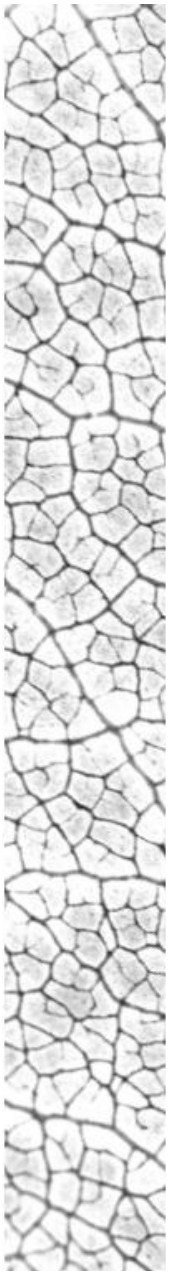

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The quality of the lollipops use in the making of the anterior upper teeth periapical radiography of in paediatric patients

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Abstract

Background: Periapical radiography is a technique that is routinely used in the field of dental radiology. Deficiencies in this procedure require patient cooperation, especially paediatric patients and during the procedure of making radiographs of intraoral film placement. Poor co-operability of paediatric patients has great potential to cause periapical radiographic failure. Vomiting reflexes are the most commonly reported complaints in children where one of the triggers for vomiting reflexes is in the palate which can affect the taking of periapical radiographs of the maxilla. The use of lollipop aids is one of the desensitization methods to overcome the problem of child cooperation during periapical radiography. **Objective**: To determine the quality of periapical radiographs of maxillary anterior teeth in paediatric patients using lollipops. **Methods**: This study used an experimental analytic study by taking periapical radiographs using lollipops and without assistive devices for paediatric patients. The lollipop used is made from tamarind candy (licensed by the Republic of Indonesia Food and Drug Supervisory Agency) which is melted and packaged into lollipops. This study has 52 samples and for each sample periapical radiography was taken by using a lollipop tool or not using a device, hence 26 radiographs were obtained for each technique. Periapical radiography was observed visually by three observers and then the observer filled the radiographic quality evaluation indicator table to obtain a score of quality evaluation results for each periapical radiography. **Results**: There were significant differences in quality evaluation results between periapical radiographs taken by using lollipops and without assistive devices (p-value 0.008). **Conclusion**: The quality of the maxillary anterior periapical radiographs of paediatric patients made using lollipops is better than without using aids.

Keywords: periapical radiography; cooperative children; radiographic quality evaluation; lollipop

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INTRODUCTION

Radiographic examination is one of the supporting examinations that has a very important role in the field of dentistry. The role of dental radiography includes assisting dentists to conduct examinations, establish diagnoses, and arrange appropriate care management. Almost all dental and oral care requires radiographic examination support data thus the treatment performed achieves optimal results. This is because a radiographic examination can see abnormalities and tissue conditions that cannot be seen clinically. In order to fulfil radiographic data, good radiographic results are needed and can be interpreted. Poor radiographic results have the potential to lead to incorrect interpretations and have an impact on diagnosis and treatment plans that are also less precise, therefore it is necessary to make radiographs with the right techniques thus the results are good.

Periapical radiography technique is a technique that is routinely used in the field of dental radiology. Periapical radiography provides a picture of the teeth and surrounding alveolar bone thus it can be important information in helping diagnose various dental abnormalities such as caries, periapical abscesses and periodontal bone loss (Gupta, et al. 2017) Even so, the practice of using periapical techniques in a clinical setting has deficiencies. Many people cannot tolerate intraoral film placement during periapical radiographic procedures (Reddy, et al. 2015) In order for radiograph results to be interpreted optimally and support diagnosis, operators need to know ways to influence patient cooperation during radiographic procedures, especially paediatric patients. According to the American Academy

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of Paediatric Dentistry (American Academy Of Pediatric Dentistry 2017), children are more potentially uncooperative so dental radiographs may fail. Paediatric patients who often undergo dental care are children of primary school age. According to the WHO (World Health Organization) definition of elementary school children, that is, the group of children aged between 7-15 years. Whereas in Indonesia usually elementary school children aged 7-12 years (Kantja, 2017). As already mentioned, periapical radiographic technique is an important technique in the radio-diagnose process of dental abnormalities. Previous studies explained that periapical radiography taking in children, 44% of radiographs failed, of which 32% could not be interpreted and the rest could still be interpreted (Salami et al. 2017). A large percentage of failures has an impact on suboptimal radiographic results or even fails to fulfil its function as a diagnostic support and treatment plan, so it needs to be reproduced. Radiographic remodelling causes the patient to receive more exposure. In fact, x-ray radiation exposure to the patient's body must be minimized and performed in conditions that are needed, especially for paediatric patients because children are more radiosensitive than adults (Looe, et al. 2006).

Failure in making a child intraoral radiography is difficult to be completely eliminated due to the child's cooperation during the manufacturing procedure. (Salami et al. 2017).Some things that can affect the child's low cooperative on dental radiographic procedures include jaws that are too small so uncomfortable during the procedure, fear of swallowing radiograph films, fear of the taking of the radiograph itself, and the gag reflex (Schwartz 2015). The gag reflex is the most commonly reported complaint in children. This is because children have a higher tendency to vomit than adults due to the progressive setback of the vomiting reflex as they age (Ardelean, Bortun, dan Motoc 2003).Five main regions that trigger vomiting reflexes are the base of the tongue, faucum, palate, uvula, and posterior pharyngeal wall (Prashanti et al. 2015).

Some modifications that can be conducted during the procedure for taking radiographs to minimize and overcome problems related to child cooperation, one of them is the use of lollipops for intraoral radiography (Schwartz 2015). This method uses lollipop as a desensitizing medium by gradually stimulating intraoral film contact in the oral environment. It is hoped that paediatric patients will be more comfortable and cooperative in the procedure. The principle of desensitization is to provide stimuli in stages from low to high intensity. The advantages of using this lollipop tool apart from the fact that children love sweets, candy is known to overcome nausea, especially sour taste candy (Kementrian Kesehatan Republik Indonesia (Kemenkes RI) dan World Food Programme (WPF) (2017). American Cancer Society (2017).The method of making

Fig. 1. Making periapical radiography using a lollipop tool

periapical radiographs of paediatric patients using a lollipop tool has never been studied at the Radiology Polyclinic of the Dental and Oral Hospital of Universitas Airlangga. Based on the background, it is necessary to conduct research to determine the quality of lollipop in the making of periapical radiographs of anterior teeth in children aged 7-12 years.

MATERIALS AND METHODS

The type of this study was experimental analytics. The samples studied were 52 samples, consisting of boys and girls aged 7 to 12 years with 26 children photographed periapical using a lollipop tool and 26 children photographed periapical without using tools. The experiment was conducted at the Dental and Oral Hospital of Universitas Airlangga, Surabaya. Before exposure, the researcher gave an oral and written explanation of the study procedure to the child's parents / guardians followed by the child's patient's guardian signing the consent form.

Furthermore, exposure was performed on each sample using lollipops or without tools. Lollipops serve as a tool for laying film / film holder by attaching periapical film using elastic ortho with a diameter of 1/4 inch in diameter. The lollipops in this study were made from sour taste candies (licensed by the Republic of Indonesia Food and Drug Supervisory Agency) which were melted and packed into lollipops. Both techniques with or without tools use the principle of bisecting angle.

RESULTS

The results of making anterior maxillary periapical radiography in paediatric patients obtained a radiographic percentage of 0 for both techniques with lollipop or without aids that was 0%. The percentage score of 1 for techniques without tools is 3.80% and for techniques using lollipop tools 0%. The percentage score of 2 for techniques without tools was 0% and for techniques using lollipop tools was 3.80%. The percentage score of 3 for techniques without tools was 42.30% and for techniques using a lollipop tool is 19.20%. The percentage score of 4 for techniques

Table 1. Table of Periapical Radiography Quality Evaluation Indicator

Quality Standard of Periapical Radiography	Score	Fulfilled (v) / Not fulfill (x)
The tooth picture has no foreshortening or elongation	1	
There is no horizontal overlap. If present, do not block the pulp / root canal	1	
All crowns and roots of teeth are covered	1	
2-3 mm Periapical bone is covered and can be observed to assess the anatomy of the apical area	1	
Total Score		

Note
Fulfilled: Score 1 (one); Not fulfilled: Score 0 (null)
Source: Andrew dan Eaton[15]
*) The quality standards shown in this table have been selected and selected according to study needs.

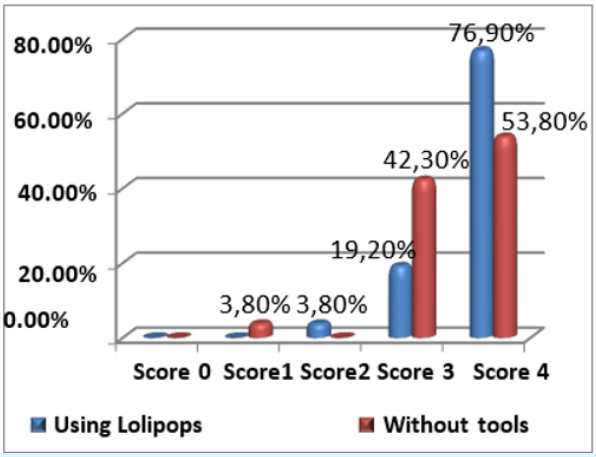
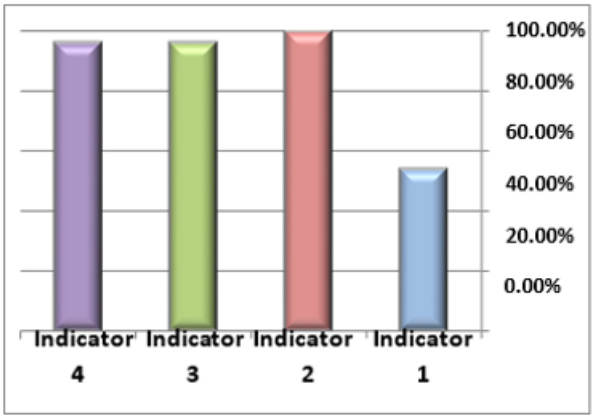


Fig. 2. Percentage score of the results of periapical radiographic quality evaluation using lollipops and without tools



Note

Indicator 1 = The tooth picture has no foreshortening or elongation

Indicator 2 = There is no horizontal overlap. If present, do not block the pulp / root canal

Indicator 3 = All crowns and roots of teeth are covered

Indicator 4 = 2-3 mm Periapical bone is covered and can be observed to assess the anatomy of the apical area

Fig. 3. Percentage of distribution of quality indicators of periapical radiographs by manufacturing without tools

without assistive devices was 53.80% and for techniques using lollipop tools was 76.90% (**Fig. 2**).

The results of periapical radiography were observed by three observers namely the researcher and two supervisors. Observation was accompanied by filling in the radiographic quality evaluation indicator table related to positioning when making periapical radiography in which there were 4 indicators (**Table 1**). Each indicator that was not met gives a score of 0 and if it was met gives a score of 1, so the range of quality evaluation scores for each radiographic result is 0-4. Then, the results of the periapical radiographic quality evaluation results from the three observers in Friedman's test to see the homogeneity of data between observers. After knowing the data between homogeneous observers, data from one observer can be used to test normality, and comparison. The normality test was conducted by using the Saphiro Wilk test.

After the normality test results were obtained, the comparison test was conducted by using the free sample t2 test if the data was normally distributed and using the Mann-Whitney test if the data were not normally distributed.

The results of making radiography without assistive devices, found that 54% radiographs did not undergo elongation or foreshortening. All radiographs do not experience horizontal overlap that covers the pulp / root canal. It was also found that 96% of radiographs included all crowns and roots of teeth and gave an observable 2-3 mm periapical bone picture (**Fig. 3**).

The results of radiography by making use of lollipops, found that 81% of radiographs did not experience elongation or foreshortening. In addition, all radiographs did not experience horizontal overlap that covers the pulp / root canal. It was also found that 96% of radiographs included all crowns and roots of teeth and gave observations of 2-3 mm periapical bone.

The results of comparative statistical tests showed that there was a significant difference between the results of periapical radiographic quality evaluation using lollipops and without assistive devices (p-value 0.008).

DISCUSSION

The role of dental radiography includes assisting dentists to conduct examinations, establish diagnoses, and arrange appropriate care management (Chiri et al. 2013). Periapical radiographic techniques are routinely used in the field of dental radiology. Periapical

radiography provides an overview of the teeth and surrounding alveolar bone thus it can be important information in helping diagnose various dental abnormalities such as caries, periapical abscesses and periodontal bone loss (Gupta, et al. 2017).However, many people cannot tolerate the placement of intraoral film during periapical radiographic procedures (Reddy, et al. 2015).This study is concerned about alternative methods for obtaining patient cooperation during periapical radiographic procedures, especially paediatric patients because according to the American Academy of Paediatric Dentistry(American Academy Of Pediatric Dentistry (2017), children have lower levels of cooperativeness than adults. The alternative method uses a lollipop tool as a film holder.

The results of the evaluation of periapical radiographic quality evaluation found that in both methods, the most commonly produced radiography was radiography that met the four periapical radiographic quality standards (score 4). This shows that both techniques generally produce radiographs that are good for interpretation. But, the percentage of the radiographs number that meet the four radiographic quality standards is higher in the method of using a lollipop tool. This may be related to the better cooperation of children due to the use of lollipops as a desensitization method. As research in the United States shows that with desensitization, paediatric patients are more cooperative and show fewer negative behaviours towards dentistry (Machen, dan Johnson 2017. Piero et al. 2008). Better child cooperation will support better radiographic results with fewer failures. This is consistent with studies in Brazil which show that in children with good cooperation, fewer failures are found on the results of intraoral radiography device. Besides that, better child cooperation and fewer failures are also factors that in the comparative statistical tests, there are significant differences between the scores of periapical radiographic quality evaluations made using lollipops and without assistive devices.

Observation of periapical radiography results in this study also found that of the two methods, radiographs that did not experience foreshortening or elongation had the lowest percentage when compared with the three other quality standards. The occurrence of foreshortening / shortening and elongation / elongation is due to vertical angulation errors when directing conus (Letsanda, 2007).This is consistent with Almogbel and Alolayan(Almogbel, dan Alolayan 2017). studies that the most common errors found on periapical radiographs of the maxillary anterior region are vertical angulation errors. The percentage of radiographic results that did not experience elongation and foreshortening was more found in the method of using lollipop tools and more failure when not using aids. The higher failure rate when not using tools may be due to the implementation of the bisecting angle principle where the accuracy of the visualization of imaginary dividing lines between the film and the gear axis is very important (Williamson 2014).

CONCLUSION

Making periapical radiography without a holder makes visualization of imaginary lines dividing the angle between the dental axis and periapical film more difficult. Whereas in the method of using a lollipop tool, lollipop sticks can visualize the angulation of the film, hence the visualization of angular dividing lines between the film and the dental axis is easier. Thus, the quality of periapical radiographs of maxillary anterior teeth in paediatric patients made using lollipops is better than radiographic results made without using aids.

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