

The prevalence of root resorption in radiographically examined teeth

Nazar Gh JAMEEL*
Zaydoon M KASIM**

ABSTRACT

The aim of this study is to determine the prevalence of root resorption in radiographically examined teeth. (256) patients admitted for routine intraoral examination were included in the study. (16%) of the patients show root resorption in one or more teeth, and (5.64%) of all the examined teeth show evidence of external root resorption. The periapical inflammation was the main cause of external root resorption. Two cases of internal root resorption were found in this study.

Key Words: External, internal, root resorption.

الخلاصة

إن الهدف من هذه الدراسة هو تحديد نسبة انتشار نضوب الجذر في الاسنان التي فحصت إشعاعياً . شملت الدراسة (٢٥٦) مريضاً اجري لهم فحص روتيني لداخل الفم . ظهر نضوب الجذر في واحد أو أكثر من الاسنان في (١٦%) من المرضى، وأظهرت نسبة (٥,٦٤%) من الاسنان التي تم فحصها وجود نضوب جذر خارجي . كان التهاب ما حول القمة السبب الرئيسي لنضوب الجذر الخارجي . وظهرت في الدراسة اثنان من حالة نضوب الجذر الداخلي .

INTRODUCTION

Root resorption is a form of tooth structure loss. It could be internal where the tooth loss starts within the pulpal chambers of intact teeth and it extends outward toward the tooth surfaces; it is relatively rare, or it is external where the tooth loss starts on the outer surface and extends inward toward the pulp. The external resorption is common⁽¹⁾.

The given resorption potential is inherent within the periodontal tissue of each patient and this individual susceptibility to resorption is the most important factor in the degree of resorption that will occur after a stimulus⁽²⁾.

*Nazar Ghanim JAMEEL; BDS, MSc: Lecturer.

**Zaydoon Mahmood KASIM; BDS, MSc: Assistant Lecturer.

Department of Oral and Maxillofacial Surgery, College of Dentistry, University of Mosul, Mosul, IRAQ.

Many factors have been reported in literatures that are associated with resorption. Some of these factors are systemic such as hormonal imbalances and Paget's disease of bone⁽²⁾. Other factors are local and include:

1. Periapical inflammation.
2. Cysts.
3. Dental trauma.
4. Excessive mechanical forces (e.g. orthodontic treatment).
5. Excessive occlusal forces.
6. Grafting of alveolar clefts.
7. Intracoronal bleaching of pulpless teeth.
8. Periodontal treatment.
9. Pressure from impacted tooth.
10. Reimplantation of teeth.
11. Tumors^(2,3).

In addition, there are some cases where no factor could be found to explain the resorption. These cases are termed as idiopathic resorption^(2,3,4,5).

The internal resorption appear as uniform well-circumscribed symmetrical enlargement of the pulp chamber or canal. The external root resorption can occur mainly on the apical and mid-portion of root. Sometimes the resorption can occur in the cervical area of the tooth. The resorption can affect single tooth or group of teeth^(1,2).

The cells that are responsible for root resorption are dentinoclast or odontoclast. These cells are multinucleated cells occupying resorption bays on the surface of dental hard tissue and the surface of the cell adjacent to the resorbing hard tissue forms a brush border which is resolved as a ruffled border produced by extensive fold in of the cell membrane. These cells have the ability to resorb any hard dental tissue and this resorption occurs firstly by the removal of minerals following dissolution of the organic matrix⁽⁶⁾.

This study is to find the prevalence of root resorption in radiographically examined teeth in patients having intraoral periapical x-ray film for routine dental treatments.

MATERIALS AND METHODS

This study includes (256) patients aged between (10-62) years old admitted for routine intraoral radiography in dental radiographic department, College of Dentistry, University of Mosul. These patients were grouped according to their sex and age starting at 10 years and increasing each (10) years.

Eight hundred and thirty three teeth were radiographically examined. The radiograph (periapical intraoral X-ray film) was examined by the two authors to investigate the prevalence of root resorption (externally and internally). The cases were recorded as resorbed when the two authors agreed on it. The cause of resorption also was recorded.

RESULTS

The total number of examined patients was 256 (131 females and 125 males). Their age ranged between 10-62 years. Two cases of internal root resorption were found. One of these was in left central incisor of 28 years old male who reported history of trauma to anterior teeth about 15 years ago. The other case of internal root resorption which was found in 35 years old female in her left central incisor without any history of trauma or any other cause.

Forty patients had external root resorption of one or more tooth in different types of teeth giving (16%) of the total number. Table (1) shows the distribution of the number of patients having resorption in relation to sex and age groups. Thirty seven patients have single affected tooth. One patient has two involved teeth and two patients reported four affected teeth by resorption.

Table (1): Patients prevalence of external root resorption in relation to age and sex

Age Group	Total			Female			Male		
	No. of Examined Patients	No. of Affected Patients	% of Affected Patients	No. of Examined Patients	No. of Affected Patients	% of Affected Patients	No. of Examined Patients	No. of Affected Patients	% of Affected Patients
0-10	3	---	---	---	---	---	3	---	---
11-20	25	6	24	15	4	27	10	2	20
21-30	116	12	10	69	7	10	47	5	10
31-40	71	10	14	31	5	16	40	5	13
41-50	31	10	32	11	4	36	20	6	30
51-60	9	2	22	5	1	20	4	1	25
> 60	1	---	---	---	---	---	1	---	---
Total	256	40	16	131	21	16	125	19	15

Forty seven teeth of (833) teeth have resorption, giving (5.64%) of all examined teeth. Table (2) shows the number of teeth having external resorption according to its cause.

Table (2): Number of affected teeth in relation to the causative factor

Causative Factor	No. of Affected Teeth
Periapical inflammation	32
Orthodontic treatment	8
Cyst or granuloma	2
Reimplantation	1
Idiopathic	1
Total	44

Tables (3 and 4) show the causes of external resorption in each type of tooth.

Table (3): Distribution of causative factors according to the type of teeth in upper jaw

Cause	Central Incisor	Lateral Incisor	Canine	First Premolar	Second Premolar	First Molar	Second Molar	Total
Periapical Inflammation	7	3	---	3	2	3	3	21
Orthodontic Treatment	4	4	---	---	---	---	---	8
Cyst or Granuloma	---	1	---	---	---	---	---	1
Dental Trauma	---	2	---	---	---	---	---	2
Reimplantation	---	---	1	---	---	---	---	1
Total	11	10	1	3	2	3	3	33

Table (4): Distribution of causative factors according to the type of teeth in lower jaw

Cause	Central Incisor	Lateral Incisor	Canine	First Premolar	Second Premolar	First Molar	Second Molar	Total
Periapical Inflammation	1	2	---	2	2	3	1	11
Cyst or Granuloma	---	1	---	1	---	---	---	2
Idiopathic	---	---	---	---	---	---	1	1
Total	1	3	---	3	2	3	2	14

DISCUSSION

Different studies have been found in literature on the subject of root resorption. many authors show different prevalence of root resorption. Henry and Weinmann⁽⁷⁾ reported that (90%) of microscopically examined teeth from adult cadavers show resorption. Massler and Malone⁽⁸⁾ demonstrated in their radiographic

study that (100%) of people had apical root resorption in one or more tooth. Harvey and Zander⁽⁹⁾ show that (80%) of all examined teeth has root resorption. Nivelle *et al.*⁽²⁾ stated that (86.4%) of radiographically examined teeth have root resorption.

This study shows that (5.64%) of all examined teeth have external root resorption and (16%) of all examined patients have external root resorption of one or more tooth. The difference between the results of this study and the above mentioned studies can be attributed to the fact that most of the above studies used panoramic extraoral x-ray films to evaluate the prevalence of root resorption while in this study the periapical intraoral x-ray film was used. Also some authors⁽⁷⁾ used microscopical examination of extracted teeth. The variation in different studies can be attributed to different racial groups.

In this study, the periapical inflammation was the main cause of external root resorption (present in 32 teeth) in such cases the pulp is either chronically inflamed or necrotic causing bacterial toxins and cell degradation products to setup a chain of reactions in the periapical tissues mainly osteoclastic activity and initiate root resorption. In addition to periapical inflammation the orthodontically treated teeth where the second cause of resorption (affected 8 teeth) followed by cyst or granuloma to cause root resorption (in 3 teeth) and one case of reimplantation show resorption. One case was reported to have resorption without any cause so it was recorded as idiopathic root resorption.

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