SURVEY OF PATIENTS, UNDERGOING PROSTHETIC TREATMENT WITH RESTORATIONS, MADE BY CONVENTIONAL AND DIGITAL IMPRESSION TECHNIQUES

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ABSTRACT

All technologies and materials nowadays aim to ensure the elimination of pain, providing greater comfort and satisfaction for the patient. Research on patients’ perceptions of the technologies used is gaining in popularity. The aim of this article is to study and compare the opinions of patients who have sought dental care to treat a defect in the dentition with restorations made using a conventional and digital impression. Materials and methods: The survey involved 116 patients who sought dental care in two private practices in Varna, Bulgaria. To achieve the goal of the survey, special questionnaires have been developed, in which there are two types of questions: with only one or more than one possible answer. Results: Most of the participants (81%) report that they have at least one extracted tooth, which is not a third molar (wisdom tooth). Patients over the age of 40 are more likely to have a missing tooth. Slightly more than 1/3 of the patients or 35% indicated impaired masticatory and aesthetic function. Most of the patients prefer a prosthetic treatment with a fixed restoration. On 76,7 % of the patients a conventional impression was taken during dental treatment and only 12 % report that they undergo a treatment with digital impressions. Conclusion: Our results show that males are at a higher risk for premature loss of permanent teeth than females. (OR=2.17 (0.830–5.654); p<0.05). The analysis of the discomfort of teeth loss according to gender revealed a significant difference in women and men (p <0.05), as women mostly experience discomfort from impaired aesthetic function, while in men the discomfort is associated with impaired masticatory and speech function.

Key words: Patient, survey, prosthodontics, conventional, digital

Introduction: Dental fear is one of the most common problems in modern dental practice. All technologies and materials nowadays aim to ensure the elimination of pain, providing greater comfort and satisfaction for the patient. Dental medicine has made great progress regarding this issue. From its beginning around 7000 BC. until now, the development of dental medicine has invariably been associated with remarkable inventions, innovations and achievements. In the past during the 18th century, the prosthetic restorations were made directly in the patient's mouth, which also served as a kind of working model. For their production, ground bones or tusks were used, as well as extracted human and animal teeth, which were attached to the residual dentition. This is period before the beginning of the impressions [1].
With the discovery of impression materials, it became possible to recreate the prosthetic field in the form of a working model outside of the mouth and to make a prosthetic restoration on it. This period, which continues to this day, is called “impression period” [1]. Bees-wax is considered to be the first impression material officially introduced by Matthaus Purmann [2].

Over the last three decades, CAD / CAM (computer-aided design and computer-aided manufacturing) technology has entered rapidly and gained great popularity, providing better working conditions and increasing the comfort of both doctors and their patients.

In the field of dental medicine, there are few studies that examine patients' awareness of the technologies used. The development of this issue will help to create a new approach to the patient in order to reduce negative attitudes on his part and resolve conflict situations in the workplace.

**Aim:** The aim of this article is to study and compare the opinions of patients who have sought dental care to treat a defect in the dentition with restorations made using a conventional and digital impression.

**Materials and methods:** The survey involved 116 patients who sought dental care in two private practices in Varna, Bulgaria. To achieve the goal of the survey, special questionnaires have been developed, in which there are two types of questions: with only one or more than one possible answer.

**Results:** The survey involved 116 patients who sought dental care in two private practices in Varna. Almost half of them are women 56, which represents 48.3% of the total number of participants. There are 60 men, which is 51.7%. (Table 1).

Most of the participants (81%) report that they have at least one extracted tooth, which is not a third molar (wisdom tooth). Of these 94 people, more than half are men - 55.3% and 44.7% women.

**Table 1**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Number</th>
<th>Relative share</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 30 y.</td>
<td>18</td>
<td>15.5%</td>
</tr>
<tr>
<td>31 – 39 y.</td>
<td>30</td>
<td>25.8%</td>
</tr>
<tr>
<td>40 – 49 y.</td>
<td>36</td>
<td>31.03%</td>
</tr>
<tr>
<td>50 – 59 y.</td>
<td>21</td>
<td>18.1%</td>
</tr>
<tr>
<td>Over 60 y.</td>
<td>11</td>
<td>9.5%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>60</td>
<td>51.7%</td>
</tr>
<tr>
<td>female</td>
<td>56</td>
<td>48.3%</td>
</tr>
</tbody>
</table>

Figure 1 shows that patients over the age of 40 are more likely to have a missing tooth. A negative moderate relation was found between the patient's age and tooth loss ($\rho=-0.466;p<0.001$). In 21.7% of the extractions the patient's age is the leading factor.

![Distribution of patients according to age and the presence of extracted teeth](image-url)
Of all the patients with one or more extracted teeth, only four (4.25%) indicated that they did not experience discomfort due to teeth loss. In contrast, 85 patients (90.4%) reported impaired masticatory function, 43 individuals (45.7%) report impaired aesthetic function and only 12 (12.7%) - impaired speech. Slightly more than 1/3 of the patients or 35% indicated impaired masticatory and aesthetic function as the main discomfort they experience due to the lack of one or more permanent teeth, while only three patients experienced simultaneous impairment of the masticatory, aesthetic and speech function. (Fig. 2)

The analysis of the discomfort of tooth loss according to gender revealed a significant difference in women and men (p <0.05), as women mostly experience discomfort from impaired aesthetic function, while in men the discomfort is associated with impaired masticatory and speech function (Fig. 3).

Regarding the discomfort associated with impaired masticatory function, a significant difference and a positive moderate dependence with age (r=0.450; p<0.01), were found, which shows that the feeling of discomfort increases with age. Age correlated weakly with discomfort associated with impaired aesthetic function (r=0.190; p=0.041) and discomfort associated with impaired speech function (r=0.186; p=0.046)

While analyzing the relation between treatment and gender, no correlation was found, while with age a moderate negative correlation was found (r=-0.321; p=0.002), which shows that with age patients rarely undergo treatment to restore missing teeth. As the most common reason, the participants indicate the lack of financial ability (68.75%), followed by the lack of time (43.75%), while 18.75% are not aware that it is necessary to restore the missing teeth. (Fig. 4)
There was a positive moderate relation between the choice of treatment with a fixed partial denture and age ($\rho=0.506$, $p<0.001$), which shows that with an increase in age, there is a preference for fixed prosthetics. Of the group of patients treated with fixed partial dentures, the largest percentage are porcelain-fused to metal (PFM) (55.5%), followed by those made of zirconium dioxide (33.3%) and the smallest percentage are metal-plastic (9%) and all-metal (2%). (Fig. 5)

![Fig. 5 Distribution of the types of fixed bridge structures used in the treatment of partially edentulous patients](image)

To the question "Have ever been an impression taken for dental purposes?", most of the surveyed patients answered that it has been taken separately for upper and lower jaw - 76.7%. Significantly fewer indicated that impression/s were taken with a triple tray - 27.5%, followed by those patients, who had a digital impression performed - 12% and the least amount of patients who hadn't had an impression taken - 10.3%.

Only 18 of the patients, or 12% of all subjects, had a digital impression, of which only 5.6% sometimes experienced discomfort while taking the digital impression. This explains the fact that 94.4% of patients prefer this type of impression technique.

There was a difference in patients' preferences of taking a digital impression instead of a traditional one according to age ($p=0.001$) (Fig. 6). Younger patients prefer the digital impression technique, while older patients are in favor of the traditional method.

![Fig. 6. Would you prefer a digital impression instead of a traditional one?](image)

**Discussion:** An analysis of the results obtained from the patients' questionnaires revealed a relatively high percentage of people who reported having at least one extracted tooth that was not a third molar. Although not the subject of this study, the reasons for premature loss of permanent teeth are of great importance during the prosthetic treatment planning. There is evidence in the available literature that the two most common causes leading to the extraction of permanent teeth in adult patients are caries and its complications and periodontal disease. [3,4,5]. Our results show that the percentage of men who have had a permanent tooth extraction is higher. Similar results were reported by Passarelli et al. in their 2020 study, which found that men were more likely to lose permanent teeth. [3]. This is explained by the greater feeling of fear, postponing visits to the dentist, which leads to a complication of the condition of the teeth. Our results confirm that males are at a higher risk for premature loss of

permanent teeth than females. (OR=2.17 (0.830-5.654); p<0.05).

Of all the participants, only of 12 people impressions weren’t taken, all of them under the age of 30. We attribute this to the fact that the majority of these patients did not receive treatment to restore missing teeth.

Although in most patients the treatment with fixed partial dentures was performed using impressions, taken with stock impression trays, in a large number of them this happened after taking an impression with a triple tray. We believe that this could have a serious impact on the quality of the impression, as well as on the final result of the treatment with fixed partial dentures due to the shortcomings of this type of impression trays [1,6].

The discomfort that half of the surveyed patients experience during the taking of conventional impressions is mainly expressed by the appearance of nausea and the urge to vomit, profuse salivation and the long duration of this type of impression technique. Evidence confirming these results are also found in the literature [7,8,9].

The analysis of the results of the conducted surveys shows a relatively small percentage of patients, who have had a digital impression taken. In our opinion, this is due to the still small number of dentists who have an intraoral scanning system in their practice, although these systems have been on the market since the 20th century and have since undergone great development and improvement. Despite this small percentage, almost all patients who underwent both impression techniques indicated that they preferred the digital impression technique.

**Conclusion:** The results obtained from the patients’ questionnaires show a relatively high percentage of people who report having at least one extracted tooth. Our results show that males are at a higher risk for premature loss of permanent teeth than females. (OR=2.17 (0.830-5.654); p<0.05). A negative moderate relation was found between the patient’s age and tooth loss (p<0.001).

The analysis of the discomfort of teeth loss according to gender revealed a significant difference in women and men (p <0.05), as women mostly experience discomfort from impaired aesthetic function, while in men the discomfort is associated with impaired masticatory and speech function.

**References:**