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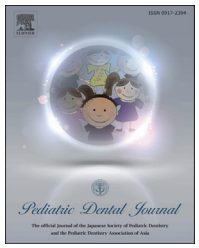

Original Article

Finger sucking callus as useful indicator for malocclusion in young children

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ABSTRACT

Purpose: Finger sucking is the most commonly observed habit in children. However, a prolonged sucking habit may have negative effects on dentition and occlusal development, including maxillary protrusion, anterior open bite, and posterior cross-bite. For treatment of malocclusion, early detection is important, especially in children, though it is difficult to exam oral habits using typical dental examination methods. In this study, we report the relationship between a callus on the sucking finger and malocclusion.

Methods: While performing dental examinations, we checked the fingers of 719 children (0–6 years old) who were attending 10 different kindergartens in Sendai City, Japan, in 2009 to determine the presence of a sucking callus formed by a finger sucking habit.

Results: The peak ratios of children with a sucking callus and malocclusion was at the age of 2 years (13.6% and 11.0%, respectively), and then decreased with age. Maxillary protrusion was detected in 42.9%, 56.2%, 42.9%, and 37.5% of the children with a sucking callus at the age of 1, 2, 3, and 4 years old, respectively. In those with maxillary protrusion, a sucking callus was detected in 42.9%, 75%, 75%, and 60%, respectively.

Conclusion: We concluded that the presence of a sucking callus is a useful indicator for malocclusion caused by an oral habit.

1. Introduction

An important factor in the development of malocclusion in children is oral habit, such as thumb sucking, nail biting (onychophagia), lip chewing, and bruxism [1], with finger sucking the most commonly encountered childhood habit. A previous report noted that 23.3% of 1946 Japanese children examined had a finger sucking habit [2]. The habit of sucking a finger is considered to be derived instinctively, and it may improve the ability to eat and drink foods by use of the mouth and tongue. However, children who persist in nonnutritive sucking beyond early childhood likely have an underlying psychologic disturbance and this can be considered as an overt sign of an attempt

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to manage increased anxiety, while it has also been suggested that increased anxiety or stress in a child's life can transform an "empty" thumb habit into a "meaningful" stress reduction response [3]. Although sucking may be necessary in younger years, a prolonged habit may have harmful effects. For example, it has been reported that thumb sucking can affect not only dentition and occlusal development, such as maxillary protrusion [4], anterior open bite [5–7], and posterior cross-bite [8], but also oral function development including an abnormal swallowing habit [9] and speech defects [10]. According to previously reported findings, sucking habit must be considered as a factor of major influence in the aetiology of malocclusion, as well as a causative factor for malocclusion at the end of the mixed dentition period because of direct (disharmony of muscles surrounding the oral cavity) and indirect (abnormal swallowing habit) effects [11]. Evidence of a finger sucking habit is the presence of a callus on the finger along with eczema due to alternating dryness and moisture [12].

Knowledge regarding occlusion has been increasing and parents often choose treatment for their affected child. Thus, detecting malocclusion at an appropriate time and treating it effectively is important. Early orthodontic treatment is beneficial to enhance skeletal and dental development, as well as to correct habits, functions, and malocclusion that may lead to temporomandibular joint problems or facial asymmetry in an early stage [11,13]. However, detection of malocclusion is not always possible, because of limited availability of appropriate medical personnel such as dentists and medical doctors. Ovsenik et al. reported that intra-oral recordings and measurements were as reliable as assessments of study casts [14]. However, an easier method to detect malocclusion is needed.

Conventionally, a number of studies have been made about the relationship between finger sucking habit and home environment. Since the 1940s, the importance of nuclear family relationships has increased. It was reported children who grew up in nuclear family had a finger sucking habit more than children who grew up with grandparents and the relationship between grandparents is important [15]. Indeed, reports of children with a sucking habit have been increasing.

Here, we report an easy method for malocclusion detection based on the presence of a callused sucking finger, which has rarely been investigated. Our results may help with understanding and recognition of the early stages of malocclusion in childhood.

2. Methods

2.1. Subjects

We examined 719 children aged 0–6 years old who were attending 10 different kindergartens in Sendai, Japan, from June to July 2009 (Table 1).

All children who had a dental check up in kindergartens were included in our study without any exclusion.

2.2. Examinations

While performing dental examinations, we checked the subject hands to determine the presence of a callus caused by a finger-sucking habit. Seven examiners with 1–3 years of experience as dentists performed the examinations and a senior dentist with a specialty pediatric dentist license made the diagnoses. Three types of malocclusion were noted, maxillary protrusion (more than 5–6 mm in an overjet configuration), open bite (negative for overbite), and cross-bite (posterior cross-bite on one side). Another oral habit including mouth breathing, lip bite, was not checked in this study.

Table 1 – Distribution of subjects by age.

Age	Number of children
0	37
1	95
2	118
3	123
4	146
5	167
6	33
Total	719

2.3. Ethical approval

Tohoku University Graduate School of Dentistry approved the protocol used in this study.

3. Results

3.1. Sucking callus frequency

Subjects with a sucking callus ranged in age from 1 to 5 years old. That was detected in 7 (7.4%) at the age of 1 year, in 16 (13.6%) at the age of 2 years (age of peak incidence), in 14 (11.4%) at the age of 3 years, in 8 (5.5%) at the age of 4 years old, and in 4 (2.4%) at the age of 5 years. No child less than 1 year old or older than 5 years had a sucking callus (Fig. 1A and B). A callus was most frequently observed on the thumb (right hand, n = 20; left hand, n = 21), with a decrease in frequency from the index finger to little finger for both hands (Fig. 2).

3.2. Malocclusion frequency

Subjects with malocclusion ranged from 1 to 5 years old. That was detected in 8 (8.4%) at the age of 1 year, in 13 (11%) at the age of 2 years (age of peak incidence), in 10 (8.1%) at the age of 3 years, in 6 (4.1%) at the age of 4 years, and in 7 (4.2%) at the age of 5 years. No child less than 1 year old or older than 5 years had malocclusion (Fig. 3A and B). Among all subjects, malocclusion was found in 36 (5%) as maxillary protrusion, in 5 (0.7%) as open bite, and in 3 (0.42%) as cross-bite. Maxillary protrusion was found in subjects aged from 1 to 5 years old, with the highest rate of incidence found at the age of 2 years (n = 12, 10.2%) and then a decrease with age. Open bite and cross-bite were found in approximately 0–1% of our subjects of all ages (Table 2).

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