolk, 1996; Scheer, 1984; Shepherd, 1994) have suggested that it might not be essential in all cases. The reasons for not recommending prophylactic extraction are: if most pathologically associated third molar teeth are extracted

at early ages, there will be fewer cases of diseased impactions that are left to be diagnosed at older ages. Secondly, in some cases the pathologies regress and thus do not progress to form significant lesions thus not requiring extraction. In this study the prevalence of impaction was found to be highest among mandibular third molars which correlates with the literature and studies that were conducted. About 18% of cases had no other radiographic finding associated with the impacted tooth. The second molar adjacent to the impacted tooth was affected in 39.8% of cases. Similar results were obtained in a study conducted in Turkish population and a group of Jordanians (Polat HB *et al.*, 2008). Incidence of bone loss was found to be highest among the impacted third molars which was 34.16%. Bone loss associated with impacted tooth is usually interdental bone loss between the impacted tooth and the adjacent second molar. Bone loss is frequently observed in cases of mesioangular impactions where the crown of impacted tooth rests on the root of adjacent tooth. 9.94% of impacted teeth had dental caries. In cases of impacted teeth, partially exposed impactions are the most prone to develop caries as they offer more favourable conditions for bacterial accumulation.

The lesser self cleaning area in cases of impacted teeth leads to food and microorganism accumulation that cannot be cleaned through normal brushings and flossing, causing a caries development. The sequel of untreated caries is pulpitis, apical periodontitis and periapical abscess which was observed in 8.07%, 6.83% and 6.83% of impacted teeth respectively. Caries in the third molar is 31% in a study conducted by Kerstin Knutsson *et al.* In our study the incidence of dental caries was observed to be lesser than the results obtained from the above mentioned study. Dental caries, pulpitis, apical periodontitis and periapical abscess in adjacent tooth associated with impacted tooth are observed in 14.29%, 9.94%, 4.35% and 8.07% of impacted teeth respectively. A study was conducted by Louis W. McArdle *et al.* that highlights the incidence and clinical course of caries in second molar due to impacted third molars. For mesio-angular and horizontal impacted lower third molars partially exposed in the oral cavity, occlusal surfaces form plaque accumulative crevices against the distal surfaces of the second molars. Thus they cause a distal cervical caries on the second molars which is difficult to be restored without extractions of the impacted teeth. Also, as the gingival margin recedes enamel-cementum junction becomes exposed forming a bacterial retention side and on this way forming root surface caries. The major pathologies like ameloblastoma and dentigerous cyst was found in 0.62% and 1.24% respectively of impactions which had the least incidence. This was similar to the results obtained in a study done to assess the prevalence of impacted teeth and associated pathologies using radiographs of Hong Kong Chinese population (Chu *et al.*, 2003). Ameloblastoma may arise from various sources of odontogenic epithelium, including the epithelial lining of the dental follicle or from the epithelial lining of a dentigerous cyst. Dentigerous cyst is developmental in origin and most commonly associated with impacted, unerupted or embedded teeth. The occurrence of hypercementosis in this study is 0.62% and this may be attributed to conditions such as functional stress due to occlusal forces, continuous dental eruption or incorporation of periodontal cementicles during physiologic cementum deposition. Reactionary deposition in response to periapical inflammatory processes may be ruled out as there was no evidence of periapical pathology in relation to the tooth. Also hypercementosis was localized in relation that particular tooth and hence systemic factors such as atherosclerosis, acromegaly, deforming arthritis, hypertrophic arthritis, thyroid diseases or Paget's disease can be ruled out as they produced generalized hypercementosis.

Conclusion

The most common finding associated with impacted third molar was horizontal bone loss. Out of 100 cases of impacted teeth, 82 cases had radiographic findings associated with the impacted teeth. Considering the problems associated with impacted third molars as observed during the study, retention of such impacted teeth may cause serious pathologies and may increase the risk of postoperative complications. Hence it is advisable to treat impactions at an early stage through prompt diagnosis and explaining the patient regarding such complications. And removal of impacted third molars, whether symptomatic or asymptomatic is recommended as early diagnosis and impacted teeth may prevent the onset of pathologies.

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