

## Original Article

### Timing of Emergence of the First Permanent Molars and Central Incisors in Male School Children in Rass City, Qassim Region, Saudi Arabia

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#### ABSTRACT:

**Background:** There is limited data available about the time of emergence of first permanent molars and central incisors in Qassim region, Saudi Arabia. So, it is essential to obtain precise emergence time of these teeth. **Aim:** The aim of this study was to determine timing of emergence of the first permanent molars and central incisors in Saudi male school children in Rass city, Qassim region, Saudi Arabia. **Materials and methods:** A cross-sectional study was conducted on a total number of 260 Saudi male school children in the age group between (6.0 -8.17) years from 16 randomly selected Primary schools in Rass City, Qassim region, Saudi Arabia. The mean age of tooth emergence was calculated using 95% confidence intervals, significance level was set as  $p < .05$ , and Paired- sample t-test was used to determine the significance of difference. **Results:** The maxillary and mandibular right first permanent molar were the earliest tooth to emerge at 6.72 years. The maxillary right and left central incisors were the last teeth to emerge (7.38 years and 7.39 years respectively). No statistically significant difference was observed in emergence times between the right and left sides of both jaws. The precedence in emergence of mandibular teeth over corresponding maxillary was significant only for central incisors while first molars erupted concomitantly. **Conclusion:** The first permanent molars were the first tooth to erupt in both jaws and sides. The mean age of eruption for first permanent molars and central incisors was comparable with other populations.

**Key words:** Central incisors, Eruption, First molars, Permanent tooth, Saudi Arabia.

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#### INTRODUCTION

Transition from primary dentition to mixed dentition stage begins with first permanent molar eruption at around the age of six years followed by eruption of incisor teeth. Tooth eruption is regarded as an important event in child's development by most parents and they often display interest in knowing it.

Knowledge about the emergence times and sequence of permanent tooth eruption are important in evaluating child growth and development.<sup>1</sup> Adequate knowledge and information about normal tooth eruption and its variation is essential for pediatric dentist and orthodontist to diagnose eruption disorders and in making appropriate treatment plan for children.<sup>2</sup>

Tooth eruption includes the entire process beginning with the embryonic development of the tooth bud in the jaw, formation of the crown and root and continuing till establishment of occlusion.<sup>3</sup>

Together local and general factors might affect the eruption time of teeth. Local pathological factors like presence of supernumerary teeth, cysts, malformations and dental trauma are unlikely to have significant effect on epidemiological data because they are uncommon.<sup>4</sup> General factors like gender, ethnicity, genetic and environmental factors are also known to influence time of permanent tooth emergence. Many studies reported that eruption is earlier in girls than boys and this credited to their earlier development.<sup>5-9</sup> Regarding ethnicity, studies declared earlier emergence time in sub-Saharan African population with

comparison to Asian<sup>10</sup> and Caucasian population. <sup>11</sup>This has been attributed primarily to genetic differences.

There are two studies that were conducted in Riyadh city, Saudi Arabia to record eruption time of permanent first molars and incisors, one of them among male school children<sup>12</sup> and other among female school children.<sup>13</sup> Limited data is available about the time of emergence of first permanent molars and central incisors in Qassim region, Saudi Arabia. So, it is essential to obtain precise emergence time of these teeth. The aim of this study was to determine timing of emergence of the first permanent molars and central incisors in Saudi male school children in Rass city, Qassim region, Saudi Arabia.

**MATERIALS AND METHODS**

A cross-sectional study was conducted. The study was approved by ethical committee of college of dentistry at Qassim university, Saudi Arabia and from Ministry of education. Written informed consent was obtained from children parents through a letter sent to them through school administration explaining the aim and procedure of present study. A total number of 260 children who were Saudi nationals, cooperative and in the age group between (6.0-8.17) were included in the study. Children with developmental anomalies, those under orthodontic treatment and known history of systemic disease were excluded.

The sample was selected randomly from 16 Primary schools in Rass City, Qassim region, Saudi Arabia using a stratified cluster random sampling technique. Calibration was carried out before the main study by examining a preselected group of 25 children examined twice in a time interval 2 days. The Kappa score was above 0.87. Examinations were performed by one pediatric dentist who is a faculty member at College of dentistry, Qassim University and this were carried out while the child was setting on an ordinary chair in the class room with the aid of a led headlamp and disposable dental examination kit. All data was recorded using a specially designed form consisting of 2 parts. The first part contained demographic details of the child.

The second part was a clinical examination form that recorded the eruption status of the teeth under study. Date of birth for children were taken from school records. The age of each participant child was calculated from the difference between date of examination and date of birth. Eruption status of Permanent first molars and central incisors were recorded as absent or present. A tooth was considered Present when any part of its crown was clinically visible or has emerged the gingival tissue while absent indicated unerupted tooth and not yet emerged the gingival tissue.

Data were analyzed and tabulated using Statistical Package for Social Science (SPSS Ver. 20). The mean age of tooth eruption for the first permanent molar and central incisor was calculated using 95% confidence intervals, significance level was set as p<.05. Paired-samples t-test was used to determine the difference in mean age of tooth eruption between right and left sides and between upper and lower arches.

**RESULTS**

The sample included 260 children. Their age ranged from 6.00 to 8.17 years. The mean emergence ages for first permanent molars and central incisor teeth are shown in Table 1 no statistically significant difference was observed between the emergence times of teeth on the right and left sides of the jaws at p<0.05. The precedence in emergence of mandibular teeth over corresponding maxillary ones was significant only for central incisors while first molar counterparts erupted concomitantly. The difference in the mean age of emergence between right maxillary and right mandibular first molar and that between left maxillary and left mandibular first molar was not statistically significant, (p=.823 and p=.074 respectively).

The maxillary and mandibular right first permanent molar were the earliest teeth to emerge in the study population at the age of 6.72 years, followed by left mandibular first molar (6.76 years), mandibular right first molar (6.84 years), mandibular left central incisor (6.85 years), mandibular right central incisor (6.89 years). The maxillary right and left central incisors were the last teeth to emerge (7.38 years and 7.39 years respectively).

Table i- The mean emergence age of first permanent molars and central incisors (right and left sides) for the boys.

Tooth		Time of emergence			p-value
		Mean	Percentile		
			5 <sup>th</sup>	95 <sup>th</sup>	
<b>Maxilla</b>					
Central incisor	Right	7.39	6.57	8.10	.621
	Left	7.38	6.47	8.10	
First molar	Right	6.72	6.33	7.39	.065
	Left	6.84	6.33	7.41	
<b>Mandible</b>					
Central incisor	Right	6.89	6.33	7.54	.200
	Left	6.85	6.33	7.50	
First molar	Right	6.76	6.33	7.45	.596
	Left	6.72	6.39	7.45	

**DISCUSSION**

Eruption of teeth can be divided into embryological and clinical tooth eruption. Clinical tooth eruption referred to the appearance of some parts of teeth in question above the gingival surface,<sup>14</sup> was considered in this study and so, any visible part of a tooth’s crown penetrating the mucous membrane was recorded as erupted.

Numerous theories have been assumed to explain the mechanism of tooth eruption into the oral cavity, such as the root formation, bone remodeling, hydrostatic pressure, and the periodontal ligament traction theories.<sup>15</sup>

In the present study, no statistically significant difference was observed in emergence times between the right and left sides of the upper and lower jaws. Similar observations were shown by authors from other countries examining different populations.<sup>1,5,7,9,16</sup> However, Leroy et al. found statistically significant differences where left mandibular first molar erupted earlier.<sup>17</sup>

The precedence in emergence of mandibular teeth over corresponding maxillary teeth was significant for central incisors and not significant for first molars. This is in agreement with studies conducted by Shaweesh,<sup>5</sup> Almonaitiene et al.<sup>7</sup> and Wedl et al.<sup>18</sup>

There are two studies that were conducted in Saudi Arabia to record the mean age eruption of first molars and incisors, one each among boys<sup>12</sup> and girls.<sup>13</sup> When comparing the emergence time of permanent teeth in the present study with the previous one by Khan et al.,<sup>12</sup> it was observed that

eruption of teeth was somewhat earlier than in present study.

The comparison of the mean eruption age of first molar and central incisor teeth in the right and left sides in both jaws between present study and other studies that were conducted in Saudi Arabia<sup>12</sup>, Jordan<sup>5</sup>, Syria<sup>16</sup>, Iran<sup>19</sup>, Turkey<sup>20</sup>, Czech<sup>1</sup>, Lithuania<sup>7</sup>, Spain<sup>6</sup>, Australia<sup>9</sup>, America – Oregon<sup>21</sup>, Ghana<sup>22</sup>, and Uganda<sup>23</sup> is provided in Table ii. It was observed that the mean ages for first molars and central incisors in Saudi children are more alike to countries in Asia continent and European countries and this might due to genetic affinity. However, significant difference in mean eruption time was observed when compared with African countries as Ghana,<sup>22</sup> and Uganda<sup>23</sup> whose teeth erupt much earlier. There are some limitations of the present to study the timing of tooth eruption. No radiographs were taken to confirm the agenesis of tooth or ectopic eruption. Therefore, missed teeth due to avulsion or early extraction may be recorded as unerupted. However, these errors in recording teeth eruption are unlikely to have biased the results of present study, given adequate size of sample. Another limitation is in sample age range so, eruption time of lateral incisors, premolars, canines, and second molars teeth can’t be recorded. The sample was limited to male school children as schools in Saudi Arabia are segregated and requisite permissions only for male schools was obtained. Longitudinal studies with a more representative sample are recommended to allow for recording of emergence times of all teeth.

Table ii- Comparison of the mean and median eruption time in boys

Tooth no. (FDI)	11	16	21	26	31	36	41	46
<b>Present study</b>	7.39	6.72	7.38	6.84	6.85	6.76	6.89	6.72
<b>Saudi Arabia (2006)<sup>12</sup></b>	7.4	6.5	7.3	6.7	6.8	6.8	6.8	6.8
<b>Jordan(2012)<sup>5</sup></b>	7.25	6.35	7.26	6.35	6.49	6.26	6.48	6.24
<b>Syria, (2017)<sup>16</sup></b>	7.57	7.12	7.36	6.55	6.72	6.33	6.63	6.72
<b>Iran, (2004)<sup>19</sup></b>	8.1	6.8	8.0	6.8	6.8	6.8	6.7	6.8
<b>Turkey, (2016)<sup>20</sup></b>	7.48	6.96	7.3	7.01	7.1	6.96	7.1	6.97
<b>Czech, (2017)<sup>1</sup></b>	7.04	6.86	7.02	6.87	6.32	6.58	6.41	6.47
<b>Lithuania, (2012)<sup>7</sup></b>	6.89	6.41	6.84	6.45	6.13	6.21	6.07	6.29
<b>Spain, (2013)<sup>6</sup></b>	7.66	7.16	7.64	7.98	7.06	8.01	7.53	8.94
<b>Australia, (2003)<sup>9</sup></b>	7.43	6.71	7.43	6.71	6.63	6.63	6.63	6.63
<b>America,Oregon (1978)<sup>21</sup></b>	7.2	6.5	7.2	6.5	6.2	6.5	6.2	6.5
<b>Ghana, (1967)<sup>22</sup></b>	6.2	5	6.2	5	5.2	4.7	5.2	4.7
<b>Uganda, (2013)<sup>23</sup></b>	6.3	6	6.3	6.7	6	5.8	7	6.2

## CONCLUSION

The first permanent molars were the first tooth to erupt in both jaws and on both sides. There was no statistically significant difference in emergence time between the right and left side on both jaws. Lower central incisor tooth tended to erupt earlier than their upper counterparts. The mean age of eruption for first permanent molars and central incisors was comparable with other populations.

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