Oral Pathology

KEYWORDS: guta-percha cones, sodium hypochlorite, decontamination.

EFFECT OF TIME ON DISINFECTION OF GUTA-PERCHA CONES WITH SODIUM HYPOCHLORITE: ORIGINAL STUDY

Volume-2, Issue-9, September - 2017

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Article History
Received: 12.07.2017
Accepted: 17.08.2017
Published: 10.09.2017

ABSTRACT:

The success of endodontic treatment is to eliminate as much bacteria as possible, reaching a point where the organism is able to remain free of the infectious process. Guta-percha cones are one of the most biocompatible dental materials, not interfering in the repair process that occurs after obturation, are the most used means in obturation of the root canal and, therefore, responsible for preventing microorganisms from penetrating in the root canal after obturation initiating a new infectious process. The objective of the present study was to investigate the efficacy of sodium hypochlorite in the concentration of 2.5 % in the decontamination of gutta-percha cones contaminated with microorganisms after their manipulation. Contaminated cones were treated by immersion in 2.5% sodium hypochlorite solution for 2, 3, 4 and 5 minutes and rinsed with sterile distilled water. The treated cones were inserted into petri dishes with the culture medium nutrient agar to verify the existence and proliferation of microorganisms. The sodium hypochlorite solution after the 4 minute exposure period, eliminated all microorganisms, making the cones safe for use.

Introduction

Endodontic treatment has the purpose of eliminating the largest number of bacteria existing in the root canal, reducing them to a level that the organism can by itself combat them, and calls for the development of an infectious process [1,2]. The obturation process has as main objective to prevent the entry of new microorganisms into the root canal [2,3].

Guta-percha is one of the most biocompatible materials among those used in dentistry, not interfering with the tissue repair process that forms after root canal filling. For this reason they are the most used material for root canal filling [3,4].

According to the literature, gutta-percha cones are composed basically of 19.0 % to 20.0 % guta-percha, 59.0 % to 75.0 % zinc oxide

and the remainder of radiopacifiers (barium sulfate), waxes, coloring agents, antioxidants and metal salts [4]. The presence of zinc oxide confers antibacterial activity on the cones of guta-percha and for this reason, several authors defend the need for disinfection prior to the obturation stage [5].

The susceptibility of the guta-percha cones to be contaminated, we then take care of the time required for sodium hypochlorite, at the concentration of 2.5 % to eliminate these microorganisms, making the use of these cones safe to maintain the success of endodontic treatment [6].

In view of this premise, the objective of this work was initially to verify these characteristics, after the first bacterial culture realized in the cones of guta-percha, we verified the growth of microorganisms in the body of guta-percha cones tested.

Materials and Methods

The previous decontamination of gutta-percha cones when used during endodontic treatment in order to prevent contamination of the canal system is quite controversial in endodontics. However, the most used method according to the literature is the immersion of guta-percha cones in sodium hypochlorite.

Disinfection medium of Guta percha Cones

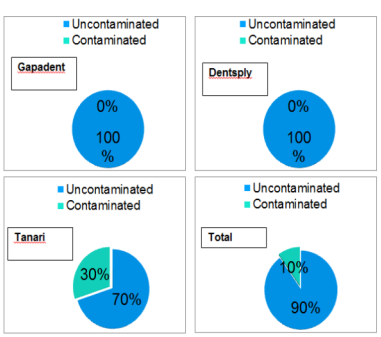
Sodium hypochlorite is the most commonly used disinfection agent in endodontics. This occurs due to factors such as its bactericidal properties, organic material solvent, cytotoxicity, allied to its low cost. For this work were used 150 cones of guta-percha from three different brands, separated into 15 different groups and immersed in sodium hypochlorite, according to table 01:

Table 1. Groups of guta-percha cones from three different brands that were immersed in sodium hypochlorite.

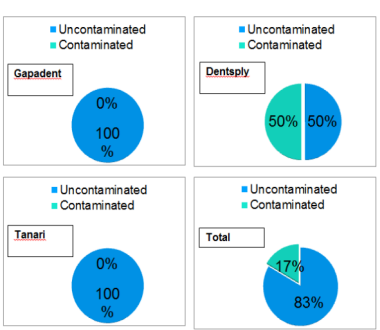
	2 minutes	3 minutes	4 minutes	5 minutes	Control
Gapadent	I	IV	VII	X	XIII
Dentsply	II	V	VIII	XI	XIV
Tanari	III	VI	IX	XII	XV

Results

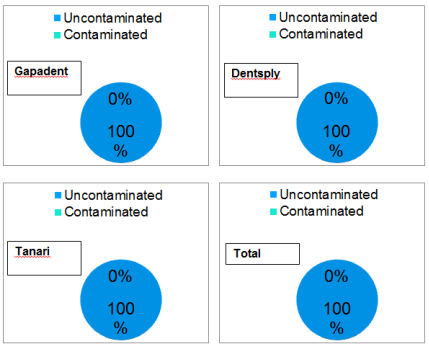
- 2 minutes



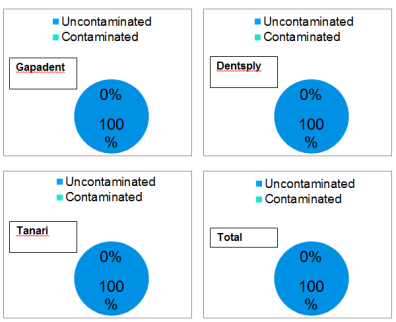
- 3 minutes



4 minutes



5 minutes



Discussion

The use of sodium hypochlorite for rapid decontamination of guta-percha cones was proposed by Senia et al. (1975) (apud Silva et al., 2005 [1]). These authors demonstrated that gutta-percha cones contaminated with Staphylococcus epidermis, Corynebacterium xerosis, Escherichia coli and Enterococcus faecalis were decontaminated after immersion in Clorox® (5.25% sodium hypochlorite) for 30, 45 and 60 seconds, respectively.

In the present study, we initially demonstrated that new guta-percha cones removed from the box may be contaminated by microorganisms and therefore it is not safe to use them without decontamination first, otherwise the chances of in-success of the endodontic treatment. The practicality, due to the use of sodium hypochlorite during the irrigation phase in the endodontic treatment, prevents the Dentist from having to buy and use two substances. It is the most used disinfection medium in endodontics [7-10]. This occurs due to factors such as its bactericidal properties, organic solvent, cytotoxicity, coupled with its low cost [11-13].

In addition, we cannot associate sodium hypochlorite with chlorhexidine because the interaction between them results in para-chloroaniline, a carcinogenic precipitate [14-16]. This precipitate has amber coloration and, according to several authors, may generate an undesirable chromatic effect on the dental crown [17,18]. Finally, a careful evaluation of the results, especially groups VI, IX and XII, was carried out to determine if there was or not contamination of the cones, due to the presence of bacterial colonies.

Conclusion

Guta-percha cones are susceptible to contamination by microorganisms, necessitating their decontamination before use in endodontic treatments. The decontamination of the cones can be carried out using sodium hypochlorite, being necessary the permanence of the guta-percha organisms in the solution of sodium hypochlorite in the concentration of 2.5 % for at least 4 minutes for the complete disinfection of these making safe its use.

Conflict of interests

There is no conflict of interest between authors.

REFERENCES

1. Silva EM, Júnior ECS, Marques AAF. Microbiological assessment of contamination of gutta-percha cones used by post-graduation students. J Health Sci Inst. 2010 Jul/Set;28(3):235-6. 3. Fagundes FS, Leonardi DP, Haragushiku GA, et al. Efectiveness of different solutions in decontamination of gutta-percha cones exposed to Enterococcus faecalis. RSBO 2005 nov;2(2):7-11.
2. Gomes BP, Vianna ME, Matsumoto CU, et al. Disinfection of gutta-percha cones with chlorhexidine and sodium hypochlorite. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2005;100(4): 512-17.
3. Sayão DM, Barros RR, Camões ICG, et al. Análise Microbiológica de Cones de Guta-Percha Disponíveis no Mercado Brasileiro. Pesq Bras Odontoped Clin Integr 2010 maio/ ago;10(2):265-269.
4. Gomes CC, Camões ICG, Freitas LF, Pinto SS, Saraiva SM, Sambati S. Avaliação do hipoclorito de sódio e da clorexidina na desinfecção de cones de guta-percha. Revista de Odontologia da Universidade Cidade de São Paulo 2010 maio/ago; 22(2):94-103.
5. Lopes HL, Siqueira Jr JF. Substâncias químicas empregadas no preparo dos canais radiculares. In: Endodontia Biologia e Técnica. 2. ed. Rio de Janeiro: Guanabara Koogan, 2004, cap.18, p.535-579.
6. Fagundes FS, Leonardi DP, Baratto Filho F, Haragushiku GA, Tomazinho LF, Tomazinho PH. E ciência de diferentes soluções na descontaminação de cones de guta-percha expostos ao Enterococus faecalis. Rev Sul-Bras Odontol 2005 out;2(2):7-11. 13. Redmerski R, Bulla JR, Moreno T, Garcia LB, Cardoso CL. Disinfection of Gutta-percha Cones With Chlorhexidine. Brazilian Journal of Microbiology 2007 out/dez;38(4):649-655.
7. Gahyva SM, Siqueira Jr JF. Avaliação da contaminação de cones de guta-percha disponíveis comercialmente. J Bras Endo/Perio 2001; 4(6):193-5.
8. Miller W D. An introduction to the study of the bacterio-pathology of the dental pulp. Dental Cosmos 1984; 36(7):505-28.
9. Walker A. A de niter and dependable therapy for pulpless teeth. J Am Dent Ass 1936; 23(2):1418-25.
10. Hauman CHJ, Love RM. Biocompatibility of dental materials used in contemporary endodontic therapy: a review. Part 1. Intracanal drugs and substances. Int Endod J 2003; 36(2):75-85.
11. Lopes HL, Siqueira Jr JF. Substâncias químicas empregadas no preparo dos canais radiculares. In: Endodontia Biologia e Técnica. 2a ed. Rio de Janeiro: Guanabara Koogan, 2004, cap.18, p.535-579.
12. Leonardo M, Tanomarulho M, Silva L, Filho P, Bonifácio K, Ito I. In vivo antimicrobial activity of 2,0% chlorexidine used as a root canal irriganting solution. J Endod 1999; 25(3):167-71.
13. Morais LCT, Olmedo AL. Análise das condições de assepsia dos cones de guta-percha. Rev Gaúcha Odont 1971; 19(2):116-7.
14. Cardoso CL, Redmerski R, Bittencourt NL, Kotaka CR. Effectiveness of different chemical agents in rapid decontamination of gutta-percha cones. Braz J of Microbiol 2000; 31(1): 67-71.
15. Radcliffe CE, Potouridou L, Qureshi R, Habahbeh N, Qualtrough A, Worthington H, Drucker DB. Antimicrobial activity of varying concentrations of sodium hypoclorite on endodontic microorganisms Actinomyces israellis, Actinomyces naeslundii, Candida albicans and Enterococcus faecalis. Int Endod J 2004; 37(27):438-46.
16. Fagundes FS, Leonardi DP, Baratto Filho F, Haragushiku GA, Tomazinho LF, Tomazinho PH. E ciência de diferentes soluções na descontaminação de cones de guta percha exposto ao Enterococus faecalis. Rev Sul-Bras Odontol 2005; 2(2):7-11.
17. Lima KC, Fava LRG, Siqueira Jr JF. Susceptibilities of Enterococcus faecalis Bio Ims to Some Antimicrobial Medications. J Endod 2001; 27(10): 616-9.
18. Dametto FR, Ferraz CCR, Gomes BPFA, Zaia AA, Texeira FB, Souza Filho FI. In vitro assessment of the immediate and prolonged antimicrobial action of chlorhexidine gel as an endodontic irrigant against Enterococcus faecalis. Oral Surg Oral Med Oral Pathol 2005; 99(6):768-72.