

Appendix

Appendix 1 Search strategies specifically designed for each electronic database

| Database | Search strategies (searched in November 2020) |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PubMed https://pubmed.ncbi.nlm.nih.gov | ((("pain, postoperative"[MeSH Terms] OR ("pain"[All Fields] AND "postoperative"[All Fields]) OR "postoperative pain"[All Fields] OR ("postoperative"[All Fields] AND "pain"[All Fields])) OR ("pain, postoperative"[MeSH Terms] OR ("pain"[All Fields] AND "postoperative"[All Fields]) OR "postoperative pain"[All Fields] OR ("postoperative"[All Fields] AND "pains"[All Fields]) OR "postoperative pains"[All Fields]) OR (endodontic[All Fields] AND ("pain"[MeSH Terms] OR "pain"[All Fields])) OR "pain"[All Fields])) OR ((("postoperative period"[MeSH Terms] OR ("postoperative"[All Fields] AND "period"[All Fields]) OR "postoperative period"[All Fields] OR "postoperative"[All Fields]) AND endodontic[All Fields] AND ("pain"[MeSH Terms] OR "pain"[All Fields])) AND (("root canal obturation"[MeSH Terms] OR ("root"[All Fields] AND "canal"[All Fields] AND "obturation"[All Fields]) OR "root canal obturation"[All Fields]) OR "root canal obturation"[MeSH Terms] OR ("root"[All Fields] AND "canal"[All Fields] AND "obturation"[All Fields]) OR "root canal obturation"[All Fields] OR ("root"[All Fields] AND "canal"[All Fields] AND "obturations"[All Fields]) OR "root canal obturations"[All Fields]) OR ("root canal obturation"[MeSH Terms] OR ("root"[All Fields] AND "canal"[All Fields] AND "obturation"[All Fields]) OR "root canal obturation"[All Fields] OR ("endodontic"[All Fields] AND "obturation"[All Fields]) OR "endodontic obturation"[All Fields]) OR ("root canal obturation"[MeSH Terms] OR ("root"[All Fields] AND "canal"[All Fields] AND "obturation"[All Fields]) OR "root canal obturation"[All Fields] OR ("endodontic"[All Fields] AND "obturations"[All Fields]) OR "endodontic obturations"[All Fields]) OR ((("dental pulp cavity"[MeSH Terms] OR ("dental"[All Fields] AND "pulp"[All Fields] AND "cavity"[All Fields]) OR "dental pulp cavity"[All Fields] OR ("root"[All Fields] AND "canal"[All Fields]) OR "root canal"[All Fields]) AND sealer[All Fields]) OR ("root canal filling materials"[MeSH Terms] OR ("root"[All Fields] AND "canal"[All Fields] AND "filling"[All Fields] AND "materials"[All Fields]) OR "root canal filling materials"[All Fields] OR ("root"[All Fields] AND "canal"[All Fields] AND "sealants"[All Fields]) OR "root canal sealants"[All Fields]) OR ("root canal obturation"[MeSH Terms] OR ("root"[All Fields] AND "canal"[All Fields] AND "obturation"[All Fields]) OR "root canal obturation"[All Fields] OR ("root"[All Fields] AND "canal"[All Fields] AND "filling"[All Fields]) OR "root canal filling"[All Fields]) OR ("root canal filling materials"[MeSH Terms] OR ("root"[All Fields] AND "canal"[All Fields] AND "filling"[All Fields] AND "materials"[All Fields]) OR "root canal filling materials"[All Fields])) |
| LILACS http://lilacs.bvsalud.org/ | (Postoperative pain OR postoperative pains OR endodontic pain OR postoperative endodontic pain) AND (root canal obturation OR root canal obturations OR endodontic obturation OR endodontic obturations OR root canal sealer OR root canal sealants OR root canal filling OR root canal filling materials) AND (db:(“LILACS”)) |
| Embase https://www.embase.com | ("postoperative pain"/exp OR "postoperative pain" OR (postoperative AND ("pain"/exp OR pain)) OR "postoperative pains" OR (postoperative AND pains) OR "endodontic pain" OR (endodontic AND ("pain"/exp OR pain)) OR "postoperative endodontic pain" OR (postoperative AND endodontic AND ("pain"/exp OR pain)) AND ("root canal obturation"/exp OR "root canal obturation" OR ((("root"/exp OR root) AND canal AND obturation) OR "root canal obturations" OR ((("root"/exp OR root) AND canal AND obturations) OR "endodontic obturation" OR (endodontic AND obturation) OR "endodontic obturations" OR (endodontic AND obturations) OR "root canal sealer"/exp OR "root canal sealer" OR ((("root"/exp OR root) AND canal AND sealer) OR "root canal sealants" OR ((("root"/exp OR root) AND canal AND sealants) OR "root canal filling"/exp OR "root canal filling" OR ((("root"/exp OR root) AND canal AND filling) OR "root canal filling materials"/exp OR "root canal filling materials" OR ((("root"/exp OR root) AND canal AND filling AND ("materials"/exp OR materials)))) |
| Scopus http://www.scopus.com | ("pain, postoperative" OR "postoperative pain" OR "postoperative pains" OR "endodontic pain" OR "postoperative endodontic pain" OR "post-obturation pain") AND ("root canal obturation" OR "root canal obturations" OR "endodontic obturation" OR "endodontic obturations" OR "root canal sealer" OR "root canal sealants" OR "root canal filling" OR "root canal filling materials") AND (LIMIT-TO (DOCTYPE, "ar")) |
| Web of Science http://apps.webofknowledge.com | ((postoperative pain or postoperative pains or endodontic pain or postoperative endodontic pain) and (root canal obturation or root canal obturations or endodontic obturation or endodontic obturations or root canal sealer or root canal sealants or root canal filling or root canal filling materials)) |
| Cochrane https://www.cochrane.org | (postoperative pain or postoperative pains or endodontic pain or postoperative endodontic pain) and (root canal obturation or root canal obturations or endodontic obturation or endodontic obturations or root canal sealer or root canal sealants or root canal filling or root canal filling materials) |
| Open Thesis http://www.openthesis.org/ Open Grey http://www.opengrey.eu/ | (pain, postoperative OR postoperative pain OR postoperative pains OR endodontic pain OR postoperative endodontic pain OR post-obturation pain) AND (root canal obturation OR root canal obturations OR endodontic obturation OR endodontic obturations OR root canal sealer OR root canal sealants OR root canal filling OR root canal filling materials) |

Appendix 2 Excluded articles and reasons for exclusion ($n = 4$)

| Reference | Author, year | Indexing in databases (DOI) | Reasons for exclusion ^a |
|-----------|----------------------|--------------------------------------|------------------------------------|
| 1 | Ferreira et al, 2020 | 10.1590/1807-3107bor-2020.vol34.0069 | 1 |
| 2 | Harrison et al, 1983 | 10.1016/S0099-2399(83)80190-3 | 2 |
| 3 | Harrison et al, 1983 | 10.1016/S0099-2399(83)80259-3 | 2 |
| 4 | Alacam et al, 1985 | 10.1016/S0099-2399(85)80233-8 | 2 |

^aReasons for exclusion: 1. Calcium silicate-base not tested; 2. No RCTs.

Appendix 3 Endodontic sealers tested and their compositions

| Endodontic sealers/Study | Compositions |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>AH Plus</i> (Dentsply Maillefer)/Fonseca et al, 2019; Ates et al, 2019; Graunaite et al, 2018; Aslan and Dönmez Özkan, 2020, Seh et al, 2020. | Paste A: bisphenol-A epoxy resin, bisphenol-F epoxy resin, calcium tungstate, zirconium oxide silica, and iron oxide pigments. Paste B: Dibenzyl diamine, aminoadamantane, tricyclodecane diamine, calcium tungstate, zirconium oxide, silica and silicone oil. |
| <i>Total Fill BC</i> (FKG Dentaire SA)/Graunaite et al, 2018, Seh et al, 2020. | Zirconium oxide, tricalcium silicate, dicalcium silicate, and calcium hydroxide. |
| <i>Sealer Plus BC</i> (MKLife Medical and Dental Products)/Fonseca et al, 2019. | Calcium silicate, zirconium oxide, tri-calcium silicate, calcium silicate, calcium hydroxide. |
| <i>iRoot SP</i> (Innovative BioCeramix Inc.)/Ates et al, 2019. | Zirconium oxide, calcium silicates, calcium phosphate monobasic, calcium hydroxide, filler, thickening agents. |
| <i>Endoseal MTA</i> (Maruchi)/Aslan and Dönmez Özkan, 2020. | Calcium silicates, calcium aluminates, calcium aluminoferrite, calcium sulfates, radiopacifier, thickening agent. |
| <i>EndoSequence BC</i> (Brasseler)/Aslan and Dönmez Özkan, 2020. | Zirconium oxide, calcium silicates, calcium phosphate monobasic, calcium hydroxide, filler and thickening agents. |

Appendix 4 Summary of results of prevalent postoperative pain from eligible studies

| Author | Pain occurrence (in %) | | | | | | | | | |
|------------------------------|--------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------|------|-------------------------|------------------------|
| | 6 h | | 12 h | | 24 h | | 48 h | | 72 h | |
| | ERB | CSB | ERB | CSB | ERB | CSB | ERB | CSB | ERB | CSB |
| Seh et al, 2020 | + | + | + | + | 19.2 | 22.6 | + | + | 9.6 | 10.0 |
| Aslan and Dönmez Özkan, 2020 | - | - | - | - | - | - | - | - | - | - |
| Fonseca et al, 2019 | + | + | + | + | 46.9 | 34.4 | 21.8 | 6.25 | 0.0 | 0.0 |
| Ates et al, 2019 | ^a Vit: 76.9 Desv: 59.0 | Vit: 66.7 Desv: 51.3 | Vit: 51.3 Desv: 46.1 | Vit: 46.1 Desv: 38.5 | Vit: 33.3 Desv: 35.9 | Vit: 30.8 Desv: 30.8 | + | + | Vit: 12.8 Desv: 15.4 | Vit: 17.9 Desv: 7.7 |
| Graunaite et al, 2018 | + | + | + | + | 21.1 | 17.5 | 15.8 | 12.3 | 0.00 | 0.00 |

Abbreviations: ERB, epoxy resin-based; CSB, calcium silicate-based.

^aThis study divided the groups in vital (vit) and desvital (desv) teeth.

^{*}The studies did not investigate this period.

⁻The study did not present dichotomous data on the occurrence of pain between the groups.

Appendix 5 Summary of pain intensity results from eligible studies

| Author | Pain intensity | | | | | | | | | | | |
|--------------------------------------|--------------------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|-------------|-----------------------------------|-----------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------|
| | 6 h | | 12 h | | 24 h | | 48 h | | 72 h | | 72 h | |
| | ERB | CSB | ERB | CSB | ERB | CSB | ERB | CSB | ERB | CSB | ERB | CSB |
| Seh et al., 2020 [†] | + | + | + | + | + | Very mild pain (n = 10) Mild pain (n = 4) Moderate pain (n = 2) | Very mild pain (n = 12) Mild pain (n = 1) Moderate pain (n = 5) | + | + | + | Very mild pain (n = 5) Mild pain (n = 2) Moderate pain (n = 1) | Very mild pain (n = 6) Mild pain (n = 0) Moderate pain (n = 2) |
| Aslan et al. 2020 ^{††} | - | - | - | - | - | - | - | - | - | - | - | - |
| Fonseca et al., 2019 ^{††} | + | + | + | + | 1.46 ± 1.96 | 1.21 ± 2.09 | 0.44 ± 0.86 | 0.09 ± 0.38 | 0.00 | 0.00 | 0.00 | 0.00 |
| Ates et al., 2019 ^{††} | ^{†††} Vit: 2.7 ± 2.8 Desv: 2.7 ± 3.3 | Vit: 2.5 ± 2.5 Desv: 1.7 ± 2.2 | Vit: 2.0 ± 2.8 Desv: 1.6 ± 2.1 | Vit: 1.5 ± 2.5 Desv: 1.2 ± 1.9 | Vit: 0.9 ± 1.6 Desv: 1.2 ± 2.1 | Vit: 0.7 ± 1.5 Desv: 0.6 ± 1.3 | + | + | Vit: 0.2 ± 0.7 Desv: 0.2 ± 0.5 | Vit: 0.3 ± 0.9 Desv: 0.3 ± 1.4 | 0.00 | 0.00 |
| Graunaitė et al., 2018 ^{††} | + | + | + | + | 0.46 ± 1.27 | 0.32 ± 1.04 | 0.25 ± 0.69 | 0.14 ± 0.40 | 0.00 | 0.00 | 0.00 | 0.00 |

ERB – Epoxy Resin-Based; CSB - Calcium Silicate-Based;

[†]Pain intensity assessed via VAS scale (mean in cm ± SD);

^{††}Pain intensity assessed via Likert scale (number of patients);

^{†††}This study divided the groups in vital (vit) and desvital (desv) teeth;

^{††††}The studies did not investigate this time interval;

^{†††††}The study described the data only in the box plot format, and/or it is not possible to extract the numerical results

Supplementary Figure S1

