

02.08.2021

STUDY PROTOCOL

TITLE:

THE EFFECT OF PEER VIDEO MODELING AND 3D JAW
VIDEOMODELING TRAINING ON ORAL HEALTH AND
TOOTHBRUSHING SKILLS IN CHILDREN WITH AUTISM

Study Protocol

The **primary aim** of this study is to determine the nutritional and oral hygiene habits of children with autism spectrum disorder (ASD), to examine the effects of these habits on oral and dental health, to evaluate their access to necessary dental treatments, and to assess oral health–related quality of life from the perspective of parents. In addition, the study aims to improve oral hygiene habits using **peer video modeling and 3D jaw model video modeling**, and to compare the effectiveness of these two video modeling methods in improving tooth-brushing performance.

The **secondary aim** of the study is to incorporate oral hygiene training into individualized education programs to enable children with ASD to perform oral care independently, similar to typically developing children, without requiring pharmacological support. By promoting preventive oral health practices, this approach may help reduce the high costs of dental treatments and prevent or decrease dental problems that negatively affect children's quality of life. Interventions targeting oral hygiene behaviors in the home environment may represent one of the most effective strategies for improving oral hygiene outcomes in this population. In this study, children diagnosed with ASD according to the **Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V)** criteria of the **American Psychiatric Association (APA)** will be included.

Variables

The **dependent variables** include tooth-brushing ability (assessed using a scoring system ranging from 0 to 3 points) and plaque index scores.

The **independent variables** consist of sociodemographic characteristics collected through the sociodemographic information form, including gender, parental education level, and socioeconomic status.

Participants and Sample Size

To determine the sample size, **a minimum of 120 children aged 6–12 years diagnosed with ASD** and enrolled at **Istanbul Hamit İbrahimiye Special Education Practice School** will be included in the study.

Study Limitations

The study is limited to children with ASD who attend the **Istanbul Hamit İbrahimiye Special Education Practice School**. Therefore, children with ASD who are not enrolled in or attending this center will not be represented in the study population.

Ethical Considerations

Because the study involves children under the age of 18 diagnosed with ASD, **written informed consent will be obtained from parents or legal guardians** prior to participation. After completion of the study, oral hygiene education will also be provided to participants in the sample group.

Data Collection Instruments

Sociodemographic Information Form (Form-1)

The **Sociodemographic Information Form**, developed based on a literature review, includes questions related to the child's gender, date of birth, parents' age and educational level, age at which the child began special education, duration of special education, parental employment status, medications used regularly by the child, presence of systemic diseases, and whether the family or the child has previously received oral and dental health education.

Family and Child Oral-Dental Health Information Form (Form-2)

The **Oral-Dental Health Information Form** is designed to assess factors affecting the oral health of children participating in the study. Parents will be asked to complete a questionnaire including items related to parental education level, oral hygiene habits (tooth-brushing practices), and the child's nutritional behaviors. These include the number of snacks consumed daily, meal duration, duration of breastfeeding and bottle use, frequency and duration of tooth brushing, brushing technique, the most recent dental visit, number of decayed, missing, or filled teeth, and who performs the tooth brushing. Completion of these forms takes approximately **15 minutes**.

Clinical Oral Examination (Form-3)

For standardization, all oral examinations will be performed by the **same dentist**. The number of **decayed, missing, and filled teeth**, plaque index values, and gingival health status will be recorded on the anamnesis forms. Disposable instruments will be used for intraoral examinations and discarded after use.

Bacterial plaque will be evaluated using the **Modified Silness-Löe Plaque Index**, assessing six teeth (four posterior and two anterior teeth). Previous studies have reported the use of modified indices in children with autism due to their specific behavioral characteristics. For instance, Klein et al. reported the use of modified indices when evaluating dental conditions in autistic patients, while Pilebro et al. utilized the Modified Silness-Löe Plaque Index for visual plaque assessment in oral hygiene education studies among autistic children. Similarly, Lowe et al. used the Silness-Löe Plaque Index to evaluate plaque accumulation in autistic patients.

The **Modified Silness-Löe Plaque Index** scoring criteria are as follows:

1. Plaque accumulation at the gingival margin is difficult to detect.
2. Visible soft deposits are present near the gingival margin but do not completely fill the interdental area.
3. Thick plaque deposits are clearly visible near the gingival margin and extend coronally, completely filling the interdental space.

Gingival health will be evaluated based on color changes. Gingiva will be considered **healthy** if no color change or edema is observed. Gingiva will be classified as **unhealthy** if there is a color change from pink to red and the presence of edema (Pandina et al., 2007).

Dental caries status will be assessed according to **World Health Organization (WHO) criteria**, and the **DMF-T index** for permanent teeth and **DMF-s index** for primary teeth will be used to determine the number of decayed, missing, and filled teeth (WHO, 1997).

Intervention Procedure

Following the oral examination and assessment of factors affecting oral health, **tooth-brushing training** will be provided. Participants will be randomly assigned to one of three groups using a **closed-box drawing method performed by a blinded special education teacher** to ensure allocation concealment. The groups will consist of:

- Peer video modeling group
- 3D jaw model video modeling group
- Control group

Parents will be instructed not to introduce additional oral hygiene practices such as mouthwash or dental floss during the study period.

The tooth-brushing procedures used in the **peer video modeling** and **3D jaw video modeling** interventions will be developed in consultation with a **pediatric dentist (pedodontist)** to ensure that the demonstrated behaviors are performed correctly.

The **Bass tooth-brushing technique** will be used in the intervention videos. Previous studies have demonstrated that the Bass technique is more effective than the roll technique in removing plaque, particularly on lingual and facial surfaces and along the gingival margin and sulcus (Gibson et al.).

Peer Video Modeling

For the peer video modeling group, a video demonstrating the tooth-brushing procedure performed by a **healthy peer model (an 11-year-old boy)** will be used. The video will present the target behavior at a **slow pace**, and the effective brushing duration will be **two minutes**.

Following the procedure described by **Charlop and Milstein (1989)**, the child will first be instructed to sit quietly and watch the video displayed on the screen. The researcher will sit next to the child and observe whether the child attends to the video. After two presentations of the video, the researcher will instruct the child: *“Let’s do it the same way as in the video.”* The child will then be asked to practice tooth brushing in front of a mirror.

3D Jaw Video Modeling

In the **3D jaw video modeling group**, the tooth-brushing technique will be demonstrated using a **three-dimensional upper and lower jaw model**. Similar to the peer video modeling procedure, the child will be encouraged to watch the video demonstration, and positive reinforcement will be provided when the child maintains attention to the video.

Participants will watch the 3D jaw modeling video **twice**, after which the researcher will say, *“Let’s do it the same way they did,”* and the child will be asked to practice the procedure in front of a mirror. Children will be able to observe their own performance in the mirror.

Performance Evaluation

Tooth-brushing ability will be evaluated on the same day using a **13-step assessment tool**, with scores ranging from **0 to 3 points**, and the results will be recorded.

Following the training session, parents will receive feedback regarding their child's performance. For example, parents may be informed that the child performs well in brushing the front teeth but requires assistance when brushing the upper posterior teeth.

Home-Based Intervention

Parents in the intervention groups will receive the **peer video model or 3D jaw video model** via **e-mail or WhatsApp** and will be instructed to have their children watch the video once daily before tooth brushing.

The study is planned to last **six months**, with data collected at **baseline, 1 month, 3 months, and 6 months**.

Follow-up Assessment

A questionnaire titled **“Tooth-Brushing Compliance Questionnaire” (Form-4)** will be administered to evaluate children's adherence and parents' attitudes toward the intervention. The questionnaire will include items such as:

- How frequently the educational material was used by the child (1–7 days per week, irregularly, or never)
- How useful the educational material was perceived (useful, neutral, or unusual)

The questionnaire will be sent weekly to parents via e-mail or WhatsApp.

At **baseline and at the end of the 1st, 3rd, and 6th months**, plaque index values will be reassessed in all groups.