

## Emergence of permanent teeth among a group of Egyptian children at Fayoum Governorate

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### ABSTRACT

**Aim:** The aim of this study was to determine the emergence date and sequence of permanent teeth in a sample of Egyptians from Fayoum governorate. **Subjects and Methods:** 978 children were randomly selected from the healthcare unite in Fayoum governorate, with an age range of 6-12 years. The children were clinically examined by trained professionals and the teeth observed in the oral cavity were recorded. Descriptive statistics was done for comparative reasons. **Results:** The mean emergence times of both males and females the upper and lower arches were close. The emergence times in the lower arch were earlier than in the upper arch. **Conclusion:** due to ethnic and gender variations, custom made diagnostic measures and treatment plan procedures should be applied to different populations, to best fit their true orthodontic and dental needs rather than sticking to the more generalized international guidelines.

**Keywords:** permanent teeth emergence, ethnic variation, factors affecting tooth emergence, age of emergence.

### Introduction

Tooth eruption is defined as the movement of teeth from their developmental site within the alveolar process to their functional position in the oral cavity. The age at which the teeth erupt is greatly related to the growth and development of the child (Alnemer *et al.*, 2017). Variation in the normal emergence is a common finding; however a significant deviation from the norms should alert the clinician to evaluate the patients' health and development (Sindelarova *et al.*, 2017).

The eruption process is divided into five stages; one of which is the appearance of part of the tooth in oral cavity this is sometimes called clinical tooth emergence. This has interested various clinicians in the fields of orthodontics, oral surgery, preventive and pediatric dentistry; since the knowledge of teeth emergence chronology and sequence is necessary for children's healthcare planning (Almonaitiene *et al.*, 2012).

There are several factors that may influence the tooth emergence process; it is believed that they influence the matrix formation and calcification. Those factors may be local as emergence cysts,

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emergence sequestra, fibrous developmental malformations and dentigerous cysts, or systemic factors which include Down's syndrome, cleidocranial dysostosis, hypopituitarism and Dwarfism (Boka *et al.*, 2009).

The genetic and environmental influence over the ethnic background, race, gender, craniofacial morphology, body weight and height, feeding habits and growth has a powerful effect over the timing and sequence of tooth emergence (Almonaitiene 2012, Kutesa *et al.*, 2013, Alnemer *et al.*, 2017), hence the emergence times vary from population to population (Mugonzibwa *et al.*, 2002).

The aim of this study was to determine the emergence times and sequence of permanent teeth in a sample of Egyptians from Fayoum governorate.

## Subjects and methods

### Subjects

This cross-sectional study consisted of 978 children randomly selected from a healthcare unit in Fayoum governorate as a part of the project of the "11<sup>th</sup> research plan". The age range was 6-12 years; all the children's parents signed an informed consent.

### Methods

A diagnosis sheet was designed that included the child's name, gender, age, number and position of the erupted tooth in the oral cavity. Any child with a history of a systemic disease or a handicapping condition was excluded from the study. The oral examination was performed by well-trained clinicians; any permanent tooth present in the oral cavity was recorded excluding the wisdom teeth. Intra-examiner method error was checked by asking the clinicians to repeat the diagnosis of 10 random cases on two different occasions. Inter-examiner examiner method error was checked by asking them to diagnose 10 randomly selected cases. The deviations in diagnosis in either situation fell within the accepted range of accuracy (3%-5%) as was proven statistically by calculating the mean and the standard deviation.

Descriptive statistics including means and standard deviations were done for the emergence times and compared.

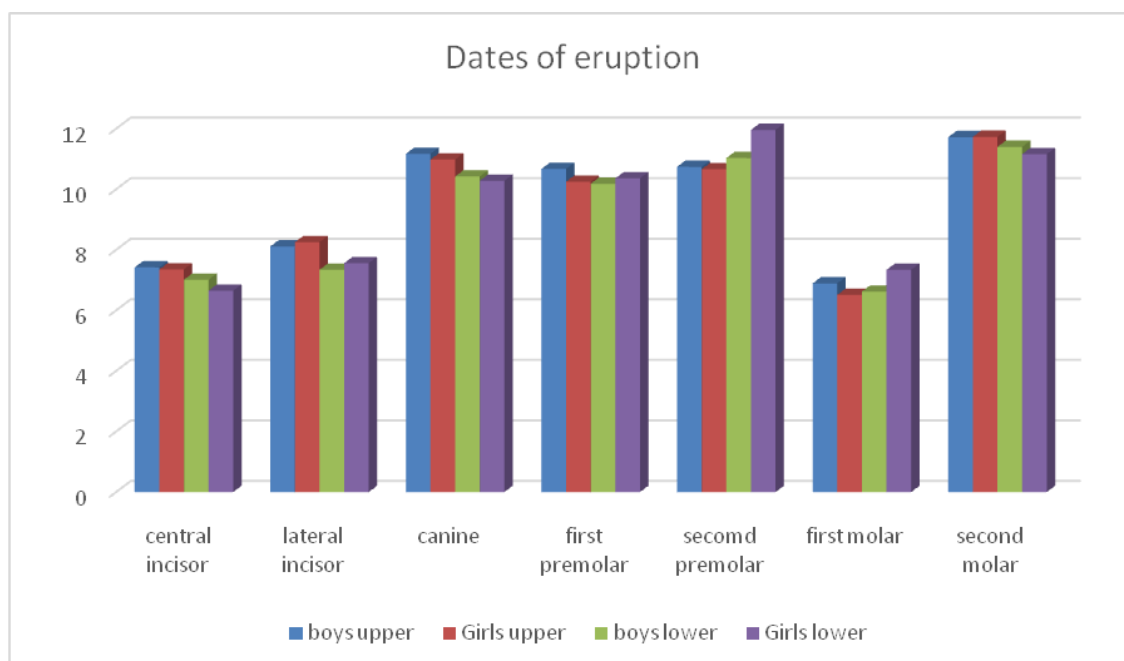
### Results

From the results it appeared that there was no difference in the mean emergence time of the upper central incisor between males and females; 7.71. The lower centrals and laterals also showed very close emergence times as shown in Table 1.

**Table 1:** Means and standard deviations of emergence times of permanent teeth in males and females in both arches in a group of Egyptians in Fayoum governorate.

Tooth	Times of emergence							
	Lower				Upper			
	Males		Females		Males		Females	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Central Incisor	7.01	1.48	6.65	1.61	7.42	1.48	7.35	1.88
Lateral Incisor	7.34	1.57	7.56	1.58	8.11	1.66	8.25	1.71
Canine	10.42	1.48	10.28	1.32	11.17	1.41	10.98	1.37
First Premolar	10.18	1.90	10.36	1.44	10.67	1.39	10.25	1.26
Second Premolar	11.03	1.35	11.96	1.31	10.74	1.61	10.66	1.29
First molar	6.62	1.59	7.34	1.52	6.89	1.50	6.51	1.91
Second molar	11.40	2.11	11.78	2.15	11.72	1.69	11.73	1.44

The mean emergence times of both males and females in either the upper or the lower arches were very close. Generally, the emergence times in the lower arch were earlier than in the upper arch, Figure 1.



**Fig. 1:** Descriptive analysis of the times and sequence of emergence of permanent teeth in a group of Egyptians from Fayoum governorate.

## Discussion

The emergence timing and sequence is of great importance when it comes to orthodontic, preventive or pedodontic diagnosis and treatment planning. It has been shown throughout the literature that there is a variation in timing among different genders and ethnic groups (Almonaitiene, 2012, Kutesa *et al.*, 2013, Alnemer *et al.*, 2017, Mugonzibwa *et al.*, 2002). Mugonzibwa *et al.*, in 2002 reported that the emergence of permanent teeth in African children was earlier when compared to Caucasians or Asians.

The Egyptian population is rich in different ethnic backgrounds depending on the geographical location; hence this cross-sectional study was conducted to inspect the emergence timing and sequence of permanent teeth in Fayoum governorate. The selected age range included the known average emergence times of all permanent teeth excluding wisdom teeth the age of children selected for permanent (Friedrich *et al.*, 2009, Sharaf *et al.*, 2011, Taha *et al.*, 2018).

In the current study the mean emergence times of males and females in both arches were almost similar; this was in contrast to other reports that females had earlier emergence times (Elmes *et al.*, 2010, Rathore *et al.*, 2017, Sindelarova *et al.*, 2017). On the other hand, Vinod *et al.* in 2016 showed that males had earlier emergence times. Furthermore, the emergence times in the lower arch preceded those of the lower arch similar to the findings of Taha *et al.* (2018). This variability in reports emphasized that racial and ethnic differences do play an important role.

The emergence sequence appearing in the Egyptian sample was in contrast to that reported by the American Academy of Pediatric Dentistry (AAPD) (Sharaf *et al.*, 2011); Table 2. It was found that in males, the sequence started with the emergence of the lower first molar, upper first molar, lower central incisor, lower lateral incisor, upper central incisor, upper lateral incisor, lower first premolar, lower canine, upper first premolar, upper second premolar, lower second premolar, lower second molar the nupper second molar. While in females the sequence was as follows; lower central incisors, upper first molar, lower first molar, upper central incisor, lower lateral incisor, upper lateral incisor, lower canine, upper first premolar, lower first premolar, upper second premolar, upper canine, lower second premolar, upper second molar, and lower second molar. This dissimilarity in sequence may be mainly attributed to the variation in race and ethnic background which was also reported in other longitudinal and cross-sectional studies (Al Quahtani *et al.*, 2010, Aly 2009).

**Table 2:** The standard times of emergence of permanent teeth according to the American Academy of Pediatric Dentistry (AAPD)

Tooth	Emergence date in upper arch (years)	Emergence date in lower arch (years)
Central incisor	7-8	6-7
Lateral incisor	8-9	7-8
Canine	11-12	9-11
First premolar	10-11	10-12
Second premolar	10-12	11-13
First molar	5.5-7	5.5-7
Second molar	12-14	12-14

## Conclusion

Ethnic background and gender play a role in determining the emergence times and sequence of permanent teeth.

Variable custom made diagnostic measures and treatment plan procedures should be applied to different populations, to best fit their true orthodontic and dental needs rather than sticking to the more generalized international guidelines.

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