Clinical and Radiological Evaluation of Chronic Periodontitis Treated by “Beyond Apex” Fillings

SUMMARY

**Background**: The treatment of complications of the tooth pulp inflammation, such as periapical lesions, has been very important for dentistry, especially endodontics. Healing of periapical lesion can allow continuation of mastication and aesthetic functions of the tooth, depending from the quality of treatment and the level of fillings of pulp canals.

**Material and Method**: 80 cases in 70 subjects (33 males and 47 females), aged 20-55, which has been treated for periapical complications and the fillings „beyond apex” were evaluated. The situation of teeth with this diagnosis was evaluated clinically and radiographically during 1997-2003, being controlled directly after filling until 6 years after treatment.

**Results**: The treated patients with this diagnosis (most of them in 1 single visit), with additional antibiotic treatment, showed a long term success, clinically and radiographically, in case of “beyond apex” fillings (in 86% of the cases).

**Conclusion**: A manifold control indicated that teeth filled “beyond apex” keep their aesthetic and functional value, and are valid as posts for prosthetic restorations.

**Keywords**: Chronic Periodontitis

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**Introduction**

The treatment of complications of the tooth pulp inflammation, such as periapical lesions, has been very important for dentistry, especially endodontics. In our opinion, this matter will persist as long as caries and its consequences exist.

In respect of complications of the tooth pulp inflammation, it should be remembered that periapical infections are considered risk factors for health. On the other hand, if these infections could heal, it could allow that particular teeth retain their mastication and aesthetic functions, and included into prosthetic planning. This will depend on the quality of treatment and the level of filling of pulp canals.

The aim of this study was to evaluate, clinically and radiographically, the local periapical area of cases in which the used medication, even involuntarily, went “beyond apex”. The questions were: is there, clinically and radiographically, any problem in the successive years, and could this tooth be functional and serve as post for prosthetic needs?

**Material and Method**

In this trial, 80 cases (70 subjects) among 100 of cases with pulps (period of time 1997-2005), were analyzed. Including criteria were the presence of periodontitis and filling “beyond apex”; excluding criterion was the presence of periodontal abscess. 33 subjects were male (aged 22-55), and 47 were female (aged 20-45). Among the treated teeth, there were more multi-radicular teeth (50 cases) than mono-radicular (30 cases). Diagnostically, chronic periodontitis (associated with non-vital tooth) was revealed in 80 cases (34 multi-radicular, 30 mono-radicular), and in 16 cases a diffuse granulomatous periodontitis was found.

After preceded clinical and radiographic evaluation, the root was treated according to principles of step back/
step down technique until its apex under a radiographic control. The next step was an abundant but careful rinsing with solutions of \( \text{H}_2\text{O}_2 \) (3%) or sodium hypochlorite (5%), sterile drying, followed by a ZnO-Thymol-Eugenol or Endomethason, Eugenol-Thymol mummy filling; gutta-percha points were then added until lateral condensation (under instrument-guided radiographic monitoring). Finally, the treatment of the tooth coronal part followed.

Antibiotics were prescribed to all patients, comprising administration of 3 g. of amoxicillin or 2 g. of tetracycline in the single dose at the precedent day. When a periodontal reaction, as a consequence of treatment, occurred (pain or moderate oedema), the administration of antibiotics followed for 3 consecutive days (2 g. per day). Particular attention was paid to the occlusion. In cases with pulp secretion during treatment, the visit took additional time. However, in more than 85% of cases the treatment required only one visit.

The successive clinical and radiographic controls followed in a week (if periodontal reaction occurred), a month, 3-12 months, and later (3-8 years).

**Results**

Long term positive effects (in our case appreciatively in 86% of cases), or low rate of complications, indicated correct treatment of root canals, because in their mechanical treatment consists the basis for the success of one-visit treatment. In figures 1-7, several examples of successful periapical treatment are shown.

![Figure 1](image1.png)

Figure 1. Patient IL, male, aged 44  a) Chronic periodontitis of the tooth 46, exacerbation immediately after treatment;  b) The same tooth, 16 months later;  c) The same tooth after 8 years - recovered, unabsorbed filling

![Figure 2](image2.png)

Figure 2. Patient OD, female, aged 24  a) Pain and oedema immediately after treatment of the tooth 36 with perforation of the mesial root;  b) The same tooth after 1 year - without clinical symptoms, obturated perforation, absorbed filling;  c) The same tooth after 3 years - recovered, absorption of overfilled material

![Figure 3](image3.png)

Figure 3. Patient EL, female, aged 29  a) Chronic periodontitis, exacerbated of the teeth 46 and 47;  b) Immediately after treatment (46), during the treatment (47);  c) The same teeth 4 years later - recovered
Figure 4. Patient HR, male, aged 47  

a) Abscess immediately after treatment of the tooth 21;  
b) The same tooth 1 year later;  
c) The same tooth after 8 years - no complains, partially unabsorbed num, new bone trabeculae

Figure 5. Patient LZ, male, aged 28  

a) Pain and oedema during treatment of the tooth 45;  
b) Filling of the tooth;  
c) The same tooth 6 months later - reduced periapical radiolucency, new bone trabeculae

Figure 6. Patient PM, male, aged 18  

a) Teeth 11 and 21 prior to the treatment;  
b) The same teeth immediately after treatment;  
c) The same teeth 14 years later, reconstructed with pins and resin-crowns, recovered. Total absorption of the extruding material

Figure 7. Patient DZ, female, aged 37  

a) Chronic periodontitis of the tooth 36, tender to percussion, with spontaneous pain, immediately after treatment;  
b) The same tooth 3 years later;  
c) The same tooth 4 years after treatment - recovered
Discussion

In this trial we aimed to evaluate the long term success in cases of filling “beyond apex”, with respect to function, clinical symptoms, radiographic finding and possible use as posts for prosthetic appliances. It is usually accepted that the success of root canal filling depends on many factors, such as the cleaning and the treatment of root canal, its sterilization, hermetrical filling that isolate foci from the canal, as well as immunological reactivity of the subject (age, general health situation, etc)\(^1,4,8,10,12,21\). In this respect, the rate of clinical-radiographic, as well as histological success, depend on the level of root canal filling\(^18\), which is in accordance with the Ketterl diagram (Fig. 8). However, with respect to histological aspects, the treatment of inflamed pulp can not assure a total periapical recovery and a required periodontal obturation\(^2,3,18,20\). Our findings confirm the opinion shared by many worldwide prominent authors.

![Figure 8. Diagram of Ketterl: histologically the most successful treatments are those with fillings up to 0.9 mm short from the apex](image)

Meanwhile, the filling “beyond apex” is used recently\(^4,20\). In the 30s of previous century, soft mums consisting of iodoform were used, later on mums consisting mild phenols, and hard cement mums during 50s-60s years\(^20\). Independently to the success, for a period of time they were abandoned because of focal infection theory, but in the next time endodontic inflammation was therapeutically treated based on the new knowledge regarding root canals, and new techniques of root canal treatment (step back or step down technique), and root canal filling (lateral or apical condensation)\(^2,5,7,10,12,18,20,21\).

In cases presented here, significant differences between ZnO-Eugenol-Thymol and Endomethasone-Eugenol mums were not established\(^4,6,9,11-13,15-17,19,20,22\). The recovery of periapical defect began on the first month and finished in the interval between 8th and 12th month after the treatment. In this respect, all medicaments could induce the bone reparation due to alkaline phosphatase activation\(^5,11\). Bone regeneration begins from the peripheral area towards central region, firstly dissolving the “linear” focal border, whereas subsequently bone trabeculae can be find, refilling the previous defect\(^2,5,10,12,18,20,21\). The needed recovery time depends on the dimension of the focus.

After a successful treatment, the treated teeth recover clinically and radiographically (negative axial and vertical percussion, disappeared focus, normal bone trabeculae, detectable periodontal line radiographically), and they can support prosthetic appliances independently to the amount of the resorbed medicament\(^1,8,13,15\). In any case, endodontics will evolve like all components of the life, but their problems will persist as long as caries and its consequences do exist!

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