



ELECTRIC PULP TEST OF TEETH WITH PERIODONTAL DISEASE

Tsonko Uzunov¹, Raya Grozdanova¹, Dimitar Kosturkov², Albena Latkovska³, Todor Ts. Uzunov⁴

1) Department of Conservative dentistry, section of dental physical therapy,

2) Dentist in private practice,

3) Student V year, Physical therapy and diagnosis of dental diseases workshop,

4) Department of Prosthetic Dentistry

Faculty of Dental Medicine, Sofia, Medical University, Sofia, Bulgaria.

SUMMARY:

Purpose: The aim of the research is to investigate the change in pulp vitality of teeth with periodontal disease using electric pulp tester (EPT).

Methods: Subjected to observation were 108 patients with chronic periodontitis. Vitality of 805 teeth with periodontal pocket depth greater than 4 mm was studied by EPT. The research was conducted with EPT "Yonovit".

Results: The highest percentage of surveyed teeth (68.4%) respond to the norm when they are tested with EPT – values between 3 μ A and 10 μ A. Teeth that respond to EPT with values below 3 μ A and between 35-100 μ A are relatively equal - respectively 4.3% and 3.3%. With increased threshold of irritation – 10-35 μ A react 23.4% of teeth. Small number of teeth have threshold of irritation over 100 μ A - 0.6%.

Conclusion: The value of EPT among periodontal damaged teeth depends on many factors - patient's age, extent of periodontal affect, group affiliation of teeth, etc.

Keywords: EPT, periodontal disease.

INTRODUCTION

Anatomic, embryonic and functional relationship exists between the pulp and periodontium.

Since these two structures develop from a common mesodermal source, relationship between pulpal and periodontal diseases can be explained due to their anatomical connection [1, 2].

There are different ways of communication between the periodontium and the pulp, which can lead to spread of infection from one of the structures to the other [3, 4, 5].

1. Pathways of developmental origin (anatomical pathways):

- Apical foramen, accessory canals/lateral canals, dentinal tubules

2. Congenital absence of cementum exposing dentinal tubules

- Developmental grooves

3. Pathways of pathological origin:

- Empty spaces on root created by Sharpey's fibers

- Root fracture following trauma

- Idiopathic root resorption internal and external

- Loss of cementum due to external irritants

4. Pathways of iatrogenic origin:

- Exposure of dentinal tubules following root planing

- Accidental lateral root perforation during endodontic procedures

- Root fractures during endodontic procedures

The main etiological factors are living (bacteria, fungi and viruses) and nonliving pathogens. Some contributing factors such as trauma, perforations, malformations, root resorptions may play an important role [2, 3, 6].

MATERIALS AND METHODS

The survey included 108 patients with chronic periodontitis. Pulp reaction of 805 teeth with periodontal pocket greater than 4mm was tested with EPT. The research was conducted with unit "Yonovit" for EPT.

The following inclusion criteria were considered: patients regardless of gender or race, who had not been submitted to periodontal treatment up to 6 months before the study, and presenting with diagnosis of chronic periodontitis. This diagnosis was based on the following criteria:

- Probing depth (PD) – greater than 4mm

- Clinical attachment level (CAL) – greater than 30%

- Age – above 30 years?

Exclusion criteria:

- Teeth with caries, acute pulp diseases, cervical decays – erosion, usura

- Teeth with crowns or bridges

- Orthodontically moved teeth

- PD – less than 4 mm

- CAL – less than 30%

The survey results were statistically processed according to following criteria:

1. Sex

2. Age

3. Teeth's group - anterior, premolars, molars

4. Probing depth (PD) - 4 to 6 mm; over 6 mm

5. Threshold of irritation (EPT):

- below 3 μ A;

- 3-10 μ A;

- 10-35 μ A;

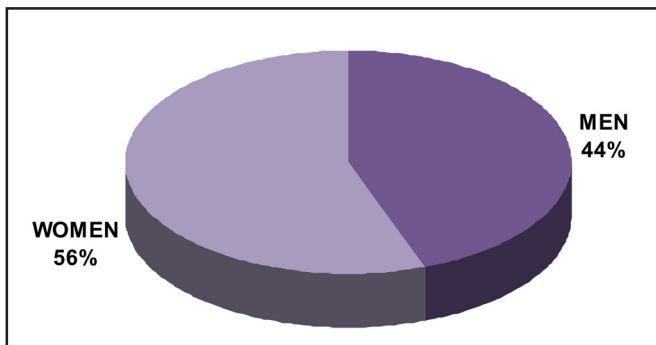
- 35-100 μ A;

- over 100 μ A

RESULTS

Distribution according to gender (fig. 1):

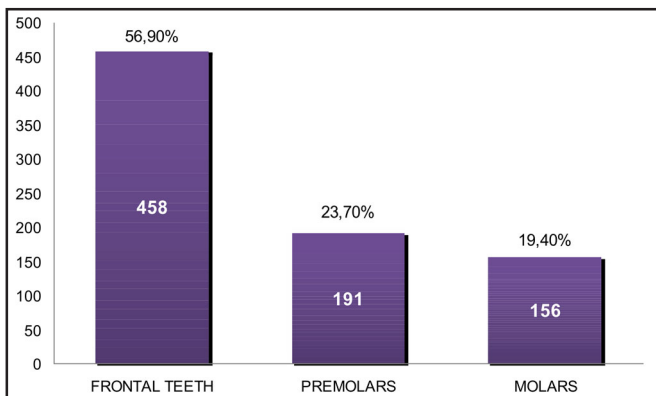
Fig. 1. - Distribution according to gender



56% of the studied patients are women, 44% are men.

Distribution according to teeth's group (fig. 3, tab. 1):

Fig. 3. - Distribution according to teeth's group



458 of the studied teeth are frontal teeth, 191 are premolars, 156 are molars.

In the table below results can be seen in detail: (tab.1)

Tab. 1. Percentage distribution according to teeth affiliation

	Pocket Depth	4-6 mm					> 6 mm				
		EPT	< 3 μ A	3-10 μ A	10-35 μ A	35-100 μ A	>100 μ A	<3 μ A	3-10 μ A	10-35 μ A	35-100 μ A
Frontal teeth		4,20%	71,70%	13,60%	0,80%	0%	0,40%	6,50%	2,80%	0%	0%
Premolars		3,20%	61,80%	21,90%	1,50%	0,50%	0%	5,80%	3,80%	1,50%	0%
Molars		2,50%	36,60%	28,30%	9,70%	2,50%	0%	7,60%	11,50%	1,30%	0%

Distribution according to EPT (fig. 4, tab. 2):

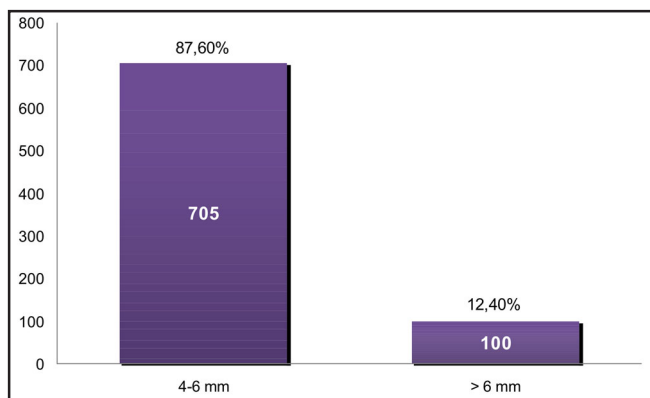
Fig. 4. Distribution according to EPT

4,3 % of studied teeth show threshold of irritation above 3 μ A, 69% respond to EPT with values between 3-10 μ A, 23,4% between 10-35 μ A, 3,3% between 35-100 μ A.

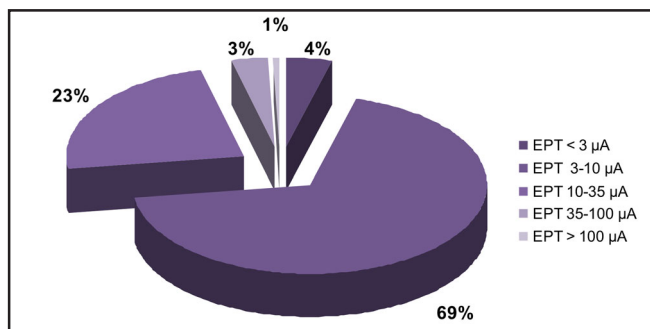
In the table below results can be seen in detail: (tab.2)

Distribution according to PD (fig. 2):

Fig. 2. - Distribution according to probing depth (PD)



705 of the studied teeth have probing depth between 4 and 6 mm, 100 teeth have probing depth greater than 6 mm.



Tab. 2. Percentage distribution according to EPT values

	Pocket Depth	4-6 mm					> 6 mm				
	EPT	< 3 μ A	3-10 μ A	10-35 μ A	35-100 μ A	>100 μ A	<3 μ A	3-10 μ A	10-35 μ A	35-100 μ A	>100 μ A
Frontal teeth		65,50%	65,20%	41,90%	18,20%	0%	100,00%	56,60%	34,20%	0%	0%
Premolars		20,70%	23,50%	28,40%	13,60%	20,00%	0%	20,70%	18,40%	60,00%	0%
Molars		13,80%	11,30%	29,70%	68,20%	80,00%	0%	22,70%	47,40%	40,00%	0%

As far as it concerns the percentage distribution according to teeth affiliation, the following results were found (the highest percentage in each group):

In the group of frontal teeth 71,7 % have PD 4-6 mm and respond normally to EPT – 3-10 μ A. 6,5% of frontal teeth have PD greater than 6 mm and show EPT values between 3-10 μ A. In the group of premolars the results are similar – 61,8% have PD between 4-6 mm and respond normally to EPT – 3-10 μ A; 5,8% have PD greater than 6mm and have threshold of irritation 3-10 μ A. In the group of molars 36,6% of studied teeth have PD 4-6mm and reaction to EPT 3-10 μ A; 11,5% have PD greater than 6 mm and respond with higher threshold of irritation – 10-35 μ A.

As far as it concerns the percentage distribution according to EPT values, the following results were found (the highest percentage in each group):

In the cases with PD 4-6 mm, most of the teeth that respond to EPT with values under 3 μ A, between 3-10 μ A and 10-35 μ A, are frontal – resp. 65,5%; 65,2%; 41,9%. Highest percentage of teeth that have EPT values 35-100 μ A and over 100 μ A are molars – resp. 68, 2%; 80%. In the cases with PD greater than 6mm, most of the teeth that respond to EPT with values under 3 μ A and between 3-10 μ A are frontal teeth – resp. 100% and 56,6%. 47,4% of teeth that have threshold of irritation 10-35 μ A are molars. 60% with reaction to EPT between 35-100 μ A are premolars. 0% of studied teeth with PD greater than 6 mm respond to EPT with values over 100 μ A.

DISCUSSION

Several studies have shown the relationship between pulp and periodontium [7, 8, 9, 10]. But there are still some controversies on that topic [11, 12]. Authors such as Mazur and Massler [13] reported that periodontal disease does not

influence the pulp.

A research of Telma R. Aguiar [8] showed that “radicular pulp of teeth with chronic advanced periodontitis presents characteristics compatible with pulp changes resulting from pulp aging”.

According to the study of Seyedmajidi et al.[9], there is a statistically significant correlation between clinical attachment loss and pulp diagnosis ($p=0.043$). Also there is a statistically significant relationship between clinical attachment loss and calcification in the pulp ($p =0.014$). [10]

The results of our study confirm the statement that there are changes in pulp in relation to periodontal alteration. It is obvious that these changes are as greater and notable as greater is the periodontal disease and probing depth.

According to our study it can be seen that EPT among periodontal damaged teeth depends on many factors - patient’s age, extent of periodontal affect, group affiliation of teeth, etc.

CONCLUSION

Lowered and normal values of EPT are registered among the frontal teeth. Raised threshold of irritation can be seen in in the group of molars. Premolars take intermediate position with respect to frontal teeth and molars.

There is a trend toward higher value of EPT with increasing probing depth, distinctively notable in the group of molars (due to more lateral canals). The greater probing depth is, the more notable are the differences between the separate teeth groups.

According to the results from our research, the diagnostic process and the treatment plan of patients with periodontal disease should be considered carefully.

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Address for correspondence:

Dimitar Kosturkov,
Department of Conservative dentistry, Faculty of Dental Medicine,
1, Sv. Georgi Sofiyski blvd., 1431 Sofia, Bulgaria
Mobile: +359883445441;
E-mail: D.Kosturkov@gmail.com