

## Atraumatic Restorative Treatment in Combination with Papain Gel: Brief Review

**Aline Cristina Lacerda<sup>1</sup>, Gabriela Cordeiro Taveira<sup>1</sup>, Taylane Soffener Berlanga de Araújo<sup>1,2</sup>, Idiberto José Zotarelli Filho<sup>2\*</sup>, Ana Paula Bernardes da Rosa Maluf Abbud<sup>1,2</sup>, Carlos Alberto Costa Neves Buchala<sup>1,2</sup> and Leandro Moreira Tempest<sup>1,2</sup>**

<sup>1</sup>University Center North Paulista (Unorp) - São José do Rio Preto-SP, Brazil

<sup>2</sup>Post Graduate and Continuing Education (Unipos), São José do Rio Preto-SP, Brazil

**\*Corresponding Author:** Idiberto José Zotarelli Filho, Professor, Unipos - Post Graduate and Continuing Education, São José do Rio Preto-SP, Brazil.

**Received:** August 05, 2017; **Published:** September 01, 2017

### Abstract

**Introduction:** It is estimated that in atraumatic dental surgery studies with meta-analysis reach 280 jobs, with almost 29.0% of all studies. Conventional Atraumatic Restorative Treatment (TRA) is a carious dentin removal technique where only manual instruments and restoration with the glass ionomer cement are used, in order to reintegrate the dental cavities in relation to their function and aesthetic improvement. Currently, new materials have been introduced to the market with the use of amino acid based products with sodium hydroxide or papain, which are indicated for chemical - mechanical removal of caries without the need for anesthesia and rotating equipment.

**Objective:** The present work had as objective to demonstrate through a review of the literature on the evolution and consequent importance of the improvement of caries restorative techniques with the use of papacarie.

**Methods:** A total of 60 articles were found involving treatment by papacarie. Initially, it was held the exclusion existing title and duplications in accordance with the interest described this work. After this process, the summaries were evaluated and a new exclusion was held. A total of 33 articles were evaluated in full, and 17 were included and discussed in this study.

**Conclusion:** The atraumatic restorative treatment, performed in the correct way, with the appropriate material, respecting all its stages, can present a high success rate. In addition, some authors report that papain gel does not significantly influence the performance and clinical success of ART.

**Keywords:** Dental Caries; Papain; Atraumatic Restorative Treatment

### Introduction

It is estimated that in atraumatic dental surgery studies with meta-analysis reach 280 jobs, with almost 29.0% of all studies [1,2]. This selection of data was due to the significant increase of quantitative synthesis methods in the dental literature from the beginning of the 21<sup>st</sup> century. Most of the studies selected were developed in the USA, the Netherlands and the United Kingdom. These three countries and 16 journals accounted for almost 52.0% of all publications. The other papers were published in 61 other journals and originated in 33 other countries, including Brazil [3].

The atraumatic restorative treatment (TRA) was advocated in the early 1980's and officially adopted in clinical situations in the 1990s by the World Health Organization, to be applied in communities without access to the minimal infrastructure for the application of conventional dentistry [1-4]. The atraumatic restorative treatment consists of the manual removal of the carious tissue with the aid of manual instruments with posterior restoration of the tooth with glass ionomer cement. It presents relatively easy technique, simple material/equipment and low cost [4].

Papain gel has become a major allied technique (TRA) as a method of chemical-mechanical removal of carious dentin that provides comfort and well-being to the patient during its application [5]. It was created in order to reduce the inconveniences of mechanical removal of the carious lesion, it presents biocompatibility, antimicrobial activity, preserves dentin tissue, reducing the risk of pulp exposure. Its application is favored by its consistency of gel and coloration, which goes from greenish to cloudy, which allows a better visualization of the procedure that can be done under relative isolation, since it is not toxic to the buccal tissues [6].

Benefits and limitations of using papain gel: it can be used as an alternative in the removal of carious dentin during the ART. In addition to facilitating the removal of carious tissue, it also contributes to the softening of infected dentin and its subsequent removal [7]. Thus, the adequacy of the buccal medium can be performed with greater speed, safety and comfort for the patient, allowing the preservation of dental structure and avoiding more complex restorative treatments [8].

It ages by softening the infected dentin and preserving healthy tooth tissue. It has bactericidal, bacteriostatic and anti-inflammatory action [8]. It is recommended for the treatment of patients who seek an alternative to the conventional and painless method [9]. Join practicality, effectiveness and safety, being atraumatic. It is an excellent option in the treatment of children, special patients and adult phobic patients and presents as a limitation the necessity of using rotary instruments to access carious lesion or cavity preparation [10]. It has low cost, which makes its use in the public network feasible.

Studies have shown that the use of papain gel with the subsequent application of the self-etching adhesive exerts a greater interference in the polymerization of the adhesive system [1-3].

The present work had as objective to demonstrate through a review of the literature on the evolution and consequent importance of the improvement of caries restorative techniques with the use of papacarie. It was hypothesized that there were statistically significant results on the advances in the attempt to minimize the traumas.

### Methods

Experimental and clinical studies were included (case reports, retrospective, prospective and randomized trials) with qualitative and/or quantitative analysis. Initially, the key words were determined by searching the DeCS tool (Descriptors in Pubmed, Health Sciences, BIREME base) and later verified and validated by MeSh system (Medical Subject Headings, the US National Library of Medicine) in order to achieve consistent search. Artigos de revisão de literatura, pesquisa científica ou casos clínicos que discutiam sobre a utilização de métodos químico - mecânicos, especialmente aqueles à base do gel de papaína, na remoção de dentina cariada.

### Mesh Terms

The words were included Dental Caries, Papain, Atraumatic Restorative Treatment. The literature search was conducted through online databases: Pubmed, Periodicos.com and Google Scholar. It was stipulated deadline, and the related search covering all available literature on virtual libraries.

### Series of Articles and Eligibility

A total of 60 articles were found involving treatment by papacarie. Initially, it was held the exclusion existing title and duplications in accordance with the interest described this work. After this process, the summaries were evaluated and a new exclusion was held. A total of 33 articles were evaluated in full, and 17 were included and discussed in this study.

### Review and Discussion

#### Association between papain gel and TRA

The chemical-mechanical removal of the carious tissue, also known as modified ART, was a method developed to make the treatment more pleasant for the patient, preserving dental structure and pulp health. It is characterized by the dissolution of organic matter, due to the action of chemicals on the carious dentin, dissolving the soft tissue [1-3].

These chemical substances must be able to degrade and soften carious dentin, facilitating their removal with manual instruments, with the main objective of minimizing or even overcoming the limitations of conventional ART [3,4]. This technique consists in the use of solutions that interact directly with the degraded precollagen of the lesion, favoring the removal of carious tissue through the use of hand tools. It is indicated for the removal of carious dentin present in cavitory carious lesions and without pulp involvement [3].

Several researches have proposed different methods of dental caries removal, having as principle the maximum preservation of healthy dental structure [2,3]. From 1972, the first study on the chemical-mechanical removal of caries was carried out. They initiated this system with the use of 5.0% sodium hypochlorite, which when applied on the carious dentin removed the infected tissue [4]. However, hypochlorite was unstable as well as toxic and irritant to healthy oral tissues [4].

Papacarie gel is a caries-removing product, developed by researchers Bussadori and Miziara, in 2003, which has a bacteriostatic, anti-inflammatory, bactericidal and disinfectant action [2]. The Papacarie® is presented in gel form having 10% papain and 0.5% chloramine T, and as a dye the toluidine blue that promotes the removal of the caries-infected tissue, preserving to the maximum the surrounding healthy tissues, without Damage to other oral tissues [3].

In relation to other natural enzymes, papain has some advantages such as quality and enzymatic activity, stability in unfavorable conditions of temperature, humidity and atmospheric pressure, is high concentration in the latex extracted from the papaya peel and has a high commercial value due to the diversity of use it presents [10-13].

The technique for mechanical removal of the carious lesion using "Papacari" consists of: no need for anesthesia: even in medium or deep cavities, there is no need for local anesthesia, relative isolation of the operative field, application of the gel to the cavity, allowing it to act for approximately 30 seconds in the higher caries and 40 to 60 seconds in chronic caries, removal of the carious tissue with uncut dentin cures or the opposite portion of the curette, scraping the degraded tissue by the gel, when there is no sign of soft tissue and no more dentin scaling, the procedure can be terminated [12,13].

Following the concepts of the Minimum Intervention philosophy, ART has been the focus of countless researches. Systematic reviews show favorable results regarding the longevity of atraumatic restorations for both the deciduous dentition and the permanent dentition [14]. Considering the scientific evidence regarding the effectiveness of ART, the reduction in working time and also the results of this study, it is possible to assume that ART is an interesting alternative for the management of children's caries [15].

The success of using the ART technique depends on the correct performance of the clinical procedure and the appropriate indication, because it inserts the patient into a health promotion program, where he receives instructions on hygiene, diet and follow-up of the treatment performed [16].

The technique of chemical-mechanical removal of caries, besides being more conservative, by promoting the selective removal of infected dentin, is comfortable for the patient, since it is a silent procedure, usually not requiring the use of anesthesia [3,16].

One of the disadvantages of chemical-mechanical removal of caries, reported in the literature, is the execution time of the technique [16]. Some authors have verified that this technique requires more time for the removal of carious tissue compared with the conventional removal technique [3].

### Conclusion

The atraumatic restorative treatment, performed in the correct way, with the appropriate material, respecting all its stages, can present a high success rate. In addition, some authors report that papain gel does not significantly influence the performance and clinical success of ART. Because of the fact that the technique is quick to perform, the atraumatic restoration technique was chosen in an attempt to compensate for the delay in the removal of the carious tissue through the chemical-mechanical method.

### Conflict of Interests

There is no conflict of interest between authors.

### Bibliography

1. Ladewig NM., *et al.* "Efficacy of conventional treatment with composite resin and atraumatic restorative treatment in posterior primary teeth: study protocol for a randomised controlled trial". *BMJ Open* 7.7 (2017): e015542.
2. Freitas CN., *et al.* "Educational strategies and atraumatic restorative treatment effect on salivary characteristics: A controlled clinical trial". *Oral Diseases* (2017).
3. Silva Júnior ZS., *et al.* "Effect of papain-based gel on type I collagen--spectroscopy applied for microstructural analysis". *Scientific Reports* 5 (2015): 11448.
4. Motta LJ., *et al.* "Randomized controlled clinical trial of long-term chemo-mechanical caries removal using Papacarie™ gel". *Journal of Applied Oral Science* 22.4 (2014): 307-313.
5. Brizon Valéria Cândido., *et al.* "Indicadores socioeconômicos associados à cárie dentária: uma revisão crítica". *Unimontes Científica* 16.1 (2015): 79-91.
6. Rank Rise Iuata., *et al.* "Análise comparativa de tempo do tratamento restaurador atraumático (art) convencional e modificado com gel de Papacárie®". *Revista Amazônia: Science and Health* 1.2 (2013): 13-20.
7. dos Santos Juliana Silva., *et al.* "Percepções e atitudes de graduandos em Odontologia sobre o Papacárie®". *Revista Brasileira de Pesquisa em Saúde/Brazilian Journal of Health Research* 15.3 (2013).
8. Lopes Michelle Cristina., *et al.* "Métodos químico-mecânicos para a remoção do tecido cariado". *Arquivos em Odontologia* 48.1 (2012): 53-58.
9. Navarro Maria Fidela de Lima., *et al.* "Tratamento Restaurador Atraumático: atualidades e perspectivas". *Revista da Associação Paulista de Cirurgios Dentistas* 69.3 (2015): 289-301.
10. Amorim RE., *et al.* "Survival of atraumatic restorative treatment (ART) sealants and restorations: a meta-analysis". *Clinical Oral Investigations* 16.2 (2011): 429-441.

11. Sousa Janaína Maniezo de., *et al.* "Utilização de gel de papaína associado à técnica de restauração atraumática em bebê: relato de caso clínico". *Odontologia Clínico-Científica* 11.1 (2012): 75-80.
12. Monnerat Antônio Fernando., *et al.* "Tratamento Restaurador Atraumático. Uma técnica que podemos confiar?" *Revista Brasileira de Odontologia* 70.1 (2013): 33-36.
13. Santos Elissandra B dos., *et al.* "Ansiedade dos bebês durante o tratamento restaurador atraumático (ART)". *Revista Da Associação Paulista De Cirurgioes Dentistas* 69.2 (2015): 182-185.
14. Chibinski Ana Claudia., *et al.* "Tratamento restaurador atraumático: percepção dos dentistas e aplicabilidade na atenção primária". *Revista Brasileira de Odontologia* 71.1 (2014): 89-92.
15. Cunha Dailane., *et al.* "Tratamento Restaurador Atraumático". *Revista Rede de Cuidados em Saúde* 10.1 (2017).
16. Motta Lara Jansiski., *et al.* "Efficacy of Papacarie® in reduction of residual bacteria in deciduous teeth: a randomized, controlled clinical trial". *Clinics* 69.5 (2014): 319-322.

**Volume 13 Issue 5 September 2017**

**© All rights reserved by Idiberto José Zotarelli Filho., *et al.***