

# Foramen Cleaning : a critical analisys

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## Abstract

One of the most controversial themes in Endodontics concerns the range of action of the endodontist in the case of teeth with periapical lesions. Traditionally, it has been agreed that the dentinal canal should be the limit as for what concerns the periapical tissues. More recently, however, because several studies showed the presence of microorganisms beyond such boundary, the due cleaning of the cementary canal (foramen cleaning) has been recommended. Although some professionals readily adopted this new procedure, many preferred not to incorporate it for reasons such as postoperative pain, trauma to the periapical tissues or simply because they believe that the procedure exercises no influence in the repair of the periapical lesions. The present literature review intends to investigate the advantages and disadvantages of cleaning the apical foramen as well as whether it influences in the repair of periapical lesions.

## INTRODUCTION

In the last years, Endodontics has undergone great technological advances. However, many topics in Endodontics are still quite discussed among the professionals, which means more research need be done to settle them. The influence of the cleaning of the apical foramen in the resolution of the endodontic periapical alterations is one of such controversial themes.

In the face of the risks of undesirable and unnecessary traumas to the periapical tissues, the classic posture has that the endodontic treatment should only be accomplished in the dentinal canal. Therefore, some measures of work length were suggested and a point located 1mm short to the radiographic apex (<sub>1</sub>) seems to be the most fully accepted. However, the extension of this canal, with an approximate diameter of 0.25mm, is enough to shelter a number of nearly 80.000 microorganisms (<sub>2</sub>) with absolute prevalence of anaerobic bacteria (<sub>3</sub>). When the canal is prepared within the classical limits, such portion is left untouched. Therefore, more recently, it has been postulated that the cleaning of the canals should be extended as far as the cementary canal, which results in cleaning of the apical foramen (<sub>4;5</sub>).

The aim of this study is to analyze the cleaning of the apical foramen, its advantages and disadvantages and its possible influence on the regression of the periapical lesions.

## LITERATURE REVIEW

Healing constitutes the main objective of any clinical attitude as for what concerns biological activity. The endodontic therapy, accordingly, also looks forward to the repair of the periapical area, allowing the dental element to regain its specific functions (<sub>6</sub>).

One of the most important phases of the endodontic treatment concerning repair, includes canal's cleaning and modeling (<sub>7</sub>). The ideal apical limit of the biomechanical preparation for the due repair of the periapical tissue is one of the crucial points about which researchers are not yet agreed upon (<sub>8</sub>). Unlike the cases of living pulps, where the canal system is not completely infected, in the necrotized pulps the presence of microorganisms reaches the level of the apical foramen. Therefore, it becomes a critical task to determine the length of the instrumentation in such cases, since all the infected root canals should be clean (<sub>9</sub>).

Because the periapical tissues should be preserved, the endodontist used to prepare the root canal within work lengths that kept the instrumented canal at a safe distance from such tissues. That made the dentinal canal to be regarded as the endontist's field of action. Recently, however, because several authors have shown the presence of microorganisms beyond that limit, a change in the attitude of the professionals was observed. Now, the endodontic intervention is also indicated for the cleaning of the cementary canal in a procedure known as cleaning of the

foramen (1).

This procedure has a biological and a mechanical well defined objectives. The first means that by removing the located microorganisms from the apical foramen, better conditions are offered to the organism to repair the periapical tissues. The latter is directed to the maintenance of the access to the foramen, so that it can be kept clean (1).

Some professionals do not clean the foramen for several reasons. Guimarães (2005) (10) concluded that the responsibility for the removal of the toxicant content in the final end of the canal and the consequent repair of the periapical lesions is credited to the chemical substances used during the canal preparation and the intracanal medication. The author performed the cleaning of the foramen in 59% out of a total of 980 teeth with radiographically visible periapical lesions while in 41% such cleaning was not made. The results showed a high percentage of resolution of the lesions in both techniques, suggesting that the cleaning of the foramen does not affect the repair of the periapical lesions.

Baumgartner and Cuenin (1992) (11) have claimed that because of the apical anatomical complexity and difficult access, the irrigant becomes ineffective in the terminal portion of the root canal. The formation of the apical plug during the biomechanical preparation may impose some restriction on the contact of the intracanal medication with the pulp stump. This would interfere negatively with the medication course of action, that is, the effectiveness of the chemical agents would be reduced on the toxicant content of the final portion of the root canal (12).

Another reason mentioned by some professionals for not cleaning the foramen is postoperative pain. During the manipulation of the foramen, the endodontic instrument together with the irrigant itself compress the root canal fluids in the surroundings of sensitive cells, which may be responsible for the postoperative pain (1).

However, just like any surgical operation, the cleaning of the foramen also generates trauma with inflammatory response and edema formation. However, if well done, it results in the clearance of this part of the canal, directing the fluids of the edema towards its interior. The canal becomes then an escape area from where the edema can be drained, which means that, contrary to what is believed, the cleaning of the foramen does not cause pain, but a relief caused by tissue decompression (13).

Another cause of postoperative pain is the extrusion of material to the periapical tissue, which has also become an argument contrary to the adoption of the cleaning of the foramen. It is to be expected that an instrument working in the intimacy of the foramen, promotes more extruding material on this site than one millimeter before the end of it (14). However, it has been evidenced that all the techniques cause extrusion of material to the periapex, and it is up to the professional, then, to choose the technique which possesses the smallest extrusion degree, proving that the simple liberation of the foramen is not going to extrude more debris than the instrumentation of the root canals itself (15).

To avoid the extrusion of material to the periapex, apical foramen must be kept patent; its diameter; however, should not be enlarged. To keep the foramen patent or open, a file of fine caliber is used (K n° 10) as far as the apical foramen, preventing thus, the debris accumulation which may cause perforations or plugs. Besides, keeping the patent foramen allows a deeper penetration of the irrigant into the apical third of the root canal system, and also enhances a more intimate contact of this area with the intracanal medication. On the other hand, when an instrument of a larger caliber is used, there follows a natural destruction of the apical constriction that should have its shape preserved in order to give the main exit of the canal a greater resistance. The enlargement of the foramen also enhances debris extrusion and the filling material towards the periapex. This causes discomfort and jeopardizes the success of the endodontic therapy (16).

Despite the fact that the apical extension of the instrumentation and the filling of the canals have been debated for decades, these procedures still cause a lot of discussion among endodontists. However, it is necessary to have in mind that the cleaning of the foramen constitutes just one additional step in the search of good cleaning and canal preparation and, as such, the success or failure of the endodontic therapy should not be credited wholly to it (14).

## CONCLUSIONS

The present literature review shows that the cleaning of the apical foramen may increase the chances of success of the root canal treatment in teeth with periapical lesions. However, this technical maneuver constitutes just one more step in the search of a good cleaning and canal preparation and, as such, not only to it should the responsibility of the success or failure of the endodontic therapy be credited.

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