

ROOT CANAL TREATMENT MODIFICATION AT PATIENT UNDERGOING LONG-TERM BISPHOSPHONATE AND CYTOSTATIC THERAPY

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ABSTRACT

Introduction: In order to prevent osteonecrosis in a patient undergoing bisphosphonate therapy, American Association of Endodontists (AAE) developed a protocol for dental treatment. There are not any precise recommendations whether root canal treatment is indicated if there is an extensive periapical lesion.

Case report: The paper presents root canal treatment of teeth 36 with apical periodontitis and sinus tract at a 39 year old patient on long-term bisphosphonate therapy and complex health issues: Sy. Sjögren, osteoporosis, hypothyreosis, temporomandibular joint dysfunction. The modification of root canal treatment emerged as consequences of:

1. Increased risk of osteonecrosis as a result of long-term bisphosphonates therapy,
2. Impossible rubber-dam placement due to a constant cough impulse caused by Sy. Sjögren, resulting in risk of mucous irritation with irrigants,
3. Temporomandibular joint dysfunction requiring shortening appointment duration,
4. Modification of the inter-appointment canal medication due to cytotherapy that patient simultaneously receives,
5. Significant obstruction of the root canals established during the treatment. According to previous, the appointments duration were shortened using a single-file technique, adequate chemical treatment with 5.25% NaOCl in gel form (lower risk of mucosal irritation) and intracanal medication by a combination of Ca(OH)₂ and chlorhexidine.

Control X-ray showed satisfactory signs of apical healing. The final success evaluation requires an extended observation period, due to the possibility of subsequent osteonecrosis associated with bisphosphonate therapy.

Conclusion: The number of patients on bisphosphonate therapy increases daily with simultaneously decreasing age limit for osteoporotic changes.

This requires serious clinical research and development of more precise endodontic protocols.

Keywords: bisphosphonates, osteoporosis, Sy.Sjögren, root canal treatment.

Introduction

Although American Association of Endodontists (AAE) has a protocol for dental treatment of patients submitted to bisphosphonate therapy, there are not any precise recommendations if endodontic therapy is indicated while a pathological process of endodontic etiology is already present in the bone. [1, 2, 3]

Bisphosphonates (BPs) are the principal therapy for osteoporotic changes. They are proscribed worldwide, nowadays at a relatively early age, probably due to advanced diagnostic procedures. Besides this, BPs are adjuvant therapeutics for cancer patients with metastatic changes in bones. Like any other medication, BPs shows serious side effects. Osteonecrosis of the jaw is one of them. It is the main concern with important medical and dental implications. [4, 5, 6]

Bisphosphonate-related osteonecrosis of the jaw (BRONJ) occurrence varies between 0% and 28% of all patients on BPs therapy. [4, 7, 8]

Patients on BPs therapy have increased risk of developing BRONJ after tooth extraction. Therefore, the dentist should escape or delay tooth extraction as much as possible. [4] According to the literature, the healing rate of periapical lesions in patients undergoing BPs therapy is not different than in general population. Root canal treatment is recommended as a non-surgical alternative, especially with modern endodontics methods. [9]

Many patients simultaneously receive chemotherapy and/or corticosteroid therapy, due to their main disease (cancer, for example). [10, 11, 12, 13]

It is well-known how chemotherapy and corticosteroid treatment can interfere with root canal therapy. [4, 12, 14, 15]

In the same time, root canal treatment can trigger BRONJ as a consequence of soft tissue damage, which can occur during rubber dam placement, and /or apical extrusion of infected debris. [4, 16]

In this particular clinical case, our second big concern was a fact that the patient has Syndrome Sjögren. Implications of dry mouth syndrome on

carries prevalence and its complications are well documented.

Some clinical recommendations for BRONJ risk-reducing procedures couldn't fully comply as a result of Syndrome Sjögren. [4, 16]

For example, a rubber dam placement was difficult cause of constant cough impulse. The patient couldn't use chlorhexidine mouth rinses as a precaution of infection, due to her extreme mucosal sensitivity. Irrigants selection and usage were limited for the same reason.

Temporomandibular joint dysfunction was an additional aggravating circumstance.

Case Report

The paper presents a report of a possible modification of standard endodontic therapy protocol in a female patient with complex health problems: Sy. Sjögren, Osteoporosis, Hypothyreosis, Temporomandibular joint dysfunction.

Anamnestic data:

In 2008 a patient was diagnosed Sy. Sjögren as well as sensitive polyneuropathy. Osteoporosis was discovered shortly after. The patient was submitted to continuous corticosteroid therapy (Medrol 4 mg) since then. Bisphosphonates were administered shortly after, in the form of Bonviva (ibandronic acid), one dose per month.

Recently, the rheumatologist additionally proscribed 400mg of Endoxan, in the form of 6 boluses administered intravenous one per month. A problem occurred on tooth 36 between the second and third cycle of chemotherapy.

After a short period of intense pain, a fistula appeared next to the tooth.

Clinical findings:

The tooth crown of lower left first molar was restored with a rather poor composite filling. The tooth was slightly sensitive on percussion. Sinus-

tract was present in the time of examination. Thin gutta-percha point was positioned in the sinus tract and X-ray was made. (Figure 1)

Rubber dam couldn't be placed due to constant cough impulse. Through the access cavity, orifices of four root canals were exposed. (Figure 2)

Root canals were extremely narrow. The initial glide-path was achieved with small hand pathfinders (ISO#.06 and .08). Canals had to be hand-instrumented till width ISO# 15.

Regarding a TMJ dysfunction, followed by a difficult mouth opening, we tried to achieve as short as possible visit duration. "Single-file" machine -drive rotary technique was reasonable



Figure 1. Initial X-ray. Thin gutapercha point was inserted into sinus tract.



Figure 2. Indirect view of the entrances to root canals.

selection. The endo motor was used in continuous rotating mode. Torque was set on 2 Ncm, at speed of 250 rpm.

"Single-file" "T-One File Gold" (Global top Inc. @ Co) was used during operation. An adequate chemical debridement was achieved by using 5.25% NaOCl in the gel form, decreasing the risk of mucosal irritation (Chloraxid 5.25%, CerKamed, Pl) (Figure 3.). A gel form of NaOCl doesn't smear over mucosa



Figure 3. Cholaxid gel, adopted from <https://cerkamed.com/product/chloraxid-525-gel/>

Gel 17% EDTA "Endo-Prep Gel" and a combination of 15% EDTA and 10% urea peroxide (Endo-Prep Cream, CerKamed, Pl) were used as lubricants needed for rotary instrumentation. Extended inter-seance medication was performed by combining the $\text{Ca}(\text{OH})_2$ and chlorhexidine-based gel prepared by manual mixing Calcipast and GlucoHex 2% Gel, (CerKamed, Pl) in a 1:1 ratio.

Inter-seance root canal medication was adapted to the rhythm of chemotherapy (10 days before next, and 20 days after the previous bolus of Endoxan). The sinus tract was closed after the first session, although biomechanical treatment of canals was not completed in a satisfactory degree.

Considering sclerosis and difficulties to keep mouth open for a long time period, canals couldn't be instrumented enough in the first appointment. As a result of temporomandibular dysfunction, as well as, constant cough impulse, work had to be constantly interrupted to give the patient an opportunity to rest her joints. Saliva was controlled simply by weak saliva ejector. Strong saliva ejector was used only in phases of copious irrigation. A burning sense of dry mouth additionally impeded procedure. The patient was allowed to use 2-3 drops of D3 vitamin every 10 minutes or so, to keep

her mucosa protected from irritants. Same precaution measures repeated in the successive appointments.

The canals were further instrumented by each subsequent session. Medication was repeated at monthly intervals three times. After completion of cytotherapy, we decided to definitive obturation. Canals were obturated with the sealer and gutta-percha points gauge ISO # 25 / .07 in "single-cone" technique ("Primary" gutta-percha point, Gapadent Co., Ltd.). (Figure 4)

Control X-ray showed adequate obturation accuracy of the root canals (Figure 5).

The tooth was restored with direct composite filling in the next session (Figure 6).

Discussion

The therapy was successfully completed, regardless of relative unfavorable prognosis and objective difficulties during clinical work. In principle, osteonecrosis is more common in a mandible than in maxilla. [1, 2] Complications are more common in combination with steroid therapy, which our patient receives caused by polineuropathy and Sy. Sjögren. [4]

Risk of root canal treatment failure is significantly higher in patients undergoing chemotherapy. [18]

Risk of BRONJ development is higher as BPs therapy is longer. [4, 18]

Regardless of the high comorbidity and objective difficulties during the work, the classical endodontic treatment with few adjustments showed an acceptable result.

This confirmed the fact that patients on long-term BPs therapy can expect a suitably periodontal healing rate after conventional root canal treatment. [19]

In this particular clinical case, recommended endodontic protocol [4] needed a few adjustments.

Chlorhexidine mouthwash rinse was too aggressive, so we decided to skip this step. Aseptic conditions were not established cause rubber-dam placement was impossible.



Figure 4. "Single-file" "T-One File Gold"(Medium) endo-file and matching "Primary" gutta-percha point (ISO # 25 / .07), Gapadent Co., Ltd,Corea.



Figure 5. Control X-ray after definitive obturation.



Figure 6. Final composite restauration.

A gel form of NaOCl showed good cleaning properties. Simultaneously, it had a low irritant effect on the mucosa. We used Nickel-titanium single file in rotary mode to avoid reciprocating

systems due to their possible apical debris extrusion. [4] Single-cone obturation technique minimizes the risk of overfilling or overextension. The requirement for a single visit endodontic was impossible to achieve due to TMJ dysfunction. Bisphosphonates are associated with osteonecrosis, but there is not enough documentation concerning the root canal obstructions related to long-term BPs therapy.

Conclusion

After completion of endodontic therapy, control X-ray showed satisfactory signs of apical periodontium healing. However, the final evaluation of endodontic therapy success, in this case, will only be possible through the next follow-up period since there is a possibility of osteonecrosis associated with bisphosphonate therapy.

Regardless of the high comorbidity and objective difficulties during the work, classical endodontic treatment showed good results.

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