DETECTION OF ALVEOLAR CRESTAL BONE LOSS AND TOOTH LENGTH FROM A RADIOGRAPH IN DENTAL PRACTICE USING DIGITAL IMAGE PROCESSING

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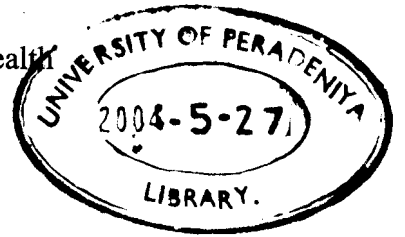
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Measuring of tooth length for root canal treatments in dentistry is a very important procedure. Inaccurate measurement will lead to poor prognosis and lot of complications. Measuring tooth length manually is difficult and may give erroneous estimation.

At present, the tooth length is estimated manually by marking measurements on a small dental x-ray image. This is a tedious procedure due to poor contrast of x-rays and smaller size. (3cm x 4cm approximately).

In addition, the measurement of bone loss is also done based visual observations of a dental x-ray. At present, no quantifiable measurements are done and recoded. However if the bone loss can be measured and recorded, it is advantageous in monitoring the prognosis of periodontal surgery and will present more concrete information during referral to another clinician.

An Image analysis program as a method of acquiring digital images were developed for the above two requirements. Normal x-rays were converted to digital images by taking their photographs using a digital camera. Back lighting was used for illuminating the x-rays as it improves brightness and contrast while minimizing reflections.

The image analysis program was developed by incorporating several image processing algorithms. The developed program could be used to obtain numerical measurements of

the tooth length as well as bone loss estimates with relatively higher accuracy. Since the measurements were not based on human judgment alone and the images displayed on the computer monitor provided the clinician with a larger image with better contrast, the measurements accuracy as well as the convenience in marking the measurements improved.