

# Dental practitioners perspective on systemic implications of dental malocclusions

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**Abstract.** Body posture and the postural instability can influence dental occlusion and also the result of a dental prosthetic treatment. Current management of this problem is continuously discussed with contrasting results. This paper aims to evaluate dental specialists' perspectives and knowledge on the clinical importance of postural analysis and on the possible correlation between posture and dental occlusion. Methods: A questionnaire was used in order to provide a useful tool to evaluate the level of knowledge of the participants over the clinical implications and management of patients with balance and occlusal disorders. Results: One-third of respondents were practicing General Dentistry (64.7%), while the rest of them were practicing the other dental specialties (15.5%-Prosthetics; 10.3%- Oromaxillofacial (OMF) surgery; 8.6%-Orthodontics/Paedodontics; 7.8% Periodontics and Endodontics). A percentage of 44.5% of the dental practitioners consider that “sometimes” the untreated pathological dental occlusion may have a negative impact on the muscular-skeletal system, while only 30.2% of them consider a “frequent” association between the pathologies. The importance given to the occlusal re-balance is in a strong correlation with the respondent's specialty and his professional experience. Conclusions: All dental practitioners included in our study consider that occlusal dental pathology is a possible etiologic factor for posture imbalance.

**Key Words:** body posture, dental occlusion, dental prosthetic treatment, orthoposturodontic

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## Introduction

The mandibular bone, temporo-mandibular joint (TMJ) dynamics and the inter-arch relations (occlusal relations) may be influenced by body posture, gravity and moreover by different systemic diseases (Golstein 1998). The relation between dental occlusion and body posture was named by some researchers as “Orthoposturodontics” (Clauzade 2006). Practically, this term explains that dental occlusion is one of the many components of the human being systemic complex (oro-facial locomotor system, cranio-facial bones, etc) which may influence a dental treatment result (Korbmacher et al 2004).

For many years, the interest to re-establish a normal static and dynamic occlusion together with the preservation of the physiological movements of TMJ, was exclusively for orthodontic treatments and indication of different orthodontic appliances (Korbmacher et al 2004).

In the past years, due to negative consequences observed of the dental malocclusion on body posture and vice-versa, and especially due to negative implications on the quality of patients' life (Clauzade et al 2006, Huggare 2009, Kondo et al 2002, Lippold et al 2006, Mew 2008), such as economical-social impact and an increase of health treatments costs, an increased number of medical and dental practitioners of different specialties interested in any dysfunctions of dental occlusion (Marchili et al 2016).

Based on recent reviews (Manfredini et al 2012, Perinetti et al 2013, Pruneda et al 2013) the literature lacks in information regarding clinical correlations between dental occlusion and body posture deformities. Moreover, the research papers focused on these issues are based on different reviews and especially on the analysis and surveys of patients with certain orthoposturodontic anomalies.

Until now, there is no research data regarding the opinion of dentists about these issues. Thus, in our study, we wanted to find based on a survey the choice and clinical attitude of dental practitioners of different specialties regarding systemic implications of dental malocclusions for prosthetic treatments.

We also aimed to see if there are any correlations between their clinical preferences and the type of dental specialty, professional experience, gender, age and demographic location where the dentist is practicing his specialty.

Another objective of this study was to find if the practitioners are open to new collaborations with different medical specialties and how they evaluate the willingness of their patients to treat a dental malocclusion from postural point of view for a better dental outcome.

## Materials and methods

This survey was anonymously done using a web-platform (Google Forms) from April 2017-February 2018. The survey

Table 1. General and demographic data

| Age (%)                 |             |               | Gender (%) |      | Working zone (%) |       |      |
|-------------------------|-------------|---------------|------------|------|------------------|-------|------|
| 20-40 years             | 40-60 years | Over 60 years | M          | F    | Urban            | Rural | Both |
| 77.6                    | 20.7        | 1.7           | 35.3       | 64.7 | 85.3             | 9.5   | 5.2  |
| Total = 116 respondents |             |               |            |      |                  |       |      |

Table 2. The relation between the indication of occlusal re-balance treatment and the respondents' dental specialty and their professional experience, respectively

| Dental specialty               | Type of occlusal re-balance treatment (%) |             |                                 |           |            |
|--------------------------------|---|-------------|---------------------------------|-----------|------------|
|                                | Prosthetic                                | Orthodontic | Combined prosthetic-orthodontic | Sometimes | Very rare  |
| GD                             | 10  | 3           | <b>77*</b>                      | 10        | 0          |
| OP                             | 0   | <b>20*</b>  | 60                              | 20        | 0          |
| OMF                            | 17  | 8           | 58                              | 17        | 0          |
| PER                            | 22  | 0           | 44                              | 33        | 0          |
| ENDO                           | 11  | 0           | 56                              | 22        | <b>11*</b> |
| PR                             | 11  | 0           | 72                              | 11        | 6          |
| <b>Professional experience</b> |   |             |                                 |           |            |
| <5 yrs                         | 10  | 3           | 70                              | 15        | 3          |
| 5-10 yrs                       | 3   | 9           | 69                              | 16        | 3          |
| 10-20 yrs                      | 3   | 3           | 83                              | 10        | 0          |
| >20 yrs                        | 43  | 0           | 36                              | 21        | 0          |

GD=General dentistry; OP=Orthodontics/Paedodontics; OMF=OMF Surgery; PER=Periodontics; ENDO=Endodontics; PR=Prosthetics

“\*\*” sign combined with red bold values indicates strong associations for Pearson Chi-Square test at  $p < 0.05$

was approved by the Committee of Ethics of the University of Medicine and Pharmacy, “I. Hatieganu” Cluj-Napoca (No. 167/7.04.2017).

The present observational study was based on 15 items for different dental specialists regarding the complex dental treatment made or recommended for their patients.

The questionnaire was structured based on 3 main sections:

- general and demographic data
- professional experience and dental specialty
- level of knowledge of the respondents of the systemic implications of the occlusal imbalance

Statistical analysis

The information obtained from the Google Form web-platform were collected using Microsoft Excel (Office 2010 Package) and statistically analyzed with Statistical Package for Social Sciences software 20.0 (IBM SPSS Chicago, US). For all the statistical tests used to analyze the data (descriptive analysis, Chi-Square test, McNemar test and Spearman correlation test) was established a level of significance at  $p < 0.05$ .

## Results

A total of 116 dental specialists from Romania, with an average age of  $49.6 \pm 18.72$  years responded to our survey. More detailed information regarding our respondents general and demographic data are given in the Table 1.

The Item 4 regarding the respondents' dental specialty revealed that almost one-third of them were practicing General Dentistry (64.7 %), while the rest of them were practicing

the other dental specialties (15.5%-Prosthetics; 10.3%-OMF Surgery; 8.6%-Orthodontics/Paedodontics; 7.8% Periodontics and Endodontics).

Pearson Chi-Square test revealed strong associations only between Orthodontics/Paedodontics specialists and complex clinical occlusal examination of the patients ( $p = 0.012$ ); moreover, 90% of the same dental specialists answered they make “always/frequent” occlusal check-ups. Nevertheless, over 60% of the practitioners answered that they choose a combined orthodontic-prosthetic treatment when occlusal re-balancing is indicated (Table 2).

When Pearson Chi-Square test was applied, significant associations were observed between the specialty and the frequency to re-establish functional occlusion when a prosthetic treatment is “always” (GD,  $X^2 = 5.37$ ,  $p = 0.02$ ), “frequently” (PER,  $X^2 = 6.45$ ,  $p = 0.011$ ; PR,  $X^2 = 5.79$ ,  $p = 0.016$ ), “sometimes” (PER,  $X^2 = 25.02$ ,  $p < 0.001$ ) and “very rare” (ENDO,  $X^2 = 19.93$ ,  $p < 0.001$ ) indicated. A percentage of 44.5% of the dental practitioners consider that “sometimes” the untreated pathological dental occlusion may have a negative impact on the muscular-skeletal system, while only 30.2% of them consider a “frequent” association between the pathologies. However, when associated these two pathologies, around 40% of the Orthodontists/Paedodontists consider there is “always” a correlation ( $X^2 = 5.004$ ,  $p = 0.025$ ). By contrary, one third of the Periodontists consider there is a “frequent” ( $X^2 = 4.22$ ,  $p = 0.04$ ) and “never” ( $X^2 = 6.47$ ,  $p = 0.011$ ) correlation between the malocclusion and the its negative impact on muscular-skeletal system, respectively.

Table 3. The relation between the professional experience and impact of malocclusion on muscular-skeletal system

| Professional experience | Muscular-skeletal impairment (%) |           |          |        |
|-------------------------|----------------------------------|-----------|----------|--------|
|                         | Never                            | Sometimes | Frequent | Always |
| <5 yrs                  | 13                               | 40        | 33       | 15     |
| 5-10 yrs                | 6                                | 50        | 31       | 13     |
| 10-20 yrs               | 13                               | 43        | 23       | 20     |
| >20 yrs                 | 0                                | 50        | 36       | 14     |

Table 4. Relation between professional experience and restoration of functional occlusion

| Professional experience | Restoration of the functional occlusion (%) |            |          |        |
|-------------------------|---|------------|----------|--------|
|                         | Very rare                                   | Sometimes  | Frequent | Always |
| <5 yrs                  | 3   | <b>25*</b> | 40       | 33     |
| 5-10 yrs                | 6   | 3          | 53       | 38     |
| 10-20 yrs               | 7   | 7          | 66       | 27     |
| >20 yrs                 | 0   | 14         | 64       | 21     |

“\*\*” sign combined with red bold values indicates strong associations for Pearson Chi-Square test at p<0.05.

Regarding the respondents’ dental experience, it was observed that their professional experience had a balanced distribution for all the chosen experience ranges (around 30%). However, over 70% of the respondents had their professional experience ranging between less than 5 years and over 20 years, representing in fact the oldest dental specialties (General Dentistry, Orthodontics/Paedodontics and OMF Surgery), while for the rest of the specialties (Prosthetics, Periodontics, Endodontics) which are new in Romania, the highest professional experience was less than 10 years.

The dental-occlusal imbalance is considered by 44.8% and 30.2%, respectively, of the specialists to have “sometimes” and “frequent” negative impact on the muscular-skeletal system. Moreover, this opinion is shared by over one-third of the practitioners with a professional experience ranging between 5 years and over 20 years of dental experience (p<0.05) (Table 3). A “frequent” or “always” restoration of the functional occlusion based on a correct prosthetic treatment is agreed by over 80% of the practitioners with a professional experience between 5-20 years (p>0.05). Among the young dental specialists with experience less than 5 years, 25% of them “sometimes” indicate the total re-establish of the functional occlusion (X<sup>2</sup>=8.98, p=0.03) (Table 4).

Regarding the working zone, the practitioners practicing their specialties in the urban zone, “frequently” (41.4%; X<sup>2</sup>=6.1, p=0.04) and “always” (28.4%; p>0.05) indicate the prosthetic restorations for occlusal re-balance treatment and moreover, they state that “always” (46.6%) and “frequently” (31%) inform the patient about the risks of an unsolved pathological dental occlusion (X<sup>2</sup>=14.22, p=0.027).

A percentage of 36,2% and 26.7%, respectively, of dental specialists working in the urban zone believe that “sometimes” and “frequently” the untreated pathological occlusion may have a negative impact on the muscular-skeletal system (p>0.05).

Regarding the reasons of patients’ unacceptance of a full treatment of functional dental occlusion, the “financial reasons” were considered to be “the most important” issue by almost 80% of the respondents from both type of working zones (urban and rural), while the “lack of time” was chosen by over 50% of the dental specialists as a “moderate importance” (p>0.05).

Among the respondents it was observed a certain availability and a necessity to collaborate with other medical specialties (80%). Among the related medical specialties considered the most important Gastroenterology was chosen by 44% of the respondents, followed by Physiotherapy/Medical recovery and Orthopedics chosen by 29.3% and 27.6% of the respondents. The Pearson Chi-Square test revealed that General dentists consider Gastroenterology “the most important” or “important” medical specialty to collaborated with (X<sup>2</sup>=9.85, p=0.02).

## Discussion

The postural concept considers the human being as an adaptive dynamic complex system evolving permanently during a lifetime (Golstein 1998). In this context, based on the literature findings, it can be stated that the dento-maxillary system is not an independent one, but it is able to have complex and functional relationships with different structural functions of the human body (Barata-Caballero et al 2011).

In our study, the present survey addressed to dental practitioners tries to highlight their necessity and their interest to collaborate with other related medical specialties for a whole and complex dental and medical treatment of the patients with different dental-systemic disorders. These facts are sustained in our study by the large number of respondents (80%) who already have a collaboration or consider a useful interaction with other medical specialties.

Based on the literature, the TMJ is the most frequent articulation used in the entire body (opening/closures: 1500-2000 times/day) (Hoppenfeld et al 2001). Thus, its deterioration may happen faster than for other body articulations, leading to temporo-mandibular disorders (TMD). In such conditions, TMD may lead to adaptive changes, which most of the times reconfigures the muscular-skeletal zones trying to reduce the discomfort and painful sensitivity of the patient (Marzola et al 1999). This information is also sustained by our results; thus, over 70% of the dental specialists recognize the TMD as a direct consequence of the negative impact on dental-occlusal disorders (p<0.05). It is already known that there is a correlation between the postural positions and dental malocclusions with direct impact on muscular-skeletal system (3,5-8 Mew 2004,12-15 Khan et al

2013, Michelotti et al 2010). Moreover, at the beginning, dental malocclusion may appear as a functional compensatory muscular mechanism generated by the central nervous system (CNS) at different levels, and in time may develop in permanent bone changes (Perinetti et al 2010). By contrary, in our investigation, “Gastroenterology” was considered by our respondents (44%) of high importance ( $p < 0.05$ ) among related medical specialties, while the specialties “Physiotherapy/Medical recovery” and “Orthopedics” were chosen by almost 30% of the dental specialists. The same percentage of them consider that dental malocclusions have a “frequent” negative impact on the muscular-skeletal system.

For the traditional dentistry, to re-establish the oral health, functionality and aesthetics represents the main purpose (Bellot-Arcís et al 2013). These data are also sustained by the answers of our dental specialists who consider an important issue to restore the oral functional occlusion for all the dental restorative treatments ( $p < 0.05$ ).

## Conclusions

Within the limits of this investigation, we may conclude the following:

- the dental specialists from Cluj County, Romania, are aware that untreated pathological occlusion may lead to important negative changes of the TMJ and musculo-skeletal system and that the restoration of the functional occlusion is an important goal which should be achieved by all dental treatments.
- significant associations were found between the type of dental specialty, professional experience or working area and the level of knowledge about systemic negative impact of malocclusion on posture
- almost all the questioned dental practitioners agreed with the necessity to collaborate with other related medical specialties, especially a strong significant association was found between the General dentists and Gastroenterologists.

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