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Impact of primary endodontic treatment provided by undergraduate students and endodontic specialists on patients' quality of life

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ABSTRACT

Everyday life of individuals can be significantly influenced by positive and negative changes in oral health status, by symptoms and severity of oral disorders and diseases. The World Health Organization (WHO) proclaims a necessity to measure health and the effects of health care not only on the basis of changes in the frequency and severity of diseases but also by estimation of patients' well-being assessed with the improvement in their quality of life. The aim of our study was to investigate the impact of primary root canal treatment on the perceived quality of life amongst patients treated by providers with different qualification and experience. Two hundred systemically healthy, mentally fit and legally capable of signing an informed consent patients needing an endodontic care were randomly selected and participated voluntarily in the study conducted in the Department of Conservative Dentistry, Faculty of Dental Medicine, Medical University, Sofia, Bulgaria. The treatment was provided by fourth-year and fifth-year students in the course of their clinical exercises and by five endodontic specialists. The study instrument was the modified Oral Health Impact Profile comprising 17 items which was filled in anonymously by all participants. The interview was carried out before the root canal treatment and two weeks after it was completed by one and the same examiner. The impact of endodontic disease and its treatment was recognized by seven conceptual dimensions: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap. The responses of the OHIP items were made on a five-point scale ranging from 0 = never, 1 = hardly ever, 2 = occasionally, 3 = fairly often to 4 = very often. The analyses of the results revealed that patients perceived their quality of life impaired because of the irreversible inflammation of the dental pulp. The negative impact of the endodontic disease was similar for the patients treated by students and specialists as the difference between the registered mean impact values at the first appointment was insignificant. Experience and training level influenced the degree of improvement as registered mean impact values were significantly greater in the group treated by endodontic specialists when compared to the one treated by undergraduate students.

Keywords:
quality of life, oral health status, Oral Health Impact Profile, endodontic treatment, irreversible inflammation of the dental pulp

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Introduction

Everyday life of individuals can be significantly influenced by positive and negative changes in oral health status, by symptoms and severity of oral disorders and diseases. The World Health Organization (WHO) proclaims a necessity to measure health and the effects of health care not only on the basis of changes in the frequency and severity of diseases but also by estimation of patients' well-being assessed with the improvement in their quality of life (20).

Recently, a growing interest by researchers and practitioners has been registered in measuring the burden of certain oral conditions on quality of life of the affected population and the effectiveness of provided health care in relieving this burden. The impact of dental prostheses (6), parafunctional habits (3), traumatic dental injury (15), orthodontic appliances (7), implants (19), dental pain (18), surgical treatment (2), dental caries (14) and endodontic treatment (1, 16) on quality of life of different population samples was studied.

Locker (9) was the first to propose a conceptual framework for measurement of oral health and came to the conclusion that oral disorders can affect physical and psychological well-being of people by altering their ability to speak, chew, taste food, sleep, enjoy life and have normal social contacts. His findings served as a basis for Slade and Spencer (11) to develop the Oral Health Impact Profile (OHIP) which turned to be one of the most widely used instrument for measurement of oral health impact. The OHIP measures the physical, psychological and social aspects of individuals' perception of the influence of different oral conditions and treatment regimes on their quality of life (5). With the intension to study the impact of endodontic treatment on patients' perceptions and everyday well-being, Dugas (16) designed an alternative short version of OHIP by decreasing its original 49 items to 17 items. Functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap were viewed from the perspective of patients with a five-point Likert-like scale ranging from 0 to 4.

Quality of life instruments are valuable, as well, for their contribution to improvement of prevention and dental intervention strategies and to promotion of better life for individuals (8, 13, 21).

Insufficient data exist in literature considering the impact of endodontic diseases and their treatment on patients' quality of life. No research has been done in our country to assess the effect of provided endodontic treatment on patients' perceptions of their functional, psychological and social well-being. Based on this, we designed the present study for a sample of patients referring for endodontic treatment to one of the dental schools in Sofia, Bulgaria. Our aim was to investigate the impact of primary root canal treatment on the perceived quality of life amongst patients treated by providers with different qualification and experience.

Materials and methods

Two hundred systemically healthy, mentally fit and legally capable of signing an informed consent patients needing an endodontic care were randomly selected and participated voluntarily in the study conducted in the Department of Conservative Dentistry, Faculty of Dental Medicine, Medical University, Sofia, Bulgaria. The treatment was provided by fourth-year and fifth-year students in the course of their clinical exercises and by five endodontic specialists.

All adults aged 18 years and more who were with diabetes mellitus, blood disorders, dialysis, immunodeficiency, pregnancy, trauma, implants and orthodontic treatment were excluded from the monitoring. A consent form describing the aim of the study and the methods to be used was signed by all approved participants. A primary endodontic treatment was planned for all of them because of an irreversible inflammation of the dental pulp. All teeth were clinically and radiographically examined and the ones with

previous endodontic treatment and signs of untreated apical periodontitis were excluded from the observation. The study protocol was approved by the ethical committee of the university.

The study instrument was the modified Oral Health Impact Profile (Dugas et al. 2002) comprising 17 items (Table 1) which was filled in anonymously by all participants. The interview was carried out before the root canal treatment and two weeks after it was completed by one and the same examiner. The impact of endodontic disease and its treatment was recognized by seven conceptual dimensions: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap.

The responses of the OHIP items were made on a five-point scale ranging from 0 = never, 1 = hardly ever, 2 = occasionally, 3 = fairly often to 4 = very often. Calculation of "mean impact value" was obtained by calculating the means of responses on each question for both visits. A parallel between scores obtained from the two visits in each group of treatment providers and between the patients treated by undergraduate students and endodontic specialists was made.

Data were analyzed using SPSS software version 17.0. Frequency distribution with means and standard errors of means was registered for continuous variables. Oral health quality of life before and after the endodontic treatment was investigated using nonparametric statistics.

Table 1 Modified version of oral health impact profile instrument (OHIP-17) (Dugas et al.)

Question number	Item question
OHIP1	Have you had trouble pronouncing words because of your teeth and mouth?
OHIP2	Have you felt that your sense of taste has worsened because of your teeth or mouth?
OHIP3	Have you had painful aching in your mouth?
OHIP4	Have you found it uncomfortable to eat any foods because of your teeth or mouth?
OHIP5	Have you had to alter the temperature of the foods that you eat because of your teeth or mouth?
OHIP6	Have you been self-conscious because of your teeth or mouth?
OHIP7	Have you felt tense because of your teeth or mouth?
OHIP8	Has your diet been unsatisfactory because of your teeth or mouth?
OHIP9	Have you had to interrupt meals because of your teeth or mouth?
OHIP10	Have you found it difficult to relax because of your teeth or mouth?
OHIP11	Have you found it difficult to fall asleep because of your teeth or mouth?
OHIP12	Have you ever been awakened by problems with your teeth or mouth?
OHIP13	Have you been embarrassed because of your teeth or mouth?
OHIP14	Have you been irritable with other people because of your teeth or mouth?
OHIP15	Have you had difficulty doing your usual jobs because of problems with your teeth or mouth?
OHIP16	Have you felt that life in general was less satisfying because of your teeth or mouth?
OHIP17	Have you been totally unable to function because of your teeth or mouth?

Results

The study was completed by 157 patients as 17 did not appear on their second visit, 18 did not finish the treatment and 8 refused to fill in the questionnaire. Seventy-seven of the participants were treated by undergraduate students and 80 – by endodontic specialists.

The impact of the provided endodontic treatment on patients' everyday life is represented in Table 2. In both groups the root canal therapy influenced significantly quality of life, especially in the group of specialists, where all items were substantially improved (p<0.0001). Results of treatment by undergraduate students revealed significant impact on almost all items, with the only exception of the question concerning necessity of alteration of food temperature because of problems with teeth (p=0.072).

Table 2 Impact of provided endodontic treatment in the groups of undergraduate students and endodontic specialist (Paired-Sample T-test)

Item	Description of the item	Undergraduate students Paired differences			Specialists Paired differences		
		Mean	Std. Deviation	P-value	Mean	Std. Deviation	P-value
Functional limitation	Trouble pronouncing words	0.364	1.468	0.033	0.725	1.031	
	Sense of taste worsened	0.532	1.643	0.006	0.988	0.948	
Physical pain	Painful aching	0.792	1.270	0.000	1.488	0.857	
	Uncomfortable to eat	0.468	1.438	0.006	1.425	0.991	
	Alter temperature of food	0.390	1.872	0.072	1.300	1.048	
Psychological discomfort	Self-conscious	0.481	1.353	0.003	1.250	0.974	
	Tense	0.571	1.175	0.000	1.263	1.040	
Physical disability	Unsatisfactory diet	0.429	1.229	0.003	1.000	0.928	p<0.0001
	Interrupting meals	0.571	1.057	0.000	1.175	1.003	
Psychological disability	Difficult to relax	0.442	1.118	0.001	0.913	0.930	
	Difficult to fall asleep	0.662	0.982	0.000	1.263	1.028	
	Awakened	0.675	1.081	0.000	0.950	0.940	
	Been embarrassed	0.390	1.582	0.034	0.750	0.921	
Social disability	Irritable with others	0.299	1.171	0.028	0.863	1.003	
Handicap	Difficulty doing jobs	0.325	0.880	0.002	0.625	0.832	
	Life unsatisfying	0.455	1.083	0.000	0.788	0.910	
	Unable to function	0.351	0.507	0.000	0.450	0.778	

Table 3 presents the frequency distribution of subjects reporting no impact (subject scored 0) or some impact (subject scored 1 or more) of the OHIP items before root canal treatment. A comparison of the mean impact values obtained in the groups treated by undergraduate students and endodontic specialist before and after the treatment was made (Table 3).

The initial endodontic symptoms impaired almost in one and the same way the life of patients in both groups, as the difference between the compared items was insignificant. The only exception was for the scores obtained in the fourth question concerning comfort during eating (p=0.022). A noticeable improvement was registered for pain, comfort during eating, difficulty to fall asleep or awakening by teeth problems. A significantly greater improvement of quality of life was registered in the group of patients treated by specialists when compared with that of students' patients.

Table 3 Comparison between the groups of undergraduate students and endodontic specialist before and after the provided treatment (Independent Samples T-test)

Item	Treatment provider	Before treatment					After treatment			
		No impact (%)	Some impact (%)	Mean impact value	Std. Deviation	P-value	Some impact (%)	Mean impact value	Std. Deviation	P-value
OHIP 1	Students	59.7	40.3	0.82	1.097	0.499	27.3	0.45	0.820	0.030
	Specialists	53.7	46.3	0.94	1.106		16.3	0.21	0.544	
OHIP 2	Students	37.7	62.3	1.42	1.260	0.709	52.0	0.88	1.038	0.009
	Specialists	30.0	70.0	1.49	1.147		36.3	0.50	0.746	
OHIP 3	Students	13.0	87.0	1.73	0.868	0.059	59.8	0.94	0.894	0.001
	Specialists	6.2	93.8	1.98	0.763		37.5	0.49	0.711	
OHIP 4	Students	20.8	79.2	1.64	1.075	0.022	67.5	1.17	0.992	0.000
	Specialists	6.2	93.8	1.99	0.819		40.0	0.56	0.777	
OHIP 5	Students	20.8	79.2	1.84	1.236	0.534	69.1	1.45	1.252	0.000
	Specialists	17.5	82.5	1.96	1.141		37.5	0.66	0.993	
OHIP 6	Students	24.7	75.3	1.64	1.157	0.077	62.3	1.16	1.089	0.003
	Specialists	7.5	92.5	1.94	0.959		46.3	0.69	0.880	
OHIP 7	Students	15.6	84.4	1.81	1.077	0.905	68.8	1.23	1.062	0.000
	Specialists	11.2	88.8	1.83	1.003		41.3	0.56	0.793	
OHIP 8	Students	33.8	66.2	1.26	1.105	0.238	53.3	0.83	0.951	0.005
	Specialists	18.7	81.3	1.45	0.899		33.8	0.45	0.692	
OHIP 9	Students	23.4	76.6	1.40	1.003	0.091	58.5	0.83	0.865	0.008
	Specialists	15.0	85.0	1.66	0.913		36.3	0.49	0.729	
OHIP 10	Students	36.4	63.6	1.12	0.973	0.240	49.4	0.68	0.768	0.010
	Specialists	26.2	73.8	1.30	0.973		32.5	0.39	0.606	
OHIP 11	Students	28.6	71.4	1.32	0.979	0.176	49.4	0.66	0.754	0.000
	Specialists	20.0	80.0	1.54	0.980		22.5	0.28	0.551	
OHIP 12	Students	24.7	75.3	1.36	1.025	0.505	45.5	0.69	0.862	0.001
	Specialists	21.2	78.8	1.26	0.868		27.5	0.31	0.542	
OHIP 13	Students	48.0	52.0	1.18	1.305	0.971	39.0	0.79	1.151	0.021
	Specialists	33.7	66.3	1.18	1.065		27.5	0.43	0.792	
OHIP 14	Students	53.2	46.8	0.88	1.063	0.208	37.7	0.58	0.833	0.003
	Specialists	38.7	61.3	1.10	1.086		17.5	0.24	0.579	
OHIP 15	Students	46.7	53.3	0.82	0.928	0.903	41.3	0.49	0.681	0.001
	Specialists	50.0	50.0	0.80	0.933		16.3	0.18	0.414	
OHIP 16	Students	32.5	67.5	1.45	1.198	0.077	53.3	1.00	1.112	0.000
	Specialists	37.5	62.5	1.13	1.118		20.0	0.34	0.779	
OHIP 17	Students	55.8	44.2	0.73	0.982	0.110	27.3	0.38	0.726	0.000
	Specialists	67.5	32.5	0.50	0.779		3.8	0.05	0.271	

Discussion

The observation in this study was made on a small population sample referring to Faculty of Dental Medicine in Sofia, Bulgaria for primary endodontic treatment and this was the first attempt in our country to examine impact of root canal treatment on patients' perceptions of quality of everyday life. Many researchers investigate the influence of tooth loss and dental prosthesis (6), trauma (15), implants (19) and periodontal injury (4) on life quality but still less of them (14,16,17) examine the impacts of carious lesions, their complications and the results of their treatment.

Opposite to assessment of effects of chronic oral diseases (21), impact of endodontic diseases and treatment on patient's physical and psychological well-being is relatively short and thus it should be registered at the time it is experienced (16). Based on this, our patients were interviewed and filled in the questionnaire on their first visit and were scheduled for their second interview in two weeks after the endodontic treatment was finished. As endodontic diseases can present with a variety of clinical signs and symptoms, only patients with irreversible inflammation of the dental pulp were treated and based on anamnesis, intraoral examination and radiographic findings, all cases with untreated and treated apical periodontal lesions were excluded from the observation.

The analyses of the results revealed that patients perceived their quality of life impaired because of the irreversible inflammation of the

dental pulp. The negative impact of the endodontic disease was similar for the patients treated by students and specialists as the difference between the registered mean impact values at the first appointment was insignificant. The almost equal initial status of the two groups of patients examined allowed more precise assessment of the improvement of their status and their perceptions for it due to the provided endodontic treatment.

Painful tooth aching, lack of comfort during eating, necessity to alter the temperature of food, psychological tension, difficulty to fall asleep and to be awakened were the prevailing negative impacts that altered patients' physical and psychological ability and comfort before treatment. The provided root canal therapy improved significantly subjects' quality of life in both groups. This positive tendency was registered for all 17 investigated items in the group treated by specialists and in 16 items in the group treated by students. The only exception was found for the question concerning necessity of alteration of food temperature because of problems with teeth in students' patients were the improvement remained insignificant. Our results are in agreement with the ones obtained in the studies of Dugas et al. (16) and other researchers (1,8).

Endodontic treatment led to a noticeable improvement of registered tooth aching, chewing comfort, difficulty to fall asleep, awakening by teeth problems and psychological tension. This apparent change in the perceptions of provided relief might be explained to some extent with the pronounced negative impact of the same items recorded before treatment. The analyses of the mean impact scores obtained in the study revealed that patients treated by specialists perceived their quality of life significantly better improved compared to these treated by undergraduate students. It seems, that the significant improvement of quality of life of patients treated by specialists might be due to their greater experience and training level when compared to undergraduate students. Unlike our findings, an equal improvement of quality of life was registered by Dugas et al. (16) when endodontic treatment was provided by generalists and endodontists. Hamasha and Hatiwsh (1) compared impact of endodontic treatment carried out by undergraduate and graduate students and endodontic specialists and did not find significant difference, as well.

In summary, the modified Oral health impact profile can be recognized as an important and reliable tool in the complex dentist-patient relationship to better appreciate endodontic diseases and treatment from the perspective of the patient. Quality of life instrument can allow further development of contemporary concepts of personal and social consequences of health care and qualitative assessment of immediate and late treatment results (8,10,12).

The impact of root canal therapy on everyday life of all participants was apparent. Experience and training level influenced the degree of improvement as registered mean impact values were significantly greater in the group treated by endodontic specialists when compared to the one treated by undergraduate students.

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