



Prevalence of Chewing Side Preference in the Deciduous, Mixed and Permanent Dentitions

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ABSTRACT

Aim: This study evaluated the prevalence of the chewing side preference (CSP) in the deciduous, mixed and permanent dentitions.

Materials and methods: Three-hundred subjects were divided in three groups (n = 100): Group 1 – children with deciduous dentition; group 2—children with mixed dentition; group 3 – subjects with permanent dentition. The CSP was determined using a direct method (visual observation) developed by McDonnell et al. (2004). Descriptive statistic was used to observe the prevalence of CSP. The Pearson's Chi-square was used to investigate significant associations between gender, presence of CSP and preferred side (right/left).

Results and conclusion: Eighty-seven percent of group 1 had a CSP. Eighty-two percent of group 2 had a CSP. Seventy-six percent of group 3 had a CSP. There was no statistically significant association between presence of CSP and gender in all groups. There was no statistically significant association between preferred side (right/left) and gender in all groups.

Clinical significance: There is a higher prevalence of subjects in deciduous, mixed and permanent dentition that presented chewing side preference. The early diagnosis of the presence of chewing side preference can prevent the unilateral chewing pattern with prophylactic therapy applied to the first teeth (deciduous).

Keywords: Mastication, Chewing side preference, Deciduous dentition, Mixed dentition, Permanent dentition.

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INTRODUCTION

The literature defines the “unilateral chewing pattern” when the number of masticatory cycles in one side is about 30%

higher than the number of masticatory cycles performed on the opposite side.^{1,2} The unilateral chewing pattern can be distributed in two classifications: Exclusive (or consistent) unilateral chewing, when all masticatory cycles occur on the same side; predominant unilateral chewing, when more than 70% of the masticatory cycles occur on the same side.^{1,2} According to McDonnell et al³ and Christensen and Radue,⁴ chewing side preference (CSP) occurs when mastication is realized exclusive/consistently or predominantly in the same side.^{3,4}

To assess the CSP, can be used the direct method by visual observation³⁻⁷ and indirect methods by electronic programs, such as cinematography, kinetography and computerized electromyography.⁸⁻¹² The direct method consists in the visual observation of the side that the bolus is positioned. This is a simple test, practical, fast and without misinterpretation. This method has more accurate than the indirect methods to assess CSP.^{12,13}

Bilateral chew plays a significant role in the craniofacial growth and development, stimulus in the eruption of teeth and increase of the dental arch dimensions,¹⁴ therefore, unilateral chewing pattern cannot be an acceptable standard in children. The early diagnosis of the presence of CSP can prevent the unilateral chewing pattern to trigger various consequences in the stomatognathic system.

We could not find in the research literature reports of studies that investigate the prevalence of CSP of the subjects in deciduous, mixed and permanent dentition or/and if this pattern is specific some of these dentitions. Therefore, this study evaluated: (1) the prevalence of CSP of the subjects in deciduous, mixed and permanent dentitions; (2) the possible associations between gender, presence of CSP and preferred side (right/left).

MATERIALS AND METHODS

This study was approved by the Research Ethics Committee of the São Jose dos Campos School of Dentistry – UNESP. Three-hundred subjects were selected from São José dos Campos School of Dentistry, São Paulo State University, São Paulo, Brazil. Term of free and informed consent was signing from parent's child and adult subjects. The subjects were selected according to the following inclusion criteria: Both gender; not be submitting to orthodontic or orthopedic jaw functional; general health good; without neurological disorders.

The 300 subjects were divided in three groups (n = 100):

Group 1: 100 children aged 3 to 5 years old in the deciduous dentition;

Group 2: 100 children aged 6 to 12 years old in the mixed dentition;

Group 3: 100 subjects aged 18 to 47 years old in the permanent dentition.

Four professionals (Postgraduate students) have been calibrated in a study pilot. The existence of a CSP was determined using a direct method (visual observation) described by McDonnell et al.³ Subjects were given a piece of gum (Trident sugarless /Adams Brazil, Bauru, São Paulo, Brazil), 1.8 g weight and 23 × 18 × 4 mm size. Subjects were observed chewing with their posterior teeth. They did not know the purpose of the research. After 15 second time, the evaluators asked to stop chewing and give a smile to observe the side that the gum was positioned (right or left). This procedure was repeated seven times with interval time of 5 seconds each.

The subjects were classified according to following criteria:

- Consistent chewing side preference (CCSP)—7/7 strokes on the same side
- Predominant chewing side preference (PCSP)—5/7 or 6/7 strokes on the same side
- Chewing side preference (CSP)—5/7 or 6/7 strokes on the same side.

To determine the prevalence of CSP, was used the descriptive statistic. The Pearson's Chi-square was used to investigate significant associations between qualitative variables (gender X presence of CSP; gender X preferred side right/left).

RESULTS

In group 1, 49 (49%) of the subjects were female and 51 (51%) were male. The age ranged between 03 to 05 years of age (mean = 4.35 years; standard deviation = ± 0.71).

Forty-six percent of children had CCSP (29% on the right and 17% on the left) and 41% had PCSP (25% on the right and 16% on the left). Eighty-seven percent (87%) of group 1 had a CSP (54% on the right and 33% on the left).

In group 2, 59 (59%) of the subjects were female and 41 (41%) were male. The age ranged between 06 to 12 years of age (mean = 8.88 years; standard deviation = ± 1.49). Thirty-seven percent of children had CCSP (26% on the right and 11% on the left) and 45% had PCSP (31% on the right and 14% on the left). Eighty-two percent (82%) of group 2 had a CSP (57% on the right and 25% on the left).

In group 3, 71 (71%) of the subjects were female and 29 (29%) were male. The age ranged between 18 to 47 years of age (mean = 23.68 years; standard deviation = ± 5.30). For group 3, 20% of children had CCSP (8% on the right and 12% on the left) and 56% had PCSP (32% on the right and 24% on the left). Seventy-six percent (76%) of group 3 had a CSP (40% on the right and 36% on the left).

There was no statistically significant association between gender and the preferred side (right/left) for all groups (group 1: p = 0.80; group 2: p = 0.71; group 3: p = 0.97). There was no statistically significant association between gender and the existence of a CSP for all (group 1: p = 0.33; group 2: p = 0.39; group 3: p = 0.59).

DISCUSSION

The admission criteria in this study included samples of subpopulations that showed possible etiologic factors of CSP, as performed by several authors.^{3-7,10,11} Thus, our results can approach with data from the general population, as were performed in individuals who may or may not show uni or multi etiologic factors of CSP. In addition, McDonnell et al³ concluded that the presence of oral diseases in children with mixed dentition have little or no influence on the preferred chewing side. Nissan et al⁶ reported that tooth loss, occlusal interferences and guides disocclusion not affect CSP.

The prevalence of a CSP in children with deciduous dentition (87%) and with mixed dentition (82%) is similar to that reported in several studies in adult subjects (50-83%). This prevalence is consistent with the findings of McDonnell et al³ that observe 92% of PCS in children with mixed dentition. The authors³ performed a study with similar inclusion criteria to our study. The prevalence of CSP in subjects with permanent teeth (76%) is similar to the findings of Christensen and Radue,⁴ Pond et al,⁷ Kazazoglu et al,⁵ Varela et al,¹² Nissan et al,⁶ Reinhardt et al¹⁰ and Martinez-Gomis et al,¹¹ who reported prevalence of CSP 68%, 77.8%, 88%, 88.4%, 97.4%, 78% and 63.24% respectively.

These authors cited above selected population sample as performed in this study, including individuals who had possible peripheral etiologic factors as: size and type of ingested food, the number and duration of masticatory cycles until deglutition, the presence of natural or artificial teeth, the number and state of the natural and artificial teeth, and diseases and dysfunctions of the mandibular locomotor system.⁴

A higher prevalence of a CSP in children (deciduous and mixed dentition) compared to adults is expected because children had in difficulties lateralizing food smoothly and efficiently.¹⁷ According to McDonnell et al,³ this result is expected because children have more difficulty to move the bolus from one side of the mouth to the other. Therefore, they will prefer chew on one side,³ and this preference tends to disappear with age.^{3,15,16} Gisel et al¹⁵ and Gisel¹⁶ observed that only 15% of children (5 years old) and 7% of children (2 years old) with deciduous dentition were able to move food gently from one side of the mouth to the other with the tongue.

As the mixed dentition is characterized by the presence of primary and permanent teeth, the chewing in this dentition is considered unstable, due to various changes that occur in the mouth. Thus, the structures of the stomatognathic system are in constant process of adaptation, and chewing follows all changes that occur in the mouth, which can lead to increased prevalence of CSP. Another factor that could influence the chewing pattern is that the masticatory efficiency of children in the mixed dentition can decrease almost 50% during this dentition,^{3,17} and according to McDonnell et al,³ the presence of CSP can indicate a poor masticatory efficiency.^{3,17} Moreover, Gisel¹⁶ noted that only 27% of children with mixed dentition are able to move smoothly and precisely the food from one side of the mouth to the other, showing chewing pattern on one side only.

Additionally, this study demonstrated a higher prevalence of subjects who preferred to chew on the right compared on the left. The results of this study confirm the findings of Shiere and Manly,¹⁷ who observed that 'among children the tendency to prefer the right side predominates over the tendency to prefer the more efficient side.'³ Also, our results are consistent with the findings of Christensen and Radue,⁴ Varela et al,¹² Nissan et al,⁶ Diernberger et al¹⁸ and Martinez-Gomis et al¹¹ who observed a higher prevalence of CSP to the right side in adults with permanent dentition.

Our study found no significant association between the gender of the subjects and the preferred chewing side on the left or the right side. Also, there was also no association between gender of the subjects and the presence of CSP. Hoogmartens and Caubergh¹⁹ found no significant

difference in the proportion of females compared to male adult to chewing preference during the first chewing side. The authors Nissan et al⁶ observed no statistical difference in chewing side preference (left or right side) between genders in adult subjects. McDonnell et al³ observed no significant association between gender and chewing side preference for children with mixed dentition. However, Diernberger et al¹⁸ observed a significant higher proportion of CSP to females compared to males adults.

In deciduous and mixed dentitions, the structures of the stomatognathic system are in constant process of adaptation. Chewing adapts the changes that occur in the mouth, which can lead to increased prevalence of PCS. PCS determines the presence of several consequences, and is need the prevention with prophylactic therapy applied to the first teeth (deciduous), seeking to eliminate as early as possible all the etiological factors that prevent the ideal occlusal development, and that suppress the performance of jaw movements ideal.

CONCLUSION

It can be concluded that the prevalence of a CSP was observed in 87% of children with deciduous dentition, 82% of children with mixed dentition and 76% of subjects with permanent dentition. There was no statistically significant association between gender and the distribution of chewing side preference (left or right side). There was no statistically significant association between gender and the presence of CSP.

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