

Internal Resorption, Therapy and Filling

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Summary

Internal resorption is the resorption of dentin which starts in the pulpal cavity either in the pulpal chamber or in the root canal. The authors describe many etiological factors but agree that its most frequent cause is either infection or trauma. These disorders initiate an inflammatory response in the pulpal tissue. Disorders in vascularization can be seen in the production of granulation tissue and transformation of macrophages into multinuclear odontoclasts. With the formation of odontoclasts, which are similar to osteoclasts, the resorption process can begin.

Resorption process is diagnosed either during routine Rtg photography or if there is extensive resorption present and the perforation has been formed. Internal resorption can be fast accelerating, and in some cases slow accelerating and it can last for years. After diagnosis, the endodontic treatment is essential in all forms of internal resorption. Therapy of the internal resorption is divided into: 1. non surgical; 2. recalcification with calcium hydroxide; 3. surgical therapy. The choice of therapy is determined by the inclination of the stomatologist and the extension and position of the pathological defect.

The internal resorption therapy relates to final filling of the root canal and the filling of the resorption defect. The defect of the internal resorption is filled by the method of lateral and vertical condensation and in combination with a method of heated vertical condensation.

The further process of internal resorption is interrupted if the filling is properly done, and therapy itself is considered successful when Rtg photography control taken after one year does not show any progression of the resorption process.

Key words: tissue resorption, granular tissue, dentinoclasts.

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Introduction

Resorption is the assimilation process of substances of structures formed by organism. The internal resorption (interior toothroot) abscess, pulpom, idiopathic resorption) is a type of dental resorption which begins in the pulpal cavity (1).

Internal resorption is very rarely found in permanent dentition. It is frequent in deciduous teeth. It can be fast accelerating, but it can be slow accelerating and last for years (2,3,4).

Etiology

Very often the internal resorption is unknown and is classified as "idiopathic internal resorption" (5). Trauma and inflammation are considered possible causing factors (6). Resorption processes can develop by shifting of pH-value to acid for example in irreversible pulpitis, so that the dentin and enamel substances are dissolved by chelation (7). The untreated internal resorption can progress into external or vice versa which causes a fracture of the tooth (3,8). In the cases of tooth trauma, the inter-pulpal hemorrhage can develop. Formed blood clots are then organised and replaced by granular tissue which compresses dentin wall of the pulpal chamber or root canal (9). With activation of non-differentiated mesenchymal cells of the pulpal tissue they differentiate into dentinoclasts, the cells responsible for resorption of the hard tooth structure (10,11).

The chronic trauma or inflammation can be the cause of transformation of non-differentiated cells of connective pulpal tissue into giant multinuclear cells which are responsible for the resorption process (7). These cells bond with diluted dentin ingredients and develop into single visible defects like Howship's lacunae which include groups of dentinoclasts.

With differentiation of dentinoblasts, the biochemical processes are simultaneously activated when the hard angle structures are beginning to dissolve due to shifting of pH-value to acid. Together with the formation of lacunae, the granular tissue which is beginning to swell can with its pressure on dentin substance also provoke and sustain the resorption process.

Granulation tissue is a very good vascular tissue containing leukocytes, macrophages, monocytes, lymphocytes, the fact which prompts a possible consideration that in the pulpal tissue the specific immunologic reaction can be included.

Symptomatology

Internal resorption is the process in the pulpal area which can be present without any clinical symptoms, or symptoms that can be similar to those of asymptomatic chronic pulpitis with occasional acute exacerbations. The clinical picture is recognized by the pink color of enamel due to irradiation of the granular tissue through the remaining still thin wall of the enamel (12,13).

Diagnosis and internal resorption

There are three basic diagnostic methods of internal resorption:

- visual examination based on the changed color in tooth crown
- Rtg diagnosis
- light microscopy
- electron microscopy

Light microscopy shows different levels of inflammation of the pulpal tissue with infiltration of predominant lymphocytes, macrophages and some leukocytes, dilated blood vessels and multinuclear dentinoclasts in resorptive lacunae on the pulpal-dentin surface.

Electron microscopy shows the pulpal-dentin wall without odontoblasts. Dentinoclasts, large in number, have size of 50 μm and with numerous filopods are turned toward dentin surface and attached to it.

Resorption process of the endodontic space can be divided in the internal resorption, external resorption and periapical resorption. The internal resorption is furthermore divided into intracoronal and intracanal, and the intracanal resorption can be found in the coronal, middle and apical third of the root canal (Figures 1,2,3 and 4).

Therapy of internal resorption

The early diagnosis and therapy of internal resorption defect are very important. After diagnosis has been made, the endodontic treatment is required (1). This is the only way to stop further development of resorption. The successful therapy can be seen in the pictures where process of resorption has been stopped after filling of the endodontic space (Figures 5,6,7). The internal resorption therapy is divided into:

- non surgical
- recalcification, remineralization with calcium hydroxide preparation
- surgical

The choice of therapy is made by stomatologist on the basis of his capacity, the adequacy of dental office and the type of resorption (14).

It should be emphasized, therapy and filling of the internal resorption is not an easy task and does require the engagement of specialist endodontist (Figure 8,9).

Non surgical therapy includes a tooth trepanation, the removal of residual vital pulp tissue and newly developed granular tissue. The therapy is made difficult by use of the profuse bleeding of granular tissue during excochleation. Irrigation with 4% NaOCl (sodium hypochlorite) the granular tissue is mechanically and chemically taken out due to the organolytic effect of NaOCl.

In the case when the resorption is present in the middle or the coronal third of the canal, the root is treated with usual techniques, and then the canal is treated three-dimensional technique. After this work, there follows the filling of the resorption defect. With utmost care the newly developed space should be filled so that a great precision is demanded on the part of the endodontist. The filling of the resorption defect is made by thermal i.e. heated gutaperchas (Figure 5).

After filling of the root canal and the resorption defect is completed, it is necessary to put a base of the glass ionomer cement then the final filling. Rtg

photography should be taken immediately after the canal is filled and the control photography to be taken after 12 and 24 months (Figure 6 and 7). The overfilling of root canal will not cause any complications. It will be resorbed (Figure 6,7). However, if the therapy is not carried out on time, the process of resorption will continue and the final result is the fracture and the loss of tooth.

During endodontic treatment when additional visits by patient are arranged, the resorption defect can be filled temporary with material on the basis of calcium hydroxide (calasept) but this extends the therapy.

Discussion and conclusion

The fact that patients mostly do not mention in their anamnesis neither clinical symptoms nor signs of periodontal disease, there is a small number of the cases of internal resorption in the clinical practice to suggest the inclusion of immunologic specific reactions as the etiopathogenetic factors in the internal resorption. However these considerations require additional immunologic research. It could be concluded that internal resorption is a rare form of resorption of the hard dental tissue which etiology is most frequently unknown, or it is trauma, inflammation - either unspecified or in the combination with specific immunologic reaction.

The reciprocal activity between the newly formed granular tissue and dentinoclasts initiates and progresses the resorption process inside the endodontic space which could be compared to pathogenetic changes in the periapical region. The early diagnosis and therapy is very important in order to stop the resorption process. The success or failure of therapy should be followed clinically and by Rtg control. Naturally, if the resorption is stopped actually is not progressing, we believe that our treatment is successful, we saved a tooth and the objective of our therapy has been accomplished.