Observation on the effect of periodontal treatment on patients with combined periodontal-pulpal lesions

Hongxiang Yan*, Xuemei Mao*, Fengchun Hu, Jie Liu, Junrong Wang

Department of Stomatology, People’s Hospital of Dongying, Dongying 257091, Shandong, China. *Equal Contributors.

Received August 25, 2020; Accepted April 25, 2021; Epub October 15, 2021; Published October 30, 2021

Abstract: Objective: To evaluate the effect of periodontal treatment on combined periodontal-pulpal lesions. Methods: A total of 327 patients with periodontal-pulpal lesions (360 affected teeth) were selected, and all affected teeth were treated with a complete root canal, and assigned into group A (periodontal treatment group, 180 affected teeth) and group B (non-periodontal treatment group, 180 affected teeth). Group A received periodontal basic treatment for 2 weeks after the completion of root canal treatment; 6 weeks later, if there were still more than 5 mm periodontal pockets and bleeding after detection, flap treatment was performed. Group B received root canal treatment and supragingival scaling. Follow-up was conducted at 3, 6, 12 and 24 months after surgery by observing the periodontal depth (PD), alveolar bone resorption and tooth mobility (TM). Result: In group A, the PDs before operation and 2 years after operation were (5.966±1.877) mm and (5.133±1.935) mm, and the PD was significantly decreased. In group B, the PDs before operation and 2 years after operation were (5.533±1.856) mm and (6.167±1.927) mm, and the PD was increased. There was no statistical difference in preoperative TM between the two groups (P>0.05). Two years after operation, TM in group A was significantly lower than that in group B (P<0.05). In terms of X-ray performance, there was no significant change in alveolar bone resorption in group A two years after operation compared with that before operation (P>0.05); two years after operation, alveolar bone resorption in group B was significantly reduced compared with that before operation (P<0.05). Conclusion: Periodontal treatment is a promising technique for patients with combined periodontal-pulpal lesions.

Keywords: Combined periodontal-pulpal lesions, periodontal treatment, root canal treatment

Introduction

Periodontal-pulp lesions usually occur in the middle and late stages of periodontitis, and there are numerous connections between periodontal tissue and pulp tissue, and mutual infection could arise, and in turn result in combined periodontal-pulpal lesions [1, 2]. In oral clinical work, the treatment of pulp disease alone and direct extraction are the mainstay for combined periodontal-pulpal lesions [3]. Nevertheless, there are several shortcomings such as unsatisfying prognosis, high cost, and poor compliance [4, 5]. In this study, we attempted to compare the effectiveness of periodontal and non-periodontal treatment in terms of periodontal pocket depth, tooth looseness, and alveolar bone resorption, with an aim to provide theoretical basis for clinical treatment options.

Materials and methods

Participants

A total of 252 patients admitted from January 2015 to December 2018 to Shanghai Xuhui District Dental Treatment Center (270 affected teeth) and 75 patients with combined periodontal-pulpal lesions admitted to Zhongshan Hospital of Fudan University (90 affected teeth) were enrolled. The 360 affected teeth were assigned into either group A (periodontal treatment group, 180 affected teeth) or group B (non-periodontal treatment group, 180 affected teeth) according to the treatment method the patients received. Inclusion criteria: Periodontal periodontitis caused by periodontal pulp and periapical disease; teeth with retrograde pulpitis; a tooth with periodontal disease and pulp disease; patients who received root canal
Observation of periodontal treatment

Table 1. Comparison of PD between 2 groups before and 2 years after treatment

<table>
<thead>
<tr>
<th>Groups</th>
<th>Before treatment</th>
<th>2 years after treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>5.966±1.877</td>
<td>4.133±1.935</td>
</tr>
<tr>
<td>Group B</td>
<td>5.533±1.856</td>
<td>6.167±1.927</td>
</tr>
</tbody>
</table>

Outcome measures

A total of 327 patients (360 teeth) were followed up at 3, 6, 12, 24 months after surgery in terms of PD, TM, and X-ray examination of alveolar bone resorption. The follow-up examination was performed by the same physician and the examination data were recorded in detail. The indicators at different time points were compared and analyzed.

A periodontal tester (Perwtest) was used to measure the periodontal value. When measuring, the measuring handle was required to be in a horizontal position, perpendicular to the crown of the tooth, and the handle head was aligned with the middle 1/3 of the crown. The position of each measurement was identical to avoid errors in the values. The handle head was 0.5-2.5 mm away from the crown surface, and then the switch was pressed, and subsequently the probe in the handle would automatically tap the teeth at a speed of 16 times per minute. If there were more than 4 correct taps, it was accepted by the instrument and analyzed by computer. The periodontal measurement value of the tooth was displayed. For accurate measurement, the measurement was repeated 3 times for each tooth, and the average of these 3 times was taken as the measurement value of the tooth.

Statistical analysis

SPSS22.0 software package was used for statistical analysis, and the measurement data was expressed with x±s, and the t test was used for inter-group comparisons, and χ² test was used to compare the rates. P<0.05 indicated the difference was statistically significant.

Results

Baseline information

Of the 327 patients, 156 cases were males and 171 cases were females; there were 160 premolars and 200 molars; patients were aged 27 to 70 years, with an average age of (43.7±
Observation of periodontal treatment

5.6) years; with 109 cases that were primary endodontic disease secondary periodontal disease, 131 that were primary periodontal disease with secondary pulp infection, and 120 had pulp combined with periodontal disease. All patients showed obvious symptoms of pulpitis. Most of the patients had hot and cold pain, spontaneous pain, night pain, biting pain or percussion pain, etc., which may be accompanied by periodontal abscess, deep blind pocket, loose teeth and other symptoms. There was no significant difference in clinical data between the two groups (P>0.05).

**Table 2.** Paired t test of PD before and 2 years after treatment between 2 groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>X</th>
<th>S</th>
<th>SE</th>
<th>95% CI Lower limit</th>
<th>95% CI Upper limit</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>1.883</td>
<td>0.940</td>
<td>0.121</td>
<td>1.640</td>
<td>2.126</td>
<td>15.512</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Group B</td>
<td>-0.633</td>
<td>0.974</td>
<td>126</td>
<td>-0.885</td>
<td>0.382</td>
<td>-5.038</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

**Table 3.** Comparison of tooth mobility before and 2 years after treatment between 2 groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>No looseness</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>x²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before treatment</td>
<td>Group A</td>
<td>0</td>
<td>18</td>
<td>32</td>
<td>10</td>
<td>0.636</td>
</tr>
<tr>
<td>Group B</td>
<td>0</td>
<td>20</td>
<td>33</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After treatment</td>
<td>Group A</td>
<td>13</td>
<td>25</td>
<td>18</td>
<td>4</td>
<td>23.72</td>
</tr>
<tr>
<td>Group B</td>
<td>3</td>
<td>12</td>
<td>34</td>
<td>11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Periodontal-pulp lesions are common in clinic, which is one of the causes of tooth extraction in patients. The patients with combined periodontal-pulpal lesions generally have poor oral hygiene and need periodontal treatment [6]. However, some patients refused periodontal treatment after root canal treatment resulting in a reduction in the preservation rate of affected teeth [7-9]. The pathogenesis of periodontal-endodontic disease is more complicated, which is mainly caused by anaerobic infection. This disease can be divided into three types including primary periodontitis secondary dental pulp disease, periodontal disease secondary to primary pulpitis and periodontal-pulpal lesions. Lesions usually occur in the late stages of periodontitis, and how to control anaerobe infection effectively remains a key concern. Positive diagnosis and treatment of periodontal disease is conducive to the healing of pulp disease and periapical lesions [10-13]. Root canal filling for pulp lesions can also help relieve pain, and lay a solid foundation for subsequent periodontal treatment. The 360 affected teeth in this study have undergone complete root canal treatment, and the success rate of root canal treatment was 31%-98%. The possible explana-
Observation of periodontal treatment

Table 4. X-ray examination of alveolar bone absorption before and 2 years after treatment between 2 groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>1/3 above the root</th>
<th>1/3 in the root</th>
<th>1/3 under the root</th>
<th>$\chi^2$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>Before treatment</td>
<td>12</td>
<td>23</td>
<td>25</td>
<td>0.3828</td>
</tr>
<tr>
<td></td>
<td>After treatment</td>
<td>14</td>
<td>20</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Group B</td>
<td>Before treatment</td>
<td>13</td>
<td>28</td>
<td>19</td>
<td>6.704</td>
</tr>
<tr>
<td></td>
<td>After treatment</td>
<td>6</td>
<td>22</td>
<td>32</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2. X-ray examination before and after treatment. Note: (A) X-ray examination before treatment; (B) X-ray examination after treatment.

...periodontal treatment, periodontal inflammation subsides, and the root surface produces new attachments, and the looseness is obviously alleviated. In this study, increased periodontal pocket depth was often associated with alveolar bone resorption, and for the 180 teeth without periodontal treatment, the alveolar bone continued to absorb to different degrees. For the affected teeth with periodontal treatment, alveolar bone absorption is relatively stable, and there is no significant difference before and after treatment. Periodontal therapy is effective for combined periodontal-pulpal lesions, although flap turnover cannot significantly increase the height of alveolar bone, but it can favorably control the periodontal lesions [18-20]. In short, periodontal-pulp lesions are common in clinical practice and for the methods of how to improve the preservation rate of affected teeth, root canal therapy combined with periodontal treatment is particularly important. Additionally, for alveolar bone resorption, guided tissue regeneration (GTR), apical curettage and so on can be further adopted. Unfortunately, despite the long-term follow-up, the retrospective study still results in a certain bias. Further observation on the severity of periodontal and pulp combined lesions were not conducted. More trials are needed to provide a basis for clinical treatment in the future.

Overall, we believe that periodontal treatment is a preferable technique for patients with combined periodontal-pulpal lesions.

Disclosure of conflict of interest

None.
Address correspondence to: Junrong Wang, Department of Stomatology, People’s Hospital of Dongying, Dongying 257091, Shandong, China. Tel: +86-18954603303; E-mail: bihao16910477283@126.com

References


