

Report of “Research Award of Oral Sciences”

Major: Oral Radiology

Grade: Graduate student 3rd year

Department: Prosthodontics and Oral Rehabilitation

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Title: Degradation of Imaging Plate of Intraoral Radiograph

1. Aim of research and results obtained (Approximately 400 words):

The purpose of this study was to explain the effect of the amount of radiation dose and exposure method/interval on imaging quality in two types of imaging plate (IP) systems available at the Radiology Department Office Outpatient Clinic, namely Digora Optime (Soredex) and VistaScan Perio (Dürr Dental). Both systems have differences in automatic exposure control (AEC) feature. Digora Optime IPs system equipped with AEC feature and VistaScan Perio system without AEC feature. The experiment and measurement were finished on 15 June 2023 for both IP systems up to 64 weeks data, and then the data was analyzed using ImageJ (NIH, Bethesda, USA). Contrast to noise ratio (CNR), low contrast value (LCV), and root mean square (RMS) values were measured for up to 64 weeks of use based on total dose and exposure frequency. At 64 weeks, the RMS of Digora Optime as well as the CNR and LCV of VistaScan Perio showed differences between the smaller and larger total dose groups. Whereas at 64 weeks, only the LCV of VistaScan Perio showed differences among the three groups with different exposure frequency. Total dose affected more on image quality than the variation in exposure frequency. This can be seen from the statistical differences in the contrast-granularity variable when the total dose is changed. These results are expected to provide input to facilities which have users of IP radiography systems, that the use of IP receiving higher exposure doses will be more susceptible to degrading image quality. Although the imaging process of IP is a reversible electron transfer process, in practice there are other factors that influence the image results such as artifacts, gray value compensation by the AEC, and the amount of dose received. The

manuscript of this research project has been drafted and is undergoing a review process by the co-authors. After the review process is finished, it will be submitted to the target journal as planned.

2. Self-evaluation of research achievement:

The results of this study will help to clarify the deterioration of IP, which has not been clarified until now, and will contribute to the clinical use of IP. In addition, we plan to conduct further research using the thermo-hygrometer purchased with the award money.

3. Meeting presentation:

Not done yet.

4. Journal publication:

Not done yet.

The manuscript of this research project has been drafted and is currently under review with the co-authors, prior to submission to the journal "Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology (Elsevier)".