

Effect of Lidocaine Spray in the Enhancement of the Quality of Intra-Oral Periapical Radiograph when Imaging Lower Third Molar Teeth

GK Dharmaratne^{1#}, DBP Rupasinghe¹, EMTH Ekanayake¹, RD Jayasinghe²

¹Faculty of Allied Health Sciences, University of Peradeniya, Sri Lanka

²Division of Oral Medicine and Radiology, University Dental Hospital Peradeniya, Sri Lanka

[#kanishkadh.rad@gmail.com](mailto:kanishkadh.rad@gmail.com)

Abstract: Dental radiography is one of the best diagnostic methods used to identify dental diseases and several dental radiographic methods are practised in order to achieve quality images of the specific dental region. In the process of imaging lower third molar region using bisected angle technique (BAT), which is an intra-oral peri apical (IOPA) radiographic method, radiographers and the patients undergo a lot of difficulties. As a result of the difficulty in placing the film packet sufficiently posterior in the mouth cavity, the qualities of the radiographs are contrastively affected and patients tend to experience discomfort and pain. This study introduces an anaesthetic spray, to be sprayed around the oral mucosa of lower third molar region so that above difficulties are minimized. This applied descriptive study is carried out engaging 62 patients in two randomly selected groups as 31 in an experimental group and 31 in a controlled group. Photographs of each radiograph obtained from both the groups were analysed for quality using a quality assessment tool and each patient were given a visual analogue scale for the pain assessment. Results obtained from statistical analysis showed that there was no significant difference between the qualities of radiographs obtained from conventional method and the new method. However, there were significant differences between conventional and new method when the overall opinions of the evaluators and the pain levels were analysed. This study can be

considered as a useful supplementary aid in the clinical practise.

Keywords: BAT, IOPA, anaesthetic, evaluators

Introduction:

Oral diseases are common non-communicable diseases which affect people throughout their lifetime, causing pain, discomfort, disfigurement and even death. Dental radiography plays an important role in managing oral diseases. During diagnosis and treatment procedures such as root canal treatment, caries diagnosis, diagnosis and treatment planning of orthodontic patients, dental radiography analysis is mandatory.(Wang *et al.*, 2016) In the oral cavity, lower third molar region is an important region which is vulnerable to much pathology and also creates much difficulty in radiographic imaging due to its anatomical position. Pathological cases such as impacted third molar, acute or chronic periodontitis, caries, pericoronitis and deleterious effects on second molars, may lead to the removal of the third molar.(Marciani, 2007) Therefore radiographic examination of the third molar is very important in diagnosing most of the above pathologies and treatment planning and also in estimating the age of individuals.(Jung and Cho, 2014) Among different radiographic methods, bisected angle technique which is an intra-oral peri apical radiographic method, is widely practised when imaging lower third molar region due to its high convenience. However, the main difficulty in this technique is the placement of the film packet sufficiently

posteriorly to record the entire third molar region (particularly when it is horizontally impacted) and the surrounding tissues including the inferior dental canal. This happens due to anatomical difficulties like large tongue (macroglossia), small mouth (microstomia), tight oral musculature, limited neck movement, narrow dental arches, shallow palate, obesity, and neurological difficulties such as severe gag reflex and anxiety. Hence patient may not hold the film properly. This results in the reduction of the quality of the film and possibly repeating the procedure. (Reddy *et al.*, 2012)

As an alternative, extra oral radiographic (EOR) methods or several modified techniques can be used. But those techniques have their own drawbacks. EOR increases the patient dose due to compensation of source to film distance and decreases resolution and contrast of final images, hence obscure the necessary anatomical details. (Reddy *et al.*, 2012) Newly invented techniques, such as using film placement tags in order to position the film packet inside the mouth cavity, has several disadvantages such as difficulty in mass production of the film tag and maintenance of its sterility. (Rad, 2018)

As a new approach to above problems, this study has implemented a local anaesthetic drug which was sprayed in to the oral mucosa prior to the radiographic examination. This significantly aided in the placement of the film packet sufficiently posterior, so that the entire third mandibular molar and the surrounding tissues including inferior dental nerves were included in the radiograph. This study was aimed to obtain a quality image for lower third molar region effectively using the conventional IOPA method, without replacing it to another alternative radiographic procedure and also to reduce the pain and discomfort experienced by patients during the film packet placement.

Methodology:

The study was conducted as an experimental randomized controlled study involving randomly selected 62 patients who were assigned in to two groups as 31 in a controlled group (CG) and 31 in an experimental group (EG). Patients selected for the CG were subjected to the normal routine procedure. Patients selected for the EG were subjected to the anaesthetic application. A separate written consent was obtained from the EG patients providing necessary information regarding the risks and benefits. Patients were clearly asked for the history of any known allergies for contrast media or other food and drugs.

After the procedure, IOPA radiographs obtained from each group were photographed and they were evaluated by 4 dental surgeons and one radiographer using a quality assessment tool which contains 7 selected qualities (Inclusion of the region of interest in the middle of the film, visibility of the IDN, apices cut off, crown not shown, dropped film corner, image distortions and cone cutting).

Evaluated results were statistically analysed. A three-point scale system was used to obtain the overall quality measurement of the radiograph. Data obtained from a visual analogue scale given to the study subjects, was analysed to find the degree of general discomfort experienced during the examination. Results were analysed using MINITAB 19 Software. Chi square test was used to analyse the quality assessment results obtained via quality assessment tool and two sample t test method was used to analyse the pain assessment results obtained via pain assessment visual analogue scale.

Results and discussion:

Bar graphs were obtained for each evaluator according to the qualities provided in the quality assessment tool to visualize the

difference between the conventional method and the new method

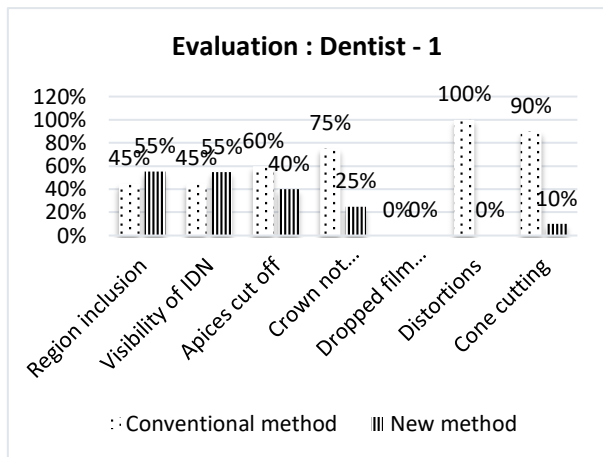


Figure 9: Evaluation 1

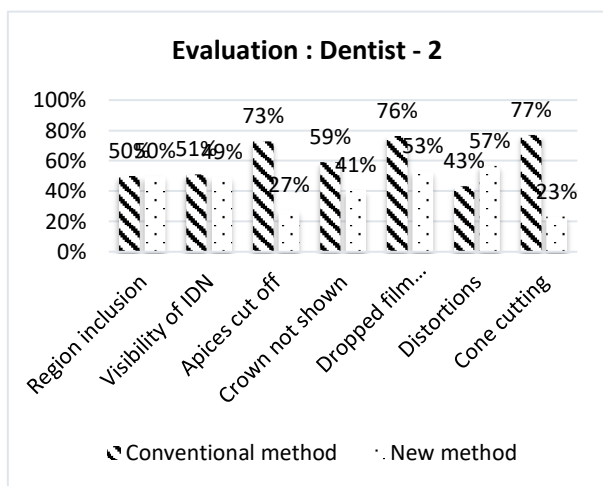


Figure 2: Evaluation 2

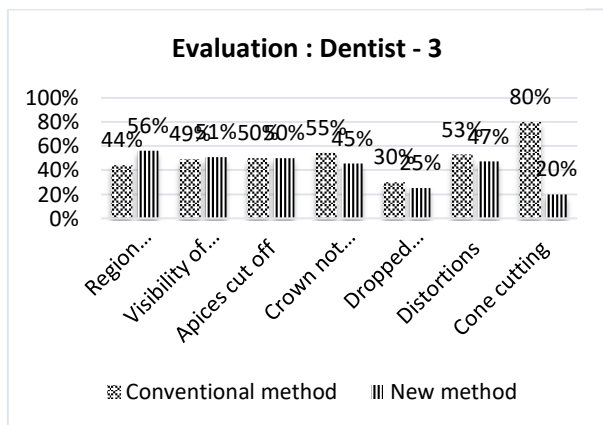


Figure3: Evaluation 3

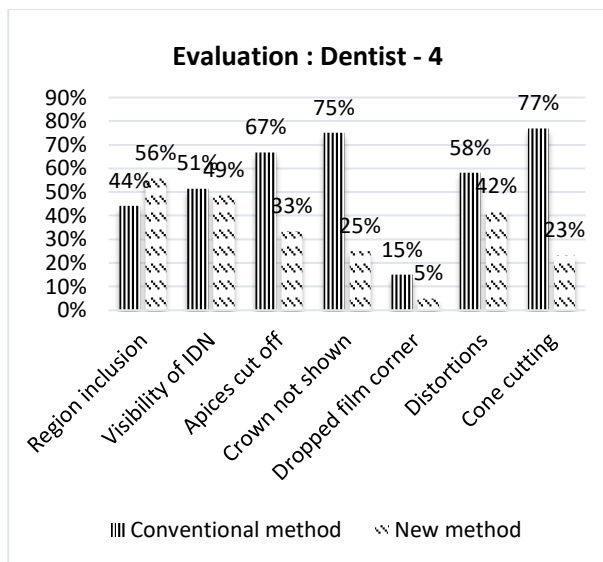


Figure4: Evaluation 4

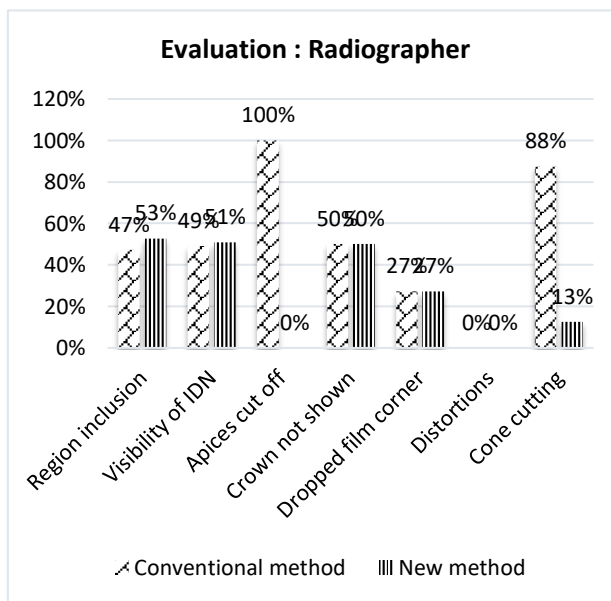


Figure 5: Evaluation 5

Overall results obtained for 'region inclusion' and 'visibility of IDN' shows less difference while overall results of other qualities 'apices cut off', 'crown not shown', 'dropped film corner', 'distortions' and 'cone cutting', show a contrastive difference between conventional and new methods. However, the statistical analysis of the qualities does not show significant difference between the two methods for the selected sample size. (p-value > 0.05)

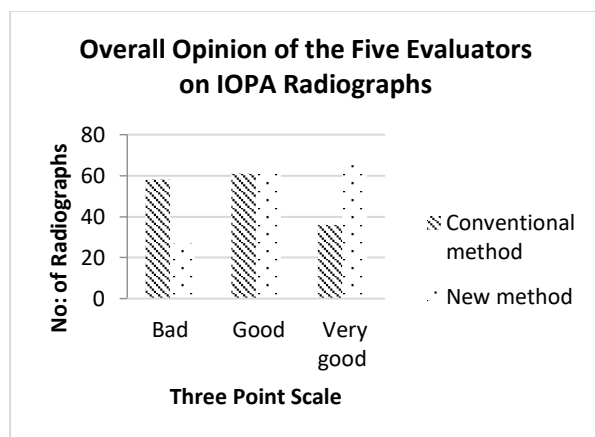


Figure 6: Overall opinion of Evaluators

Statistical analysis of the overall opinion of the evaluators indicates that the positive qualities 'good' and 'very good' show a significant difference between the conventional and new method. (p-value < 0.05) That is, the radiographs obtained using the new method show more positive qualities than radiographs obtained from the conventional method. In case of negative quality 'bad', radiographs obtained from the conventional method show more negative qualities than in new method.

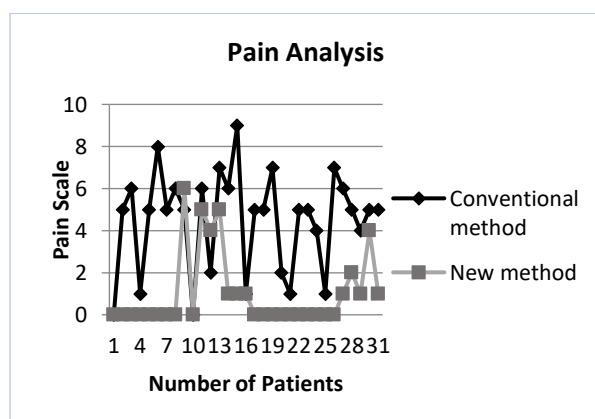


Figure7: Pain Analysis

Results obtained from the statistical analysis of the pain scale, indicated that the mean pain experienced by the patients subjected to new method had a significant difference compared to the pain experienced by the patients subjected to conventional method. (p-value < 0.05) That is, more pain and discomfort was experienced by the patients who were subjected to conventional method than new method.

The proposed method in this study is a highly practical solution. The anesthetic spray significantly aided in the placement of the film packet sufficiently posterior. This helped to include the entire third mandibular molar and the surrounding tissues including inferior dental nerves in the radiograph. Since the gag reflex was absent patient was very cooperative in placing the film packet in the correct position as instructed by the radiographer.

The pain and the general discomfort caused due to the contact of the sharp corners of the film packet in the floor of the mouth cavity were not experienced by the patients. The radiographer also found it very convenient to push the film packet sufficiently inferior so that whole tooth from crown to root is included in the film packet area. This produced a quality radiograph with excellent diagnostic value. A larger sample size would show a significant difference between each given qualities of conventional and new method. The overall opinion of the evaluators was that the radiographs obtained from the new method are better in quality than the radiographs of conventional method. According to the pain assessment obtained, patients subjected to the proposed method marked nearly 0 in the visual analog scale from 0 to 10. That is they had very less pain and discomfort during the film packet placement. Most of the patients subjected to the conventional method experienced a pain which was marked almost above 5 in the visual analog scale. Pain analysis showed statistical difference in between the two methods.

Conclusion:

This is a useful alternative technique and has proved to be effective in patients who are unable to tolerate the conventional technique. This technique might be used in the patients with exaggerate gag reflex, dental phobic patients and especially when patient feels

severe pain when placing the film packet inside the mouth. The advantage of this technique is the increased patient compliance providing images with adequate details and diagnostic quality. The unknown allergies for the anesthetic spray, the temporary altered sense of taste, and pain being highly subjective from patient to patient can be considered as limitations of this technique.

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