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<td>Author(s)</td>
<td>Ohtawa, Y; Tsujino, K; Kubo, S; Ikeda, M</td>
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<td>URL</td>
<td><a href="http://hdl.handle.net/10130/3272">http://hdl.handle.net/10130/3272</a></td>
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Clinical Report

Dental Treatment for Patients with Physical or Mental Disability under General Anesthesia at Tokyo Dental College Suidobashi Hospital

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Abstract

Dental treatment for patients with physical or mental disability is often performed under general anesthesia due to level of cooperation with treatment, type and location of treatment, time required, or number of times patient is required to attend hospital. University hospitals are receiving an increasing number of requests from local private dentists and dental clinics to provide dental care for patients with physical or mental disability which can only be performed under general anesthesia. We carried out a retrospective survey of the routes of referral and types of dental treatment carried out in such patients under general anesthesia at Tokyo Dental College Suidobashi Hospital. The survey covered a 5-year, 9-month period from April 2006 to December 2011, during which 163 patients, comprising 106 men and 57 women, were treated. Their age ranged widely, from 2 to 53 years, with a high proportion (118 patients, 72.4%) being minors aged under 20. Among the total number of patients, 69 (42.3%) had disorders associated with mental retardation. One hundred and two patients (62.6%) had been referred from other medical institutions, with a particularly high number coming from public dental clinics for patients specializing in such patients. Conservative restorative procedures were performed in most cases (59.4%), with composite resin restorations being particularly frequent. After treatment, many patients returned to their referring medical institutions, which were responsible for subsequent management, but information on the post-treatment status was not available for some patients. Tokyo Dental College Suidobashi Hospital frequently collaborates with local medical institutions, and the present results suggest the importance of improving such collaboration.

Key words: General anesthesia — Dental treatment — Patients with disabilities

Introduction

Dental treatment for patients with physical or mental disability (hereafter, referred to as P/MD patients) in Japan is now mostly performed at university hospitals or dental clinics.
specializing in such patients operated by
dental associations\textsuperscript{5). Dental clinics for P/MD
patients vary widely in terms of their facilities
and staff, and few are equipped to carry out
dental treatment under general anesthesia.
When dental treatment under general anes-
thesia is required due to level of cooperation,
type of treatment, time required, or number
of times the patient is required to attend hos-
pital, the patient is often referred to a special
medical institution\textsuperscript{6).}

Under general anesthesia, dental treatment
can be performed safely, regardless of level
of patient cooperation. However, the type of
treatment and the number of times it can
be performed are limited\textsuperscript{11).}

When providing dental treatment for
P/MD patients, systemic condition must be
carefully evaluated\textsuperscript{4). When treating P/MD
patients at Tokyo Dental College Suidobashi
Hospital, we use general anesthesia if it is
difficult to treat them using behavior control
or restraints. Recently, we have been receiv-
ing numerous requests from local dental
clinics for treatment of P/MD patients that
can only be performed under general anes-
thesia. A retrospective investigation of such
cases treated at our hospital would provide
useful information on the future treatment of
such patients. In this paper, we report the
results of our investigation of dental treat-
ment performed under general anesthesia
at Tokyo Dental College Suidobashi Hospital
and post-treatment in P/MD patients.

Patients and Methods

A total of 163 P/MD patients, comprising
106 men and 57 women, underwent dental
treatment under general anesthesia at Tokyo
Dental College Suidobashi Hospital over a
5-year, 9-month period from April 2006 to
December 2011. The decision as to whether
or not to carry out dental treatment under
general anesthesia was made collaboratively
by a dental anesthetist and the dentist respon-
sible for treatment. A detailed explanation
was given to the patient or their parent/
guardian, and consent obtained.

We carried out a retrospective survey of
P/MD patients based on medical and anesthe-
thetic records of age, type of disability, source
of referral, intraoperative and postoperative
complications, type of dental treatment, and
post-treatment status.

According to the procedures performed
during each administration of general anes-
thesia, the type of dental treatment was clas-
sified as follows:
(a) If a filling or veneer crown restoration
was performed on the same day as pulpotomy,
root canal treatment, or root canal filling, it
was counted as a single tooth treatment.
(b) In the case of indirect restoration, if treat-
ment was carried out twice under general
anesthesia, this was counted as two treatments,
one for preparation and one for luting.
(c) Scaling and application of medication
were not counted as treatment.

Results

The age and sex of the patients are shown
in Fig. 1. For patients who underwent treat-
ment under general anesthesia more than
once during the survey period, age at the time
of initial treatment is given. Overall, patients
comprised 106 men (65.0\%) and 57 women
(35.0\%). The age ranged from 2 to 53 years.
In terms of age distribution, the largest age
group comprised 66 patients (40.5\%) aged
between 2 and 9 years. A greater proportion
of the patients (118 patients, 72.4\%) were
minors aged below 20 years.

The types of disability are given in Table 1.
The most common condition was autism, fol-
lowed by disorders and syndromes associated
with mental retardation, mental retardation
alone, or cerebral palsy associated with men-
tal retardation.

The routes of referral are shown in Fig. 2.
The most common route of referral was
via public dental treatment centers, with 102
patients (62.6\%). This means that collabora-
tion with other medical institutions involved
a total of 155 patients (95.1\%), the great
majority. Only 8 patients (4.9%) came to our hospital without being referred by another medical institution.

The 163 patients in the survey underwent 193 procedures under general anesthesia. Average treatment time was 2 hrs 20 min (range 40 min to 8 hrs 7 min). Treatment took 8 hrs or more in only one case; in 118 patients (97.4%) treatment was completed within 5 hrs. No severe intraoperative or postoperative complications occurred in any patient. Two patients underwent emergency treatment under general anesthesia to treat pain due to trauma or acute periapical periodontitis. Including 9 patients (5.5%) who underwent planned procedures twice, 16 (9.8%) underwent treatment between 2 and 5 times. According to the conditions mentioned in the Methods, 1,812 teeth were treated. The average number of teeth treated during each general anesthesia was 9.3 (range 1–25).

<table>
<thead>
<tr>
<th>Table 1 Type of disability</th>
<th>Number of patients (%)</th>
<th>Number of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental retardation</td>
<td>69 (42.3)</td>
<td>36 (22.1)</td>
</tr>
<tr>
<td>Syndromes with mental retardation</td>
<td>33 (20.2)</td>
<td></td>
</tr>
<tr>
<td>Mental retardation alone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pervasive developmental disorders</td>
<td>69 (42.3)</td>
<td>57 (35.0)</td>
</tr>
<tr>
<td>Autism</td>
<td>12 (7.4)</td>
<td></td>
</tr>
<tr>
<td>Developmental disorders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerebral palsy</td>
<td>21 (12.9)</td>
<td>17 (10.4)</td>
</tr>
<tr>
<td>Cerebral palsy with mental retardation</td>
<td>4 (2.5)</td>
<td>4 (2.5)</td>
</tr>
<tr>
<td>Cerebral palsy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other disability</td>
<td>4 (2.5)</td>
<td>3 (1.8)</td>
</tr>
<tr>
<td>Psychiatric disorders</td>
<td></td>
<td>1 (0.6)</td>
</tr>
<tr>
<td>Higher brain dysfunction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>163 (100)</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 1 Age and sex of patients

Fig. 2 Route of referral
The types of treatment are given in Table 2. The most frequently performed procedure was conservative restoration (59.4%), followed by extraction of 332 teeth (18.3%). Endodontic treatment was performed in 224 teeth (12.4%), and was carried out simultaneously with veneer crown placement in 130 teeth (7.2%) and with conservative restoration in 90 (5.0%).

The types of conservative restorations performed in 1,076 teeth are shown in Table 3. The types of veneer crowns are given in Table 4. The types of endodontic treatment are given in Table 5. Vital pulpotomy was the most frequently performed procedure.

Hospital attendance after treatment is shown in Fig. 3. After undergoing treatment under general anesthesia, 94 patients (57.7%) returned to their referring medical institution and were managed there. Forty-one patients (25.2%) continued to attend our hospital for regular examinations and treatment. Information on the post-treatment status of dental care was not available for 20 patients (12.3%). A further 8 patients (4.9%) were referred by our hospital to other medical institutions as they had moved to other areas.

### Table 2 Type of dental treatment

<table>
<thead>
<tr>
<th></th>
<th>Number of teeth</th>
<th>(%)</th>
<th>With endodontics</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealant</td>
<td>76</td>
<td>(4.1)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Conservative restoration</td>
<td>1,076</td>
<td>(59.4)</td>
<td>90</td>
<td>(5.0)</td>
</tr>
<tr>
<td>Veneer Crown</td>
<td>196</td>
<td>(10.8)</td>
<td>130</td>
<td>(7.2)</td>
</tr>
<tr>
<td>Abutment teeth of bridge</td>
<td>10</td>
<td>(0.6)</td>
<td>4</td>
<td>(0.2)</td>
</tr>
<tr>
<td>Endodontics</td>
<td>10</td>
<td>(0.6)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Extraction of teeth</td>
<td>332</td>
<td>(18.3)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Extraction of teeth (the third molar)</td>
<td>109</td>
<td>(6.0)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
<td>(0.2)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Total</td>
<td>1,812</td>
<td>(100)</td>
<td>224</td>
<td>(12.4)</td>
</tr>
</tbody>
</table>

### Table 3 Type of conservative restoration

<table>
<thead>
<tr>
<th></th>
<th>Number of teeth</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite resin restoration</td>
<td>962</td>
<td>(89.4)</td>
</tr>
<tr>
<td>Amalgam restoration</td>
<td>20</td>
<td>(1.9)</td>
</tr>
<tr>
<td>Glass ionomer restoration</td>
<td>21</td>
<td>(2.0)</td>
</tr>
<tr>
<td>Inlay restoration</td>
<td>73</td>
<td>(6.7)</td>
</tr>
<tr>
<td>Total</td>
<td>1,076</td>
<td>(100)</td>
</tr>
</tbody>
</table>

### Table 4 Type of veneer crown

<table>
<thead>
<tr>
<th></th>
<th>Number of teeth</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel crown</td>
<td>118</td>
<td>(60.2)</td>
</tr>
<tr>
<td>Composite resin crown</td>
<td>39</td>
<td>(19.9)</td>
</tr>
<tr>
<td>Cast crown</td>
<td>39</td>
<td>(19.9)</td>
</tr>
<tr>
<td>Total</td>
<td>196</td>
<td>(100)</td>
</tr>
</tbody>
</table>

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The greater proportion of patients undergoing dental treatment under general anesthesia were men. This was consistent with previous reports on dental treatment under general anesthesia. The reported reasons for the larger number of male patients include the greater prevalence of autism among males and the difficulty of restraining them due to physical build and strength. This would also account for the situation in such patients at our hospital.

A greater proportion of the patients (72.4%) comprised minors aged below 20 years. The age distribution of patients in other institutions varied according to circumstances. Possible reasons for the large number of young patients here include the fact that they have more opportunities to undergo dental checkups during which caries can be identified, and it is easier for parents or guardians to accompany them to hospital compared with adults. Other reasons were that the number of remaining teeth in P/MD patients was markedly smaller than that in healthy subjects, and that they have fewer opportunities to attend a dental clinic.

Most disabilities were disorders associated with mental retardation. This tendency was almost identical to those reported at other institutions. This is because patients with severe mental retardation or autism have little understanding of dental treatment and can be uncooperative, which makes management extremely difficult. Patients with psychiatric disorders or higher brain dysfunction may also undergo treatment under general anesthesia, and in an aging society the number of patients is expected to increase.

The greatest number of patients (62.6%) was referred by public dental treatment centers. When severe P/MD patients attend local dental treatment centers which do not possess facilities for general anesthesia, they are frequently referred to our hospital for treatment that requires general anesthesia. Reports from other institutions did not identify the routes of referral, and therefore the data could not be compared. It may, however, be due to the fact that our hospital is a highly reputed medical institution. Few patients came to our hospital via the internet or personal introduction; however, the number of such patients is expected to increase in the future.

Almost all treatment consisted of procedures to treat caries. The average number

Table 5 Type of endodontic treatment

<table>
<thead>
<tr>
<th>Type of endodontic treatment</th>
<th>Number of teeth</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vital pulpotomy</td>
<td>133</td>
<td>59.4</td>
</tr>
<tr>
<td>Pulpectomy and root canal filling</td>
<td>62</td>
<td>27.7</td>
</tr>
<tr>
<td>Pulpectomy</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Root canal treatment and filling</td>
<td>19</td>
<td>8.5</td>
</tr>
<tr>
<td>Root canal treatment</td>
<td>9</td>
<td>4.0</td>
</tr>
<tr>
<td>Root canal filling</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Total</td>
<td>224</td>
<td>100</td>
</tr>
</tbody>
</table>

Fig. 3 Hospital attendance after treatment

Discussion
of teeth treated during each administration of general anesthesia was 9.3 (range 1–25). This is similar to the averages of 8–13 teeth reported at other institutions\(^3,10–13\). Average treatment time was also very similar to that reported at other institutions at 2 hrs 20 min. The scheduled time of treatment in the patient in whom treatment took longest (8 hrs 7 min) was 5 hrs. Treatment of the molar in this particular case was very difficult due to trismus owing to Werdnig-Hoffman disease.

Most caries treatment comprised conservative restoration, very similar to the trend reported at other institutions\(^3,10–13\). Most conservative restoration procedures involved drilling and were completed in a single treatment, with composite resin restorations placed in the great majority of cases. Similarly, a stainless steel or composite resin crown was placed in most cases and all procedures were completed in a single treatment. This was because many patients attended our hospital to solely undergo treatment that required general anesthesia, meaning that several treatment visits would impose a heavy burden and the demand to complete procedures in a single visit was high.

There was a wide variation in previously reported extraction rates. In recent years, the rate of extensive caries requiring pulp treatment or extraction among P/MD patients has reportedly been decreasing, indicating a decline in the severity of caries\(^2,3,9\). According to Morisaki\(^8\), the clinical polarization of patients is becoming apparent, with some, albeit few, patients presenting with advanced, severe caries affecting several teeth. In this study, conservative restoration accounted for the majority of treatment, but extraction was the next most common procedure. This reflects the polarization of caries.

Procedures other than caries treatment included those for which general anesthesia was indicated due to a high level of surgical invasiveness, including extraction of supernumerary teeth and third molars and fenestration of impacted teeth.

Regular checkups and maintenance are important following comprehensive dental treatment. We strongly recommended regular checkups and maintenance to patients, parents and guardians. After completion of treatment under general anesthesia, many patients returned to their referring medical institutions, where they underwent supportive care, while 25.2% continued to attend our hospital for regular examination and treatment. A further 4.9% were referred to other medical institutions by our hospital as they were moving to other areas. Information on post-treatment status was not available for 12.3%, and guidance and prognosis was a matter of concern here. Post-surgical guidance during regular examinations was insufficient, indicating the need for greater consideration to be given to this topic.

Tokyo Dental College Suidobashi Hospital frequently collaborates with local medical institutions, and the present results suggest the importance of improving such local collaboration.

References


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