



Full Length Review Article

DISTURBANCE FIELDS IN MAXILLO-FACIAL AREA AS A REASON FOR IDIOPATHIC URTICARIA AND ANGIOEDEMA

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ABSTRACT

In search of other causes of idiopathic angioedema and urticaria we investigated the possible consequences of the disturbance fields in MFA in two patient groups: group 1 - patients with angioedema (n = 11) and group 2 - patients with urticaria and angioedema (n = 39), in total 50 people. We found that compared with the control group (n = 60 healthy patients) there is a statistically significant difference between higher values of DMFT index and presence of active foci in MFA. Angioedema is more typical for patients of a higher mean age ($56,5 \pm 10,59$). Oral hygiene habits and conducting preventive dental examinations of patients with urticaria and angioedema are comparable to those of control patients. The most common dental materials used for fillings in all three groups are light curing and self adhesive composite materials. The patients' contact with angioedema with methacrylic plastics shows a statistically significant difference being larger in comparison with other two groups. Most patients in both groups associate the occurrence of urticaria and angioedema with conducted endodontic treatment (33%) and after tooth obturation (24%), for which no statistically significant relationship was found.

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INTRODUCTION

Urticaria is a polietiological and polipathogenetical disease with acute or chronic recurrence flow, which is represented by pruritus, erythema and characteristic rash - hives (Baleva, 2001). Urticaria usually occurs in the first type of allergic reaction (Ig E- mediated) and most important immunologically relevant factors associated with drugs and foods. Idiopathic angioneurotic edema and urticaria are states with unclear etiology. Excluding genetic component that clearly classifies one of the subspecies as hereditary angioedema, determination of the cause and consequently treatment of such conditions still remains a difficult task for the specialist.

Disturbance fields: energetically non-integrated area of the organism that turns into a source of functional disturbances that may but not necessarily have material fixations. The disturbance field by means of its constant impact on the ground regulation system of the organism results in certain structural changes.

The problem with foci was most extensively covered in the theory of Pischinger, Heine, Kellner, Stacher, (Pischinger, 1963; Pischinger, 1956; Pischinger, 1975). According to that theory the living organism has a system of ground regulation (SGR) that coordinates the links between all cells, tissues and organs and their functions and allows communication with the external environment.

The system of ground regulation is defined as a function unit of (Kellner, 1977 and Pischinger, 1990):

- Main matter including extracellular fluids,
- Connective tissue cells,
- Functional peripheral vascular system,
- Peripheral vegetative nerves Figure 1

The system of ground regulation is the main connecting link between dental clinical allergology, immune system and disturbance fields Figure 2. Dental pulp is such an unit based on a system of ground regulation. Bergsmann proved that 80% are supposed to be found in oral cavity. Dental infection foci are only a part of all possible foci in the body. Disturbance fields can be either active or potential. The active fields of

disturbance have a negative impact of distance in the body (Pischinger, 1972), Цититиране на предишна статия в биотехнологии They can give rise to a disease. However, they can prevent or delay the treatment of a disease resulting from another condition by blocking basic vital functions (Dencheva, 2010). They could be of different nature, including sensitization to dental materials and drugs.

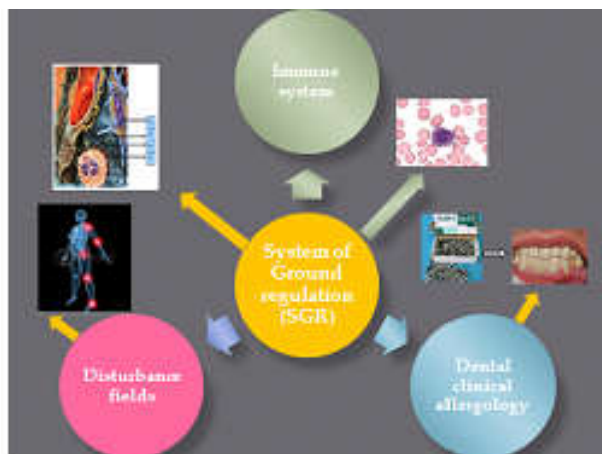
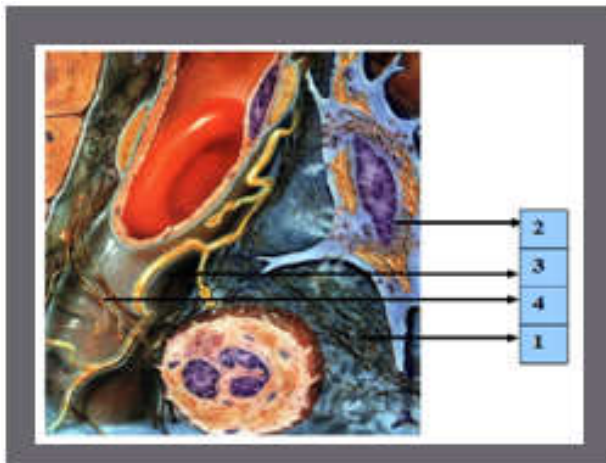


Figure 2. Connection between SGR (system of ground regulation), IS (immune system), DcA(dental clinical allergology), DF (disturbance fields)

Kisselova classifies disturbance fields as follow: (Kisselova-Yaneva, 2001):

Endogenous

- Teeth with reduced vitality
- Non-vital teeth
 - Root treated teeth
 - Non-endodontically treated teeth
- Acute and chronic pulpitis
- Acute and chronic periodontitis
- Pulp gangrene
- Odontogenic cysts
- Stomatogenic disturbance fields
 - Impacted teeth
 - Semi-impacted teeth
 - Difficult tooth eruption
 - Periodontium diseases
 - Oral mucosal diseases
 - Radices

- Incorporated foreign bodies
- Chronic maxillary osteitis
- Chronic affects
- Dental medicines and materials
- Dental implants
- Iatrogenic factors
 - Uncomplicated caries treatment
 - Endodontic treatment
 - Tooth obturation
 - Periodontium treatment
 - Oral mucosa treatment
 - Allergic reactions and conditions
 - Mental disorders

Exogenous

- Environmental harms
- Energy disturbance fields and electrosmog

The classification structure allows additional inclusion of nosological entities depending on the evidence of focal impact. The object of our study is the link between active disturbance fields in MFA, involving not only inflamed dental and dental supporting structures but also hypersensitivity reactions to dental restorative materials.

MATERIAL AND METHODS

The study included 110 patients of an average age $44,6 \pm 15,2$ years. 29 of them were males (26.4%) and 81 - females (73.6%).

The patients were divided into 3 groups

- **Patients with Angioedema** – 11 patients (10% of the total number of patients included in the study) - 1st Working Group
- **Patients with Urticaria and ANE** – 39 patients (35.5% of the total number of patients included in the study) - 2nd Working group
- **Control group** – 60 patients (54,5% of the total number of patients included in the study)

Inclusion criteria

Patients over 18 years with at least one dental restoration in the oral cavity (silanisation, filling, crown, partial or full denture), a primary or secondary angioneurotic edema, hives.

Exclusion criteria

18-year-old children, patients with hereditary angioedema, patients with systemic medication (allergy therapy, ACE inhibitors), pregnancy

Criteria for the control group

No common diseases and long-term drug therapy without proven allergy and autoimmune diseases. The participants from the three groups were diagnosed by means of thermo vision Camera Flir T620 and software Therma CAM Reporter 8.1. Caries severity was measured by DMFT index, which points out the number of DT (decayed teeth), MT (missing teeth) and FT (filled teeth). Corrosive potential and pulp

vitality of defined teeth was measured. The relationship of urticaria and angioedema with the type of dental treatment was investigated carrying out a direct survey. The oral-hygiene habits and most frequently used materials for dental treatment in groups were established. Clinical data was entered into Excel and subsequently exported to Statistical Package for Social Sciences (SPSS 21.0 for Windows) for statistical analysis. The prevalence proportion rates, mean values and standard deviations were calculated for the purpose of analysis. Statistical analysis was performed applying descriptive statistics and the independent sample Chi-square test, Fisher's Exact test between different groups and one-way ANOVA tests in order to compare the means of DMFT, DT, MT and FT to the other variables. The level of statistical significance was set at $P = 0.05$.

RESULTS AND DISCUSSION

Age distribution

Angioedema and urticaria can affect people of all ages, but according to Mansi M, Zanichelli A, Coerezza A *et al.* (2009) individuals who are predisposed to angioedema have an increase in frequency of attacks after adolescence, with peak incidence in the third decade of life. In our study, the average age of patients in group 1 (Angioedema), group 2 (Urticaria + Angioedema) and the control group is accordingly $56,5 \pm 10,59$, $45,9 \pm 15,02$ and $41,6 \pm 14,97$ years (Table 1). Significantly greater mean age of patients with angioedema has been found compared to the other two groups.

molars are included. The higher the index value is, the more affected the hard tooth tissues are. The DFM average value for patients of group 2 (urticaria + ANE) is $17,69 \pm 7,95$, which is significantly higher than the DFM average value for patients of the control group $13,20 \pm 7,27$ ($p = 0.006$). Significantly higher DFM average values have been established in the working groups compared with the control one (Table 3). We consider this fact to be of utmost importance as in a large percentage of cases oral health is excluded from range and diagnostic algorithms of allergologists and dermatologists. The inclusion of dental examination should become a routine practice when looking for causes of chronic idiopathic urticaria and angioedema. Figure 3 shows the distribution of the index individual components in relation to groups.

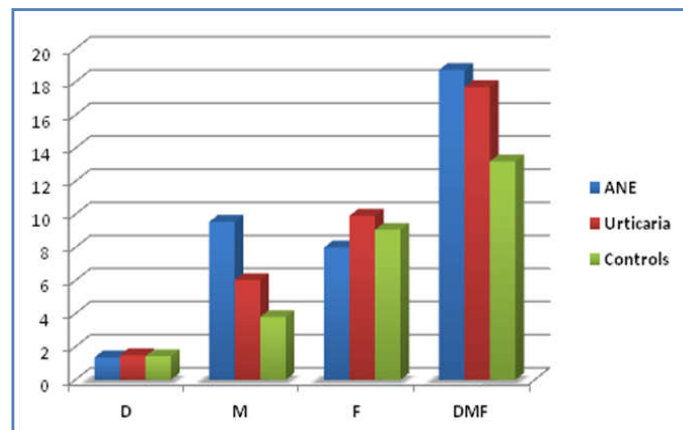


Figure 3.

Table 1. Age distribution (n=110)

Groups	N	Min	Max	Mean	SE Mean	Std. Dev.	p-value
ANE	11	36	67	56,5	3,19	10,59	0,008
Urticaria +ANE	39	25	86	45,9	2,40	15,02	
Control group	60	19	86	41,6	1,93	14,97	

Table 2. Gender distribution (n=110)

Группы пациенти	Men		women		p-value
	N	%	N	%	
ANE	2	18,2	9	81,8	0,184
Urticaria +ANE	7	17,9	32	82,1	
Control group	20	33,3	40	66,7	

Table 3. DMF index by groups (n=110)

DMF index	N	Min	Max	Mean	Std. Error Mean	Std. Dev	significance
ANE	11	4	32	18,73	2,332	7,734	0,006
Urticaria +ANE	39	3	32	17,69	1,274	7,954	
Control group	60	0	32	13,20	0,939	7,274	

Sex distribution

In all three patient groups females prevail. The share of women for first, second and control groups is respectively 81.8%, 82.1% and 66.7%. According to Hentges F *et al.* (2008), chronic idiopathic angioedema is more common in females than in males. Estrogen may exacerbate certain forms of angioedema. No significant difference in the proportion of women between groups has been found, although it is the lowest in the control group (Table 2).

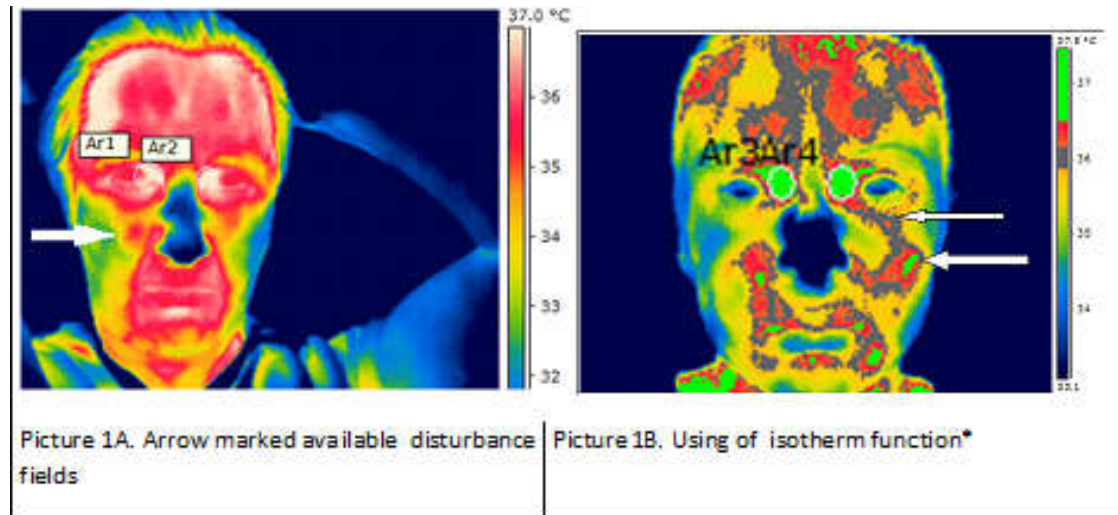
Index DMF (decayed missing filled teeth) is the sum of carious, extracted and filled teeth. DMFT-index is used for permanent teeth and ranges from 0 to 32, as long as third

Carious teeth (D) are of nearly equal values in all three groups, unlike missing teeth (M) prevailing in group 1 - patients with angioedema, followed by group 2 - patients with urticaria and angioedema. In scientific literature evidence of the relationship of this index with the presence of urticarial rashes and angioneurotic edema has not been found so far. This relationship has never been the subject of scientific searches, but in the light of the theory of focal infection, we think it has not been studied completely yet. A large number of scientific publications could be given as an example of examining in details the relationship of patients' oral health with bronchial asthma and its treatment. The bacterial flora of oral cavity and altered mucosal immunity in the following allergic patients (Karova, 2012; Marković *et al.*, 2015 and Harrington, 2016),

have been studied. However, possible influences of chronic dental lesions and abnormalities in dental supporting structures on the occurrence of urticarial rashes and / or angioneurotic edema have not been considered. Data from this index analysis correlates with established significantly higher proportion of patients with focal infection belonging to the group with urticaria and angioedema, proven with analysis of thermovision filming, compared to the other two groups.

Temperature gradient greater than 0.4°C is considered to be statistically significant and indicative of the presence of a pathological process (Gratt, 1995).

The study of qualitative characteristics of temperature distribution over the human body is the most common approach used in thermogram evaluation. The increased corrosion potential and the deviation in the vitality of dental



Picture 1.

Table 4. Pulp vitality aberration and Increased corrosion potential by groups

Indicators	Groups			p-value
	ANE n (%)	Urticaria +ANE n (%)	Control group n (%)	
Pulp vitality aberration	1 (9,1%)	6 (15,4%)	8 (13,3%)	0,853
Increased corrosion potential	3 (27,3%)	7 (17,9%)	9 (15,0%)	0,626

Thermovision test protocol

- Distance between the camera and the patient – from 0,3 m to 2 m;
- Room temperature - $22^{\circ}\text{C} \pm 2^{\circ}\text{C}$;
- No movement of air of more than 1 m/sec; this is the reason why operation of fans and AC units is not allowed during the test;
- No thermal radiation open sources;
- Patients or thermovision system must not be exposed to direct sunlight or powerful artificial lighting radiation.

The analysis of thermal images is always done in direct correlation with anamnesis. It is not obligatory for the disturbance fields to have been physically fixed or be visible on X-ray. When the connection irritation-producing response in a specific area of the body is broken for a long time, a field of disturbance arises and it can be detected by thermovision diagnostics.

Medical analysis of the thermogram is based on the assessment of two major factors

- Temperature gradient – this is the value of the temperature difference between two elements of the studied object.
- Qualitative characteristics of the temperature field of the object or of a separate fragment of that object.

pulp accompany and complement the picture of the distribution of disturbance fields in MFA among patients with urticaria and angioedema. Increased corrosion potential (Pathogalvanism) can be measured in the oral cavity if there are prosthetic structures with open metal surface-crowns, bridges, cast dentures, amalgam obturations, inlays. Corrosion products themselves can alter the buffering capacity of saliva, sensitize the organism and change the mucosal immunity. Having found increased corrosion potential and / or sensibilization to corrosion products, their removal and replacement with biocompatible dental materials becomes necessary (Dencheva, 2014 and Biocompatibility in oral medicine from theory to practice, 2016). Increased corrosion potential is registered most often in the group with ANE - 27.3%, followed by the group with urticaria and ANE - 17.9% and most rarely in the control group - 15%. No significant difference between groups has been established. Table 4. The role of increased corrosion potential is expressed both by its numerical values and allergenic potential of the released corrosion products of all kinds of metal objects in the oral cavity. According to Ivanova's (Ivanova, 2008), dg-alloy EASY (nickel-chromium alloy) is with the highest risk of developing an allergic reaction among base alloys while HeraniumP poses the lowest risk. The most common allergenic components in dental alloys ranked by sensitization potential are: nickel, gold, palladium and cobalt. Due to clinical dental examinations it was found that most metal alloys for treatment including dental amalgam were used in the group with urticaria and angioedema, Table 6. The most commonly used

alloys containing nickel are Argeloy NP, Cristalloy N, Wirron 99, Heranium Na. Argeloy Np Special, Wironit, Remanium380, Bioceram CC are the most frequently detected from cobalt-chromium alloys in the study. Although Ivanova (Ivanova, 2008), finds no link between the presence of allergenic prosthetic structure in oral cavity and affecting the local mucosal and systemic humoral immune response we are obliged to report the case of Gomułka K1, Panaszek B (Gomułka, 2014), 2014 who describe the onset of quick urticarial reaction of the organism in contact with low molecular allergens - haptens - which usually cause a later type of allergic reaction. Büyükoztürk S1 and Gelincik A (Büyükoztürk *et al.*, 2015), comment on such a rapid allergic reaction to nickel alloys, as well. Тук да се включи от Мигленината монография. The data analysis of altered vitality of dental pulp suggests that these deviations are more frequently in the group with urticaria and angioedema - 15.4%, followed by the control group - 13.3% and most rarely in patients having only ANE - 9.1%, but without statistical significance. Alterations in tooth vitality have diagnostic value concerning the presence of chronic ongoing pulpitis, asymptomatic gangrene and outcomes of conducting biological treatment. This is a diagnostic test that is the starting point for analyzing oral health and active disturbance fields of dental origin in patients with various common diseases including urticaria and ANS. / There is confirmation of the thermovision filming.

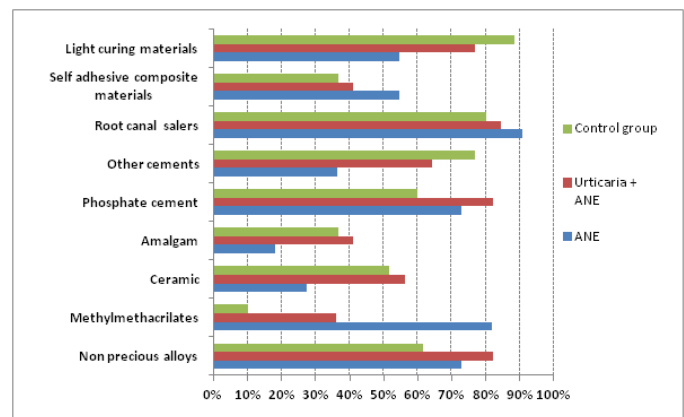


Fig 5.

Apart from being involved in root canal filling materials it can also be part of impression materials, periodontal dressings and means for temporary obturation. It is very well soluble and passes for long into the body from zinc oxide eugenol materials. Its derivatives are used in cosmetics and perfumery. During the research a case of urticaria and angioedema was described in a female-patient with overfilled gutta-percha pin and filling of endometazon in endodontic treatment of tooth 25, (Денчева, 2016). The highest percentage of restorations with methacrylic plastics and lowest for the use of other cements - glass ionomer, carboxylic were registered among

Table 5. Comparative presentation of the frequency of various dental material groups

Dental materials	Groups			p-value
	ANE n (%)	Urticaria +ANE n (%)	Control group n (%)	
Non precious dental alloys	8 (72,7%)	32 (82,1%)	37 (61,7%)	0,094
Methylmethacrilates	9 (81,8%)	14 (35,9%)	6 (10,0%)	<0,001
Ceramic	3 (27,3%)	22 (56,4%)	31 (51,7%)	0,229
Amalgam	2 (18,2%)	16 (41,0%)	22 (36,7%)	0,379
Phosphate cement	8 (72,7%)	32 (82,1%)	36 (60,0%)	0,065
Other cements	4 (36,4%)	25 (64,1%)	46 (76,7%)	0,024
Root canal sealers	10 (90,9%)	33 (84,6%)	48 (80,0%)	0,630
Self adhesive composite materials	6 (54,5%)	16 (41,0%)	22 (36,7%)	0,531
Light curing materials	6 (54,5%)	30 (76,9%)	53 (88,3%)	0,024

Table 6. Comparative presentation of the visits to the dentist by groups

Dental visit	Groups			p-value
	ANE n (%)	Urticaria +ANE n (%)	Control group n (%)	
the last 1 month	3 (27,3%)	17 (43,6%)	40 (66,7%)	0,065
the last 6 months	6 (54,5%)	17 (43,6%)	16 (26,7%)	
More than 1 year	2 (18,2%)	5 (12,8%)	4 (6,7%)	

Table 7. Oral hygiene habits

Groups	Teeth washing		Use of mouth rinse
	1 time daily	2 times daily	
ANE n (%)	5 (45,5%)	6 (54,5%)	4 (36,4%)
Urticaria +ANE n (%)	8 (20,5%)	31 (79,5%)	13 (33,3%)
Control group (%)	21 (35,0%)	39 (65,0%)	27 (45,0%)

Dental materials for treatment

Our study data points that the most commonly used obturation material in all three groups is light curing materials. Maximum amalgam and metal alloys have been used to treat the patients of group 2 with urticaria and angioedema Fig. 5. From root canal filling materials most commonly used are those containing eugenol- endometazon, kortizomol, zinc oxide with eugenol - under consultation with dental practitioners. Eugenol plays essential role as an allergenic factor.

patients with angioedema (first working group). The differences are statistically significant. The lowest percentage of dental restorations with methacrylic plastics and the highest of restorations with photopolymers and other cements were established in the control group. The differences are statistically significant. Apparently the contact with methacrylic monomers is observed in all three groups, but in the first group where elderly patients predominate (Table 1) it is at the expense of removable prosthetic structures while in

the control group is at the expense of obturations with light curing polymers.

Oral health

Visiting dentist

In relation to oral health and correct personal oral hygiene practice we have found that patients in the control group visit the dentist most frequently. Besides, more than a half of them did not miss the control check-up every 6 months. However, more than a half of the patients with angioedema have not been to the dentist for the last year.

indicated as a cause of objective symptoms - hives and swellings by 17.9% of patients and only 3.6% reported a relationship with orthodontic treatment. The comparison between both working groups indicates that in the first working group 7 patients (63.6%) reported a correlation of ANS with dental treatment while in the second working group 21 patients (53.8%) did so. The patients with ANS found a correlation mainly with conducted prosthetic (orthopedic) treatment (57.2%). However, in the second working group the main reason pointed out was endodontic treatment (33.3%) (Table 8, Fig.6). This made us look for a correlation between a history of the disease onset after dental treatment and the results of thermo vision diagnostics Table 9.

Table 8. Correlation between ANE, Urticaria and dental treatment

Correlation	Groups	
	ANE	Urticaria +ANE
After endodontic treatment	1 (14,3%)	7 (33,3%)
After teeth obturation	0 (0,0%)	5 (23,8%)
After orthodontic treatment	0 (0,0%)	1 (4,8%)
After surgical treatment	2 (28,6%)	5 (23,8%)
After orthopedic treatment	4 (57,2%)	3 (15,3%)

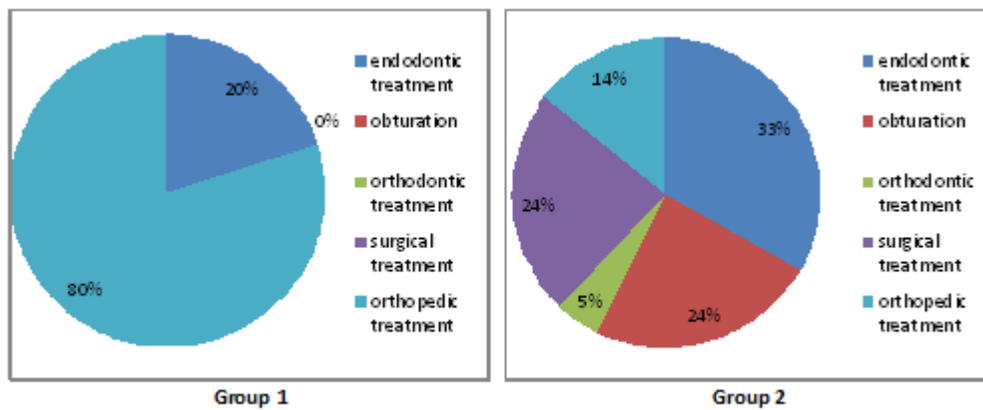


Fig. 6. Correlation of the disease with dental treatment

Table 9. Correlation between a history of the disease onset after dental treatment and the results of thermo vision diagnostics

Groups	Results from thermovision	Correlation with dental treatment		p-value
		Absent	existing	
ANE	Thermovision Negative	3 (42,9%)	4 (57,1%)	0,554
	Positive	1 (25,0%)	3 (75,0%)	
Urticaria +ANE	Negative	4 (40,0%)	6 (60,0%)	0,651
	Positive	14 (48,3%)	15 (51,7%)	

Oral hygiene habits

In terms of oral hygiene habits a significant difference between the analyzed groups has not been established. In all three groups the teeth are brushed most often twice a day and the patients in the control group use mouthwash most frequently.

Relationships

Correlation with dental treatment

28 patients (56%) of all studied 50 patients with ANS and urticaria reported that they noticed a relationship of the disease with conducted dental treatment. 28.6% associate most often the onset of the disease with a period after endodontic treatment, followed by surgical and prosthetic treatment, respectively 25% for both of them. The new obturations are

Statistical reliability between history and results of diagnostic tests has not been found, i.e. patients believe that dental treatment triggered the disease, but the incidence of focal infection is not higher than in those who do not find this correlation.

Conclusion

The relationship of daily dental clinical practice with idiopathic urticaria and angioedema is not yet fully understood. However, it is obvious that for complex diagnosis of a patient with allergic manifestations multidisciplinary approaches should be used with a basic, but often disregarded emphasis - asymptomatic chronic inflammation of dental and dental supporting structures, allergenic potential of dental restorative materials and their components. The current study suggests for the first time a more complete algorithm of

diagnostic tests, which we hope to contribute with facts to clarifying other causes of idiopathic forms of urticaria and angioneurotic edema.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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