

Prevalence of Retained Primary Teeth without Permanent Successors among Orthodontic Patients in Basrah City/ Iraq

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ABSTRACT

Background: the aim of this study was to evaluate the prevalence of retained primary teeth (RPT) and the most favorable treatment option from the patient point of view.

Method: The study sample consist of 508 orthodontic patients, 367 females and 141 males with aged range from (7-35) years old, all patients where clinically examined and panoramic radiographs were recorded for them.

Result and Conclusion: No significant differences were found in total prevalence of RPT between males and females, while a significant difference was found in relation between types of treatment of retained primary teeth with age. The total prevalence of RPT was 3.7% among orthodontic patients examined in this study. The most frequently RPT was the primary second molar. RPT found more frequently in the maxilla, the majority of the patient has one RPT but the female patients has a higher incidence of two or more RPT than males, the most favorable treatment option of RPT without a permanent successor is extraction and closing the space.

Keywords: Retained primary teeth, orthodontic patients, orthodontic treatment, and panoramic radiograph.

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INTRODUCTION

Persistence of primary teeth beyond their expected time of exfoliation is an uncommon condition, and there is a limited number of reports that have investigated the retention or persistence of primary teeth⁽¹⁻³⁾. In addition to that, the absence (agenesis) of one or more teeth is not an uncommon condition in permanent dentition, moreover, may cause serious complications, such as malocclusion, functional and masticatory dysfunction, malposition, decreasing in alveolar bone height, and esthetic consequences^(4, 5). Although, retention of primary teeth can lead to some clinical problems including caries, periodontitis, and ankylosis⁽⁶⁾. A persistent primary tooth, with good condition of crown, roots, and periodontium, can propound many years of service (aesthetic and function) for the adult patient⁽⁷⁾. Few studies have documented the factors underlying the retention of primary teeth. The most common reason was the developmental agenesis of a permanent successor or congenital absence of permanent premolars⁽⁸⁾. Several studies substantiate evidence that the patients with unilateral or bilateral agenesis of maxillary and/or mandibular second premolars and lateral incisors presented a significant increase in the occurrence of third molar agenesis, compared with the controlled ones⁽⁹⁻¹²⁾. Clinically, preservation of primary teeth is essential especially in severe cases of hypodontia, as they could play a functional role for a substantial period. This study aimed to evaluate the prevalence of retained primary teeth among orthodontic patients and their preferences for treatment.

MATERIAL AND METHODS

The sample for the study collected from private orthodontic clinics (in Basrah city/Iraq) with age range (7-35) years. Out of 508 only 19 (male and female) fit the criteria of sample selection and only panoramic

radiographs taken to confirm the presence of primary tooth to the patients who fitted the criteria and have retained primary teeth. Orthodontic patients with a history of orthodontic treatment, previous history of extraction, orofacial disorders (cleft lip and/or palate or systemic diseases with oral repercussions, history of severe trauma like the jaw fracture excluded from the study.

METHOD

A written informed consent form was obtained from each orthodontic patient to confirm their voluntary participation in this study, after that, each patient was seated on the dental chair and information's regarding his/her name, age, dental and medical history were taken, then each patient was subjected to clinical and radiographical examination.

Then the presence of any dental anomalies and/or retained primary teeth checked clinically and confirmed radiographically by taking the panoramic radiograph.

Radiographic examination

Each panoramic radiograph should be examined by one examiner for the presence of primary teeth, dental anomalies, permanent successors agenesis, and if there were any prosthetic replacement for the retained primary teeth. Additionally, each patient asked about his/her preference whether to keep and restore or, extract\implant or extract and orthodontic space closure. After clinical and radiographical examination, a permanent tooth related to a retained tooth is recorded as congenitally missing when there was no trace found on the radiograph and the patient assured that the tooth has not been extracted previously. Each patient with retained primary tooth/teeth gave his/her opinions regarding their preferences of management of their case. The data was collected and analyzed statistically by using a computer program (SPSS version 23).

RESULTS AND STATISTICAL ANALYSIS

Distribution of retained primary teeth

The sample consisted of 508 patients, 367 of them were females and 141 were males, only 19 (3.7%) have RPT (**Figure1**), this is inconsistent to the finding of other researchers in different countries, they found that the prevalence of missing permanent teeth, excluding the third molar, was 3.4% in Swiss children, 4.4% in American children, 4.6% in Israeli children, 6.1% in Swedish children, 8% in Finnish, and 9.6% in Austrian children (13-17).

Table (1-1) shows that no differences found when comparing the total prevalence of RPT between males and females, our results are consistent with the finding of Silva Meza R¹⁸, and inconsistent to the finding of Polder *et. al.* ⁸who found agenesis varies by continent and gender: the prevalence for both sexes was higher in Europe (males 4.6%; females 6.3%) and Australia (males 5.5%; females 7.6%) than for North- American Caucasians (males 3.2%; females 4.6%).

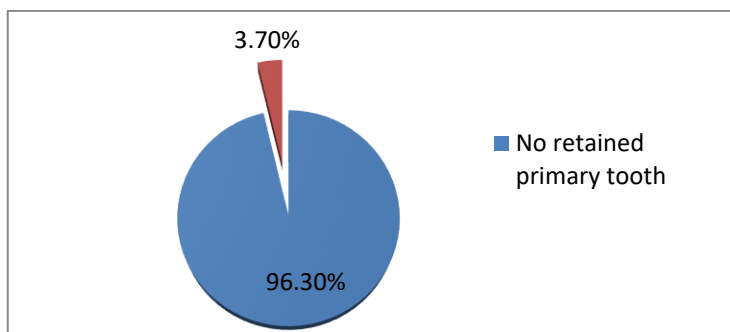


Figure1: Percentage of the presence of retained primary tooth/teeth among the total sample.

Table 1-1: Comparison of the distribution of patients with retained primary teeth according to genders.

Gender	No. of sample	Patient with RDT	% of RDT patients	p-value
Male	141	7	4.9%	0.367
Female	367	12	3.3%	
Total	508	19	3.7 %	

Distribution of R.D.T according to Number of R.P.T per patient in both Genders

In **table (1-2)**, shows that 7 females have two and more and 5 females have less than two RPT, while in males only 1 has two and more RPT and 6 of males have less than 2 RPT. there was no significant difference in the prevalence between males and females, the same results based on gender were obtained in Mexican¹⁸, Korean orthodontic

population²⁴, and Brazilian²⁵ populations. The difference was statistically insignificant $P>0.05$ is inconsistent with the finding of other researchers who found a higher incidence of tooth agenesis in females than in males (8,17,19-21). On the other hand, Kirkham *et. al.*²² found a high prevalence of tooth agenesis among males in the British population, and these results are analogous to the findings of dermiriz *et. al.*²³

Table 1-2: Association the number of patients with retained primary teeth with gender.

RPT	Males no.	Females no.	Total	Pearson Square	Chi-Square	P-Value
2 and more RPT	1	7	8	3.519		.061 (NS)
Less than 2 RPT	6	5	11			
Total	7	12	19			

RPT: retained primary tooth. NS: Non-significant. df= 1.

Distribution of retained primary tooth/teeth according to the tooth type:

The most frequently RPT without permanent successor among the examined patients was primary retained E (52.6%) followed by primary retained B then Ces and

lastly was primary retained A (10.5%) in both gender **Figure2**.

This result is in agreement to the finding of (Polder *et. al.* ⁸, Dermiriz *et. al.* ²³) who found mandibular second bicuspid, upper laterals, and maxillary second bicuspid

were the teeth most commonly missing, and Aktan *et.al.*⁶ who found that mandibular primary second molars, followed by maxillary primary canines⁶.

In contrast to the finding of (Silva Meza R⁷; Fekonja A¹⁸) who found a significantly higher incidence of missing maxillary lateral incisors followed by 2nd premolar in their studies.

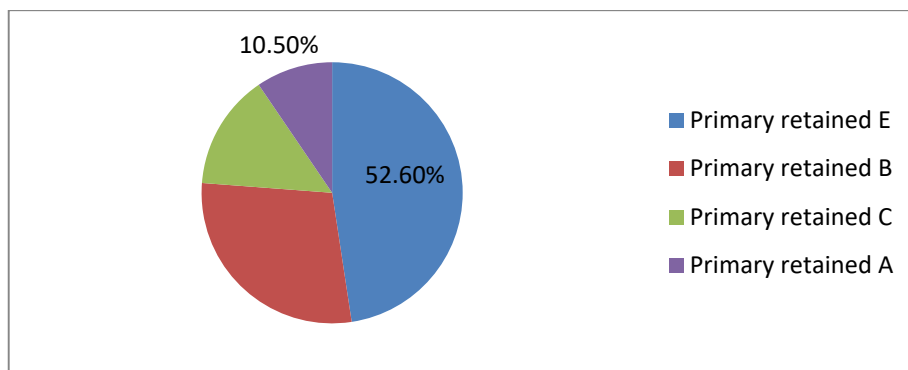


Figure 2: Distribution of retained primary tooth/teeth according to the tooth type.

Table 1-3: Association the number of patients with retained primary teeth with age.

RPT	Above 20 years old no.	Below 20 Years old no.	Total	Pearson Square	Chi-	P-Value
2 and more RPT	3	5	8	.224		.636 (NS)
1 RPT	3	8	11			
Total	6	13	19			

RPT: retained primary tooth. NS: Non-significant. df= 1.

Table (1-3) shows that subjects below 20 years old appear to have RPT more than those above 20 years old (for both 1 RPT, 2, and more RPT) the difference was statistically insignificant $P>0.05$. This could be explained by that those above 20 years have greater chance that they lost the RPT previously (without knowing) than those below 20 years.

Association of the site of retained primary teeth (according to arch) with gender

Table (1-4) shows that the RPT in the maxilla was more in females than in males, whereas, in the mandible, there was no difference between males and females, but 4 females have a RPT in both maxilla and mandible. The difference was statistically insignificant, but it seems that more RPT is present in the maxillary arch than in the mandibular arch our result agrees with (Polder *et al.* ⁸; Fekonja¹⁸).

Table 1-4: Association of the site of retained primary teeth (according to arch) with gender

RPT	Males no.	Females no.	Total	Pearson Square	Chi-	P-Value
Maxillary	4	5	9	3.003		.223 (NS)
Mandibular	3	3	6			
Maxillary and Mandibular	0	4	4			
Total	7	12	19			

RPT: retained primary tooth. NS: Non-significant. df= 2.

Association of the site of retained primary teeth (according to side) with gender

Table (1-5) shows that unilateral retention of primary teeth was more than the bilateral retention of primary teeth in the total patients. Out of 19 patients, 6 patients have unilateral retention (right side) including 2 females and 4 males. 5 patients have unilateral retention (left side) including 3 females and 2 males. On the other hand,

8 patients (7 females and 1 male) have bilateral retention. Although the difference was, statistically not significant it seems more retention of primary teeth present on the right side, in agreement with the finding of Feconja¹⁸ who observed more missing teeth occur on the right side.

Table 1-5: Association of the site of retained primary teeth (according to side) with gender

RPT	Males no.	Females no.	Total	Pearson Chi-Square	P-Value
Right (Unilateral)	4	2	6	4.352	.113 (NS)
Left (Unilateral)	2	3	5		
Right and Left (Bilateral)	1	7	8		
Total	7	12	19		

RPT: retained primary tooth. NS: Non-significant. df= 2.

Table 1-6: Association of type of treatment of retained primary teeth with gender

Treatment of RPT	Males no.	Females no.	Total	Pearson Chi-Square	P-Value
Extraction and closing space	6	6	12	6.537	.366 (NS)
Extraction and implant/keeping for future implant	0	3	3		
keep the tooth and restore it	1	3	4		
Total	7	12	19		

RPT: retained primary tooth. NS: Non-significant. df= 6.

Table (1-6) shows that out of seven males' patients with RPT, 6 males prefer extraction and closing the space as a treatment option and only one patient prefers to keep the tooth and restore it. While in females out of the twelve patients, 6 patients prefer extraction and closing space, 3 prefer to keep the tooth because it has a good prognosis,

and 3 prefer extraction and restore with the implant. Most of the patients (males and females) prefer to extract the RPT and close the space, this could be explained by that they prefer to overcome the space that could be left in the dental arch if the RPT resorped and exfoliated.

Table 1-7: Association of type of treatment of retained primary teeth with age

Treatment of RPT	Above 20 years old no.	Below 20 years old no.	Total	Pearson Chi-Square	P-Value
Extraction and closing space	2	10	12	14.835	.022 (S)
keep the tooth and restore it	4	0	4		
Extraction and implant/keep the tooth for future implant	0	3	3		
Total	6	13	19		

RPT: retained primary tooth. S: significant. df= 6.

Table (1-7) shows that 10 patients who were below twenty years prefer extraction and closing space as a treatment procedure, and only 3 subjects preferred to keep the tooth and extract it later for a future implant.

While patients who were above the twenties, 4 of them prefer to keep the tooth and restore it and only two preferred to extract and close the space.

Table 1-8: Association of type of treatment of RPT with number of the RPT

Treatment of RPT	2 and more RPT no.	1 PRT no.	Total	Pearson Chi-Square	P-Value
Extraction and closing space	4	6	10	5.052	.537 (NS)
keep the tooth good prognosis	2	2	4		
Extraction and implant /keep the tooth for future implant	2	3	5		
Total	8	11	19		

RPT: retained primary tooth. NS: Non-significant. df= 6.

Table (1-8) shows that the most preferred treatment is extraction and closing the space whether there is one or more than two RPT, there were 10 of the total 19 patients prefer this treatment modality. The other treatment option whether to keep the tooth or extract and replace it with an implant is almost equal regarding treatment preference. Regarding gender, age, and number of RPT the most preferred treatment was extraction and closing the space, the other treatment modalities of keeping the tooth and replace it for future implant deferred until the patient is above twenty years of age this in agreement with Jamilian *et al.*²⁶ who found patients with an orthodontic space closure had better periodontal health in comparison with those patients who was treated with an implant substitution. Furthermore, infraocclusion more than 1 mm detected in all the implant patients in their study. Besides that in space closure treatment is completed immediately after orthodontics and, in the case of adolescents, there is no need to wait years until the 'end of growth' to substitute the missing tooth, and additional cost will be paid. Moreover, the result is natural and all the changes in the long term will be natural.

Bjerklin *et al.*²⁷ found in their study that during the observation period, only seven of the 99 primary molars were lost due to extensive root resorption, infraocclusion, or caries. Long-term survival may be expected in more than 90 percent of patients with retained primary molars with agenesis of mandibular second premolars. In the present study, the other treatment modalities are also accepted but it requires long-term follow up from the orthodontic point of view.

CONCLUSION

The prevalence of RPT without permanent successor was 3.7% among orthodontic patients examined in this study. The most frequently RPT was the primary second molar followed by the primary laterals, RPT found more frequently the maxilla, the majority of the patient has one RPT but the female patient has a higher incidence of two or more RPT than males, the most favorable treatment

option of RPT without a permanent successor is extraction and closing the space.

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