Two-year Survey of Trends at Food Introduction Booth at Suidobashi Hospital of Tokyo Dental College

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Abstract

A working group established at Tokyo Dental College Suidobashi Hospital considered how to manage patients experiencing difficulties with food intake during the process of dental treatment. This resulted in the opening of an in-hospital booth dedicated to providing advice on such problems. A survey was performed to determine the number of patients utilizing this facility and the department which they were attending with the aim of investigating factors involved in eating-related problems. The results revealed that patients were being referred to the booth from the departments of dental prosthetics, conservative dentistry, oral and maxillofacial surgery (by both dentists and dietitians), oral implantation, and orthodontics. Patients were provided with information on the booth by their dentist or dietician, either by means of introductory materials or verbally. These patients were requested to complete a questionnaire, with informed consent, over a 2-year period. The participants were classified according to age and original dental problem on attending this hospital and the results analyzed. The inability to eat hard foodstuffs, difficulty in chewing, inability to open the mouth, insufficient nutrition,
unbalanced nutrition, intraoral pain, and difficulty in swallowing were all identified as problems related to eating. A total of 1,948, 413 visitors had received introductory materials, while 156 had learned of the facility verbally. Looking at department as a factor, the inability to eat hard foodstuffs and difficulty chewing occupied a large percentage of the reported problems for all departments. Taken together, these results revealed that many patients experienced difficulties in eating during the process of treatment. This indicates that it is necessary to give the appropriate eating instructions to each patient according to their specific needs and stage of dental treatment.

Key words: Food intake — Food — Post-surgical — Survey

Introduction

Eating is fundamental and indispensable for maintaining life. It is important not just for nutritional supplementation, but also for “pleasure,” and is a factor related to quality of life (QoL). Eating has many related factors, such as what kind of food to eat, as well as when, where, and with whom. One of the aims of dental treatment is to improve eating ability by curing disease, which often entails the insertion of a mechanical device. Therefore, there has been considerable research into comparisons of QoL after treatment. Dental treatments such as implantation and insertion of dentures have been reported to improve food intake. Due to pain and swelling during actual dental treatment, or immediately after, however, food intake may become temporarily difficult. At dental college hospitals, many types of treatment are also performed as outpatient treatments. Immediately after dental treatment accompanying a surgical procedure or insertion of a new denture, or with painful teeth accompanying the movement of teeth after an orthodontic procedure, chewing may be physically impossible. Since mastication may be temporarily difficult, it might be necessary to change the form of the food to be consumed. In some cases, it is not that any food intake immediately after treatment is impossible; instead, it may be difficult to eat the same kinds of food that were eaten before treatment. For example, a patient might only tolerate water or jelly-containing beverages for one or two days. Thus, various cases of food intake difficulty can occur. Such cases have received little attention because patients soon recover from eating problems and are able to eat normally again. Even though the eating difficulty may only last several days, however, the fact that QoL is reduced by invasive treatment is something clinicians should address. Therefore, a working group was established here at the Suido-bashi Hospital of Tokyo Dental College with the aim of considering how to address problems with food intake during the process of dental treatment. This working group mainly comprised dentists from departments where treatment was performed that could be expected to lead to temporary difficulty in eating. Dietitians and employees of food manufacturers were also included, however. The team investigated readily available soft foodstuffs, as well as nutritional supplement foods and drinks, that might be suitable for patients with temporary eating difficulties. A study group was formed to look at nutrition and a food menu designed, combining foods readily available on the market.

As part of this endeavor, a food introduction booth was opened here in July 2014, offering advice on both soft foods and nutritional supplement foods and drinks to such patients. If it was suspected that a patient might experience difficulties in eating, they were advised to stop by this booth. A survey was performed to determine the number of
patients utilizing this facility and the department which they were attending to investigate factors involved in problems with mastication.

**Method**

The number of patients receiving dental treatment at the Suidobashi Hospital of Tokyo Dental College and who came to the food introduction booth (or whose families came to the booth) was determined. Each patient was requested to complete a questionnaire, with informed consent. The questionnaire was administered between January 2015 and May 2016. The number of such patients attending the booth between July 2014 and June 2016 was determined. This research was performed after review and approval by the Ethics Committee of Tokyo Dental College (approval number: 675).

1. **Booth introduction method**

   The departments of prosthetics, conservative dentistry, oral surgery (including both dentists and dietitians), oral implantation, and orthodontics all referred patients to the booth. Each department chose patients who had difficulties with food intake or who were expected to have such problems. The chosen patients were given introductory materials by the dentist or dietitian concerned (these were the patients who brought introductory materials) or just encouraged verbally (these were the patients with verbal referrals) to visit the booth. The patients stopped by the booth and presented the introductory materials and supplemental foods if they had them. The questionnaire was then administered to those who consented to be part of the study. The department they were attending was also determined in patients coming to the booth of their own accord, without either introductory materials or verbal encouragement from their dentist.

   The items in the questionnaire addressed age, the identity of the person coming to the booth, problems related to eating, and the treatment department that provided the referral. When a participant did not want to answer, or did not answer an item, it was treated as a non-response. The participants were classified into the following age groups: up to 29, 30 to 49, 50 to 69, or 70 years or older. Identity was classified patient, spouse, guardian (when the treated patient was a child), offspring (when the treated patient was a parent), or other. Problems related to eating were classified as inability to eat hard foodstuffs; difficulty in chewing; inability to open the mouth; insufficient nutrition; unbalanced nutrition; intraoral pain; or difficulty in swallowing based on subjective observation. The departments of prosthetics, conservative dentistry, oral surgery, oral implantation, and orthodontics all referred patients to the booth.

**Results**

1. **Booth visit analysis**

   The cumulative number of visitors to the booth was 1,948, of whom 413 brought introductory materials when they visited and 156 were referred verbally (Fig. 1). The total number of visitors was 646, 765, 537, with an average of 5.7, 3.2, and 4.5 visitors per day in 2014, 2015, and 2016, respectively (Table 1). The average number of visitors with introductory materials per month was 2.5 ± 1.4, 11.9 ± 3.9,
and 42.5 ± 40.0 (average ± SD) in 2014, 2015, and 2016 respectively; and the number of visitors who were referred verbally was 3.2 ± 2.0, 6.8 ± 4.3, and 9.2 ± 5.0 (average ± SD) in 2014, 2015, and 2016, respectively, indicating a tendency to increase over time (Table 2). The largest numbers of patients arriving with introductory materials emanated from the departments of oral surgery (including dietitians) (225 persons), oral implantation (85), and prosthetics (49). For verbal referrals, this comprised the department of oral surgery (including dietitians) (112 persons), followed by the other departments (Table 3).

### Table 1 Cumulative number of visitors to food introduction booth by year and average number per day between July 2014 and June 2016

<table>
<thead>
<tr>
<th>Year</th>
<th>Days</th>
<th>Visitors to the booth</th>
<th>The total number of visitors</th>
<th>The average number of visitors per day (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>113</td>
<td>646</td>
<td></td>
<td>5.7 (3.1)</td>
</tr>
<tr>
<td>2015</td>
<td>241</td>
<td>765</td>
<td></td>
<td>3.2 (0.6)</td>
</tr>
<tr>
<td>2016</td>
<td>120</td>
<td>537</td>
<td></td>
<td>4.5 (2.4)</td>
</tr>
</tbody>
</table>

### Table 2 Cumulative number of visitors bringing introductory materials or who were referred verbally by year and average number per month between July 2014 and June 2016

<table>
<thead>
<tr>
<th>Year</th>
<th>Months</th>
<th>Given introductory materials</th>
<th>The total number of visitors</th>
<th>The average number of visitors per month (SD)</th>
<th>Given a verbal introduction</th>
<th>The total number of visitors</th>
<th>The average number of visitors per month (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>6</td>
<td>15</td>
<td>2.5 (1.4)</td>
<td>19</td>
<td>3.2 (2.0)</td>
<td>82</td>
<td>6.8 (4.3)</td>
</tr>
<tr>
<td>2015</td>
<td>12</td>
<td>143</td>
<td>11.9 (3.9)</td>
<td>82</td>
<td>6.8 (4.3)</td>
<td>82</td>
<td>6.8 (4.3)</td>
</tr>
<tr>
<td>2016</td>
<td>6</td>
<td>255</td>
<td>42.5 (40.0)</td>
<td>55</td>
<td>9.2 (5.0)</td>
<td>55</td>
<td>9.2 (5.0)</td>
</tr>
</tbody>
</table>

### Table 3 Cumulative number of visitors bringing introductory materials or who were referred verbally by treatment department between July 2014 and June 2016

<table>
<thead>
<tr>
<th>Department</th>
<th>Given introductory materials</th>
<th>Given a verbal introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral surgery</td>
<td>225</td>
<td>112</td>
</tr>
<tr>
<td>Oral Implant</td>
<td>85</td>
<td>8</td>
</tr>
<tr>
<td>Prosthesis</td>
<td>49</td>
<td>3</td>
</tr>
<tr>
<td>Orthodontics</td>
<td>40</td>
<td>8</td>
</tr>
<tr>
<td>Conservative dentistry</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>

2. Questionnaire survey

The total number of collected questionnaires was 961. Some items were not answered,
so the total number of answers differed depending on the item concerned. A total of 888 participants answered the item regarding age, and the most common ages were the twenties (154), seventies (134), and thirties (124) (Fig. 2). A total of 922 participants answered the item regarding the identity of the visitor to the booth, and the most common answer was the patients themselves (740) (Fig. 3). A total of 869 participants answered the item related to eating-related problems, and the most common problems were inability to eat hard foodstuffs (337), difficulty in chewing (180), and inability to open the mouth (119) (participants could indicate multiple answers) (Fig. 4).

Regarding age according to treatment department, there were 486 total responses. For oral surgery, eating problems were identified in almost every age category. For orthodontics, the largest age category (71%) was people up to age 29, and for prosthetics, as one might expect, the largest age category (75%) was people aged 70 years or older (Fig. 5).

Regarding eating problems according to treatment department, the most commonly reported problems for every department were the inability to eat hard foodstuffs and difficulty in chewing. Additionally, compared to other departments, a larger percentage of patients in the oral surgery and orthodontics departments reported inability to open the mouth (Fig. 6).

Discussion

Conditions affecting the oral cavity, such as pain and various disorders related to articulation and mastication have been reported to have a great influence on QoL. Research using The Dental Impact on Daily Living indicates that tooth loss and tooth decay affect QoL. In addition, a healthy oral cavity also affects eating, mental stability, and smiling. Thus, there is a close relationship between the condition of the oral cavity and QoL, which suggests that eating will be affected if
the former is poor.

Earlier studies have already compared satisfaction\( ^{15} \) and QoL\( ^{13} \) between patients who did or did not have dental treatment. To our knowledge, however, no studies to date have studied QoL in patients during the actual process of dental treatment. A number of causes might be expected to decrease QoL during the treatment process, including change in occlusion, pain due to infection, and swelling, all of which would make it impossible to chew, perhaps necessitating a temporary change in diet. In the present study, therefore, the focus was placed on problems related to “eating”, an element of QoL, during the treatment process itself. Hence, a survey was conducted to determine the precise nature of these problems.

The results showed a yearly increase in the number of patients being referred to the
booth from the various departments they were attending. One possible reason for this increase was an expansion of awareness of our activities within the hospital, which meant that more people would have been interested in completing the questionnaire.

When a patient experiences pain or difficulty in opening their mouth during the course of dental treatment, they may change their diet. Being made aware of the booth by their dentist, however, may stimulate them to reevaluate their attitude to eating. In addition, the booth was set up in a place that made it easily noticeable, so that even if a patient had not been directly informed about it, they might still have the chance to look in. Furthermore, by inserting the questionnaire among the papers that are necessary for treatment at the initial visit, all patients, without exception, had the opportunity to participate in the survey. In the oral surgery and oral implantation departments, where surgical treatment is very invasive, there were many visits to the booth prior to or immediately after treatment. We believe that all these factors played a part in the observed increase in the number of visitors.

Many of the visitors were in their twenties and thirties, indicating that patients in these age groups take a great interest in eating and its changes during dental treatment. This may have been because patients in these age groups would have felt the change in eating ability between before and during treatment more sharply than older patients who were, perhaps, already accustomed to only being able to consume a more limited range of foodstuffs.

There were also many visitors in their seventies and older, which appears to support the results of an earlier study showing that older people are more likely to report eating problems than young people\(^2\).

The largest number of visitors to the booth was made up of the patients themselves, who came seeking advice. The next largest number comprised guardians of children who were expected to receive dental treatment. Children were not allowed to come to the booth on their own. Therefore, for the purposes of this study, the guardians were considered as representative of the patients themselves.

The most commonly reported problems were the inability to eat hard foodstuffs and difficulty in chewing. Mastication problems arise from loss of teeth, use of dentures, and sense of pain\(^19\). One study on prostheses for the front teeth reported that eating improved after treatment compared to before\(^17\). Since problems such as tooth loss and pain lead to changes in chewing and eating, it may similarly be assumed that tooth loss and pain occurring during the treatment process can cause difficulties.

Regarding the relationship between tooth loss and nutritional status, one earlier report has shown that nutritional status can be well maintained by improving the number of functional teeth through a prosthesis such as dentures\(^2\). This indicates the necessity of temporarily attaching a prosthesis whenever possible and providing instruction on foods that can be eaten during the treatment process. In the present study, some people, including parents of children, elderly patients with dentures, and even people who were not undergoing dental treatment, might have visited the booth due to nutritional concerns alone. This may explain why few problems were found that were specific to a particular department. Future study is required to elucidate this point, however.

The present results revealed that inability to open the mouth was more commonly reported by patients attending the oral surgery and orthodontics departments than the other departments. In patients undergoing oral surgery, such difficulties may be due to swelling, which may arise from inflammation or as a result of the surgical method or jaw-fixing procedure used. In patients undergoing orthodontic treatment, on the other hand, it may be due to the use of elastic bands. Uncorrected malocclusion is also presumed to affect chewing. One study showed that older people with uncorrected malocclusion reported more dissatisfaction with chewing.
than younger people\textsuperscript{8}. It is reported that dissatisfaction related to uncorrected malocclusion was particularly prevalent in patients in their 30s\textsuperscript{9}. In the present study, most orthodontic patients were younger than 30, but still showed considerable concern and problems related to mastication. Presumably, these problems were due to changes in occlusion resulting from the treatment process. In the oral implantation department, late middle age was the largest group, and again, the main problem was the inability to eat hard foodstuffs. It is necessary to avoid applying pressure soon after tooth loss or surgery to promote healing. Therefore, it may be possible only to eat soft food. In the conservative dentistry department, there was a tendency for difficulty in chewing to be listed more often than the inability to eat hard foodstuffs. The number of persons was small, however. Further research is required to elucidate this point.

Conclusion

Many patients reported experiencing eating-related problems during the process of dental treatment. Differences in age and problems varied depending upon the department at which treatment was received. These results indicate the need to tailor the advice given to each patient, and this will depend on treatment stage, age, and food habits. Further study is planned aimed at investigating patient needs with regard to eating, such as reducing pain, improving nutritional conditions, and reducing the time and effort needed to provide soft foods.

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Disclosure of Conflicts of Interest

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