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GABRIELA GUARDIOLA MÜLLER

EFICÁCIA DA AGITAÇÃO ULTRASSÔNICA PASSIVA DE UM SOLVENTE ORGÂNICO PARA A REMOÇÃO DE MATERIAIS OBTURADORES

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Trabalho de Conclusão de Curso apresentado ao Curso de Graduação em Odontologia da Faculdade de Odontologia da Universidade Federal do Rio Grande do Sul, como requisito parcial para obtenção do título de Cirurgião-Dentista.

Orientador: Prof. Dr. Augusto Bodanezi

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RESUMO

MÜLLER, Gabriela Guardiola. **Eficácia da agitação ultrassônica passiva de um solvente orgânico para a remoção de materiais obturadores**. 2012. 26 f. Trabalho de Conclusão de Curso (Graduação em Odontologia) – Faculdade de Odontologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, 2012.

O objetivo deste estudo foi investigar se a irrigação final com o solvente Endosolv R® e ultrassom promovia maior limpeza nas paredes do canal radicular durante o retratamento endodôntico. Um total de 56 dentes pré-molares extraídos foram instrumentados manualmente utilizando-se a técnica step-back e obturados com guta-percha e cimento AH Plus. Após nove meses, os canais foram retratados através da remoção da guta-percha e do cimento com ProTaper Universal Retratamento e do repreparo dos canais com Sistema ProTaper Universal até o instrumento F5. Após essa etapa, a amostra foi aleatoriamente dividida em quatro grupos (n=14) e os dentes submetidos à irrigação ultrassônica passiva (PUI) associada ao Endosolv R ou à água destilada. Nos grupos controle, os irrigantes permaneceram sem agitação. Em seguida as raízes foram clivadas e examinadas sob microscopia eletrônica de varredura (MEV) para que a quantidade de material obturador remanescente nas paredes do canal fosse avaliada por dois examinadores calibrados de forma cega. Os dados foram analisados através dos testes de Kruskal-Wallis e de Student-Newman-Keuls *post hoc* (α=0.05). Todos os grupos apresentaram resíduos de materiais obturadores nos três terços do canal radicular após o retratamento. Não houve diferenças significativas entre os grupos ou entre os terços dos canais em cada um dos grupos (P>0,05). Concluiu-se que PUI com Endosolv R não foi efetiva para a remoção de remanescentes de material obturador das paredes do canal radicular.

Palavras-chave: Ultrassom. Retratamento. Solventes. Terapêutica. Materiais obturadores de canal radicular.

ABSTRACT

MÜLLER, Gabriela Guardiola. **Efficacy of an organic solvent and passive ultrasonic irrigation for filling materials removal.** 2012. 24 f. Final Paper (Graduation in Dentistry) – Faculdade de Odontologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, 2012.

The aim of this study was to investigate whether a final rinse with Endosolv R® solvent and ultrasonics resulted in cleaner root canal walls during endodontic retreatment. A total of 56 extracted premolar teeth were manually instrumented using a step-back flare technique and obturated with gutta-percha and AH Plus sealer. After 9 months, the canals were retreated by removing the gutta-percha and sealer with ProTaper Universal Retreatment and rotary preparation with Universal ProTaper System up to an F5 file. As a final step, the sample was randomly divided in four groups (n=14) and teeth were submitted to passive ultrasonic irrigation (PUI) with either Endosolv R or distilled water. In the control groups, the irrigants were left undisturbed. Roots were cleaved and examined under scanning electron microscopy (SEM), and the amount of filling remnants on the canal walls was assessed by two calibrated examiners in a blinded fashion. Data were analyzed by the Kruskal-Wallis test and the Student-Newman-Keuls *post hoc* test (α=0.05). All groups presented filling debris in the three root canal thirds after retreatment. There were no significant differences between the groups or among the root canal thirds within each group ($P>0.05$). PUI with Endosolv R was not effective in the removal of filling debris from root canal walls.

Keywords: Ultrasonics. Retreatment. Solvents. Therapeutics. Root canal filling materials.

SUMÁRIO

1 INTRODUÇÃO

Diante dos insucessos no tratamento dos canais radiculares, o retratamento convencional passa a ser alternativa mais utilizada (ALVES et al., 2011) provavelmente por ser menos onerosa e dispendiosa, tanto para o profissional quanto para o paciente, quando comparada com outras formas de resolução do problema, tais como as intervenções cirúrgicas, as extrações e os implantes dentários (PENNINGTON et al., 2009). Promover a diminuição da necessidade de novos tratamentos endodônticos na população mostra-se fundamental para reduzir os índices de insucesso. Contudo, a formulação de estratégias de combate à doença periapical instalada não pode ser relegada nessa busca.

Os microrganismos remanescentes ao tratamento endodôntico inicial, que constituem a causa mais frequente dos insucessos, são mais resistentes aos procedimentos convencionais de desinfecção (SIQUEIRA;RÔÇAS, 2009). Na tentativa de eliminá-los, faz-se necessário desenvolver um grau de alcalinidade mais elevado que é atingido somente quando do contato com substâncias desinfetantes (hidróxido de cálcio e hipoclorito de sódio) (NERWICH et al., 1993). Para atingir esse objetivo, a remoção completa de barreiras constituídas por resíduos de guta-percha e de cimento ao longo de todo o canal radicular torna-se condição obrigatória a um retratamento de excelência (ORSTAVIK;HAAPASALO, 1990).

A remoção da obturação com instrumentos rotatórios de níquel-titânio tem sido associada à melhor limpeza das paredes do canal radicular (GERGI;SABBAGH, 2007; GU et al., 2008). Apesar disso, os níveis de limpeza atingidos ainda estão muito distantes do que é considerado ideal (SCELZA et al., 2008).

Diante da incapacidade das técnicas de repreparo em remover resíduos de locais inacessíveis à ação mecânica dos instrumentos - paredes, dobras, e reentrâncias – a ação química das substâncias solventes auxiliares mostra-se como recurso fundamental (GUTARTS et al., 2005). Substâncias solventes orgânicas tem a propriedade de modificar a estrutura de materiais obturadores e, dessa forma, reduzir a resistência que os mesmos oferecem à penetração das limas em direção ao término apical dos canais radiculares (SCELZA et al., 2008).

Há muitos anos os aparelhos de ultrassom fazem parte do arsenal odontológico e, durante o tratamento endodôntico, a movimentação ultrassônica das soluções irrigadoras potencializa sua atuação ao acelerar sua renovação, ao mesmo tempo em que favorece a

movimentação e o desprendimento de partículas previamente aderidas às paredes e às reentrâncias do canal radicular (GUTARTS et al., 2005; LUMLEY et al., 1993).

Poucos recursos são investidos na pesquisa e no desenvolvimento de técnicas alternativas práticas destinadas a complementar ou a finalizar a limpeza inicial obtida nos retratamentos, o que, talvez, possibilite aumentar o índice de sucesso dessa terapia. Com este propósito, considerou-se o desenvolvimento de uma linha de pesquisa cujo objetivo seria investigar o desempenho de recursos destinados a melhorar a limpeza e a desinfecção do sistema de canais radiculares.

Em estudo laboratorial prévio, demonstrou-se que, dentre diferentes solventes orgânicos testados, o Endosolv R® foi o que promoveu a maior dissolução do cimento obturador resinoso AH Plus (SCHÖNHOFEN et al., 2012). Em estudo subsequente, observou-se que a agitação ultrassônica desse solvente na máxima intensidade promoveu remoção de parte do cimento AH Plus aderido às paredes (MORAES et al., 2012). A partir dessas constatações, supôs-se que a dissolução química deste solvente sobre este cimento resinoso poderia ser potencializada quando agitada ultrassonicamente e, da mesma forma, a remoção de debris de material obturador durante o retratamento endodôntico.

Com a intenção de gerar novas informações e de contribuir para o campo de pesquisa em questão, nas páginas seguintes apresenta-se, em forma de artigo científico, a descrição de uma pesquisa concebida com o objetivo de investigar se a associação de dois recursos rotineiros (solventes orgânicos e ultrassom) proporciona melhoras à limpeza de canais radiculares desobturados e repreparados.

2 ARTIGO PARA PUBLICAÇÃO

Efficacy of an Organic Solvent and Ultrasonics for Filling Materials Removal

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The aim of this study was to investigate whether a final rinse with Endosolv R® solvent and ultrasonics resulted in cleaner root canal walls during endodontic retreatment. A total of 56 extracted premolar teeth were manually instrumented using a step-back flare technique and obturated with gutta-percha and AH Plus sealer. After 9 months, the canals were retreated by removing the gutta-percha and sealer with ProTaper Universal Retreatment and rotary preparation with ProTaper Universal System up to an F5 file. As a final step, the sample was randomly divided in four groups (n=14) and teeth were submitted to passive ultrasonic irrigation (PUI) with either Endosolv R or distilled water. In the control groups, the irrigants were left undisturbed. Roots were cleaved and examined under scanning electron microscopy (SEM), and the amount of filling remnants on the canal walls was assessed by two calibrated examiners in a blinded fashion. Data were analyzed by the Kruskal-Wallis test and the Student-Newman-Keuls *post hoc* test (α=0.05). All groups presented filling debris in the three root canal thirds after retreatment. There were no significant differences between the groups or among the root canal thirds within each group ($P>0.05$). PUI with Endosolv R was not effective in the removal of filling debris from root canal walls.

Key words: ultrasonics, retreatment, solvents, therapeutics, root canal filling materials.

INTRODUCTION

Conventional endodontic retreatment is the primarily choice to deal with residual or subsequently acquired infection after primary root canal therapy (1). To succeed in this procedure, the removal of as much sealer and gutta-percha as possible from inadequately shaped and filled root canal system is critical for uncovering remnants of necrotic tissue or bacteria (2) and to expose them to a more efficient chemo-mechanical disinfection protocol. Nevertheless, root filling removal from root canal irregularities, such as oval extensions, isthmuses and apical deltas, is a major concern due to inaccessibility of instruments and chemical irrigants (3). In an attempt to address this challenge, the additional enlargement of the root canal with extra NiTi rotary files has been proposed (4), but root canals that are free of filling residues have remained unattainable (4-8).

Passive ultrasonic irrigation (PUI) of NaOCl and EDTA have been proposed to improve root canal cleaning through the removal of organic tissue remnants, dentin debris and microorganisms from root canal walls and anatomic areas that are difficult to access (1,9). The rapid and continuous movement of irrigants around the vibrating files seems to enhance the potential of the solution to contact a greater surface area of the canal wall and thus exert their chemical and physical properties (10). Additionally, the dislodged material may be detached from the root canal wall and absorbed or dissolved in the irrigant (11).

Organic solvents are a chemical class of compounds that are applied during retreatment to decrease the resistance of filling materials in the root canal (12), thus facilitating their removal without damaging the tooth (6). Diverse chemical solvents are available, and they dissolve root canal sealers at different intensities (12). Sometimes, these substances need to be renewed during filling removal so that the instruments may reach the apical foramen (13).

Endosolv R® is an organic solvent that has been shown to aid in fresh AH Plus removal after filling (14) and to dissolve set AH Plus in vitro better than orange oil and distilled water (15).

Given that ultrasonic agitation might be beneficial for improving the chemical properties of organic solvents, such as dissolving capacity, the aim of this study was to investigate whether PUI of Endosolv R as a final flush during retreatment results in cleaner root canal walls.

MATERIAL AND METHODS

This study was approved by the Dentistry Research Committee and by the Ethics Committee of Federal University of Rio Grande do Sul (# 18179/2011).

Specimen preparation

Fifty-six extracted human lower premolars (22 mm ± 1 mm) with single root canals were used in this study. Roots with severe curvatures (>20◦), immature apices or previous root canal treatment were discarded. Soft tissue and calculus were mechanically removed from the root surfaces. After cavity access preparation, a K#10 file was inserted to determine the patency of the root canal and to establish the working length of each tooth by subtracting 1 mm from the length at which the file tip could be viewed at the apical foramen. The canals were manually prepared with the Oregon technique (16) until a K#35 file reached the apical length. Canals were irrigated with 1 mL of 2% sodium hypochlorite (Biodinâmica Química e Farmacêutica Ltda., Ibiporã, Paraná, Brazil) after each instrument change. After a 3-minute final irrigation with EDTA (Biodinâmica Química e Farmacêutica Ltda., Ibiporã, Paraná, Brazil) 17% followed by a final flush with 2 mL of 2% sodium hypochlorite, the canals were dried with sterile paper cones.

Root filling

A standardized gutta-percha master cone (size 35) (Tanariman Industrial Ltda., Manaus, Amazonas, Brazil) was fitted with tug-back at working length (WL). This master cone was lightly covered with AH Plus sealer (Dentsply De Trey, Konstanz, Baden-Württemberg, Germany) and slowly inserted into the root canal until it reached WL. Cold lateral compaction with accessory gutta-percha cones (size Fine Medium) was performed until the cones could not be introduced further than 5 mm into the root canal. The excess gutta-percha was removed with a heated plugger, and teeth were radiographed in a buccolingual direction so that the homogeneity and the apical extent of the root canal filling could be assessed. If voids were detected, the fillings were recondensed and reassessed or discarded. All procedures were conducted by the same operator. The access cavities were sealed with ionomer (Vitremer 3M ESPE, St. Paul, MN, USA). Subsequently, the specimens were stored at 37°C and 100% humidity for 9 months.

Retreatment technique

After the aging interval, root canal retreatment was performed with Protaper Universal Retreatment (Dentsply-Maillefer, Ballaigues, Switzerland) instruments at 500 rpm and 2 N/cm torque. The D1 ProTaper file (size 30, 0.09 taper) was used for the removal of the coronal third of the root canal filling, followed by the use of the D2 ProTaper instrument (size 25, 0.08 taper) for the middle third of the root canal. Finally, the D3 ProTaper instrument (size 20, 0.07 taper) was used at WL. Apical preparation was performed with ProTaper instruments F2 (size 25, 0.08 taper), F3 (size 30, 0.09 taper) F4 (size 40, 0.06 taper) and F5 (size 50, 0.04 taper) at 250 rpm and 1.5 N/cm torque. The same experienced operator, who received prior training, performed all retreatments. Procedural incidents, such as blockages and instrument fractures, were recorded. If an instrument fracture occurred, the specimen was replaced.

In all root canals, irrigation was performed with distilled water using a syringe and a 30-gauge needle after each instrument change. All instruments were discarded after use in six root canals. Retreatment was deemed complete when the last file reached WL, there was no filling material covering the instrument, and the canal walls were smooth and free of visible debris. Roots were fixed to the opening of an Eppendorf-type vial, and the sets were inserted into an acrylic resin base for stability.

Afterwards, the sample was divided into four groups of 14 teeth, and each group received a different final irrigation protocol. In group 1 and in group 2, the root canals were flooded with formamide or distilled water, respectively, and an ultrasonic smooth wire (CVD Dentus, São José dos Campos, SP, Brazil) attached to an ultrasonic device (NAC Plus, Adiel, Ribeirão Preto, SP, Brazil) was inserted 3 mm short of the root canal length and activated for 60 seconds at maximum intensity. The same procedures, excluding ultrasonic activation, were conducted for groups 3 and 4 (controls). No renewal of solutions was performed during or after ultrasonic use. Finally, the root canals were then irrigated with 3 mL of distilled water, dried with paper cones, and stored for 96 h at 20 ± 3° C for dehydration.

SEM of filling debris

The roots were grooved longitudinally in a buccolingual direction with a diamond disk and split into halves with a chisel. The two halves were visualized using a stereomicroscope (EMZ-TR, Meiji, Saitama, Japan) at 5.5X magnification. The half with a greater quantity of filling debris was then examined under electron microscope (JSM-6060,

JEOL, Tokio, Japan) at 75X magnification, and one representative electron micrograph for each portion (coronal, middle, and apical) of the root canal was taken.

Prior to image assessment, two reviewers received instructions and were calibrated with 30 images presented on a projection screen. The 168 micrographs were numbered, mounted in random order, and individually categorized according to a grading system, which was used to score the amount of residual filling debris in each root canal section. The following criteria were used: 0 = none to slight presence (0%–25%) of residual debris covering the dentinal surface, 1 = presence of 25% to 50% of residual debris on the surface, 2 = moderate presence (50%–75%) of residual debris, and 3 = the entire or almost the entire surface (75%–100%) is covered with residual debris. No attempt was made to distinguish between filling materials or sealer remnants. After four weeks, the image assessments were repeated for the estimation of intra-and inter-examiner agreement.

Data analysis

Data were analyzed with the Kruskal-Wallis test and the Student-Newman-Keuls post hoc test (α=0.05). First, statistics were used to compare canal thirds within each group; next, the groups were compared in each canal third; and finally, intergroup comparison considered the total canal area to calculate the filling debris.

RESULTS

Table 1 presents the median and range of root canal wall scores obtained in the root canal thirds for each group. The differences within each group were not statistically significant (Table 1) (Fig. 1). The techniques did not differ significantly when each third was compared between groups (Table 1) (Fig. 1). The inter-examiner agreement value was 0.67 for the first assessment and 0.63 for the second. The intra-examiner agreement value was 0.81 for examiner #1 and 0.89 for examiner #2. No procedural errors were observed, but three ProTaper instruments (1 D3 and 2 F2) fractured.

DISCUSSION

The main objective of nonsurgical retreatment is to remove all filling material from the root canal and to regain access to the apical foramen (6). In laboratory research, optical microcopy is still the most common method for obtaining information about dentin cleanliness after retreatment (7). Scanning electron microscopy, however, allows the

examination of the entrance of dentinal tubules, where the process of hybridization and resin-tag formation of cements occurs (17). A disadvantage of this methodology is that only a very small part of the root canal can be evaluated, and this is often not standardized. In an attempt to address this bias, lower magnification than those presented by Somma et al. (7) was employed to increase the observation area and strict criteria for examiner calibration were conducted. Nevertheless, despite this actions, variation between different observers, owing to the subjective evaluation of images, was still expected (18) and may also account for the lack of statistical significance that was observed between the groups.

Two recent investigations on straight root canals demonstrated that apical enlargement by two sizes beyond the initial preparation size significantly reduced the amount of residual filling material, but no complete removal occurred (4). In this study, despite apical enlargement with three instruments beyond the initial preparation size, the filling remnants were distributed equally in patches throughout the buccal and lingual walls, as observed for the experimental and the control groups, possibly due to the mesio-distal flattening of premolar teeth.

Optical microscopy and three-dimensional reconstruction studies have revealed that filling removal with ProTaper Universal Retreatment left more residual fillings in the apical third of root canals (19). By contrast, in this study, no significant difference was observed between the cervical and apical thirds in all groups. The additional apical enlargement with ProTaper F5, however, might have caused the apical removal of debris to a level at which no significant difference was detected in relation to the cervical third, where the PUR D3 taper 0.07 instrument contacted a greater dentin surface area. The root canal filling may have been easier to remove from the apical third because no organic solvent was used during retreatment. Chemically softened fillings may be easily pushed into anatomically complex canal irregularities that have not been touched by rotary instruments (6, 7, 18).

Through ultrasonic activation, the irrigant was expected to more easily penetrate into the apical part of the root canal system (20), thus increasing the effectiveness of the cleaning (21). This effect, however, was not observed in this study given that no significant differences between groups were observed when the apical thirds were compared.

Physical properties were believed to influence the action of the irrigants during PUI (10). Root canal filling remnants were observed in all groups, but the lower scores that were assigned to group 1 when compared to group 3, although not statistically significant, may suggest that PUI with Endosolv R removed more residues from root canal walls than the undisturbed solvent. Provided that no equivalent behavior was observed when distilled water

was tested (groups 2 and 4), it could be hypothesized that, besides acoustic microstreaming, the chemical action of the irrigant might be important for residue removal from canal walls, isthmuses or reentrances. Complying with this assumption, the removal of the smear layer with PUI was significantly better when EDTA and sodium hypochlorite were employed in primary treatment relative to distilled water (10).

Ultrasonic energy was applied at maximum intensity for only 60 seconds, based on the effectiveness for dentine debris removal as described by Sabins et al. (22). Considering the differences in composition and structure between artificial smear layer and AH Plus/gutta-percha remnants produced in this study, the time interval adopted was insufficient to dislodge the filling residues from root canal walls of extracted teeth, and different cleaning effects could be expected if longer time intervals were used.

At first, some chemical dissolution of filling residues by the organic solvent were expected, followed by the elimination of these particles and the renewal of the solvent solution due to ultrasonic microstreaming and cavitation effects. Although some chemical dissolution of the residual sealer may have occurred, it was not enough to generate cleaner root canal walls. Nevertheless, most of the filling consisted of gutta-percha, whose susceptibility to Endosolv R may not be as significant as that detected in vitro for AH Plus (15). AH 26 was also susceptible to chloroform solvency (23) and, as observed in this study, its ultrasonic agitation as the final step in retreatment did not result in cleaner canals, despite procedural differences such as manual preparation and stereomicroscopic analysis (24).

Passive ultrasonic irrigation does not increase the apical extrusion of NaOCl (13); however, the main component of Endosolv R is formamide, a toxic substance in animal and human cells (25). Thus, additional testing with alternative non-toxic solvents is encouraged.

The type of sealer seemed to influence the quantity of filling residues that remain after root canal retreatment with ProTaper Universal rotary instruments (5) as well as the chemical agent used for removal of AH Plus residues from dentin walls (26). Therefore, different results could be expected if other filling materials or organic solvents were tested.

In conclusion, the present in vitro study showed that PUI with Endosolv R or water was not effective in the removal of filling debris from root canal walls. Meanwhile, the supplementary enlargement of root canals with NiTi rotary or precurved hand instruments to achieve some reduction of filling remnants during retreatment is still recommended.

O objetivo deste estudo foi investigar se a irrigação final com o solvente Endosolv R® e ultrassom promovia maior limpeza nas paredes do canal radicular durante o retratamento endodôntico. Um total de 56 dentes pré-molares extraídos foram instrumentados manualmente utilizando-se a técnica step-back e obturados com guta-percha e cimento AH Plus. Após nove meses, os canais foram retratados através da remoção da guta-percha e do cimento com Protaper Universal Retratamento e preparo rotatório com Sistema Protaper Universal até o instrumento F5. Após essa etapa, a amostra foi aleatoriamente dividida em quatro grupos (n=14) e os dentes submetidos à irrigação ultrassônica passiva (PUI) associada ao solvente Endosolv R ou à água destilada. Nos grupos controle, os irrigantes permaneceram sem agitação. Em seguida as raízes foram clivadas e examinadas sob microscopia eletrônica de varredura (MEV) para que a quantidade de material obturador remanescente nas paredes do canal fosse avaliada por dois examinadores treinados de forma cega. Os dados foram analisados através dos testes de Kruskal-Wallis e de Student-Newman-Keuls *post hoc* (α=0.05). Todos os grupos apresentaram resíduos de materiais obturadores nos três terços do canal radicular após o retratamento. Não houve diferenças significativas entre os grupos ou entre os terços dos canais em cada um dos grupos (P>0,05). Concluiu-se que PUI com Endosolv R não foi efetiva para a remoção de remanescentes de material obturador das paredes do canal radicular.

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TABLE 1

Table 1. Median values of filling debris scores and range in the coronal, middle, and apical thirds of root canal walls from each group.

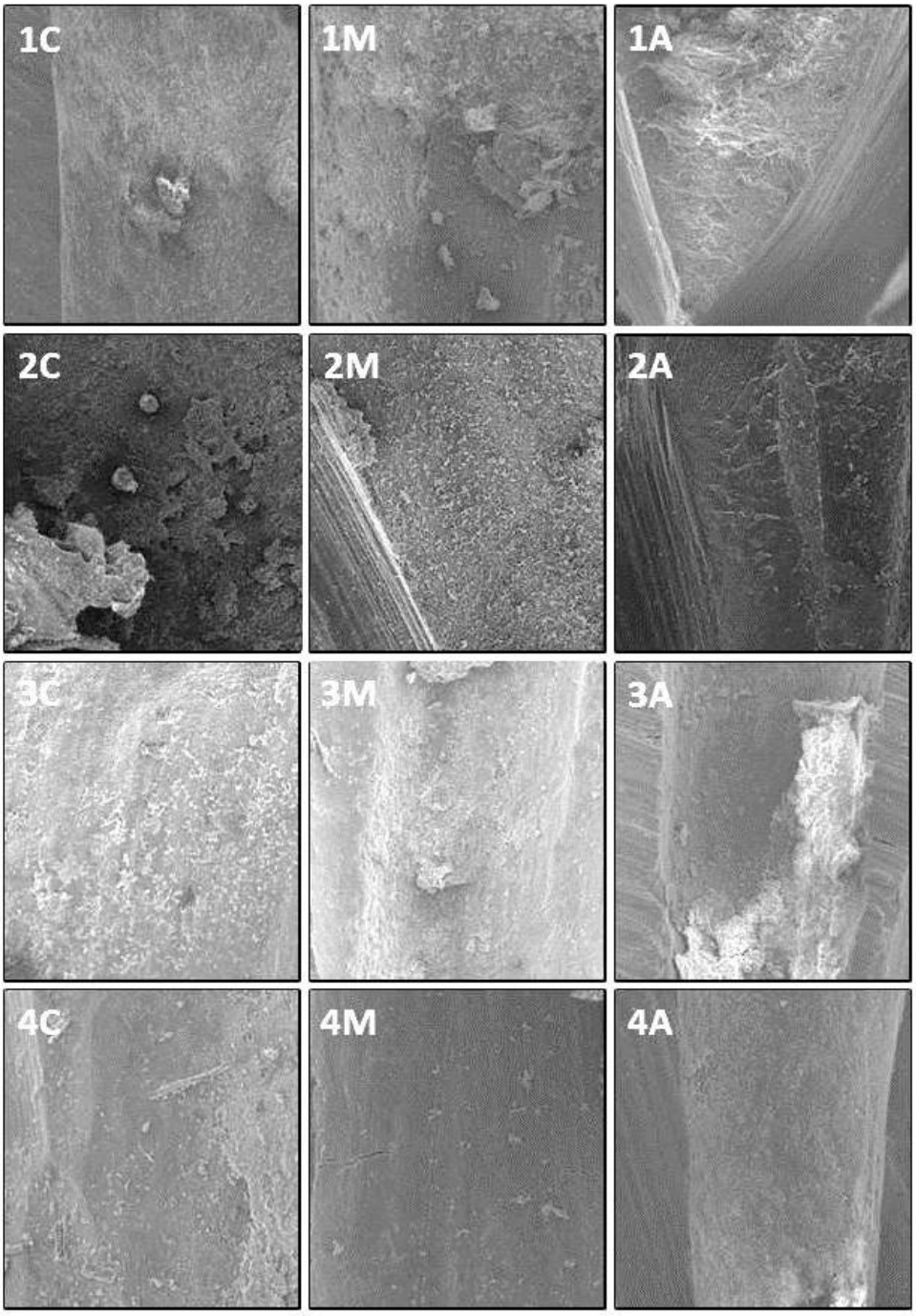
Groups	Coronal	Middle	Apical	Total	P value*
Endosolv R+US	1.50 (1-4)[a]	2.00 (2-4)[a]	1.00 (1-3)[a]	1.50 (1-4)[b]	0.580
H_2O+US	2.00 (1-4)[a]	1.00 (1-3)[a]	2.50 (1-4)[a]	2.00 (1-4)[b]	0.440
Endosolv R	3.00 (1-4)[a]	2.50 (1-4)[a]	4.00 (3-4) [a]	3.00 (1-4)[b]	0.150
H_2O	4.00 (2-4)[a]	3.00 (1-4)[a]	3.00 (1-4)[a]	3.50 (1-4)[b]	0.897

Similar letters indicate no statistically significant differences at a 5% significance level.

FIGURE CAPTIONS

Figure 1 - Scanning electron micrographs of root canal surfaces after final flush treatments. Numbers indicate the groups whereas letters indicate the thirds of root canals (C - cervical, M - middle, A - apical).

FIGURE 1



3 CONSIDERAÇÕES FINAIS

A partir dos resultados deste estudo laboratorial, concluiu-se que o Endosolv R agitado passivamente pelo ultrassom não foi eficaz como manobra suplementar para se remover resíduos de materiais obturadores das paredes de canais radiculares após desobturação e repreparo. Reitera-se, assim, a importância do alargamento dos canais durante o retratamento, seja com instrumentos rotatórios ou com instrumentos manuais, como recurso para se reduzir a quantidade de resíduos de material obturador.

Apesar de a manobra investigada neste trabalho não ter produzido o efeito esperado, a diversidade de materiais obturadores, de solventes orgânicos e de protocolos de agitação ultrassônica existentes invoca a necessidade de que novos estudos e métodos sejam conduzidos para que seja possível conhecer e aprimorar as manobras envolvidas no retratamento de canais radiculares. Por fim, a concepção e o desenvolvimento de novos recursos com o propósito de potencializar a desinfecção obtida durante o retratamento endodôntico são encorajados.

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ANEXO – APROVAÇÃO ÉTICA DO PROJETO

Sistema Pesquisa - Pesquisador: Augusto Bodanezi

Projeto Nº: 18179

Título: EFEITO DA AGITACAO ULTRASONICA DE SOLVENTES SOBRE A REMOCAO E EXTRAVASAMENTO APICAL DE RESIDUOS REMANESCENTES DA DESOBTURACAO E REPREPARO DE CANAIS RADICULARES

COMISSAO DE PESQUISA DE ODONTOLOGIA: Parecer

O estudo tem por objetivo testar ex vivo o efeito da agitação ultrasônica da substancia solvente sobre a sujidade remanescente nas paredes de canais radiculares curvos após os procedimentos de desobturacão e repreparo. Aspectos metodológicos importantes, tais como randomização, cegamento, calibragem, e cálculo do tamanho de amostra são contemplados no projeto. O estudo apresenta-se bem delineado, possuindo mérito cientifico. O projeto deverá passar por avaliação do Comitê de Ética Central da Universidade.

Projetos Page 1 of 1

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