



## Patient reporting for anterior tooth alignment during ugly Duckling stage - A mishap

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### ABSTRACT

Ugly duckling stage is a self-correcting anomaly seen during the mixed dentition period. It is characterised by the spacing between the upper incisors and proclination of teeth. It is seen that during this stage, parents take their child to the dentist to correct the malaligned teeth due to unawareness. The aim of this study is to assess the prevalence of pediatric dental patients reporting for tooth alignment during the ugly duckling stage. This retrospective cross-sectional study included patients who reported to saveetha dental college during June 2019 - March 2020. Case records of about 10,000 patients were reviewed and 3363 patients were recruited under 8 to 13 years of age. Statistical analysis was done using SPSS software version 20.0. About 50.8% of patients who belonged to the age of 10 years reported for tooth alignment during an ugly duckling stage. Results were statistically significant for the association between age and chief complaint of anterior tooth alignment ( $p < 0.05$ ). Thus, the role of the dentists lies in making the parents aware that the ugly duckling stage is a self-correcting phenomenon and no orthodontic correction is required during this stage.



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### INTRODUCTION

“Ugly duckling stage” - It is also called the Broadbent phenomenon. It is nothing but a self-correcting anomaly during the mixed dentition period. Late

childhood is the period where the deciduous teeth are replaced with permanent teeth. Permanent incisors begin to erupt in the oral cavity, and this period is called the “ugly duckling” stage. It is related to the phenomenon of physiological diastema, namely a gap between permanent upper central incisors, and the position of these teeth in the anteroposterior and transverse dimensions. The name “ugly duckling”, from Andersen’s 19th-century fairy tale, which was introduced in 1937 by Broadbent, orthodontist, to dentistry (Broadbent, 1937). The physiological diastema should close spontaneously when the upper lateral incisors and canines have erupted. There are a few peculiar features that help to identify “the ugly duckling stage”. They are

1. Laterally tipped upper incisors (both central and lateral incisors)

2. Milline space (Midline diastema)
3. Proclination of anterior teeth.

All these features are transitory in nature and the incisors assume a normal alignment when the upper permanent canines erupt into position (Broadbent, 1941). Midline diastema is the most typical of all the above-mentioned features (Tanaka et al., 2015). As the permanent maxillary canines erupt, they displace the roots of maxillary lateral incisors mesially.

This force transmitted to the central incisors and their roots are also displaced mesially. Thus, the resultant force causes the distal divergence of the crown in the opposite direction, leading to midline spacing. This is called Ugly Duckling Stage. This condition corrects itself after the canines have erupted. The canines after eruption apply pressure on the crown of incisors, thereby causing them to shift back to original positions. The term ugly duckling stage indicates the unaesthetic appearance of a child during this stage. No orthodontic treatment should be attempted at this stage because there is a danger of deflecting the canine from its normal eruption path. Before the dentist can determine the optimal treatment, he or she must consider the contributing factors.

These include normal growth and development, tooth size discrepancies, excessive incisor vertical overlap of different causes, mesiodistal and labiolingual incisor angulation, generalized spacing and pathological condition, labial frenum, oral habits, muscular imbalances, various dental anomalies (Muthu et al., 2007; Christabel and Gurunathan, 2015). However, Ceremello states that midline diastema is a characteristic of the primary dentition (Ceremello, 1953).

All these characteristic features of the ugly duckling stage are not much awareness among the parent population. It is seen that a few people report to the dentist and ask them treatment options for the alignment of the teeth during this mixed dentition period (Govindaraju, 2017; Jeevanandan and Govindaraju, 2018).

During this ugly duckling stage "the role of the dentist is to ascertain the clinical as well as radiographic diagnosis. The long axes of the roots of the maxillary central and lateral incisors diverge from each other (Higley, 1969) which often misleads practitioners to diagnose a diastema caused by a hypertrophic frenum or other dental etiology etc (Atulkar et al., 2015).

During this stage, it is seen that there is a major psychological impact by their peer friends among children. Parent knowledge and awareness are very less

regarding the ugly duckling stage. As Dentists, we should impart little awareness of this stage to parents so that they don't report for alignment of teeth. Previously our team had conducted numerous clinical trials (Govindaraju et al., 2017a; Jeevanandan et al., 2017) and systematic reviews (Jeevanandan, 2017; Packiri, 2017; Ramakrishnan and Shukri, 2018) and surveys (Govindaraju et al., 2017b; Gurunathan and Shanmugaavel, 2016; Ravikumar et al., 2017) over the past 5 years. Now we are focussing on the retrospective study. The idea for this study stemmed from the current interest in our community. Thus, the aim of this study is to assess the frequency of the pediatric patients reported for the tooth alignment during this stage (Somasundaram et al., 2015; Subramanyam et al., 2018).

## MATERIALS AND METHODS

### Study design and Study setting

Case records of about 10,000 patients were reviewed who visited Saveetha Dental College from June 2019 -March 2020 and 3363 patients were recruited under the age group of 8 to 13 years. Ethical approval was obtained from the institutional ethical committee.

### Exclusion Criteria

Midline diastema- No other apparent midline pathologies

Congenitally missing anterior teeth.

Patients with Malocclusion and high frenal attachment

### Data Collection

Dental Information archiving software - DIAS was used to identify the patient details. All the general examination and the clinical examination of patients are correlated and the relevant data collected such as age, gender, a chief complaint of the patient was recorded. Repeated and incomplete data records were excluded. Data verification was done by an external reviewer.

### Statistical analysis

Data were entered in Microsoft excel sheet and later exported to spss software (version 20.0) for statistical analysis. Variable definition process was done. Both descriptive (frequency) and inferential (chi-square test) were employed. Level of significance was set at  $p < 0.05$  for this study.

## RESULTS AND DISCUSSION

The study population selected were 8 to 13 years of age, 10 years of age (18.6%), 11 years (15.7%), 12

years (15.9%), 13 years (17.6%), 9 yrs (16.6%) and in the age of 8 years (15.6 %) of the patients (Figure 1). Figure 2 shows the gender distribution of pediatric patients (8-13 years of age) visiting the OP. It is inferred that males (55.4%) have reported the highest in number compared to females (44.6%). It is seen that about an overall of 23.28% of the patients had been reported for tooth alignment during the age group of 8-13 years. (Figure 3) Table 1 and Figure 4 shows the association between age and chief complaint. It was found to be statistically significant. It is inferred that the highest number of patients reported during 10 years of age for tooth alignment when compared to 13 years of age in the study population ( $p < 0.05$ ). Table 1 and Figure 5 shows the association between Gender and chief complaint. There was no statistical significance between gender and tooth alignment chief complaint. ( $p > 0.05$ ) It is inferred that male patients (56.58%) have reported the highest numbers for tooth alignment during the ugly duckling stage.

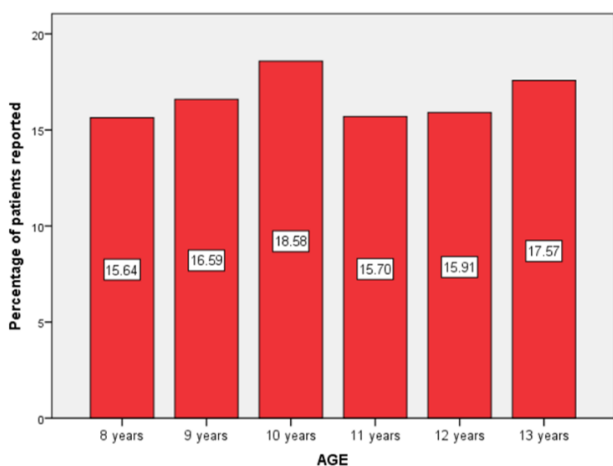


Figure 1: 10 years (18.6%) old patients have visited in the highest numbers for a dental checkup

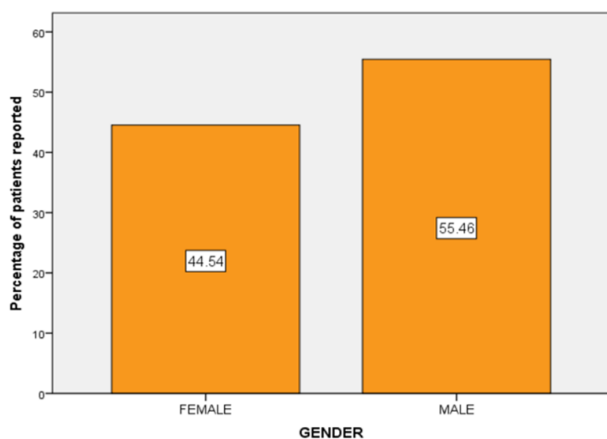


Figure 2: Males (55.4%) have reported the highest number compared to females (44.6%).

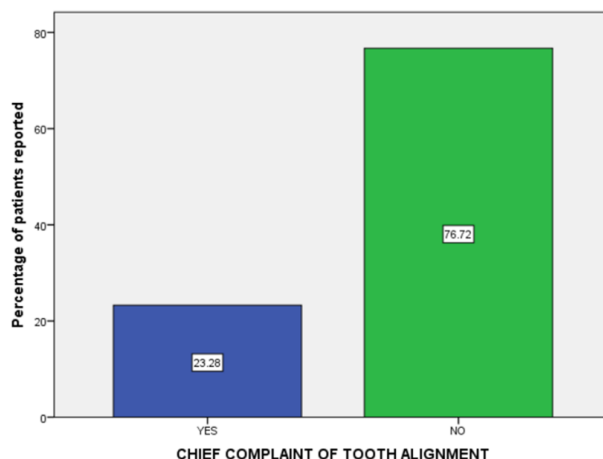


Figure 3: 23.28 % of the patient population have reported tooth alignment during the ugly duckling stage.

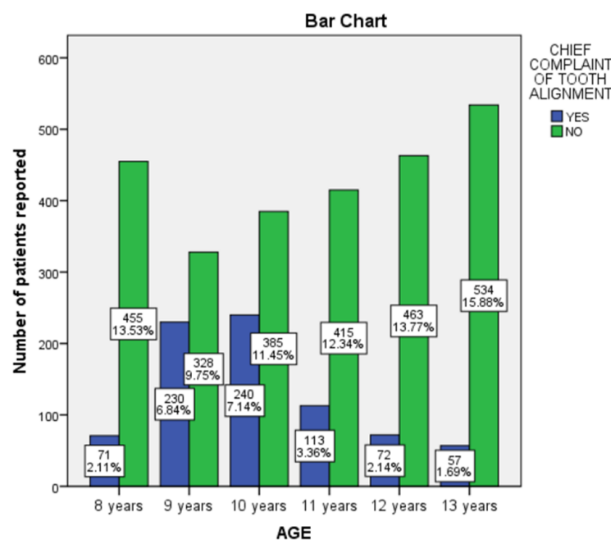


Figure 4: Pearson chi-square = 300.154,  $p = 0.00$  ( $< 0.05$ ) which is statistically significant.

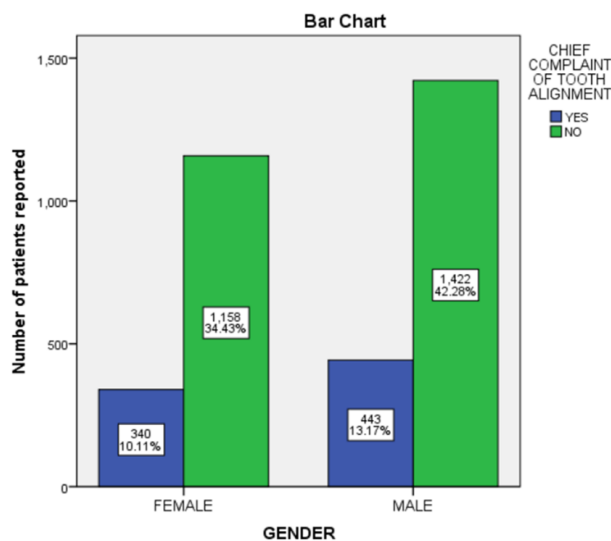


Figure 5: Pearson chi-square value = 0.575,  $p = 0.23$  ( $> 0.05$ )

**Table 1: Patients reported for tooth alignment during the ugly duckling stage according to age and gender.**

Variable Age (Years)	Chief Complaint as Tooth Alignment			Statistical Correlation Values
	Yes	No	Total	
8 years	71(0.9%)	455(17.6%)	526	Pearson chi-square value: -300.154 p-value- 0.00*
9 years	230(29.3%)	328 (12.7%)	558	
10 years	240(30.6%)	385(14.9%)	625	
11 years	113(14.4%)	415(16.1%)	528	
12 years	72(9.1%)	463(17.9%)	535	
13 years	57(7.2%)	534(20.6%)	591	
<b>Gender</b>				
Female	340(43.4%)	1160(39.4%)	1500	Pearson Chi Square value- 0.575 p-value - 0.23
Male	443(56.6%)	1420(48.2%)	1863	

There is a significant correlation between age and chief complaint as tooth alignment,  $p=0.000(p<0.05)$ . (\* statistically significant)

According to this study, there were a total of 3363 patients (8- 13 years) who reported to the OP during June 2019 - March 2020 of Saveetha Dental College. Out of this almost 18.6% of the patient belonged to the age group of 10 years of age. It is that most of the Males have reported the highest in number for a dental check-up during 8-13 years. It is because males are much more concerned about their tooth alignment compared to females. A study was done by Essamet (Essamet and Darout, 2016) reported that males are much aware of the ill effects of dental malocclusion. It is noted that the highest number of patients reported during 10 years of age for tooth alignment. This is in agreement to study done by Masłowska (Masłowska-Kasowicz and Nowicka-Dudek, 2019) which reported children aged 8–9 years are a large group coming for an orthodontic check-up because of the eruption of first permanent incisors, whose characteristic position is very much disturbing for parents (Nair et al., 2018; Panchal et al., 2019). In case a patient reports during this stage for tooth alignment, it is the ultimate responsibility of the dentist to educate the parent on this. Therefore, it is necessary that the dentist should be aware of this.

A study was done by Canavarro et al., (Canavarro et al., 2012) there was much awareness among the undergraduate degree holders for treatment of tooth alignment. They said that features of malocclusion could be inferred at only the end of the mixed dentition period. However, studies, Kumar et al. (2014) say that certain malocclusions to be treated at the age intercepted by the dentist. This is not applicable to midline diastema for which the dentist has to wait till all the permanent denti-

tion erupts. Divergent diastema was the most commonly recognized midline diastema, and it is a characteristic feature of children in this ugly duckling stage (Tausche, 2004). According to a study by Johnson and Harkness, (Johnson and Harkness, 2000) they suggest that orthodontic treatment is least indicated in patients with ugly duckling stage (mixed dentition period) even though many parents report to the dentist seeking closure of a diastema for aesthetic reasons during 8-13 years of age.

During normal physiological development, diastema of less than 2 mm close spontaneously and no orthodontic interception is required (Chu et al., 2001; Oquendo et al., 2011) and Das et al. (2008); Huang and Creath (1995); Richardson et al. (1973) also reported that no requirement of orthodontic treatment during this stage. Considering the different views related to uneventful dental development, it is concluded that an initial presence of midline diastema is not a matter of concern. However, when the diastema is more than 2 mm even after the eruption of lateral incisors, orthodontic intervention may be necessary. Timing is often significant to achieve satisfactory results. Several etiological factors are conveyed and debated in the literature, and no single etiological factor is decided upon for the development of a midline diastema. Elimination of the etiologic agent usually can be commenced on diagnosis and after the adequate development of the central incisors. Tooth movement usually is postponed until the eruption of the permanent canines but can begin prematurely in certain cases with very large diastemas. Retention procedure should be subject to the size and the etiology of the midline diastema.

Most of the midline diastemas occurring during the

mixed dentition appear due to the consequence of the growth in the width of the jaws in preparation for the eruption of the larger permanent teeth. The maxillary unerupted permanent canines lie superior and distal to the apices of the lateral incisor roots, and when they gradually erupt, they tend to force the lateral and central incisors towards the midline closing the space. In most cases, a diastema of less than 2mm will close spontaneously unless and until the patient has a generalised spacing of the dentition. The incidence of diastemas varies with the age group and the race studied. Richardson and colleagues found the incidence at age 14 to be 12% in white girls, 17 % in white boys, 19% in black girls and 26% in black boys (Sanin et al., 1969). Popovich and colleagues found that 83 % of patients with a diastema at nine years in the mixed dentition had no diastema at 16 years (Omotoso and Kadir, 2010).

To conclude, all these are most studies that go in accordance with tooth alignment is not necessary during the ugly duckling stage as it is a self-correcting anomaly. Thus, the role of the dentist lies in educating the parents who report for tooth alignment during the ugly duckling stage.

## CONCLUSION

Within the limits of the study, it is seen that the maximum number of the population reported at the age of 10 years for tooth alignment during ugly duckling stage. The dentist should make the parents aware that it is a self-correcting phenomenon. Nevertheless, proper diagnosis and timing of interception is an important part of the management of midline diastema.

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## Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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