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## **Proper Timing and Manipulation of Self – Processing Dental Radiographs in Baghdad Weather (Clinical Comparative study)**

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### **Abstract**

Poor image quality in self processed films is not an uncommon problem despite following the manufacturer's instructions, this matter has its influence on the ultimate diagnosis when the radiographic examination is the backbone in this diagnosis. The present study was carried out to investigate this problem and to provide a guideline measure to overcome it. One hundred fifty films were processed using three different manipulations: message, shaking and a combination of both, the resultant film quality was measured and comparison was made the results showed that combination of message and shaking procedure yield significantly better results regarding image quality in comparison to the other two procedures.

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### **Introduction:**

Despite the invention of digital intraoral radiography by Frances Mouyens 1984, film-based radiographs are still more common and valuable diagnostic tools<sup>(1,2)</sup> However, it requires the use of careful technique and precautions to maximize the diagnostic and interpretative value of the radiograph while at the same time minimizing patient exposure to radiation,<sup>(3,4)</sup> present-day improvement in radiology is directed at improving the quality of the image and reducing the radiation dose received by the patient.<sup>(5)</sup>

Many factors control the image quality in dental radiography, such as film type, technique and film processing, the correct processing of the radiographic film is critical to ensure the lowest radiation exposure and good quality radiographic<sup>(6)</sup>, Among other factors, accurate processing of radiograph plays a critical role in obtaining an acceptable diagnostic image with the lowest radiation exposure, Following image processing instructions issued by the manufacturer supposed to serve these two purposes<sup>(7,8)</sup>. Self-

developing films are no exception, these films come ready packed with a mono bath containing developer and and fixer, and uses an injector system to run the chemicals into the film envelope, As an examples of these films are the available (ECO 30<sup>TM</sup> ) and (Hanshin<sup>TM</sup>)system in periapical (size 2) format only, then ECO 30 films come ready packed with a mono bath containing developer and fixer, and so do not require darkroom, the film develops and fixes in 50 seconds, the Hanshin system uses an injector system to run the chemicals into the film envelope, Both systems are expensive, costing more than 1 for each film.<sup>(9,10)</sup> According to the manufacturer, instructions processing needs only 50 seconds to produce an acceptable image<sup>(11,12)</sup>, however, many factors that may interfere with dental radiograph quality have not been considered by the manufacturer, the matter that may lead to poor quality radiographs. This requires repetition with increase radiographic hazard to the patient and dentist. In addition to high financial cost. These problems have been encountered in the department of Radiology /College of Dentistry / Al-Mustansiriya University where self-processed films are uses as a part of teaching program of dental students. Several students complaining of poor image quality, despite following the manufacturer's instructions.

### **Aim of the study**

The present study was carried out to investigate the problem of improper image quality of commercially available soft processing radiographic films and to provide a guideline measure to improve the image quality of these films.

### **Materials and Methods:**

This study was carried out at the Department of Radiology/ College of Dentistry /Almustansyria University between March and April 2012. The study was conducted in two stages. In the first stage, 50 self processed films (Dent film, erconom-X-Italy) were categorized into five groups (10 films in each group) Films

in first group were processed for 50 seconds; in second group for 45; in third group for 35 seconds , in forth group for 30 and in last group for 25 seconds. The aim of this stage is to identify the best processing time in spring weather in Baghdad (room temperature was fixed on 20 C). The resultant radiographs were assigned as proper dark or faint. The time that yields the best result will be estimated and used as a fixed parameter in the second stage that designed to compare the different manipulation techniques. After conducting this part of the study, the best time that gives a large percent of proper images was found to be 35 found. In the second stage of this study, another 150 films of the same types were categorized into three groups as follows:-

*50 films processed for 35 seconds using the only message.*

*50 films processed for 35 seconds using only shaking.*

*50 films processed for 35 seconds using shaking and message.*

The resultant radiographs were assigned as poor: good and very good, depending on the clarity of the lamina dura. The radiograph considered Poor when the lamina dura is undetectable, good when the lamina dura is detectable and Very good radiograph the lamina dura is detectable and clear. Data then were subjected to both descriptive and inferential statistical analysis and comparisons were made.

### **Results:**

Table (1) shows that Films processed in 35 seconds gave batter results compared to films processed with other times. Film processed in more time showed a (dark) image, whereas time gave (faint) images. Regarding the method of manipulation, results of this study showed that (32%) of films manipulated with messaging procedure was poor in comparison to (15%) good and (3%) very good as shown in Fig (1).Results also show that that (16%) of films manipulated with shaking procedure was poor in comparison to

(21%) good and (13%) very good as shown in Fig(2). On the other hand the results show that (34%) of films manipulated with both messaging and shaking procedures were very good in comparison to (12%) good and (4%) poor as shown in Fig(3). Regarding the comparative significance, messaging the films while processing yield significantly (p ) better image quality in comparison to shaking. Combination of message and shaking were significantly (p ) better in comparison to message and highly significant (p ) comparison to shaking alone Table (2).

**Discussion:**

Following the right protocol processing is an important rule to ensure good quality radiography. Self-processing radiographs are no exception from this rule. However, following the manufacturer’s instruction of films used this study (Denta film, Erconom-X-Italy) seems to be not the best option in Iraqi environment. This situation results in several problems as the need for repetition and unnecessary exposure to radiation due to poor-quality radiographs. In the current study, the number of processing techniques and timings were tested to produce reasonable quality radiographs. According to the manufacturer’s instruction, the processing time of the film used in this research is 50 seconds. However, several processing errors were noticed, despite following the exact time for processing. As an example, these errors, some films were very dark or

completely black. Other were presented with black or green spots and others with finger pressure spots. These problems may be due to individual differences between the students in applying equal pressure or frequency of message sometimes the student press on the area more than others which gives a black spot. The outcome of radiographs with shaking only was better than radiographs with massage only. This could be explained by the fact that shaking does not need standardization in frequency and pressure power. It only depends on the time of shaking, for this reason a proper time was estimated and fixed in the second stage of this study. A combination of both procedures yields better results because the problems of each procedure had been overcome when both of them are incorporated in the third method (shake and message). The results of this research clarify the need for more studies in terms of testing and exploring different techniques and procedures when such types of radiographic films need to be used.

**Conclusions:**

Time of 35 seconds processing with both massage and shaking gives the best outcome in terms of self-processing radiography quality. This result calls for the need of implementing this timing and processing technique in the teaching process of dental student colleges.

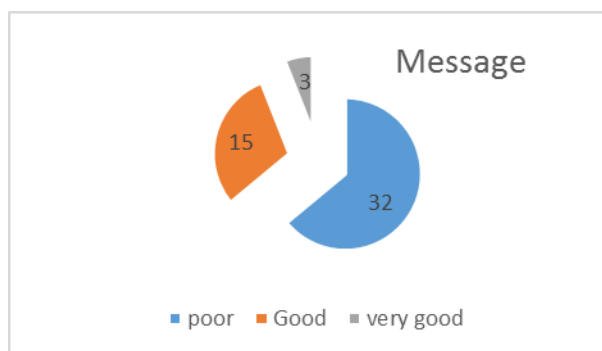


Fig. (1): Quality by massage.

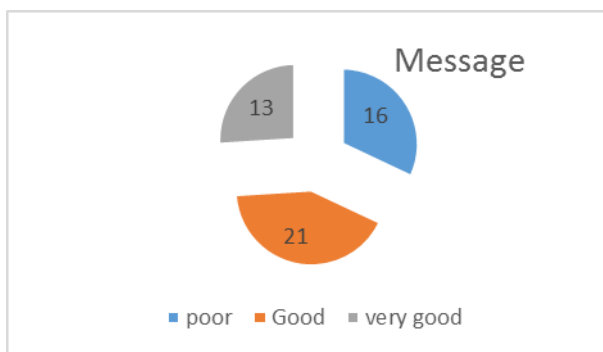


Fig. (2): Quality by shaking.

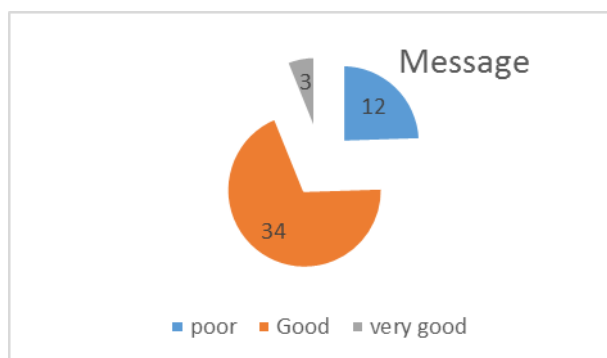


Fig. (3): Quality by message & shaking.

Table (1):- Distribution of films by the time of processing

| Time       | Clear | Dark | Faint | Total |
|------------|-------|------|-------|-------|
| 50 seconds | 2     | 8    | 0     | 10    |
| 45 seconds | 4     | 6    | 0     | 10    |
| 35 seconds | 8     | 1    | 1     | 10    |
| 30 seconds | 4     | 0    | 6     | 10    |
| 25 seconds | 2     | 0    | 8     | 10    |

Table (2):- Comparison between the three methods.

| Technique         | Shaking | Message | Shaking & message |
|-------------------|---------|---------|-------------------|
| Shaking           | -       | s       | HS                |
| Message           | s       | -       | s                 |
| Shaking & message | HS      | s       | -                 |

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