

Outcomes of Regenerative Endodontic Treatment

Dr. Pedram Iranmanesh

DDS, MSc (Endodontics), PhD

Department of Endodontics, Isfahan University of Medical Sciences

Failures

Regenerative Endodontics: A Systematic Analysis of the Failed Cases

Waleed Almutairi, BDS,*[†] Ghaeth H. Yassen, BDS, MSD, PhD,* Anita Aminoshariae, DDS, MS,* Kristin A. Williams, DDS, MPH,* and Andre Mickel, DDS, MSD*

Abstract

Introduction: The aim of this systematic review was to analyze failed cases of regenerative endodontic treatment (RET) reported in the literature in terms of etiology, diagnosis, treatment protocols, signs of failure, and additional endodontic interventions. **Methods:** Electronic searches were performed in PubMed, Web of Science, and ProQuest Dissertations & Theses databases. All *in vivo* publications in humans that reported at least 1 failed case of RET were included in this systematic review. Failed RET cases were defined in the current study as any case that required an additional endodontic intervention or extraction after the completion of the initial RET. **Results:** A total of 28 studies that reported 67

Regenerative endodontics has been recommended as the treatment of choice in cases of immature teeth with necrotic pulps. The majority of clinical regenerative endodontic treatment

(RET) cases reported in the literature have shown positive clinical outcomes (1, 2). The absence of clinical signs and symptoms and radiographic evidence of periapical healing have been recognized as the primary indications of a successful endodontic regeneration procedure (3). Additionally, increased thickness of the root walls and/or increases in the length of the immature root as well as regaining the vitality of the

Significance

There is a need for a detailed description of the etiology, diagnosis, clinical protocols, and postoperative follow-up to provide a better understanding of the circumstances surrounding the failure or success of regenerative endodontic treatments.

- 28 studies that reported 67 failed cases of RET were included
- Etiology in the initiation of RET;
 - 59% of these cases were caused by dental trauma,
 - and 30% were caused by dens evaginatus.
- 26 (39%) failed RET cases were detected at least 2 years
- 53 (79%) failed RET cases were presented with signs and/or symptoms of persistent infection.

Significance

Persistent infection was the main presentation in 79% of failed RET cases.

Furthermore, 39% of failed RET cases were identified after more than 2 years of follow-up.

Future studies should include a detailed description of the etiology, preoperative variables, intraoperative protocols, and postoperative follow-up

Journal Pre-proof

Does the Etiology of Pulp Necrosis affect Regenerative Endodontic Treatment Outcomes? A Systematic Review and Meta-Analyses

Simay Koc, Massimo Del Fabbro

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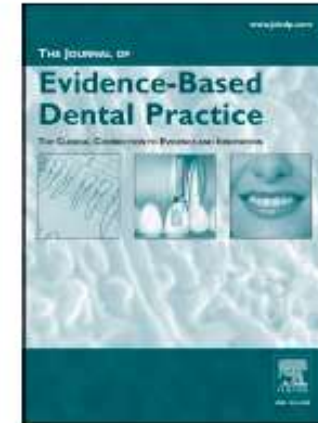
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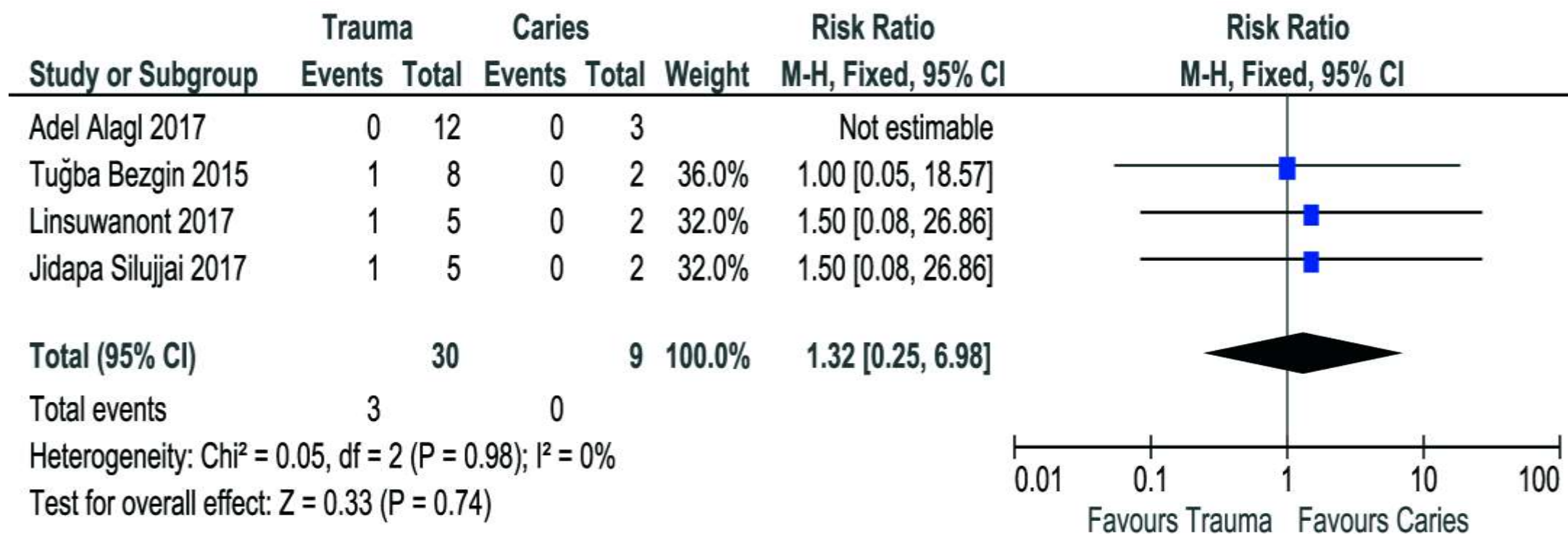
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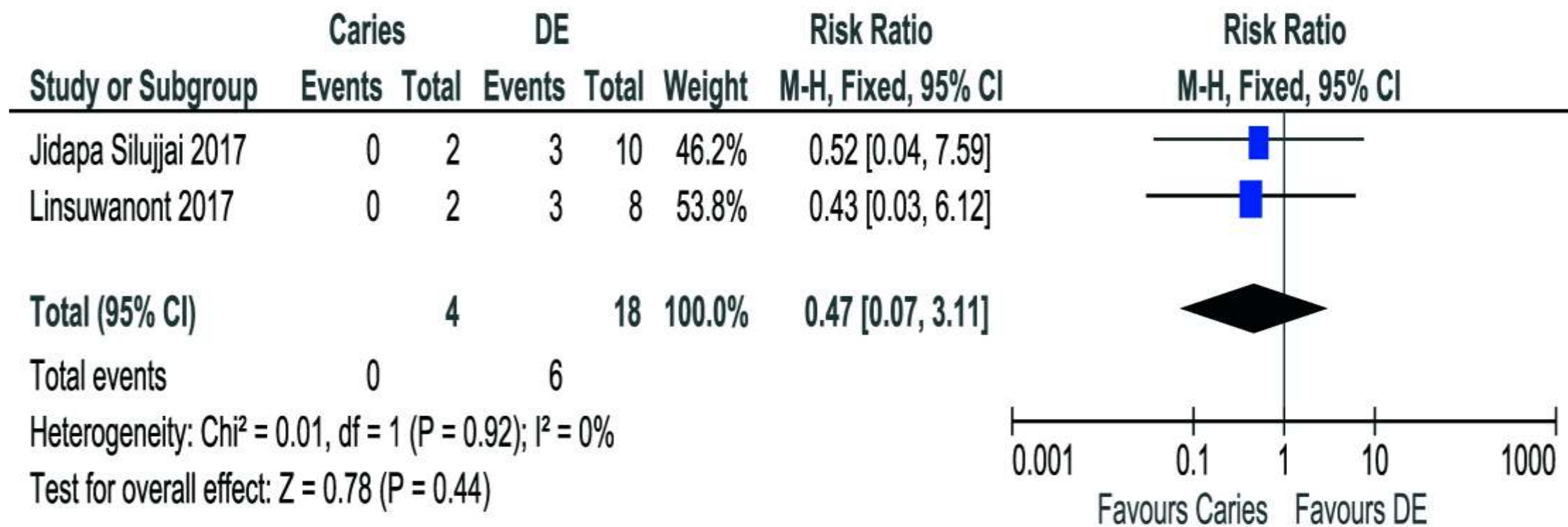
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Significance

comparing teeth with caries vs. dens evaginatus,
and trauma vs. caries confirmed that

there was no evidence for difference in outcomes

Discoloration



Alternative to Avoid Tooth Discoloration after Regenerative Endodontic Procedure: A Systematic Review

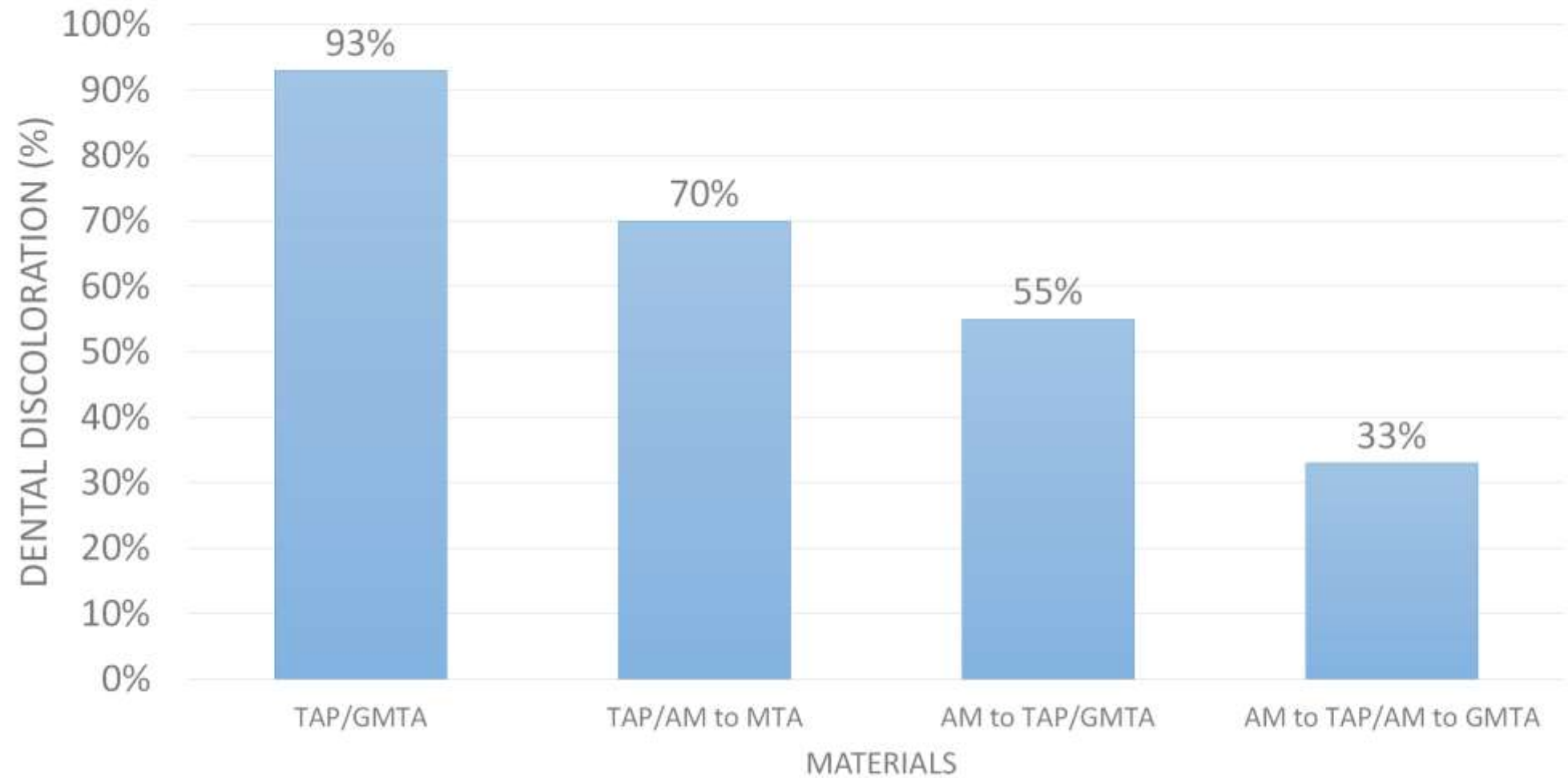
Luciane Geanini Pena dos Santos¹, Luiz Alexandre Chisini¹, Camila Guerner Springmann², Beatriz Dulcineia Mendes de Souza², Fernanda Geraldo Pappen¹, Flávio Fernando Demarco¹, Mara Cristina Santos Felipe², Wilson Tadeu Felipe²

¹Graduate Program in Dentistry, UFPel - Universidade Federal de Pelotas, Pelotas, RS, Brazil

²Department of Dentistry, UFSC - Universidade Federal de Santa Catarina, Florianópolis, SC, Brazil

Correspondence: Flávio Fernando Demarco, Rua Gonçalves Chaves, 457, 5º andar, CEP 96015-560 Pelotas, RS, Brazil. Tel.: +55-53-3222-6690. e-mail: ffdemarco@gmail.com

This systematic review aimed to evaluate whether alternative materials to conventional triple antibiotic paste (TAP - metronidazole, ciprofloxacin, and minocycline) and grey mineral trioxide aggregate (GMA) could avoid tooth discoloration in teeth submitted to Regenerative Endodontic Procedure (REP). It was also investigated if dental bleaching is able to reverse the color of darkened teeth due to REP. The search was conducted in four databases (Medline via PubMed, Scopus, ISI Web of Science and BVS - Virtual health library), following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses. The retrieved papers were uploaded in the software EndNote™ and two reviewers independently selected the studies and extracted the data. Only studies in



Alternative materials to GMTA: WMTA, Biodentine, and CEM

Alternatives to minocycline are cefaclor , amoxicillin or clindamicine. Double antibiotic paste)

Significance

Alternatives to Triple Antibiotic Pastes and Gray MTA avoid tooth discoloration

Dental bleaching is able to reverse partially the color of discolored

Minocycline seems to be the main responsible for discoloration induced by TAP.

Mature Teeth

REVIEW ARTICLE

Regenerative Endodontic Procedures for the Treatment of Necrotic Mature Teeth with Apical Periodontitis: A Systematic Review and Meta-analysis of Randomized Controlled Trials



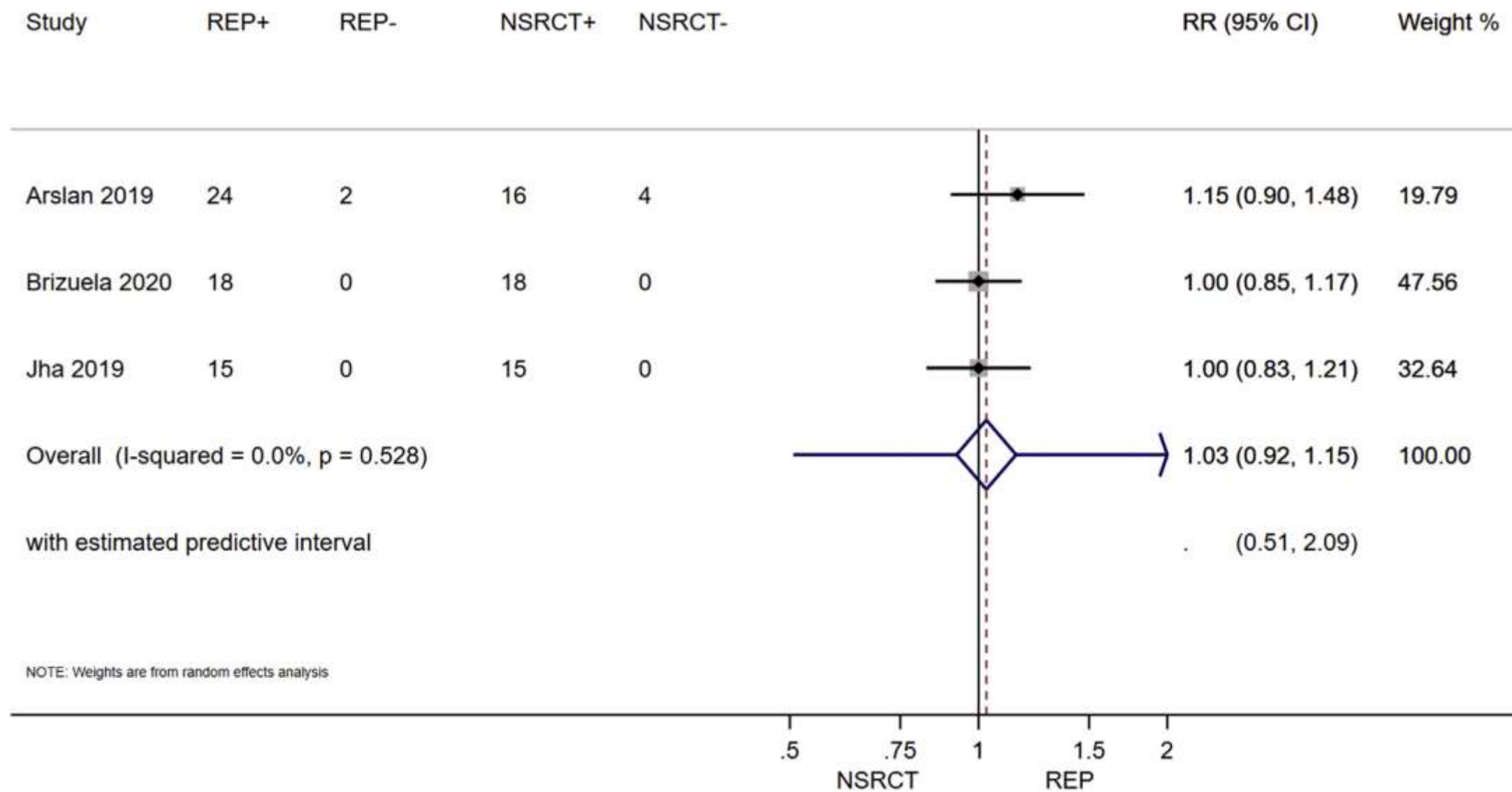
Antonios Glynis, DMD, MSc,^{}*
Federico Foschi, BDS, MSc,
PhD, FDS RCS, FHEA,^{†‡}
Ismini Kefalou, DDS,^{}*
Despina Koletsi, DDS, MSc,
DMD, MSc, DLSHTM,
PGCHEd,[§] and
Giorgos N. Tzanetakis, DDS,
MSc, MSc, PhD^{||}

ABSTRACT

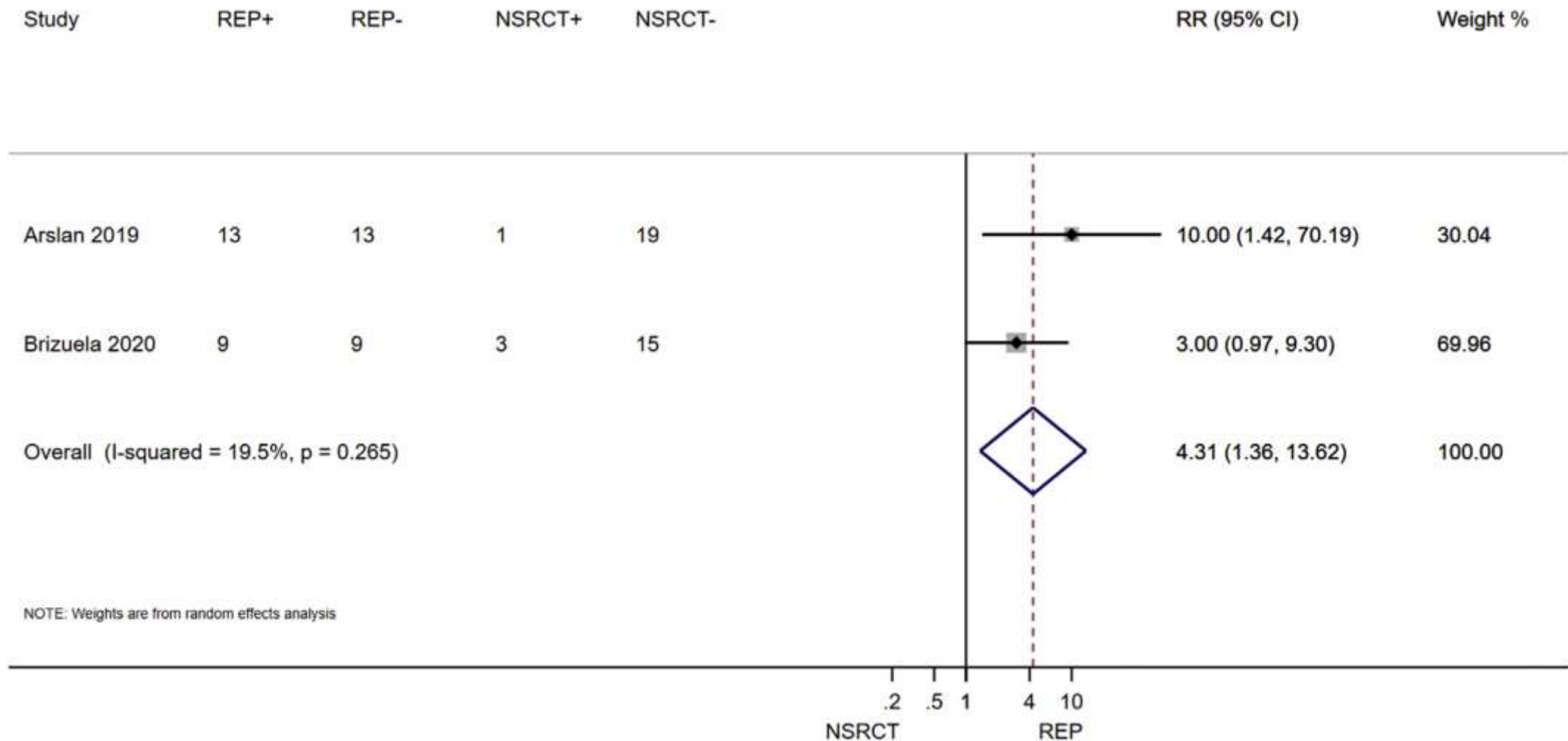
Introduction: Regenerative endodontic procedures (REPs) are intended to repair and regenerate part of the pulp-dentin complex. The aim of this study was to systematically appraise the existing evidence on the effectiveness of REPs on mature teeth with pulp necrosis and apical periodontitis. **Methods:** Electronic database and hand searches were performed on 8 databases of published and unpublished literature from inception to January 3, 2021, for the identification of randomized controlled trials (RCTs) or prospective clinical

SIGNIFICANCE

The results of the present systematic review highlight the potential of regenerative endodontic procedures to be considered as viable



A forest plot of subgroup analysis of survival rates.



The random effects meta-analysis for a positive response to electric stimuli comparing REPs and conventional NSRCT

TABLE 4 - The Summary of Findings Table for the Quality of the Evidence according to Grading of Recommendations Assessment, Development and Evaluation (GRADE)

REPs vs NSRCTs for successful treatment and positive stimuli response

Patient or population: patients with necrotic mature teeth with periapical lesions

Settings: university

Intervention: REPs

Comparison: NSRCTs

| Outcomes | Illustrative comparative risks* (95% CI) | | Relative effect (95% CI) | No. of participants (studies) | Quality of the evidence (GRADE) | Comments |
|---|--|---------------------|-----------------------------|-------------------------------------|---------------------------------------|----------|
| | Assumed risk | Corresponding risk | | | | |
| Success of treatment | Study population 906/1000 | 933/1000 (833–1000) | RR = 1.03 (0.92–1.15) | 112 (3 studies) | ⊕⊕⊕⊖ moderate [†] | None |
| Positive response to electric stimuli | Study population 105/1000 | 454/1000 (143–1000) | RR = 4.31 (1.36–13.62) | 82 (2 studies) | ⊕⊕⊕⊖ moderate [†] | None |

Significance

The result highlight the potential of regenerative endodontic procedures to be considered as viable alternative treatment modalities

with high success rates

in cases of mature teeth presenting with pulp necrosis and apical periodontitis.



Article

Prognosis of Regenerative Endodontic Procedures in Mature Teeth: A Systematic Review and Meta-Analysis of Clinical and Radiographic Parameters

Pantaleo Scelza ¹, Fabiano Gonçalves ², Isleine Caldas ¹, Fernanda Nunes ¹, Emanuelle Stellet Lourenço ², Sandro Tavares ² , Marcela Magno ³, Andrea Pintor ³, Pietro Montemezzi ⁴, Emanuele Di Edoardo ⁵, Carlos Fernando de Almeida Barros Mourão ^{6,*} , Gutemberg Alves ⁶ and Miriam Zaccaro Scelza ^{7,*}

¹ Geriatric Dentistry Department, Universidade Federal Fluminense, Niterói 24020-140, RJ, Brazil; pantaleoscelza@terra.com.br (P.S.); isleinecaldas@hotmail.com (I.C.); nandasouzanunes@gmail.com (F.N.)

² Post-Graduate Program in Dentistry, Universidade Federal Fluminense, Niterói 24020-140, RJ, Brazil; fabianopalmeira@hotmail.com (F.G.); emanuelle_stellet@yahoo.com.br (E.S.L.); sandro.tavares04@gmail.com (S.T.)

³ Department of Pediatric Dentistry and Orthodontics, Universidade Federal do Rio de Janeiro, Rio de Janeiro 21941-902, RJ, Brazil; marcela.magno@hotmail.com (M.M.); andrea_pintor@hotmail.com (A.P.)

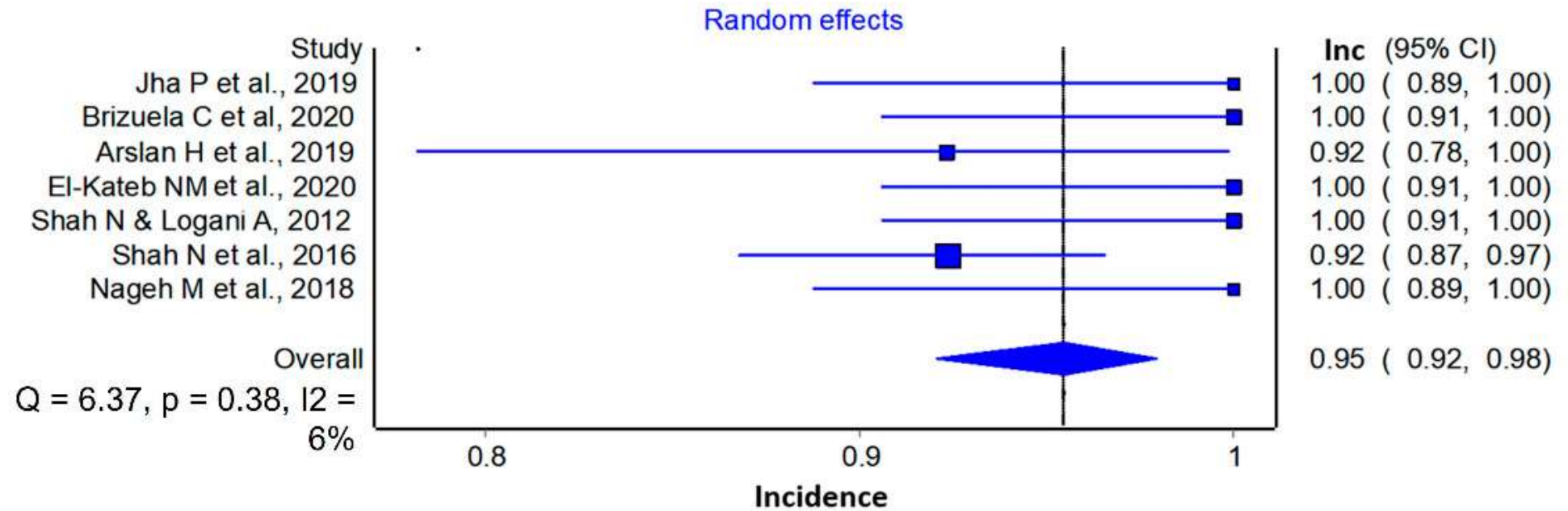
⁴ Independent Researcher, 24128 Bergamo, Italy; m.montemezzi@libero.it

⁵ Independent Researcher, 20100 Milan, Italy; emanueledr.diedoardo@libero.it

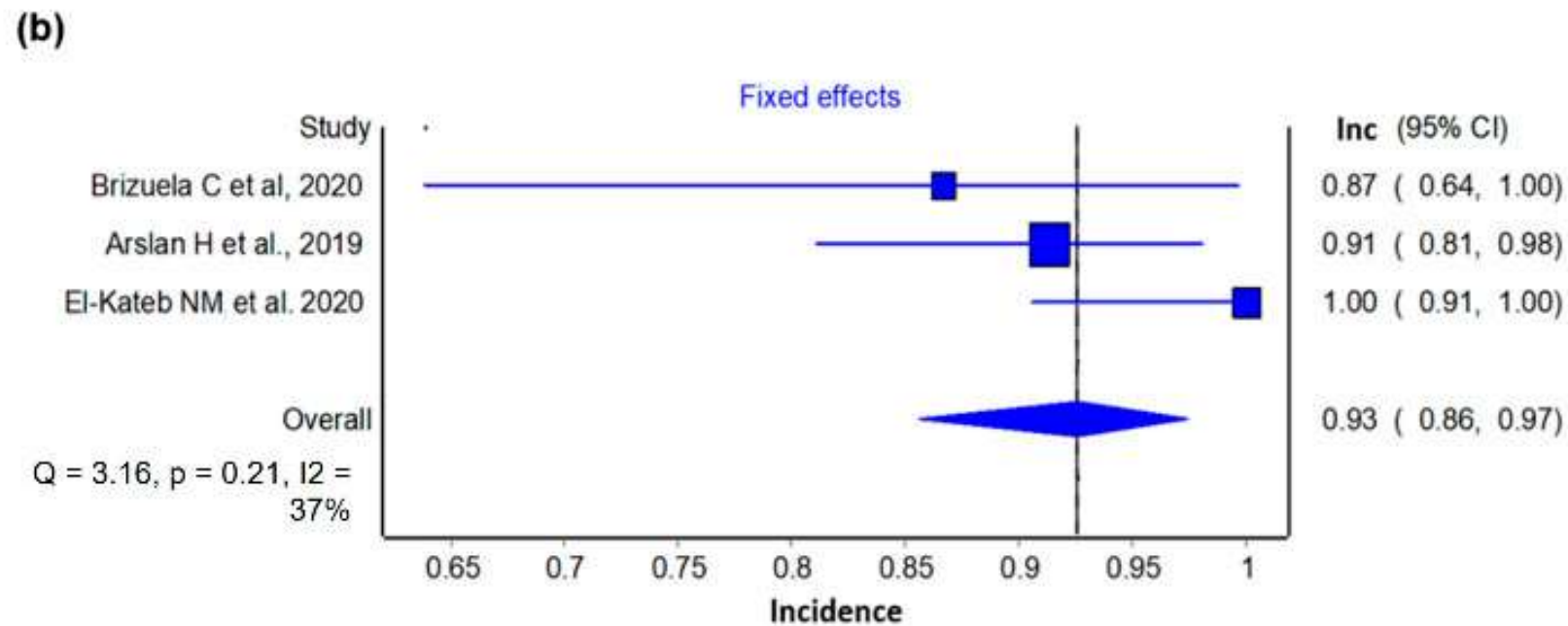
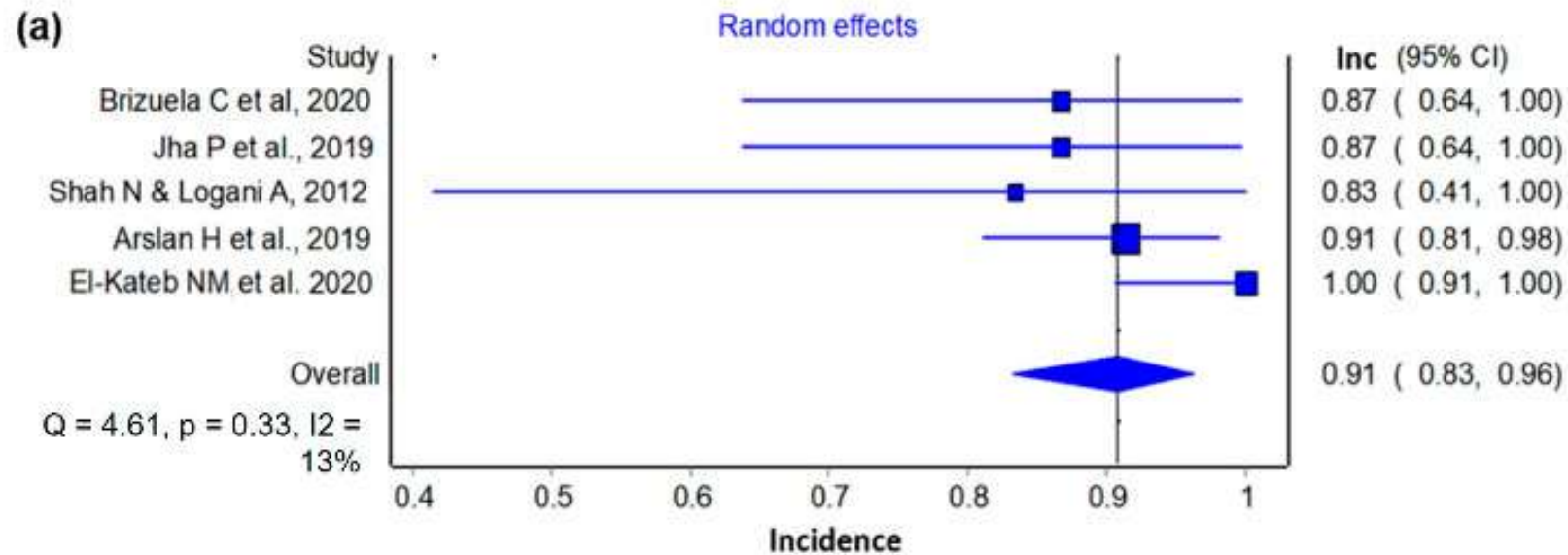
⁶ Clinical Research Unit of the Antônio Pedro Hospital, Universidade Federal Fluminense, Niterói 24020-140, RJ, Brazil; gutemberg.alves@uniflume.edu.br (G.A.); carlosfernando@uniflume.edu.br (C.F.A.B.M.)

⁷ Geriatric Dentistry Department, Universidade Federal Fluminense, Niterói 24020-140, RJ, Brazil; miriamzaccaro@uniflume.edu.br (M.Z.S.)

* Correspondence: carlosfernando@uniflume.edu.br (C.F.A.B.M.); miriamzaccaro@uniflume.edu.br (M.Z.S.)

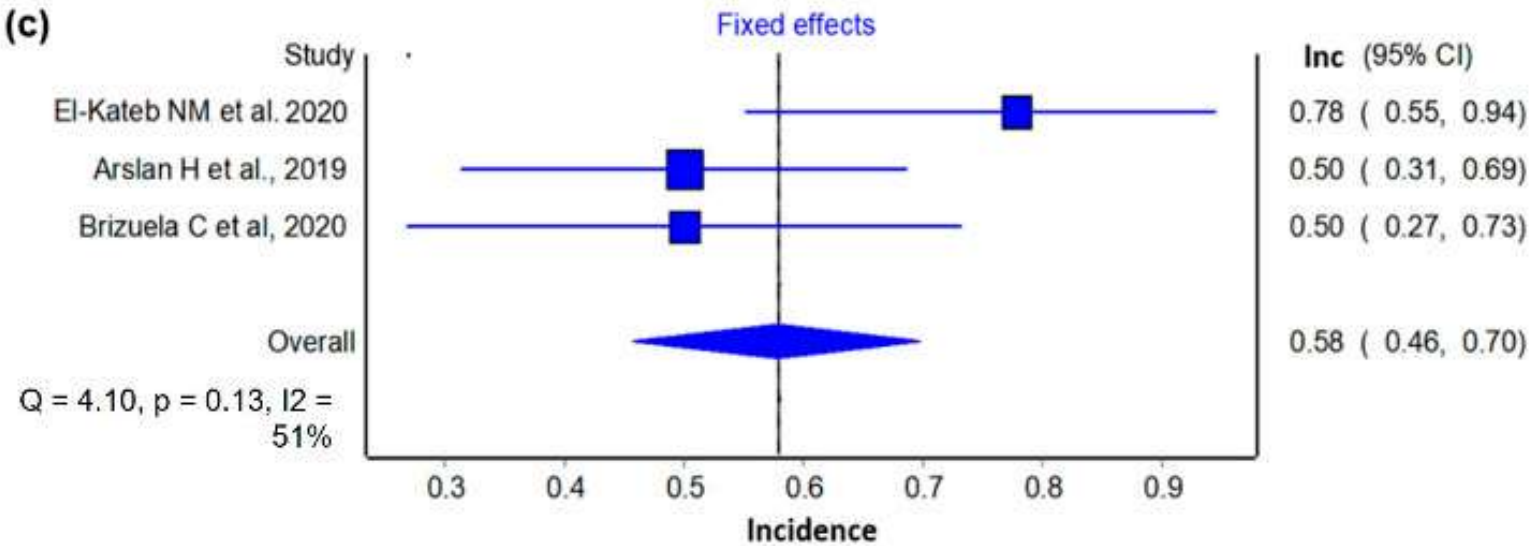


Success rate



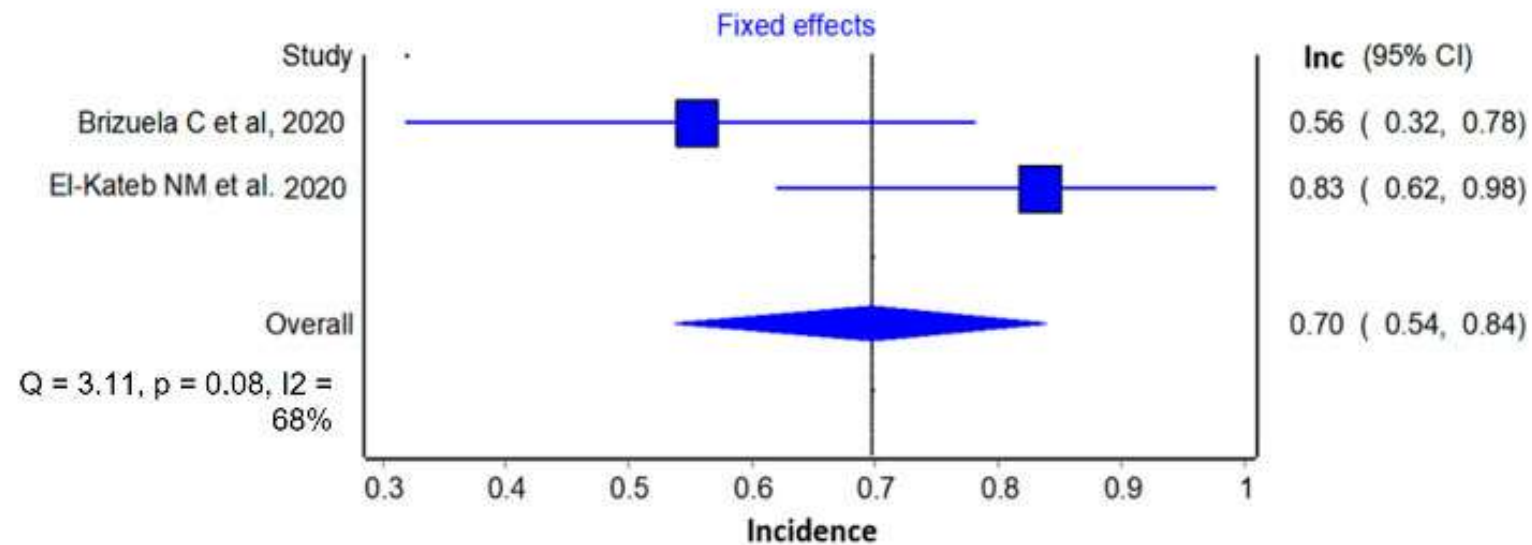
incidence of
periapical lesion
reduction

(c)



incidence of positive
electrical test response

(d)



incidence of positive
cold test response

Significance

high incidence of success of REP on the healing of mature teeth with a
necrotic pulp

reduction on the periapical lesion and positive responses to sensitivity tests

However, the low certainty of the available evidence indicates the need for more
clinical studies for paradigm shift

As a final point



Systematic Review

Regenerative Endodontic Procedures: An Umbrella Review

Luísa Bandeira Lopes ^{1,2,*} , João Albernaz Neves ^{2,3} , João Botelho ^{2,4} , Vanessa Machado ^{2,4}  and José João Mendes ^{2,4} 

¹ Dental Pediatrics Department, Egas Moniz—Cooperativa de Ensino Superior, 2829-511 Almada, Portugal

² Clinical Research Unit (CRU), Centro de Investigação Interdisciplinar Egas Moniz (CiiEM), Egas Moniz—Cooperativa de Ensino Superior, 2829-511 Almada, Portugal; jalbernazneves@gmail.com (J.A.N.); jbotelho@egasmoniz.edu.pt (J.B.); vmachado@egasmoniz.edu.pt (V.M.); jmendes@egasmoniz.edu.pt (J.J.M.)

³ Endodontics Department, Egas Moniz—Cooperativa de Ensino Superior, 2829-511 Almada, Portugal

⁴ Evidenced-Based Hub, CiiEM, Egas Moniz—Cooperativa de Ensino Superior, 2829-511 Almada, Portugal

* Correspondence: luisabpmlopes@gmail.com

Abstract: The Regenerative Endodontic Procedure (REP) is a biologically based method in which a damaged pulp–dentin complex is replaced by a new vital tissue. This umbrella review aimed to critically assess the available systematic reviews (SRs) on REP. An electronic database search was conducted (PubMed-Medline, CENTRAL, Scielo, Web of Science, and LILACS) until December

Significance

29 Systematic Reviews (SRs)

The quality of evidence produced by the available SRs was not favorable.

Future high standard SRs and well-designed clinical trials are warranted

Conclusion

- بر اساس هرم شواهد
اکثر مطالعات در حیطه رژنراسیون اندودانتیکس در پایین ترین سطح قرار داشتند
سطح ۵ شامل: گزارش مورد، نظرات شخصی

- نتایج مطالعات در حیطه رژنراسیون اندودانتیکس شامل ارزیابی های زیر بود:
 ۱. بالینی
 ۲. رادیوگرافیک
 ۳. هیستولوژیک

- در مقایسه درمان رژنراسیون اندودانتیکس و پلاگ MTA: موفقیت و بقا بدون تفاوت بود (مطالعه ترابی نژاد).

- در مقایسه درمان رژنراسیون اندودانتیکس و اپیکسیفکاسیون: برتری دیده نشد (مطالعه متاآنالیز)
افزایش طول ریشه (مطالعه کارآزمایی بالینی)

- در دندان های نابالغ

نتایج مربوط به نرخ موفقیت، رفع پاتوز پری اپیکال عالی بود
نتایج مربوط به پارامترهای رادیولوژیک متفاوت بود

- دردندان های بالغ (در مقایسه با درمان های مرسوم)

پاسخ به EPT به صورت چشمگیری برتر بود

- در ارزیابی هیستولوژیک

۱. بافت تشکل شده ناشی از ترمیم و بازسازی می باشد.
۲. باقی مانده پالپ به بازسازی کمک می کند.
۳. بافت پری اپیکال سالم به بازسازی کمک می کند.

- نمود اصلی شکست رژنراسیون اندودانتیکس
عفونت پایدار

- برخی از مراحل رژنراسیون اندودانتیکس بر نتایج آن تاثیرگذار بود.
خمیر آنتی بوتیک: ضخامت ریشه
هیدورکسید کلسیم: بسته شدن اپیکال

- اتیولوژی بر نتایج رژنراسیون اندودانتیکس بی تاثیر بود.

- عامل اصلی تغییر رنگ رژنراسیون اندودانتیکس
جز مینوسیکلین در خمیر آنتی بیوتیک سه گانه

- مروی جامع (Umbrella review) بر روی مطالعات مروی منظم مربوط به نتایج رژنراسیون
اندودانتیکس
نیاز به کارآزمایی های بالینی برای حصول به نتایج قطعی

Thank you