Conventional endodontic treatment of primary molars using metronidazole as an intra-canal medicament: a pilot study

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Abstract

AIM: This was to evaluate the clinical and radiographic outcomes of an antibacterial drug (Metronidazole, Nidazol, IE Ulagay Iłac A.S) application as an intra-canal medicament combined with pulpectomy in infected primary molar teeth.

METHODS: The study material consisted of data collected from children treated at the Dental School Dept. of Paediatric Dentistry in Marmara University between 2000 and 2004. Clinical and radiographic data were collected over 2 years from patients who had received a topical application of metronidazole in root canal dressing before a pulpectomy was completed. Clinical success parameters were: no abscess formation, no fistula, no pain and no pathologic mobility at treated teeth with metrandazole dressing. The overall success and failure rates were analysed. Radiographic diagnosis was standardized between investigators and intra and inter-rater reliability assessed. Both investigators read and evaluated all radiographs, after a comparison of results, a consensus was agreed upon for each result.

STATISTICS: All data were entered into an Excel format and SPSS 11.0 P < 0.05 were used for Windows and Chi-square for statistical analyses.

RESULTS: There were 64 molars assessed for clinical and radiographic success. Considering the eruption times, success rate was 75% as determined by the last follow up clinically and radiographically according to predetermined success criteria. In the 64 molars, 4 cases demonstrated loss of the alveolar bone, 3 exhibited varying degrees of root resorptions on radiographic examination and 3 showed clinical pathologic mobility. Fistulae were observed in only 1 case and early loss was detected in 5 cases. CONCLUSION: These results suggest that main factors responsible for failure may be associated with uncertain mixing proportions of the metronidazole paste and inadequate maxillary restorations. But some modifications in preparing the paste could increase its efficacy.

Introduction

As primary teeth maintain arch length and preserve masticatory function, clinicians must be familiar with treatments for pathology of primary teeth. Where the radicular pulp is non-vital or irreversibly inflamed, the treatment of choice is pulpectomy [Koch, 2001; AAPD, 2009] with an aim a tooth that would otherwise be extracted, and in doing so, to prevent space loss and disturbance to the permanent dentition [Llyewelyn, 2000].

Key words: Metronidazole, anaerobic bacteria, primary teeth pulpectomy

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European Archives of Paediatric Dentistry // 11 (Issue 4). 2010

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Materials and Methods

Study material. Data was collected retrospectively from dental records of children treated at the Dept. of Paediatric Dentistry, Dental School of Marmara University. Clinical and radiographic data were collected from a retrospective chart review for 64 infected primary molars in 57 children who were 6 to 10 years old when the treatments had been performed and follow-up times ranged from 1-4 years.

Table 1: Distribution of pulpectomy treated primary molars teeth with intra-canal use of metronidazole.

<table>
<thead>
<tr>
<th>Teeth</th>
<th>N</th>
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<tbody>
<tr>
<td>Maxilla</td>
<td></td>
</tr>
<tr>
<td>55 – 65</td>
<td>22</td>
</tr>
<tr>
<td>54 – 64</td>
<td>11</td>
</tr>
<tr>
<td>Mandible</td>
<td></td>
</tr>
<tr>
<td>75 – 85</td>
<td>14</td>
</tr>
<tr>
<td>74 – 84</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
</tr>
</tbody>
</table>

Samples. The study sample comprised of patients who presented at least one primary molar non-vital pulpectomy following metronidazole intra-canal medicament. Patient records were screened to meet the following criteria for acceptance into the study:

- primary teeth with non-vital carious exposure with pulp tissue,
- clinical symptoms or evidence of pulpal degeneration, including swelling or presence of fistula,
- presence of at least two thirds of the root primary teeth,
- restorable crowns following root-canal treatment, proper general health conditions.

Table 1 shows the number and type of treated primary molars.

Techniques. Full-time faculty members in the Dept. of Paediatric Dentistry treated all molars. Caries removal and coronal access was performed with a # 330 high-speed bur with water spray. Access to the pulp chamber was performed using a sterile slow-speed round steel bur. Following removal of necrotic pulp tissue, the root canals were prepared with files up to # 25, then rinsed with hydrogen peroxide and dried with paper points. Under the isolation conditions (cotton rolls and suction) metronidazole (Nidazol, IE Ulagay Ilac A.S) was introduced into the root canals by lentulospiral through pulp chamber. Metronidazole, canal disinfection temporary dressing mixture between sessions, was prepared via mixing 0.1 ml of sterile saline and granulated metronidazole 500 mg tablet. Freshly mixed intra-canal medicament, metronidazole mixture in cream form, placed in the root canals and pulp chamber covered with temporary filling zinc-phosphate cement (Adhesor® SpofaDental).

Follow-up. Patients were asked to return one week later for radicular and coronal final restoration. In the absence of clinical pathological signs of inflammation such as swelling or fistulae, the root canals were obturated using a viscous mixture of zinc oxide eugenol cement (Cavex®). The paste was delivered to the root canals with the hand instruments and spun into root canals with endodontic files. Pulp chambers were obturated with glass ionomer cement as a cavity liner and restoration was completed with compomer restorations (Dytract AP, Dentsply, Germany)(Fig 1).

Assessment. All subjects were evaluated clinically and radiographically. Criteria used to describe radiographic findings included: external root resorption, internal root resorption, interradicular bone destruction, periapical bone destruction and early loss based on criteria used by Moskowitz et al. [2005]. Radiographic success was defined as absence of pathologic internal or external resorption, furcation or periapical radiolucency. Periapical radiographs were taken of all treated molars for all patients, in order to assess the objectives of the study.

Success criteria. Pulpectomies recorded as clinically successful if they had no symptoms of pain, tenderness to percussion, swelling, missing restoration, fistula or pathologic tooth mobility. Examples of treated molars are shown in Figures 1 and 2.

Fig.1. Radiographs of maxillary molar (#65) showing: A. Immediate post-operative status; B. no pathological change after 24 months post-treatment and root resorption proceeding normally.