

Early Malocclusion Detection Education for SD Muhida Students

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ABSTRACT

Objective: This community service activity was designed to enable students and parents to recognize methods for early malocclusion detection and understand the occlusal conditions of first-grade students at Muhammadiyah 1 Elementary School. **Method:** Conducted on May 12, 2026, the activity included oral health education, oral examinations, distribution of pocket guides, presentation of educational posters, formation of a parent information group, and assessment of participants' knowledge before and after the session. Examination data from 96 students were analyzed descriptively. **Results:** All recorded first permanent molar relationships were classified as Angle Class I, accompanied by anterior crowding, anterior crossbite, anterior reverse bite, anterior protrusion, deep bite, and unerupted first permanent molars. **Novelty:** The activity showed that education combined with simple school-based screening can improve understanding of early malocclusion detection and provide an overview of students' initial occlusal conditions for follow-up through school-based oral health monitoring, parental guidance, and orthodontic referral when necessary. Thus, this activity supports the early detection and prevention of malocclusion among school-aged children.

INTRODUCTION

Oral health among elementary school children is an important component of quality of life, eating function, speech, and psychosocial development. Untreated dental and oral health problems can cause discomfort, difficulty maintaining oral hygiene, and barriers to learning and social activities. Therefore, promotive and preventive approaches at elementary school age should emphasize the early recognition of dental problems, oral hygiene practices, and regular monitoring of dental development. The World Health Organization recognizes oral health as an essential component of general health because oral diseases remain a major global public health burden [1].

Malocclusion is an irregularity in tooth arrangement or interarch relationships that prevents the maxillary and mandibular teeth from meeting optimally. Among children aged approximately 6–12 years, the mixed dentition period is important because primary and permanent teeth coexist during a transitional stage; consequently, knowledge of eruption sequences, dental morphology, and arch development is required for an initial assessment [2], [3], [4], [5], [6], [7]. During this period, crowding, crossbite, anterior reverse bite, protrusion, tooth rotation, and retained primary teeth may begin to appear, allowing early detection and promotive-preventive intervention before the condition becomes more complex. Systematic reviews have also shown a high prevalence of malocclusion across different stages of dentition in children and adolescents, including the mixed dentition stage [8], [9], [10].

The community service activity at SD MUHIDA was initiated in response to the need for early malocclusion detection education among first-grade students, their parents, and the school community. Child-friendly educational materials were delivered through presentations, posters, banners, pocket guides, direct examinations, and continued communication with parents. Visual media and communicative approaches were selected according to the characteristics of elementary school children so that the health messages would be easy to understand, remember, and apply in daily routines [11], [12]. Teacher and parent involvement is also important because repeated oral health education supported by the school environment has been shown to improve children's knowledge, practices, and oral health maintenance behavior [13], [14], [15].

RESEARCH METHOD

The activity was conducted on Tuesday, May 12, 2026, at 08:00 Western Indonesian Time at SD MUHIDA. The participants were first-grade students in the mixed dentition stage and their parents or guardians. The activity was implemented by the Faculty of Dentistry, Universitas Muhammadiyah Sidoarjo team, with Lila Muntadir, DDS, Orthodontist; Ronny Sutanto, DDS, Orthodontist Consultant, MARS; and Tontowi Ashari, DDS, MM, as resource persons. It took place in the school hall and involved lecturers working in related research and community service areas who also alternately taught the same classes.

The activity stages comprised coordination with the partner, student education, oral and dental examinations, distribution of pocket guides, presentation of posters, documentation, formation of an educational group for parents, and preparation of a publication manuscript. The educational material covered the definition and timing of malocclusion, the benefits of early detection, good habits for healthy teeth, signs and types of malocclusion, orthodontic treatment options, the role of orthodontists, and the role of the School Health Unit. This school-based educational sequence combined visual media, examinations, and reinforcement of messages to parents because oral health education for schoolchildren is more effective when delivered in a structured and communicative manner with the involvement of the children's immediate environment [11], [13].

The evaluation instruments consisted of questionnaires for parents and students. The parent questionnaire contained 12 questions addressing the definition of malocclusion, the mixed dentition stage, harmful habits associated with malocclusion, its effects, early examination, and the role of parents. The student questionnaire contained 12 simple questions about irregular teeth, toothbrushing habits, thumb sucking, routine examinations, sweet foods, open bite, crowding, and oral hygiene practices. A pretest-posttest evaluation model was used to assess changes in knowledge following the educational activity, consistent with school-based oral health education principles that emphasize measuring knowledge and behavior and repeatedly reinforcing key messages [14], [15].

RESULT AND DISCUSSION

Results

The activity was successfully implemented with the active support of SD MUHIDA. The partner facilitated coordination and communication, provided the venue, organized the students and parents, and supported documentation through the school's social media team. The principal and school leaders delivered welcoming remarks, guided the homeroom teachers, and encouraged the students to participate in an orderly manner. School and parent involvement is an important component of successful oral health education because children's behavior is more readily developed when promotive and preventive messages are reinforced by teachers, parents, and the school environment [11], [13].

The examinations involved 96 first-grade students from the UMAR, UTSMAN, and KHOLID classes, each comprising 32 students. The sample included 52 boys, 43 girls, and one student whose sex was not recorded. A summary of participant characteristics and molar relationships is presented in Table 1. All recorded molar relationship data indicated an Angle Class I relationship accompanied by variations in malocclusion. These variations warrant attention because epidemiological studies show that malocclusion characteristics may differ across child populations and should be monitored from the mixed dentition stage [8], [9], [10]. Table 1 summarizes participant characteristics and molar relationships, Table 2 presents the accompanying malocclusion variations, and Table 3 presents the distribution of the deft/DMFT dental caries index.

Table 1. Participant Characteristics and Molar Relationships among First-Grade Students at SD MUHIDA

Category	n	%
Class: UMAR	32	33.3
Class: UTSMAN	32	33.3
Class: KHOLID	32	33.3
Sex: Male	52	54.2
Sex: Female	43	44.8
Sex: Not recorded	1	1.0
Molar relationship: Angle Class I (recorded data)	95/95	100.0
Molar relationship: Not recorded	1	1.0

Table 2. Accompanying Malocclusion Variations Recorded during the Examination

Category	n	%
Clinical record: No accompanying variation recorded	71	74.0
Clinical record: Anterior crowding	14	14.6
Clinical record: Anterior crossbite	3	3.1
Clinical record: Anterior reverse bite	1	1.0
Clinical record: Anterior reverse bite + anterior crowding	2	2.1
Clinical record: First permanent molar not erupted	1	1.0
Clinical record: Anterior crowding + anterior reverse bite	1	1.0
Clinical record: Anterior protrusion	1	1.0
Clinical record: Anterior protrusion + deep bite	1	1.0
Clinical record: Reverse bite + anterior crowding	1	1.0

Table 3. Distribution of the deft/DMFT Dental Caries Index among First-Grade Students

Category	n	%
Caries index: Caries-free	15	15.6
Caries index: Very low	8	8.3
Caries index: Low	13	13.5
Caries index: Moderate	20	20.8
Caries index: High	12	12.5
Caries index: Very high	23	24.0
Caries index: Not recorded	5	5.2

These findings are consistent with the dynamic nature of the mixed dentition stage, during which primary teeth are replaced by permanent teeth [6]–[10]. At this stage,

crowded or rotated teeth and teeth positioned outside the ideal dental arch should be recorded as early signs requiring monitoring. The results in Tables 1 and 2 show that an Angle Class I molar relationship may coexist with malocclusion variations such as anterior crowding, anterior crossbite, tooth rotation, and retained primary teeth. This finding is consistent with orthodontic literature that identifies the mixed dentition stage as a strategic period for recognizing eruption problems, arch-space discrepancies, and oral habits that may affect occlusion [2], [3], [4], [5], [6], [7].

In addition to occlusal findings, the deft/DMFT dental caries index showed that examination data were available for 91 students, with a mean score of 4.25. As shown in Table 3, the largest categories were very high and high. This finding indicates that malocclusion education should be linked to oral hygiene practices, control of sweet-food consumption, and routine dental examinations because caries, premature loss of primary teeth, and poor oral hygiene may affect children's comfort and the monitoring of dental development [16], [17], [18].

The educational outputs consisted of a banner, posters, and a pocket guide developed in simple language with child-friendly visuals. The pocket guide included the topics "What Is Malocclusion?", "When Can Malocclusion Occur?", "Why Is Early Detection Important?", healthy dental habits, types of malocclusion, orthodontic treatment, and the role of the School Health Unit. Documentation of the activity is presented in Figure 1, while the educational materials used and provided to the partner are presented sequentially in Figures 2, 3, and 4. Age-appropriate visual media support the communication of oral health messages to children [19].



Figure 1. Documentation of the Oral Health Education and Examination Activity at SD MUHIDA



Figure 2. Banner for Malocclusion Education among Seven-Year-Old Children in the Mixed Dentition Stage



Figure 3. Educational Poster on Early Detection of Malocclusion in Children



Figure 4. “Let’s Recognize Malocclusion!” Pocket Guide as Student Educational Media

Discussion

The main implementation constraint was the density of the school and university schedules. At the school, the activity had to be adjusted to accommodate student examinations, the FASHMU competition, the Qur’anic education division, and the Sidoarjo Muhammadiyah Regional Leadership Tabligh Council agenda. At the university, implementation coincided with the Faculty of Dentistry accreditation submission process and preparations for student examinations. Nevertheless, partner support and the use of visual educational media, as shown in Figures 2–4, helped maintain successful implementation.

The follow-up plan includes processing the parent and student questionnaire data, conducting further quantitative descriptive analysis, developing a database of dental abnormalities, strengthening the GITA or Strong Teeth program as a flagship initiative of the Faculty of Dentistry at Universitas Muhammadiyah Sidoarjo, training elementary school student cadres by optimizing the School Health Unit, and donating a dental unit to SD MUHIDA. These measures are important to ensure that the educational intervention does not remain a one-time activity but develops into a school-based oral

health monitoring system. Continuous monitoring is also consistent with the principles of prevention and early orthodontic intervention [20].

CONCLUSION

Fundamental Finding: Examination results for students with recorded molar relationship data showed an Angle Class I pattern accompanied by anterior crowding, anterior crossbite, anterior reverse bite, anterior protrusion, deep bite, and unerupted first permanent molars. **Implication:** Simple school-based examinations can provide an entry point for malocclusion education, monitoring, and orthodontic referral during the mixed dentition stage, while the School Health Unit can support recordkeeping, healthy-habit reminders, and coordination among the school, parents, and oral health professionals. **Limitation:** The activity was limited to descriptive examination data from first-grade students at one elementary school and did not assess the long-term effects of the educational program on knowledge, oral health behavior, or malocclusion outcomes. **Future Research:** Future research should involve multiple schools, evaluate changes in participants' knowledge and behavior over time, and examine the effectiveness of regular dental monitoring, twice-daily toothbrushing reinforcement, parental involvement, and timely orthodontic referral.

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