Removable Prosthodontics

Treatment results with immediate overdentures: An evaluation of 4.5 years

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In a controlled clinical trial, 74 patients who required complete immediate dentures were randomly treated with immediate mandibular overdentures on two mandibular canines with or without magnetic attachments or with complete immediate dentures. All were borderline situations for overdenture therapy. The patients were evaluated for 4.5 years after denture insertion. The results demonstrated that 50% of the dentures had been renewed or had required replacement; in this respect, no differences were found among the three groups. In the overdenture groups, 15% of the abutments were extracted; most abutment restorations were replaced or had to be replaced. Two thirds of the magnets were lost or in bad condition. No significant differences were found in relation to patient satisfaction; most patients were satisfied with their dentures. It is the authors' opinion that even though the abutment conditions were disappointing after 4.5 years, mandibular overdenture therapy is indicated in borderline situations because of the 50% reduction in mandibular bone loss found. (J Prosthet Dent 1996;76:153-7.)

Extraction of the last remaining teeth and replacement with complete dentures has many consequences. The patient has to adapt to a new situation with respect to speech, chewing, swallowing, and so forth. The patient also has to accept edentulousness, which may lead to psychologic problems and social isolation. Furthermore, extraction of teeth leads to a reduction of the alveolar ridge, which causes changes in denture base adaptation, vertical dimension of occlusion, and occlusal contacts. To make a gradual transition from a natural dentition to complete dentures possible, overdenture therapy is recommended by prosthodontists. The question remains whether overdenture therapy really provides the improvement (namely, less discomfort, improved denture function, and reduced bone resorption) claimed by its advocates. For that reason a randomized clinical trial was set up in which patients who needed complete dentures were treated either with complete immediate dentures or with complete immediate mandibular overdenture on two canines. Results based on the treatment of these patients with respect to bone reduction have been published. In those studies, mandibular bone heights were measured in all regions of the mandible, both anteriorly and posteriorly to the abutments. A 50% reduction of bone loss in patients with an overdenture was found (0.9 mm average in the overdenture groups compared with 1.8 mm in the complete denture group). Surprisingly, this reduction was not only significant in the region directly around the abutments but also in the molar regions, 2.5 cm distal to the abutments. Another study reported on denture satisfaction and patients' experiences with the dentures after 1 year. All of the patients were satisfied and no significant differences were found between the groups.

The purpose of this longitudinal study was to follow up these patients. Aftercare during the first 4.5 years, denture and abutment condition, and patients' satisfaction after 4.5 years were evaluated.

MATERIAL AND METHODS

Seventy-four patients were selected from the patient population of the University Dental Clinic in Nijmegen, Nijmegen, The Netherlands. Fifty patients were men and 24 were women; their average age at the time of denture insertion was 54 years (SD 11 years). All had severely decayed and/or periodontally involved teeth. Consequently complete immediate denture treatment was indicated and overdenture therapy was in all cases a borderline indication. In the maxilla a complete immediate denture or a complete denture was indicated. In the mandible they were treated either with an immediate overdenture or with an immediate complete denture after a verbal and written
Table I. Patient distribution in three groups

<table>
<thead>
<tr>
<th>Group*</th>
<th>At beginning</th>
<th>After 4.5 years</th>
<th>Lost</th>
</tr>
</thead>
<tbody>
<tr>
<td>OD</td>
<td>26</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>ODA</td>
<td>26</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>CD</td>
<td>22</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>66</td>
<td>18</td>
</tr>
</tbody>
</table>

*OD, Immediate overdenture group; ODA, immediate overdenture group with attachment; CD, complete denture group.

The explanation of the research design had been given and the patients had agreed to treatment. The treatment was carried out by undergraduate dental students under supervision of three experienced prosthodontists. For all dentures, acrylic resin teeth designed according to the lingual occlusion concept were used (Optiform acrylic resin teeth, ENTA, Bergen op Zoom, the Netherlands). All immediate dentures were rebased after 6 months.

Three groups were formed, two overdenture groups and one complete denture group. The first overdenture group used abutments where the endodontic cavity in the mandibular canines was filled with an amalgam restoration material (the OD group). The second overdenture group used a Dyna magnet direct attachment (Bergen op Zoom) on both mandibular canines 9 months after extraction and insertion of the dentures (the ODA group). The third group received a complete immediate denture (the CD group). To divide the patients into comparable groups, the patients were "balanced," by means of a "self-designed" computer program, on age, gender, periodontal condition (periodontal breakdown more or less than two thirds of the root length), and the presence or absence of teeth in the premolar and molar regions of the mandible. By use of this balancing procedure, 26 patients were allocated to the OD group, 26 to the ODA group, and 22 to the CD group. At 4.5 years (SD 7 months), 18 patients failed to attend the recall (Table I). One patient died, three were ill, six relocated and left no forwarding address, six refused to attend without offering a specific reason, and the remaining two refused to attend because of dissatisfaction with their dentures.

Patients were evaluated radiographically with respect to the reduction in bone height, the condition of the abutments, plaque- and bleeding-index according to Mombelli et al., and the gingival index according to Löe and Silness. Probing depths were assessed at four locations around the abutments (mesial, buccal, distal and lingual) with a Merit-B probe, (HU-Friedy, Düsseldorf, Germany). Performed and required aftercare was sampled out of the patients' dental records. Denture satisfaction and the patients' opinions about their dentures were assessed by means of a questionnaire with precoded answers. The clinical evaluation was conducted by two experienced prosthodontists. Significant differences between the overdenture and the complete denture groups were tested by χ-square analysis and ANOVA (α = 0.05).

RESULTS

Exclusive of the regular rebasings in the sixth month after immediate denture insertion, 38% of the maxillary dentures and 39% of the mandibular dentures were relined or rebased. New maxillary dentures were fabricated for 15% and new mandibular dentures for 20% of the patients. Specification per treatment group is presented in Table II. At the 4.5 year evaluation, relining was necessary for one sixth of the patients and new dentures for one third of the patients (Table III).

An overall view of the prosthetic aftercare performed or required is given in Table IV. In all groups new dentures were made or needed by approximately 50% of the patients. In the overdenture groups, no treatment was necessary in 10% of the patients and in 25% of the patients in the complete denture group; this difference was not statistically significant (χ-square, α = 0.05). One of the reasons for making new dentures was severe wear of the posterior acrylic resin teeth, which leads to complete loss of balanced articulation.

For the condition of the abutments in the overdenture groups, 15% were removed in the evaluation period because of caries or periodontal diseases; this percentage hardly differs in both groups (Table V). Amalgam restorations were replaced in 37%. At the 4.5 year evaluation, 18% of the abutments had caries. With respect to the magnets, one third were still functioning normally, one third were in bad condition, and one third were lost. "Wear" of the magnet cover was the main problem.

No differences were present between the overdenture groups with respect to plaque, bleeding, and gingival scores (Table VI). Only one patient had a probing depth of more than 3 mm (Table VII).

Seventy nine percent of the patients were satisfied with their dentures and 7% were dissatisfied. All of the dissatisfied patients were found in the overdenture groups (Table VIII). With regard to patients' opinions about the fit and the retention of the dentures and eating ability, no
DISCUSSION

The evaluation in this article is part of a longitudinal study on complete immediate overdentures. It concerns a randomized controlled clinical trial that compares different treatment strategies in immediate denture patients. Previous reports have discussed other aspects of treatment, such as changes in bone reduction and patient satisfaction.11-13

A major problem in recall studies is the loss of subjects. In this study, 24% of the patients were lost to follow-up after 4.5 years. The patients selected for the trial had a poor dental state before commencing treatment caused mostly by personal neglect (borderline cases); therefore, some loss of patients was expected. Because the dropouts were equally divided over the three groups, it did not influence the results to a great extent.

Table III. Number of relinings and new dentures required after 4.5 years

<table>
<thead>
<tr>
<th></th>
<th>OD (n = 19)</th>
<th>ODA (n = 20)</th>
<th>CD (n = 17)</th>
<th>Total (n = 56)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relinings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maxillary</td>
<td>0</td>
<td>3</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Mandibular</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>New dentures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maxillary</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Mandibular</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>17</td>
</tr>
</tbody>
</table>

Key to abbreviations in Table I.

Table IV. Summary of prosthodontic aftercare

<table>
<thead>
<tr>
<th></th>
<th>OD (n = 19)</th>
<th>ODA (n = 20)</th>
<th>CD (n = 17)</th>
<th>Total (n = 56)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No treatment</td>
<td>2</td>
<td>11</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Relining and/or occlusal correction</td>
<td>7</td>
<td>37</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>New dentures</td>
<td>10</td>
<td>52</td>
<td>9</td>
<td>53</td>
</tr>
</tbody>
</table>

Table V. Condition of abutments

<table>
<thead>
<tr>
<th></th>
<th>OD (n = 38)</th>
<th>ODA (n = 40)</th>
<th>Total (n = 78)</th>
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</thead>
<tbody>
<tr>
<td>Abutments removed</td>
<td>6</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Restorations replaced</td>
<td>20</td>
<td>53</td>
<td>29</td>
</tr>
<tr>
<td>Caries after 4.5 years</td>
<td>10</td>
<td>26</td>
<td>14</td>
</tr>
</tbody>
</table>

statistically significant differences between the groups were found (ANOVA, \( \alpha = 0.05 \)).

Table VI. Periodontal condition of abutments

<table>
<thead>
<tr>
<th></th>
<th>OD (n = 32)*</th>
<th>ODA (n = 34)*</th>
<th>Total (n = 66)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plaque No</td>
<td>22</td>
<td>18</td>
<td>40</td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>16</td>
<td>26</td>
</tr>
<tr>
<td>Bleeding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>2</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>1</td>
<td>12</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Gingival index</td>
<td>0</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>1</td>
<td>21</td>
<td>20</td>
<td>41</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>6</td>
<td>13</td>
</tr>
</tbody>
</table>

*The number of abutments is less than in Table V because six teeth were removed in both groups.

Table VII. Probing depths around abutments

<table>
<thead>
<tr>
<th></th>
<th>OD (n = 32)</th>
<th>ODA (n = 34)</th>
<th>Total (n = 66)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesial Distal Mesial Distal Mesial Distal</td>
<td>1 mm</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2 mm</td>
<td>21</td>
<td>22</td>
<td>17</td>
</tr>
<tr>
<td>3 mm</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>4 mm</td>
<td>—</td>
<td>—</td>
<td>2</td>
</tr>
</tbody>
</table>

Table VIII. Answer to the question, “Are you satisfied with your denture?”

<table>
<thead>
<tr>
<th></th>
<th>OD (n = 19)</th>
<th>ODA (n = 20)</th>
<th>CD (n = 17)</th>
<th>Total (n = 56)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfied</td>
<td>14</td>
<td>16</td>
<td>14</td>
<td>44</td>
</tr>
<tr>
<td>Doubt</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Dissatisfied</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

Substantial aftercare was needed in all groups during the first 4.5 years after denture insertion (Table II). At the 4.5 year evaluation, considerable aftercare was deemed necessary by the examiners (Table III). The stated indication for treatment, however, does not mean that these treatments were always carried out; many patients were not interested in treatment because they had no evident problems. The finding that no differences were displayed between the groups is surprising. It had been anticipated that less prosthetic treatment would be necessary in the overdenture groups because there is more support for the mandibular denture and less bone reduction, leading to smaller changes of the denture-bearing areas.12

Fifteen percent of abutments were extracted during the 4.5 year evaluation period. Other studies reported lower
to the fit and retention of the dentures and about eating because they had no evident problems and were not used to insert attachments if needed.

The retention of the mandibular denture that did not differ of bone loss found in the mandible.

Differences might occur in the same disappointing results, especially in the absence of a cal situation we propose that an overdenture without at­

The patients received professional instruction on cleaning the abutments with fluoride toothpaste and chlorhexidine gel several times as recommended by Keltjens et al. However, ideal abutment conditions were not achieved in all situations. One reason for this is the bad condition of the abutments from the beginning. Another reason may be that recall visits were more irregular than expected. The study's protocol prescribed a half-year recall. Many patients, however, were reluctant to come so often because they had no evident problems and were not used to visiting the dentist regularly. Other studies have the same disappointing results, especially in the absence of a strict maintenance protocol.

The results regarding the Dyna magnetic attachments were disappointing; most were lost or in a bad condition. “Wear” of the magnet cover often occurred, which lead to cracks and the loss of magnets. This was also caused possibly by poor denture stability during the immediate denture period, which causes movements of the mandibular denture across the surface of the magnets. In view of the reported patient satisfaction, particularly with respect to the retention of the mandibular denture that did not differ between the groups, such attachments are in our opinion not indicated in immediate denture situations. In a clinical situation we propose that an overdenture without attachments should be fabricated. One could later decide to insert attachments if needed.

The finding that satisfaction did not differ between the overdenture and the complete denture groups was unexpected. All groups were more or less satisfied with respect to the fit and retention of the dentures and about eating ability (Tables VIII and IX). Differences might occur in the long run, but were not present after 4.5 years.

Taking all the results into account leads to the question of whether overdenture therapy is worthwhile in border­line cases, because several advantages, claimed by its advocates, are not achieved (no differences in experienced comfort and retention of the mandibular dentures, no reduction in aftercare, loss of abutments, necessity of stringent maintenance program). Even though these advantages were not found in this study, the decrease in bone reduction for the mandibular overdenture patients as reported earlier is, in our opinion, so important in the long run that overdenture therapy is always indicated, even in borderline cases.
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reduction in patients treated with immediate overdentures or with im-
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with resistant BMS after treatment of diagnosed medical and dental disease were examined and
compared with a sex- and age-matched control group. After evaluation of BMS symptoms,
the personality, psychologic functioning, and life quality were assessed by use of the
Karolinska Scales of Personality (KSP). In addition, a personality scale, psychologic
functioning scale, and quality of life scale was used in the evaluation of these patients.
Results. When compared with the control group, the resistant BMS patients had a
significantly lower score on the socialization scale, significantly higher scores for somatic
anxiety, muscular tension, and psychasthenia scales. In addition, these patients were more
easily fatigued, more sensitive, and showed a tendency to be more concerned about their
health. With regard to psychologic functioning, these patients had more problems taking
initiatives, more easily became dizzy, felt more depressed, and in addition reported more
palpitations and/or indigestion.
Conclusions. The authors contend that the observed differences in personality and
psychologic functioning may suggest that the burning sensations were psychosomatic
sensations in these patients and that for patients who have resistant BMS, psychologic
investigation may be helpful in treatment. 23 References. RP RENNER

Noteworthy Abstracts of the Current Literature

Personality characteristics of patients with resistant burning mouth syndrome.
This study described the personality, psychologic functioning, and life quality of patients
with resistant burning mouth syndrome (BMS). Resistant BMS after treatment of
diagnosed medical and dental conditions may be somatic manifestations of mental distress.
Thus the authors concluded that studying the personality characteristics of patients with
this condition is important.

Material and Methods. The personality characteristics of 32 patients with resistant
BMS after treatment of diagnosed medical and dental disease were examined and
compared with a sex- and age-matched control group. After evaluation of BMS symptoms,
the personality, psychologic functioning, and life quality were assessed by use of the
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