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A COMPREHENSIVE STUDY ON ERUPTION OF PERMANENT TEETH WITH RELATION TO AGE AND BODY MASS INDEX

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Abstract:
Introduction: *Parents consider tooth eruption as an important event in the child's development, and they have often showed their concern about the timing of eruption of teeth. Eruption time of the teeth and order are essential aspects in treatment planning, mainly when patients require orthodontic treatment, it also plays a pivotal role in forensic dentistry as it can help to find the age of an adolescent.* ***Aims and objective:*** *The basic aim of the study is to assess the eruption of permanent teeth with relation to age and body mass index among local population of Pakistan.* ***Methodology of the study:*** *This cross sectional study was conducted at Punjab Dental Hospital, Lahore during October 2018 to Dec 2018. In this study we selected the participants of aged 10 to 15 years. The data were collected from 100 participants of both genders. Basic information such as educational level, date of birth, place of birth and family history was asked from students or taken from school records.* ***Results:*** *The data were collected from 100 children of both genders. Table 1 shows the descriptive statistics (number of cases, mean, median, standard deviation, and 95% confidence interval of mean) of eruption time of both the jaws and* P*-value for antagonist teeth (upper and lower corresponding teeth). The minimum mean eruption time was 6.5±1.1 years of right first molar of mandibular jaw (# 46). The maximum eruption time of 11.8 years was for the 2nd molars of maxillary jaw.* ***Conclusion:*** *It is concluded that there is no significant difference of eruption time between gender in all the studied teeth, except tooth #15, # 25 and #43.*

Key words: *Eruption, Teeth, Gender, Descriptive*

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INTRODUCTION:

Parents consider tooth eruption as an important event in the child's development, and they have often showed their concern about the timing of eruption of teeth. Mostly the information on the age of permanent teeth emergence used in clinical and academic situations in Pakistan is based on American and European standards. Eruption time of the teeth and order are essential aspects in treatment planning, mainly when patients require orthodontic treatment, it also plays a pivotal role in forensic dentistry as it can help to find the age of an adolescent [1].

However, it has been suggested in the literature that standards for tooth emergence should be derived from the population in which they are to be applied because factors related to emergence may vary considerably in both dentitions [2]. Similarly, adequate knowledge of timing of permanent tooth emergence is essential for diagnosis and treatment planning in Pediatric Dentistry and Orthodontics. Furthermore, information on tooth emergence is also used to supplement other maturity indicators in the diagnosis of certain growth disturbances, and in forensic dentistry to estimate the chronological age of children with unknown birth records. Therefore, the specific standards of the time of emergence of teeth characterize an important resource for general dental practitioners, orthodontists and pedodontists [3].

Body Mass Index (BMI) is a reliable table for measurement of obese people and for those who are overweight especially teenagers and small kids [4]. BMI is reliant on age and gender in kids and teenagers and is for the most part stated to as particular for a specific age but, no sound research has been performed in Pakistan on the assessment of eruption of permanent teeth according to age and its relation with body mass index [5].

Aims and objective

The basic aim of the study is to assess the eruption of permanent teeth with relation to age and body mass index among local population of Pakistan.

METHODOLOGY OF THE STUDY:

This cross sectional study was conducted at Punjab Dental Hospital, Lahore during October 2018 to Dec 2018. In this study we selected the participants of aged 10 to 15 years. The data were collected from 100 participants of both genders. Basic information such as educational level, date of birth, place of birth and family history was asked from students or taken from school records. Prior to carrying out the research, parental permission (written informed consent) was acquired.

Inclusion criteria

1. Students between the ages of 10-15 years
2. No previous medical history
3. No surgery history

Dental examination

The dental examination was carried out by field examiners using the dental examination kit under fluorescent light. The height was measured in centimeter, using wall-mounted ruler on the child's head with their back and knees completely straight, and their feet together. The weight was measured in kilogram using a commercial digital scale after removal of the shoes only. The date of birth was obtained from the school records. The clinicians were trained and calibrated by showing many clinical pictures of just erupted, un erupted or erupted teeth. No casts or subjects were used for inter or intra examiner calibration. Because it's very easy to distinguish among the above three different conditions for a tooth.

Statistical analysis

The data were analyzed using SPSS statistical software. Two sample'*t*' test was employed to compare the mean time of eruption between gender (male/female) and type of schools (private/ public), while paired '*t*' test was used to compare the mean time of eruption upper and lower jaws. Pearson and partial correlations were used to determine the significant relationship between eruption time with height, weight and BMI of the children.

RESULTS:

The data were collected from 100 children of both genders. Table 1 shows the descriptive statistics (number of cases, mean, median, standard deviation, and 95% confidence interval of mean) of eruption time of both the jaws and *P*-value for antagonist teeth (upper and lower corresponding teeth). The minimum mean eruption time was 6.5±1.1 years of right first molar of mandibular jaw (# 46). The maximum eruption time of 11.8 years was for the 2nd molars of maxillary jaw. All the mandible teeth, except the premolars, erupted earlier than maxillary teeth. The difference of mean eruption time all the contra-lateral (left and right) teeth did not show any statistical significance (table 2).

Table 1: Descriptive statistics of eruption time of all the teeth, except third molars, in maxillary jaw

Tooth No	Mean	Median	SD	95% CI of mean
17	11.8	11.8	1.6	(11.6,12.0)
16	6.6	6.4	1.2	(6.4,6.8)
15	10.4	10.3	1.5	(10.2,10.6)
14	10.1	10.0	1.4	(9.9,10.2)
13	10.9	10.8	1.5	(10.8,11.0)
12	8.4	8.3	1.3	(8.2,8.5)
11	7.5	7.4	1.5	(7.4,7.7)
21	7.5	7.3	1.4	(7.3,7.6)
22	8.4	8.3	1.3	(8.3,8.5)

Table 2: Comparison of eruption time among gender

Tooth type	Male		Female		*P*-value
	n	$\bar{X}$ ± *SD*	n	$\bar{X}$ ± *SD*	
17	137	11.6 ± 1.6	91	12.0 ± 1.5	0.865
16	85	6.6 ± 1.2	72	6.6 ± 1.2	0.952
15	118	10.2 ± 1.5	73	10.8 ± 1.5	0.008
14	158	10.1 ± 1.3	128	10.1 ± 1.5	0.940
13	396	11.0 ± 1.5	201	10.7 ± 1.5	0.065
12	177	8.4 ± 1.1	160	8.4 ± 1.5	0.625
11	192	7.5 ± 1.3	134	7.5 ± 1.7	0.985
21	187	7.5 ± 1.1	137	7.5 ± 1.6	0.919
22	180	8.5 ± 1.2	143	8.3 ± 1.4	0.398
23	385	10.9 ± 1.4	185	10.9 ± 1.4	0.959
24	165	10.1 ± 1.4	140	10.1 ± 1.6	0.990

DISCUSSION:

In the literature, different population groups are targeted to determine the mean eruption time of permanent teeth. However, no reported data are available for Pakistani children, except an article published in pre-partition time for the mean eruption time of boys from Lahore [6]. Due to unavailability of local data, the standards for eruption time being taught in dental colleges of Pakistan, are based on non-Pakistani population, especially American and European standards [7]. It is documented in the literature that significant variation exists in time of eruption and emergence sequence in different population. Therefore, it was a noteworthy and significant contribution to make an investigation of the standard values of eruption time of Pakistani children [8]. This report presents baseline information for time of eruption of permanents teeth of Pakistani children. Furthermore, except the Iranian study, all the previous studies established the standard of eruption time on moderate or small sample sizes [9].

The present study was conducted in local population, which assessed the eruption of permanent teeth according to age and its relation with body mass index. Our study showed high percentage of children in the normal weight category of BMI. Present study used the BMI percentile chart to access the body mass index of children [10]. It was validated that BMI was related but weakly connected with dental and skeletal development.

Body Mass Index (BMI) is a reliable scale for measurement of obese people and for those who are overweight especially teenagers and small kids. Obesity in kids can cause skeletal complications in the head and neck area [11]. BMI is reliant on age and gender in kids and teenagers and is for the most part stated to as particular for a specific age. Hedayati, et al (2014), reported BMI as an attribute for dental eruption ages as increase BMI showed early eruption of teeth [12]. This finding is in line with our study as these findings indicated that nutritional status may have an effect on dental maturity but it is a minor effect and any certain role of B.M.I in connection with this should be studied on a larger scale [13].

CONCLUSION:

It is concluded that there is no significant difference of eruption time between gender in all the studied

teeth, except tooth #15, # 25 and #43. The children who are tall, it did not matter whether they are heavy weight or not, showed delayed eruption. However, if they are heavy, it would be early eruption if they are not tall and delayed eruptions if they are tall.

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