

# Evaluation of the Efficiency of 2 Types of Periodontal Probing

## SUMMARY

**Background:** The periodontal probing has an important role in clinical examination of the periodontal status; different types of periodontal probes have been described. The aim of this investigation was to evaluate comparatively the efficiency of periodontal probing with conventional periodontal probe and electronic periodontal probe. **Material and Methods:** We examined 57 patients, each patient being subjected to conventional and electronic probing. We assessed the tolerance degree for each probing type and also the time consumed by probing and periodontal charting. **Results:** The periodontal probing with the electronic probe revealed superior results regarding the accuracy of the measurements, the tolerance level and the time consumed. **Conclusions:** The electronic periodontal probing is an exceptionally accurate method in establishing diagnosis and assessing treatment results. The electronic periodontal probe represents an efficient and useful tool for measurements of the gingival sulcus and periodontal pockets, and also for determination of the periodontal risk.

**Keywords:** Periodontal Probing; Conventional Periodontal Probe; Electronic Periodontal Probe.

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## Introduction

The periodontal disease represents an inflammatory disease, which may affect the superficial and also the profound periodontal tissues, such as in periodontitis cases. Regardless the form of the disease (chronic or aggressive), periodontitis is characterized by different degrees of periodontal tissue destructions. The periodontal disease forms are determined by a rigorous clinical examination, accompanied by para-clinical examinations<sup>1</sup>. The periodontal probing has an important role in clinical examination of a patient with periodontal impairment. It has to be precise, rapid, and with a relatively easy technique. Furthermore<sup>2</sup>, the pressure of the probe in the sulcus must not exceed 0.2 N/mm<sup>2</sup>.

To date, different types of periodontal probes have been described, with the purpose of measuring the gingival sulcus, from the free gingival margin to the base of the sulcus, represented by the attached epithelium<sup>3</sup>.

These periodontal probes have been grouped in 5 generations. The first generation of periodontal probes includes conventional periodontal probes, which present a handle, a shank and an active part. The active part presents a rounded tip (to avoid a harmful manoeuvre) and different types of gradations in millimetres, to quantify the depth of the gingival sulcus. Until now, the Williams' periodontal probe still remains the most used instrument in the examination of the periodontal pockets.

The second generation of periodontal probes represents pressure-sensitive probes. This type of probes solved the problems of previous probes, but it still presents a lack of tactile sensitivity.

The third generation of periodontal probes includes electronic, computerized probes. These probes have a hardware component, which conducts the probing, and a software component, which analyses the transmitted data due to a wired or wireless connection between the 2 components; these probes are extremely accurate but also expensive; the high cost is the main reason for the fact that they are not often used<sup>4</sup>.

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The fourth generation of periodontal probes includes 3-dimensional probes and the fifth generation presents non-invasive probes, still in the research phase, based on the principle of echography<sup>5</sup>.

The purpose of this study was to assess the efficiency and accuracy of periodontal probing with the electronic probe versus conventional probe.

### Material and Methods

The study was conducted on a group of 57 patients, in the Periodontology Clinic of “Gr.T.Popa” University

of Medicine and Pharmacy, Iași, between February 2013 and July 2013. The patients were submitted to clinical examination, which consisted in the assessment of periodontal clinical indices and also in the periodontal charting, with sole purpose to establish a periodontal diagnosis and make a periodontal treatment plan.

We adopted 2 methods for the periodontal charting. First of all, we conducted the periodontal probing with a conventional periodontal probe, Williams type (Fig. 1), followed by the conventional periodontal charting, operations handled by the same operator. Furthermore, we conducted probing with the electronic periodontal probe (Fig. 2) on the same patient, using Pa-on Periometer, Orangedental GmbH & Co. KG).



Figure 1. Williams periodontal probe; the gradation are as follows: 1, 2, 3, 5, 7, 8, 9, 10 mm



Figure 2. Electronic periodontal probe (Pa-on Periometer)

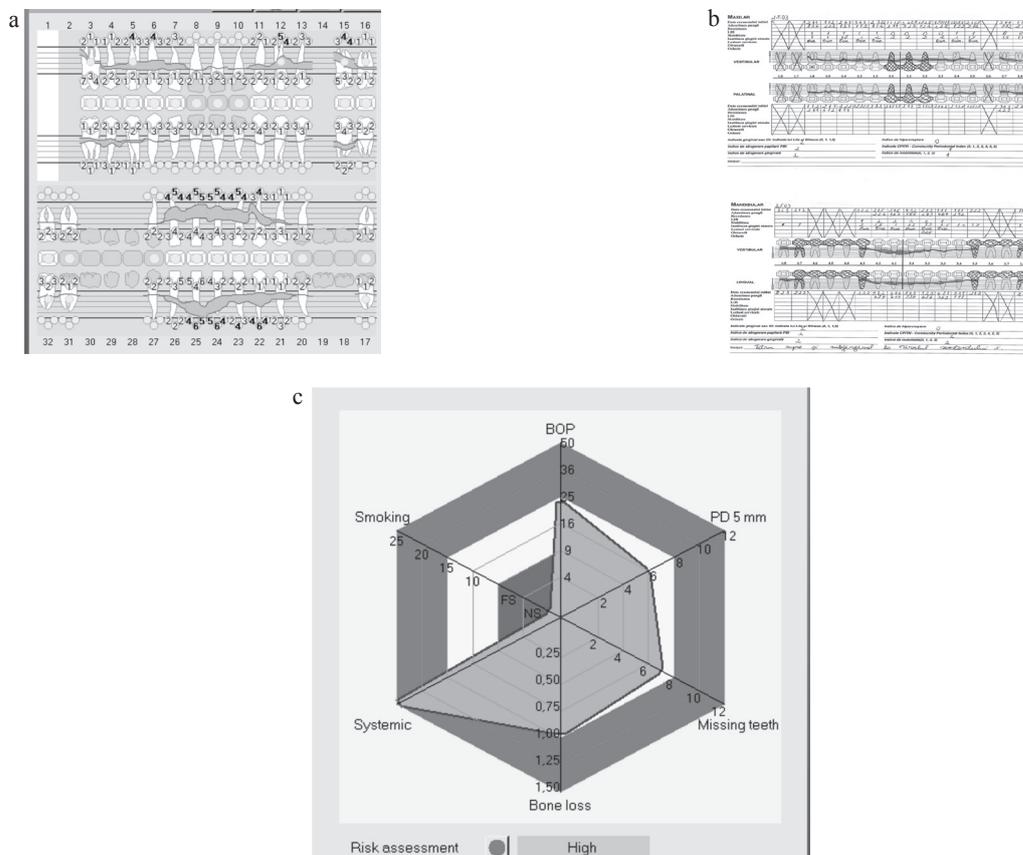


Figure 3. Patient SI, 59 years old. a) electronic perio chart; b) conventional perio chart; c) perio risk assessment

The registered values by the hardware piece were simultaneously transmitted to the PC having previously installed the software component (Byzz 5.5 by Orangedental GmbH & Co. KG); thus, the electronic periodontal chart and the risk chart were automatically generated (Fig. 3).

We also registered the patients' tolerance degree to these 2 types of periodontal probing, by 3 degrees (excellent, satisfactory and unsatisfactory). The time consumed with the probing and the charting was also assessed. The obtained data were registered and submitted to statistical analysis. For this purpose we used Microsoft Excel și PASW 18 Statistics software.

## Results

The patients' response to the 2 types of periodontal probing was clearly favourable for the electronic periodontal probing (Fig. 4).

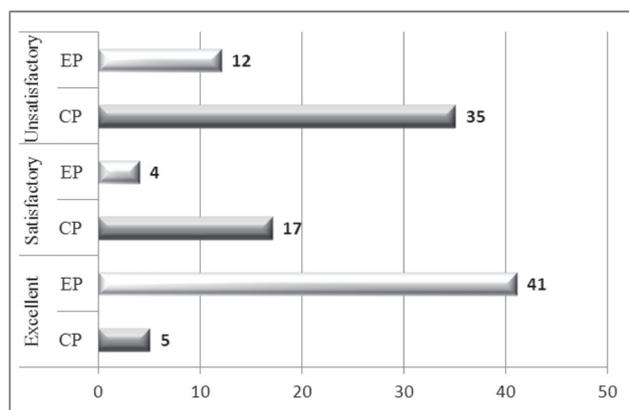


Figure 4. Distribution of satisfaction degree among patients (EP: Electronic Probing; CP: Conventional Probing)

The comparative analysis of the probing depths offered noticeably favourable results for the electronic periodontal probing (Tab. 1). Differences between the measurements of the 2 periodontal probing types were statistically significant.

Table 1. The overall mean values of periodontal probing depths

Periodontal probe	Mean probing depth (mm) $\pm$ SD
Conventional probe	4.43 $\pm$ 1.52
Electronic probe	5.03 $\pm$ 1.69

Also, it is important to stress the much lower time consumption using electronic periodontal probe in comparison to the conventional probe. If the average time

spent on conventional probing + periodontal charting was 34.20  $\pm$  6.8 minutes, the mean value of the electronic probing + periodontal charting was 11.30  $\pm$  3.3 minutes.

## Discussion

The electronic periodontal probing offered clearly favourable results regarding the patients' compliance. Even if this appreciation is a subjective one, the high degree of compliance determines us to consider the electronic periodontal probe as a tool easier to tolerate than the conventional probe.

Many times, the high error intervals may determine the under-appreciation of the degree of tissue destruction, leading to a faulty periodontal diagnosis. This fact determines us to consider the electronic periodontal probe an exceptional accurate device, with a high value for establishing the diagnosis, as well as assessing the treatment results. This instrument is very useful, especially for operators who lack experience.

Regarding time spent with periodontal probing and charting, by using the electronic periodontal probe we obtained a 3 times decrease of probing time, which is extremely valuable.

The software of the electronic periodontal probe also offers the possibility of conducting a risk evaluation for periodontal diseases. This fact is important for medical investigators, offering them a global view of the patient but also for the patient himself, who can directly be informed and motivated regarding his own periodontal status.

The results of the present study are consistent with a number of published data in the literature<sup>6-9</sup>. Further studies are needed to evaluate the effectiveness of electronic probing and the use of other probes in various dental sites (such as the furcation area).

## Conclusions

Electronic periodontal probing showed more accurate results regarding gingival sulcus and periodontal pockets values. Patient tolerance was higher when electronic probe was used, and the time spent for this type of survey, together with the periodontal charting and risk assessment, was greatly diminished.

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