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OCCURRENCE OF MIDLINE DIASTEMA AMONG CHILDREN OF DIFFERENT AGE, SEX AND RACE

Norpo'latov Lochin Sherali o'g'li.
Student of group 304
Student of Pediatric Stomology TDSI
Tastanova Gulchexra
Research Advisor

Abstract

Maxillary midline diastema is a common aesthetic complaint of patients. Treating the midline diastema is a matter of concern for practitioners, as many different aetiologies are reported to be associated with it. The appearance of midline diastema as part of the normal dental development makes it difficult for practitioners to decide whether to intervene or not at an early stage. The incidence of midline diastema varies greatly with age group,gender, population and race.

Objective: To date, no studies have addressed what young children notice when they see individuals with or without a midline diastema. Also, it is unclear at what age children notice, if they do, a midline diastema. Hence, objective data of where children fixate when looking at images with or without diastema will provide better information regarding children's perception of such dental variations. Therefore, this study aimed to explore individual differences among preschool children and their educator's eye movement patterns and visual attention to images with and without a midline diastema via EMHMM. We hypothesised that a picture with a midline diastema would hold or capture visual attention more effectively than an image without a midline diastema.

Introduction

Diastema refers to a gap or space between two or more consecutive teeth. A midline diastema refers to a space between the maxillary central incisors. Approximately 40% of preschool children exhibit generalised spacing between the primary maxillary incisors. However, causes such as abnormal anatomy of the maxillary labial frenum, midline bony clefts, non-nutritive sucking habits, physical impediments and dental anomalies may lead to a diastema. Nevertheless, little is known about children's perception of a midline diastema. One cannot prove objectively if children even notice such dental variations to this extent. Understanding children's expression may be limited by vocabulary, comprehension

of words, relatively little world experience, and shorter attention span. What preschool-age children notice may differ from adults, or what we assume children may notice may vary from what they see. This adaptive mechanism of distributing attention can be advantageous to adults, who often employ selective attention to focus on essential data. Nevertheless, studies involving children often rely on an adult interpretation, leading to the proxy effect leading to under or over-reporting events and the saliency principle effect where proxy persons recall more accurately or are relevant in their reporting.

Material and methods

We recruited children and educators from 13 different childcare centres in metropolitan Perth, Western Australia. Five centres within the central business district and three, five- and ten-kilometre radii were randomly selected and subsequently contacted. Participants received information outlining the project details, and their parents or legal guardians provided written informed consent before study commencement. For comparisons, educators from the same childcare centres participated following a consent process.Before viewing the pictures, all children were presented with two activities complete the pattern and join the dots in a line (Appendix Fig. 1.) to achieve in their own time. We used these activities to group children in ways other than age to test their ability to follow instructions and manual dexterity. This strategy facilitated the data to be analysed based on gender (male, female), age (2.6–3.5y, 3.6–4.5y, and 4.6–5.5y) and the activity (complete or incomplete). A total of 155 children born in Australia participated in this study. However, no significant differences were evident for all demographic variables, as shown in Table 1 and Appendix Table 1. Similarly, 34 educators participated, and they did not complete any activities before viewing the images. All children were born in Australia from different cultural backgrounds, and there was no statistical significance between the groups. Among 26.6% of children with maxillary midline diastema, 16.6% were male (n=149), 10.0 %(n=90) were female. Among 1% of children with mandibular midline diastema, 0.7% were male and 0.3% were female. Results showed that 1182 patients' records were identified to have one of the search keywords. The socio-demographic data in Table 1 indicated that females have a higher prevalence of diastema (56.7%).

Table II: Percentage of diastema among males and females

Types	Female (%)	Male (%)
Maxillary midline	90 (10.0%)	16.6% (149)
Mandibular midline	3 (0.3%)	6 (0.7%)
Both	8 (0.9%)	6 (0.7%)

Results

Children data-driven method.Two different eye movement patterns were identified in children using this method through clustering: Pattern 1, the explorative pattern (76%), where the children's ROIs were predominantly around the nose and mouth, and Pattern 2, the focused pattern (26%), in which children's ROIs were precise, locating on the teeth with and without a diastema, and fixations transited among the ROIs with similar frequencies (Fig. 2). A two-tailed t-test revealed a statistically significant difference between these two eye movement patterns. i.e., data from participants using the explorative pattern had a significantly higher log-likelihood to generate the explorative than the focused HMM and vice versa for data from those using the focused pattern. Here we referred to the 1–2 scale as E–F (Explorative-Focused) scale and used it to quantify participants' eye movement patterns and the contrast between the explorative and focused patterns.

DISCUSSION:

Children and educators adopting the focused eye movement pattern also showed different gaze preferences over the images with and without diastema. Children adopting the focused pattern did not have a significant preference to look at the images with or without diastema, whereas educators adopting the focused pattern had a considerable gaze preference over the image without diastema than that with diastema. In addition, the transition matrix of the HMMs revealed that educators using the focused eye movement pattern demonstrated an exciting behaviour. Once they looked at the diastema, they had a higher probability of switching to the other image than when they looked at the no diastema image in both data-driven or fixed ROI analysis methods (Fig. 3- 2 and 4). This behaviour indicates that they were biased not to continue looking at the diastema image; instead, they switched to the

no diastema image. The finding may preclude that educators in the focused group shy away from the diastema.

Conversely, educators adopting the explorative pattern had no preference, demonstrated by the almost symmetric switching probability between ROI1 and ROI2 in the fixed ROI methods (Fig. 3-3). Interestingly, children in the explorative pattern using the fixed ROI method behave similarly to the transition matrix (Fig. 2-3). Thus, in children, despite having found explorative and focused groups, there is not a strong bias as educators in the transition matrix.Among children, females showed a preferential fixation that was statistically significant for the image without diastema. One explanation would be that girls noticed or fixated on the image without diastema, which did not capture their attention in boys. Children in different age groups or those who could complete the exercises did not differ in their preference or eye movement pattern groups between images with or without a diastema

Conclusion

Within the limitations of the present investigation, there was a significant relation between the presence of diastema and ethnicity. The most common type and site of diastema was mild diastema in the maxillary arch only followed by moderate diastema in both arches.Keeping a record of patients diagnosed can help in early intervention and successful treatment planning Corrective steps should be taken at early stages for young individuals to minimize its frequency .

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