Reasons For Endodontic Treatment Of Permanent Teeth Of Patients Seen In A Nigerian Teaching Hospital

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ABSTRACT

Objective: To determine the reasons for endodontic treatment.

Methodology: This was a cross-sectional study of all patients aged 17 years and above of both gender attending the conservative clinic for endodontic treatment during the 18 months study period. Reasons for pulp disease leading to teeth being indicated for root canal therapy were retrieved from the patients’ hospital record.

Result: 323 teeth were indicated for endodontic treatment. The teeth included one hundred and two anterior teeth (31.6%), one hundred and forty one premolars (43.7%) and eighty molars (24.8%). Reasons for endodontic treatment were caries, trauma, failed restoration, tooth wear, periodontal disease and any combination of these reasons. Caries was the most common reason for endodontic treatment (50.2%), followed by trauma (30.7%) while failed restoration accounted for (16.1%). Trauma was the commonest reason for endodontic treatment among the anterior teeth studied while dental caries was the commonest reason for endodontic treatment among the posterior.

Conclusion: Dental caries was found to be the commonest reason for endodontic therapy. Traumatic exposure of the pulp was the second most common reason for endodontic treatment. Premolars were the most treated teeth, followed by anterior (incisors and canines). Molars were the least treated teeth.

Key words: Endodontic Treatment, Pulpitis, Indications

INTRODUCTION

The concept of endodontic therapy involves treatment of an inflamed pulp in order to preserve tooth that would otherwise be lost. The tooth is retained as a functional unit of the dental arch. Post endodontic restoration of the tooth is an essential part of the treatment process necessary to restore the tooth to function and aesthetics.1,2

Endodontic treatment is indicated in teeth with signs and symptoms of irreversible pulpitis, pulp necrosis or teeth with periapical pathology. Endodontic treatment is sometimes selectively indicated in potential abutment teeth with healthy pulps but with a strong suspicion of future pulpal involvement. These include abutments for fixed and removable prosthesis that have extensive intracorononal restoration or deep caries.1,2 Others are hemisectioned periodontally compromised posterior teeth, and advanced periodontally involved anterior teeth used as overdenture abutments.

The reaction to injury by the dental pulp is via inflammatory response. Additionally, the pulp response includes stimulation of odontoblasts to deposit reparative dentine at the site of injury to help protect the pulp but if the injury is severe, necrosis of these cells results.4,5

Caries, trauma, operative dental procedures, toothwear and periodontal disease are causes of injury to the pulp.4,8

These causes of injury to the pulp are preventable with proper public oral health awareness programmes and operative precautions by the dentist.

This study was done to document the prevalent causes of pulpal inflammation leading to endodontic treatment in a teaching hospital setting.

MATERIALS AND METHODS

This was a cross-sectional study conducted at the conservative clinic of the Department of Restorative Dentistry, Lagos University Teaching Hospital (LUTH), Lagos, Nigeria from July 2002 to January 2004.

All patients aged 17 years and above of both gender attending the clinic for endodontic treatment during the study period were included in the study.

Reasons for pulp disease leading to teeth being indicated for root canal therapy were retrieved from the patients’ hospital record.

Data was analyzed using SPSS statistical software for windows (version 10.0, SPSS Inc Chicago, IL). The descriptive statistics and test of significance were used as appropriate. Level of significance was set at p<0.05.

RESULT

Three hundred and twenty three teeth of 301 patients were included in this study. One hundred and thirty nine male (46.2%) and 162 female (53.8%) patients’ teeth were evaluated.

Tooth Type

Of the three hundred and twenty three teeth studied, there were 102 anterior teeth (31.6%), 141 premolars (43.7%) and eighty molars (24.8%). Table 1

Reasons for Endodontic Treatment

Reasons for which endodontic treatment were performed are caries, trauma, failed restoration, toothwear, periodontal disease and any combination of these reasons.
Caries and its sequelae i.e. pulpititis and apical periodontitis was the most common reason for endodontic treatment 162 (50.2%). Exposure of the pulp due to trauma accounted for 67 (20.7%). While previous failed restoration as etiology for pulp disease requiring endodontic therapy was 52 (16.1%).

Other indications for endodontic therapy are shown in Table I. There was no tooth electively indicated for root canal therapy during the period studied.

Reasons for endodontic treatment in relation to position of tooth in the arch.

In anterior teeth (Incisor and Canine), trauma was the commonest reason for endodontic treatment, it accounted for 60.8% (62) of the 102 anterior teeth and 19.2% of the total number of teeth studied. Dental caries, failed restorations, toothwear, periodontal disease and combined reasons were involved in 23.6% (24), 3.9% (4), 5.9% (6), 2.9% (3), 2.9% (3) of anterior teeth respectively (Table 2).

Dental caries was the commonest reason for endodontic treatment among the posterior teeth (premolars and molars). It was indicated in 58.9% (83) of the 141 premolars and 68.8% (55) of 80 molars seen in this study. Failed restorations accounted for 23.4% (33) and 18.7% (15) of the root treated premolars and molars. Trauma, toothwear, periodontal disease and combined reasons accounted for 2.8% (4), 1.4% (2), 5.7% (8) and 7.6% (11) in premolars and 1.3% (1), 2.5% (2), 2.5% (2), 8.2% (5) molars respectively. (Tables III and IV).

### Table I
Reason for Endodontic Treatment Among Root Filled Teeth

<table>
<thead>
<tr>
<th>ROOT FILLED TEETH</th>
<th>Caries (%)</th>
<th>Trauma (%)</th>
<th>Failed Restoration (%)</th>
<th>Tooth Wear (%)</th>
<th>Periodontic Disease (%)</th>
<th>Combined Reasons (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTERIOR</td>
<td>24</td>
<td>(7.4)</td>
<td>(4)</td>
<td>(6)</td>
<td>(3)</td>
<td>(3)</td>
<td>102</td>
</tr>
<tr>
<td>PREMOLAR</td>
<td>83</td>
<td>4</td>
<td>(33)</td>
<td>(1.2)</td>
<td>(1.9)</td>
<td>(0.9)</td>
<td>(31.6)</td>
</tr>
<tr>
<td>MOLAR</td>
<td>55</td>
<td>1</td>
<td>(15)</td>
<td>(2)</td>
<td>(0.6)</td>
<td>(2)</td>
<td>80</td>
</tr>
<tr>
<td>TOTAL</td>
<td>162</td>
<td>67</td>
<td>52</td>
<td>10</td>
<td>(3.1)</td>
<td>19</td>
<td>323</td>
</tr>
</tbody>
</table>

### Table II
Percentage distribution of reason for Endodontic Treatment in Anterior Teeth

<table>
<thead>
<tr>
<th>REASON FOR ENDODONTIC TREATMENT</th>
<th>FREQUENCY</th>
<th>PERCENTAGE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caries</td>
<td>24</td>
<td>23.6</td>
</tr>
<tr>
<td>Trauma</td>
<td>62</td>
<td>60.8</td>
</tr>
<tr>
<td>Failed restoration</td>
<td>4</td>
<td>3.9</td>
</tr>
<tr>
<td>Tooth wear</td>
<td>6</td>
<td>5.9</td>
</tr>
<tr>
<td>Periodontal disease</td>
<td>3</td>
<td>2.9</td>
</tr>
<tr>
<td>Combined reasons</td>
<td>3</td>
<td>2.9</td>
</tr>
<tr>
<td>Total</td>
<td>102</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Table III
Distribution of reason for Endodontic Treatment in Premolars

<table>
<thead>
<tr>
<th>REASON FOR ENDODONTIC TREATMENT</th>
<th>FREQUENCY</th>
<th>PERCENTAGE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caries</td>
<td>83</td>
<td>58.9</td>
</tr>
<tr>
<td>Trauma</td>
<td>4</td>
<td>2.8</td>
</tr>
<tr>
<td>Failed restoration</td>
<td>33</td>
<td>23.4</td>
</tr>
<tr>
<td>Tooth wear</td>
<td>2</td>
<td>1.4</td>
</tr>
<tr>
<td>Periodontal disease</td>
<td>8</td>
<td>5.7</td>
</tr>
<tr>
<td>Combined reasons</td>
<td>11</td>
<td>7.8</td>
</tr>
<tr>
<td>Total</td>
<td>141</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table IV
Percentage distribution of reason for Endodontic Treatment in Molar

<table>
<thead>
<tr>
<th>REASON FOR TREATMENT</th>
<th>FREQUENCY</th>
<th>PERCENTAGE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caries</td>
<td>55</td>
<td>68.8</td>
</tr>
<tr>
<td>Trauma</td>
<td>1</td>
<td>1.3</td>
</tr>
<tr>
<td>Failed restoration</td>
<td>15</td>
<td>18.7</td>
</tr>
<tr>
<td>Tooth wear</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>Periodontal disease</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>Combined reasons</td>
<td>5</td>
<td>6.2</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Endodontic treatment is often indicated in teeth with necrotic pulp and sometimes selectively indicated in teeth with healthy pulps. Dental caries, trauma, tooth wear, periodontal disease, operative dental procedures and restorative materials are causes of pulp disease that may warrant endodontic treatment of the pulp. In this study, the commonest reason for pulp disease leading to endodontic treatment was dental caries, (50.2%). This is not surprising because dental caries has been described as one of the most common human diseases. Though report of a decline in caries experience has been reported when compared to previous survey data, the disease still constitutes a public health problem as a result of low treatment ratio among Nigerians. What is disturbing about the finding in this study is that dental caries, a preventable disease was the most prevalent cause of pulpal death. Preventive measures against initiation or progression of dental caries are well-documented and as such dental caries should no longer be seen as a prevalent cause of pulp death. More effort needs to be geared towards improving caries preventive measures including dietary advice, regular tooth brushing, regular dental check up, plaque control, fluoridation and fissure sealing.

Except in the anterior teeth where aesthetics plays an important role patient with caries are more likely to present in the clinic at the onset of toothache or even only when the pain becomes unbearable.

Routine denial check-up that would have led to early intervention and therefore preclude the need for endodontic treatment is not a common habit in this environment.

Dental caries was observed to be the commonest reason for endodontic treatment of the posterior teeth examined in this study. This is due to the presence of pits and fissures in posterior teeth, and as such, caries prevalence is much higher in molars and premolars than in incisors and canines. When one considers that caries constitutes the highest indication for endodontic treatment and that molars are the most caries affected teeth, it would have been expected that molars will form the highest number of teeth indicated for endodontic treatment whereas this is not the pattern revealed in this study where molars accounted for only 24.8% as against 43.7% and 31.6% premolars and anterior teeth respectively. The question then raised is, are molars less likely to develop pulps as a complication of caries? Other studies suggest that this is not the case, but that molars are more likely to be extracted. In a study, molars accounted for 87.1% of extractions done over a four year period.

Dental caries accounts for the highest percentages of extractions in this environment. This suggests that patients will rather opt for the quicker and cheaper alternative of extraction rather than undergo the more expensive and time consuming endodontic treatment when aesthetics is not important as in the case of molars compared to the more aesthetically important premolars and anterior teeth. More effort should be geared towards keeping the molars in the arch as they serve an important role in mastication, and arch maintenance.

Extractions should be limited to the hopeless tooth which is not restorable and should not serve as an easy way out in the management of pulpally involved molars.

Trauma was the second most common reason for endodontic treatment, (20.7%) while it was the most prevalent reason among the anterior teeth, (60.8%). Akpata et al, also found trauma to be the more common reason for endodontic treatment in anterior teeth. Trauma rather than caries is a common cause of pulp disease in the anterior teeth. This is because the anterior teeth are more prone to injury than posterior teeth due to their position in the mouth. This is supported by reports of high prevalence of traumatized anterior teeth of Nigerians. Trauma to the tooth can occur as a result of falls, fight, road traffic accidents and contact sports. Trauma often occurs accidentally but its effect on the dental pulp can sometimes be managed to prevent irreversible damage to the pulp. Prompt occlusion of exposed dentine after traumatic exposure may prevent permanent damage to the pulp. Use of mouth guard during contact sports, orthodontic alignment of procinated incisors may also be used to reduce the incidence of trauma to the teeth.

Failed restoration as a reason for endodontic treatment accounted for a substantial percentage (16.1%) among the root filled teeth studied. Failure of restoration leading to pulpal exposure to oral fluid and pathogens is usually due to marginal leakage, fracture of restorative material or recurrent caries underneath restoration. Proper attention to restorative techniques and properties of restorative material while restoring teeth will help prevent failure and possible damage to the dental pulp.

Periodontal disease can have an effect on the pulp through dentinal tubules, lateral canals or apical foramen. The apical migration of a periodontal pocket can continue until the apex is reached and the vital pulp may become necrotic as a result of infection via exposed dentinal tubules, a lateral canal or the apical foramen. Such advanced periodontal disease have poor prognosis to periodontal treatment. Such teeth are extracted rather than been root filled. This probably accounted for the relatively few teeth indicated for endodontic treatment as a result of periodontal disease in this present report. No tooth was observed to have been electively root filled in this study.

In this study, tooth wear was also not a common reason
for pulp disease leading to endodontic treatment though tooth wear lesions especially cervical abrasion and attrition have been known to cause pulpal exposure and disease. Dental education on the aetiology of tooth wear especially that caused by wrong tooth brushing technique, texture of toothbrush, force of brushing and diet must be emphasized to the general public.

CONCLUSION

In this study, dental caries, a preventable disease was found to be the commonest reason for pulp disease that warranted the endodontic treatment of teeth. Other causes of pulpal exposure and damage also found included trauma, failed restorations, toothwear lesions and periodontal disease.

Trauma was the aetiology for most of the anterior teeth treated and its prevention must be considered as an important public health issue. Premolars were the most endodontically treated teeth, followed by anterior teeth (incisors and canines) and molars respectively.

The authors recommend continuous public dental awareness programs organised by dental professional bodies and also the government to help in reducing the prevalence of Dental caries and other oral diseases.

REFERENCES