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Effects of Swimming on Vertical and Transverse Dimension of Dentition

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ABSTRACT

Introduction: The effects of swimming on dimensions of dentition have never been explored in orthodontics. **Objective:** To find out the effects of swimming on vertical and transverse dimensions of dentition. **Study design:** A cross sectional study. **Setting:** Department of Orthodontics, Dental Section-Faisalabad Medical University & de'Mont, Lahore. **Duration of study:** 18 months from 10-2-2017 to 10-8-2018. **Sample size:** The calculated sample size was 100 patients. **Sampling technique:** Purposive sampling technique. **Data collection procedure:** Present study consisted of comparison of 50 swimmers with 50 non-swimmer controls. Plaster models were obtained for the evaluation of overbite, intermolar width and crossbites. **Results:** Insignificant differences were found in overbite (P =0.65) between swimmer and the control group. However, control subjects were having significantly increased frequency of crossbites. **Conclusion:** Swimming was not found to influence the vertical dimensions of dentition; however, it might decrease a chance of developing crossbites.

Keywords: Swimming; Vertical; Transverse.

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INTRODUCTION

According to Proffit, occlusion is determined by several components, such as, soft tissue forces, occlusal forces, periodontium forces and abnormal habitual forces.[1] Disturbances in soft tissue forces, occlusal forces, periodontium forces and abnormal habitual forces can cause negative effects in the vertical and transverse dimensions of the dentition.[2,3] Some animal studies showed that orthodontic force of even 8 hours per day can cause changes in the teeth position.[4,5]

Influence of certain physical activities like oral habits in the ethology of occlusal disharmonies already well known.[6] Swimming is also a form of physical activity that causes positive lift-up of nasal and respiratory systems,[7] and it also influence growth of maxilla and mandible in the three dimensions by well-known phenomena of functional matrix concept.[2]

Certain oral habits like mouth breathing and tongue posture also plays important role in ethology of various occlusal disharmonies.[8,9]

Proposed advantages of swimming, includes, stimulation of chondrogenesis[10] and changes in alveolar bone mineral density.[11] Swimming might also influence vertical and transverse dimensions of dentition because of immature dental roots development and increased alveolar plasticity.

Following this rationale, the objective of present study was to find out the effects of swimming on vertical and transverse dimensions of dentition. There is no study in orthodontic literature that critically reviewed the effects of swimming on dentition. Plaster models were evaluated for the presences of: (1) overbite (mm), (2) Intermolar widths (mm), and (3) crossbites.

METHODOLOGY

Study design: A cross sectional study.

Settings: Orthodontics Department, Dental Section-Faisalabad Medical University & de'Mont, Lahore.

Duration: 18 months from 10.2.2017 to 10.8.2018.

Sample size: The calculated sample size was 100 patients

Sampling technique: Purposive sampling technique

Methods: In the present study 50 experienced swimmers with the mean age of 15.07 ± 0.5 years were compared with 50 non-swimmer controls with the mean age of 15.12 ± 0.3 years. Swimmers group consisted of experienced swimmers who were involved in daily swimming in growing age for 6-8 hour per day for at least 3 consecutive years while non-swimmer controls consisted of orthodontic patients who were never involved in any water sports.

Following patients were excluded: Significant medical issues, nasal obstruction, history of previous orthodontic therapy, history of oral habits, and any dental anomaly.

Data Collection Procedure: Plaster models were evaluated for the presences of: (1) overbite (mm), (2) Intermolar widths (mm), and (3) crossbites.

DATA Analysis: The error of method was found to be insignificant. ANOVA was applied to compare the means of overbite and intermolar width between the two groups and chi-square test was applied to compare the means of crossbites between the two groups.

RESULTS

Age distribution and gender distribution showed insignificant differences between the two groups. Insignificant differences

were found in overbite (P =0.65) between swimmer and the control group (Figure 1).
However, control subjects were having significantly increased frequency of crossbites (Figure 2). Insignificant difference was found in the mandibular intermolar width (Figure 3). Results showed no influence of age and gender on tested variables in both the groups.

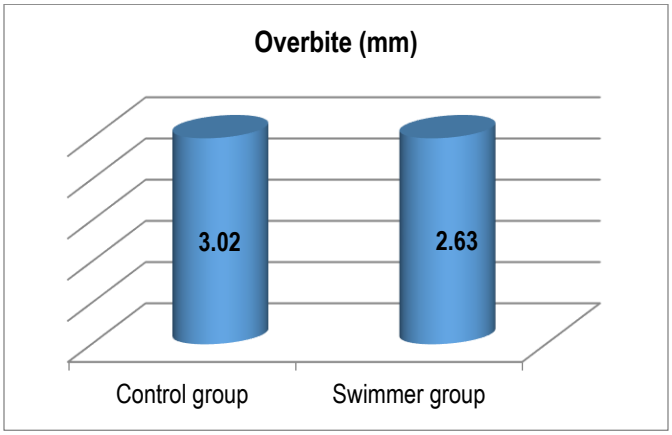

Figure 1: Overbite comparison (p 0.65)

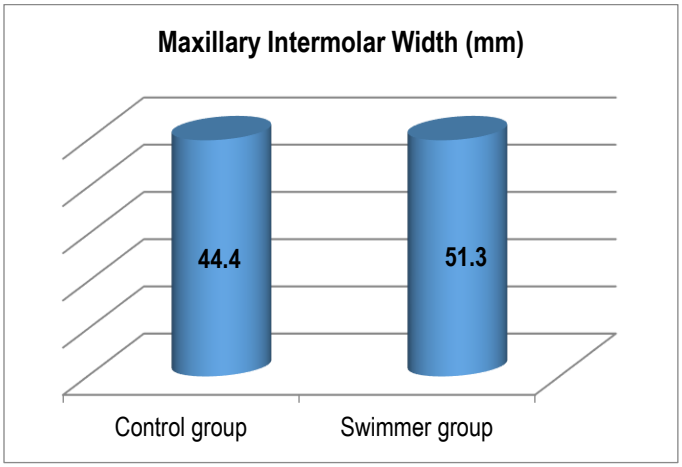

Figure 2: Maxillary intermolar width comparison (p 0.22)

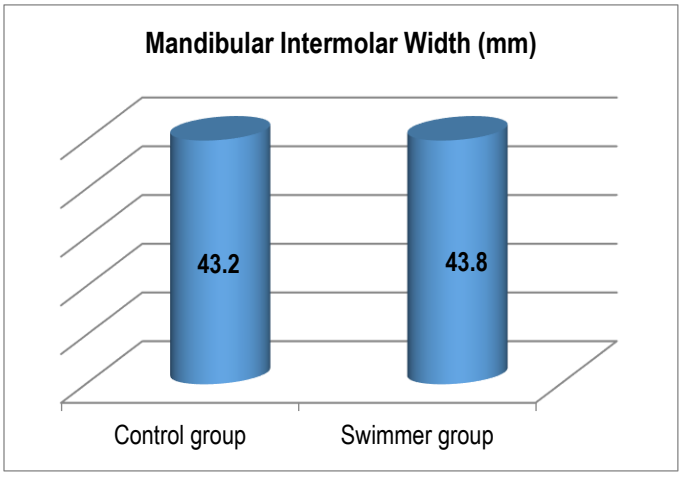

Figure 3: Mandibular intermolar width comparison (p 0.001)

DISCUSSION

Swimming consists of rhythmic inspiration / expiration and is a form of breathing exercise that involves repeated lip and tongue movement that can stimulate orofacial musculature resulting in positive influence on the development of stomatognathic complex. An underwater orthodontics phenomenon was initially described in 1990.[12] Various authors showed the role of craniofacial musculature in development of craniofacial complex.[13-15]

There is no study in orthodontic literature that critically reviewed the effects of swimming on dentition except on the aspect of dental erosion.[16-18] The objective of present study was to find out the effects of swimming on vertical and transverse dimensions of dentition. Plaster models were evaluated for the presences of: (1) overbite (mm), (2) Intermolar widths (mm), and (3) crossbites.

Results of the current research showed that control subjects were having significantly increased frequency of crossbites. This might be due to the active involvement of tongue and lips while swimming and presence of air pressure between alveolus and buccal musculature stimulates alveolar bone growth of maxilla and thus lesser frequency of crossbites.[19,20]

Results of the current research also showed that insignificant differences were found in overbite (P =0.65) between swimmer and the control group, thus no differences in frequency of open/deep bite was found between the two groups. This might be due to the insufficient low magnitude forces of interrupted nature and buffering by adjacent musculature.

Thus, the findings of current study showed that swimming was not found to influence the vertical dimensions of dentition, however, it might decrease a chance of developing crossbites. Further large-scale studies are suggested using CBCT.

CONCLUSION

Swimming was not found to influence the vertical dimensions of dentition; however, it might decrease a chance of developing crossbites.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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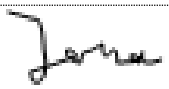
Dr. Javed Iqbal Associate Professor Oral Biology, Dental Section FMU / PMC Faisalabad-Pakistan	Data Analysis and Interpretation of data	
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