Accuracy of Panoramic Radiography for Detection of Periapical Endodontic Lesions

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Abstract: The aim of this study was to evaluate the accuracy of panoramic radiography for detection of periapical endodontic lesions. 50 panoramic radiographs with endodontic treated teeth with periapical lesions were examined. They were processed by a computer program Adobe Photoshop CS5. The results showed that there was a statistically significant difference between mean values of the index K, measured in the angle of the mandible and the endolesion.

Keywords: panoramic radiograph, periapical endodontic lesions

1. Materials and Methods

A total of 50 panoramic radiographs from 50 patients from University Medico-dental centre, Faculty of Dental Medicine, University of Varna, Bulgaria were investigated. They were selected randomly. Planmeca ProMax®2D X-ray unit was used. It has a generator with resonance mode high frequency 80–150 kHz, focal spot size 0.5 x 0.5 mm and constant magnification for panoramic radiographs - 1.2. The software for the images which was used is Planmeca Romexis®.

All the patients were registered by e-card, which includes patient's name and years as well as data from the panoramic radiograph in the software imaging Planmeca Romexis®. The subject of retrospective analysis were digital radiographs of 50 patients with endodontic treated teeth with periapical lesions. The criteria used for inclusion in the study were: patients over 18 years old, coming for the first time in the Medico-dental centre, with a digital panoramic radiograph. The panoramic radiographs were processed by a computer program Adobe Photoshop CS5: 1. The panoramic radiograph was opened by Adobe Photoshop CS5 2. From the menu we chose Image » Mode » Grayscale » 8 bits/Channel (fig.1). 3. Then select Move Tool (V) from the upper left corner of Adobe Photoshop CS5. 4. From the upper right corner of Adobe Photoshop CS5 we chose info and then recognized index K, which gives us information about the intensity of black and white colour of the examined panoramic radiograph (fig.2). The index K was measured in two examined areas - 1. An area of healthy bone in the corner of the mandible. 2. An area of periapical lesion in an endodontic treated tooth.

The following exclusion criteria were attached: upper and lower third molars (wisdom teeth), patients under 18, patients over 69, the totally toothless patients, teeth after endodontic surgery.

The results are recorded in tables and were subject to statistical analysis with specialized statistical analysis package STATISTICA.

Figure 1: Analysis of a panoramic radiograph with Adobe Photoshop CS5
Endolesio

mandible

between the average values of the index K, which was

area of healthy bone at the angle of the mandible was

0.05, so there is a

statistical analysis package STATISTICA (table 1).

The most common procedures used to determine the

From the statistical analysis was clear that p=0.00001 <

was measured at the endolesion was 72,82 (SD 4,43).

After analyzing the results of the retrospective study we

described an index to assess the presence of a periapical

Endolesio

n

\[ \begin{array}{|c|c|c|c|c|c|c|}
\hline
& \text{Mean} & \text{Std.} & \text{Count} & \text{Dif.} & \text{Std.} & \text{Confidence} \\
\hline
\text{Angle of} & 51.78 & 40 & 572 & 21.04 & 47.378 & 95,000% \\
\text{the} & & & & & - & +95,000% \\
\text{mandible} & & & & & & \\
\hline
\text{Endolesio} & 72 & 44 & 387 & 21 & 47.378 & 95,000% \\
\text{n} & & & & & - & +95,000% \\
\hline
\end{array} \]

From the statistical analysis was clear that p=0.00001 <

0.05, so there is a a statistically significant difference between the average values of the index K, which was measured at the angle of the mandible and the endolesion.

The average value of the index K which was registered in an

area of healthy bone at the angle of the mandible was e

51.78 (SD 4,05). The average value of the index K which was measured at the endolesion was 72,82 (SD 4,43).

After analyzing the results of the retrospective study we

described an index to assess the presence of a periapical

Endolesio

by software processing of a digital panoramic

radiograph (tabl.2).

Table 2: An index to assess the presence of a periapical

Endolesio

an index (PAI) (8). They

found out that apical periodontitis was scored more often on

paper than on screen, and more often on screen than in

periapical radiographs.

4. Conclusion

Using software processing of digital panoramic radiographs in the diagnosis of periapical inflammatory changes of endodontic origin through a computer program Adobe Photoshop PS5 significant differences in the index K at the black and white colour of the studied areas were found. This gave us the opportunity to offer a new index for assessing the presence of a periapical lesion. This is another option for assessing the presence or absence of periapical lesions of endodontic origin.

References


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