

S1. The details of the control and intervention groups of all included studies.

Study	Control Group	Intervention Group
Ibrahim et al., 2020 [33]	<ul style="list-style-type: none"> - Negative Control (no sealant application) - Control Sealant (base formulation) 50 wt% PEHB (44.5% PMGDM + 39.5 EBPADMA + 10% HEMA + 5% Bis-GMA + 1% BAPO) + 50 wt% Glass	<ul style="list-style-type: none"> - 50 wt% PEHB + 20 wt% nACP + 30 wt% Glass - 45 wt% PEHB + 20 wt% nACP + 30 wt% Glass + 5 wt% DMAHDM
Yang et al., 2020 [34]	hCS 0: 50 wt% RM + 0 hCS Filler + 0 wt% CS Filler + 50 wt% silanized glass RM: 49.5 wt % Bis-GMA + 49.5 wt % TEGDMA, + 0.3 wt% CQ, + 0.6 wt % 2(DMAEMA)	<ul style="list-style-type: none"> - hCS 12.5: (50 wt% RM + 12.5 wt% hCS + 0 wt% CS + 37.5 wt% salinized glass) - hCS 25.0: (50 wt% RM + 25 wt% hCS + 0 wt% CS + 25 wt% salinized glass) - hCS 37.5: (50 wt% RM + 37.5 wt% hCS + 0 wt% CS + 12.5 wt% salinized glass) - hCS 50.0: (50 wt% RM + 50 wt% hCS + 0 wt% CS + 0 wt% Salinized glass) - CS 50.0: (50 wt% RM + 0 wt% hCS + 50 wt% CS + 0 wt% salinized glass)
Bohns et al., 2019 [35]	SCG: 90 wt% TEGDMA + 10 wt% Bis-GMA + 1 mol% CQ and 1 mol% EDAB	<ul style="list-style-type: none"> - SBNNT0.1%: 90 wt% TEGDMA + 10 wt% Bis-GMA + 1 mol% CQ and 1 mol% EDAB + 0.1% Hexagonal BNNTs - SBNNT0.2%: 90 wt% TEGDMA + 10 wt% Bis-GMA + 1 mol% CQ and 1 mol% EDAB + 0.2% Hexagonal BNNT
Bohns et al., 2019 [36]	SCG: 90 wt% (TEGDMA) + 10 wt% (BisGMA) + 1 mol% (CQ) + 1 mol% (EDAB)	<ul style="list-style-type: none"> - SHAp: 90 wt% (TEGDMA) + 10 wt% (BisGMA)+ 1 mol% (CQ) + 1 mol% (EDAB) + 10 wt% Ca10(PO4)6(OH)2 - Sα-TCP: 90 wt% (TEGDMA) + 10 wt% (BisGMA)+ 1 mol% (CQ) + 1 mol% (EDAB) + 10 wt% α-Ca3(PO4)2 - SOCP: 90 wt% (TEGDMA) + 10 wt% (BisGMA)+ 1 mol% (CQ) + 1 mol% (EDAB) + 10 wt% Ca8(HPO4)2(PO4)4·5H2O
Sadabad et al., 2019 [37]	<ul style="list-style-type: none"> - Master-Dent - Negative Control (no sealant application) 	Embrac Wetbond
Şişmanoğlu et al., 2019 [38]		<ul style="list-style-type: none"> - Clinpro - Helioclear F - Fissurit F - BeautiSealant
Khudanov et al., 2018 [39]	<ul style="list-style-type: none"> - Argecem - Helioclear 	<ul style="list-style-type: none"> - Fisskheim - Fissurelight - Helioclear F
Ibrahim et al., 2018 [40]	Virtuoso	<ul style="list-style-type: none"> - FluroShield - 5% DMAHDM + 0% nACP: - (45% PEHB + 5% DMAHDM + 50% Glass + 0% NACP) - 5% DMAHDM + 10% nACP:

		<ul style="list-style-type: none"> - (45% PEHB + 5% DMAHDM + 40% Glass + 10% NACP) - 5% DMAHDM + 20% nACP: (45% PEHB + 5% DMAHDM + 30% Glass + 20% nACP) - 5% DMAHDM + 30% nACP: (45% PEHB + 5% DMAHDM + 20% Glass + 30% nACP)
Utneja et al., 2018 [27]	<ul style="list-style-type: none"> - Clinpro (unfilled) - 35.5 wt% Bis-GMA + 35.5 wt% TEGDMA + 28%wt HEMA + 0.8 wt% 4E + 0.2 wt% CQ + 0 wt% filler (unfilled) 	<ul style="list-style-type: none"> - Delton FS plus - Aegis - 35.5 wt% Bis-GMA + 35.5 wt% TEGDMA + 28%wt HEMA + 0.8 wt% 4E + 0.2 wt% CQ + 30 wt% nHAP filler - 35.5 wt% Bis-GMA + 35.5 wt% TEGDMA + 28%wt HEMA + 0.8 wt% 4E + 0.2 wt% CQ + 10 wt% nHAP+20 wt% silica filler - 35.5 wt% Bis-GMA + 35.5 wt% TEGDMA + 28%wt HEMA + 0.8 wt% 4E + 0.2 wt% CQ + 10 wt% nHAP + 20 wt% nACP filler
Zin El et al., 2018 [28]	<ul style="list-style-type: none"> - Fuji VII - G bond Plus - Estelite flow Quick 	<ul style="list-style-type: none"> - Teethmate F-1 - Clinpro
Kosior et al., 2017 [21]		<ul style="list-style-type: none"> - Con Seal F - Fissurit FX - Delton FS+ - Admira Seal
Nakamura et al., 2017 [20]	<ul style="list-style-type: none"> - Negative Control (no sealant application) - Fuji III LC 	<ul style="list-style-type: none"> - Teethmate F-1 - BeautiSealant
Surintanasarn et al., 2017 [41]	Concise sealant without filler	<ul style="list-style-type: none"> - Concise sealant + 5 wt% mesoporous silica - Concise sealant + 5 wt% calcium carbonate - Concis sealant + 5 wt% Fluoro-alumino silicate
Dionysopoulps et al., 2016 [18]	FX-II	<ul style="list-style-type: none"> - Teethmate F-1 - Fissurit F - BeautiSealant
Munhoz et al., 2016 [42]	<ul style="list-style-type: none"> - VITRO FIL - VITRO SEAL ALPHA 	<ul style="list-style-type: none"> - ALPHA SEAL – AUTO - ALPHA SEAL – LIGHT
Salmerón-Valdés et al., 2016 [43]		<ul style="list-style-type: none"> - BeautiSealant - Clinpro - Helioseal F - UltraSeal XT
Zawaideh et al., 2016 [19]	Concise™	<ul style="list-style-type: none"> - Aegis - Con Seal-F™

Hojjati et al., 2014 [44]	<ul style="list-style-type: none"> - Concise - Control: 70 wt% BIS-GMA + 30 wt% TEGDMA + 0.5 wt% DMAEMA+ 0.5 wt%CQ + 7 wt% Silanized Silica 	<ul style="list-style-type: none"> - 1 wt% β-TCP-NPs - 2 wt% β-TCP-NPs - 3 wt% β-TCP-NPs - 4 wt% β-TCP-NPs - 5 wt% β-TCP-NPs
Abdel-Haffiez et al., 2013 [45]	<ul style="list-style-type: none"> - Negative Control (no sealant application) - Fluor Protector 	Pro-Seal
Fan et al., 2013 [46]	SeLECT Defense	<ul style="list-style-type: none"> - Sealant containing 35% Fluoride-releasing Filler: 16.13 wt% Synthesized antibacterial fluoride releasing monomer + 6.45 wt% BisGMA + 12.90 wt% UEDMA + 12.90 wt% HDDMA + 12.90 wt% HEMA + 3.22 wt% synthesized adhesive monomer + 35 wt% silanized fluoride-releasing filler + 0.5 wt% photo- initiators - Sealant containing 20% Fluoride-releasing Filler + 15% Bioactive Glass: 16.13 wt% Synthesized antibacterial fluoride releasing monomer + 6.45 wt% BisGMA + 12.90 wt% UEDMA + 12.90 wt% HDDMA + 12.90 wt% HEMA + 3.22 wt% synthesized adhesive monomer + 20 wt% silanized fluoride-releasing filler + 15 wt% NovaMin bioactive glass + 0.5 wt% photo- initiators - FluroShield - Clinpro
Kantovitz et al., 2013 [29]	<ul style="list-style-type: none"> - Sound + Heliaseal clear chroma (SH) - Caries-like lesion + Heliaseal clear chroma (CH) - Caries + topical fluoride + Heliaseal clear chroma (CFH) 	<ul style="list-style-type: none"> - Sound + FluroShield (SF) - Caries-like lesion + FluroShield (CF) - Caries + topical fluoride + FluroShield (CFF)
Yang et al., 2013 [47]	<ul style="list-style-type: none"> - BAG0: 50 wt% RM + 0 wt% 45S5 BAG filler + 50 wt% silanized dental glass filler - RM= Bis-GMA/TEGDMA 50/50 (wt%) containing 1% of DMAEMA/CQ 2:1 (wt%) 	<ul style="list-style-type: none"> - BAG12.5: 50 wt% RM + 12.5 wt% 45S5 BAG filler + 37.5 wt% silanized dental glass filler - BAG25: 50 wt% RM + 25 wt% 45S5 BAG filler + 25 wt% silanized dental glass filler - BAG37.5: 50 wt% RM + 37.5 wt% 45S5 BAG filler + 12.5 wt% silanized dental glass filler - BAG50: 50 wt% RM + 50 wt% 45S5 BAG filler + 0 wt% silanized dental glass filler
Choudhary et al., 2012 [48]	Concise	<ul style="list-style-type: none"> - Aegis. - Teethmate F1
Prabhakar et al., 2012 [30]	<ul style="list-style-type: none"> - Heliaseal - Fuji VII™ 	<ul style="list-style-type: none"> - Guardian Seal™
Shimazu et al., 2011 [49]		<ul style="list-style-type: none"> - BeautiSealant - Deltion FS+ - Teethmate F-12.0
Kaga et al., 2011 [50]	Fuji III LC	<ul style="list-style-type: none"> - S-PRG filler containing FS: UDMA + TEGDMA+ S-PRG filler - Delton FS+

- Teethmate F-12.0

Wang et al., 2011 [51]	- Control: UDMA + TEGDMA + Silica oxide filler - Fuji III LC	- BeautiSealant - DELTON FS - Teethmate F - 1 2.0
AlSaffar et al., 2010 [52]	- Fuji Triage - Delton Opaque	- UltraSeal XT plus - Clinpro - Aegis
Bayrak et al., 2010 [53]	- Fuji VII - Fuji II LC	- Fissurit F - Ionosit - Aelite Flo
Shen et al., 2010 [54]		- 2Ca/ 8CHX (70 wt% UDMA+30 wt% TEGDMA + CaF2/CHXDA were prepared with weight ratios of 2/8) - 5Ca/5CHX (70 wt% UDMA+30 wt% TEGDMA + CaF2/CHXDA were prepared with weight ratios of 5/5) - 8Ca/2CHX (70 wt% UDMA+30 wt% TEGDMA + CaF2/CHXDA were prepared with weight ratios of 8/28)
Kuşgöz et al., 2010 [55]	Fuji Triage	- Clinpro - Grandio Seal
Motohashi et al., 2010 [56]	- FujiIII - Negative Control (no sealant application)	Teethmate-F1
Silva et al., 2010 [57]		- Fluroshield - Aegis - Experimental sealant containing fluoride - Experimental sealant containing ACP and fluoride
Cildir et al., 2007 [58]	- Fuji VII - Ketac Molar	- Clinpro - Embrace
Salar et al., 2007 [31]	- Delton - Fuji Triage	ProSeal
Lobo et al., 2005 [32]	- Negative Control (no sealant application) - Concise - Vitremer	Clinpro
Loyola-Rodriguez et al., 1996 [59]	Helioseal	- FluoroShield - Teethmate-FIM

Roberts et al., 1984 [60] Delton + 0.0% Sodium fluoride

- Delton + 0.1% Sodium fluoride
- Delton + 0.25% Sodium fluoride
- Delton + 1.0% Sodium fluoride
- Delton + 2.5% Sodium fluoride

Swartz et al., 1976 [61]

- Nuva Seal
- Eposylite
- Exp.BIS-GMA
- Exp.cyanoacrylate.

ACP: Amorphous calcium phosphate. RM: Resin Matrix. DMAHDM: Dimethylaminohexadecyl methacrylate. PMGDM: Pyromellitic glycerol dimethacrylate. EBPADMA: Ethoxylated bisphenol A dimethacrylate. HEMA: 2-Hydroxyethyl methacrylate. Bis-GMA: Bisphenol A glycidyl dimethacrylate. BAPO: Phenyl-bis (2,4,6- trimethyl benzoyl)-phosphine oxide. hCS: Hydrated calcium silicate. CS: calcium silicate cement. HAP: hydroxyapatite. TEGMA: Triethylene glycol monomethacrylate. UDMA: Urethane dimethacrylate. TEGDMA: Triethylene glycol dimethacrylate. CQ: Camphorquinone. BNNT: Boron-nitride nanotubes. S-PRG: Surface reaction-type pre-reacted glass ionomer. CaPs: Calcium phosphate. 4E: Ethyl 4-N, N-dimethylaminobenzoate. nACP: Nano amorphous calcium phosphate.

S2. The details of the protocol of all included studies.

Study	Summary of Protocol
Yang et al., 2020 [34]	<ul style="list-style-type: none"> - Lactic acid solution - pH=4 - Distilled water. - pH=6.5 - 28 days
Şişmanoğlu et al., 2019 [38]	<ul style="list-style-type: none"> - polyethylene vials with 5 ml of deionized water - For 28 days - at 37°C - +
Khudanov et al., 2018 [39]	<ul style="list-style-type: none"> - Distilled water - 21 days
Ibrahim et al., 2018 [40]	<ul style="list-style-type: none"> - Sodium chloride - pH=4 - 70 days
Utneja et al., 2018 [27]	<ul style="list-style-type: none"> - Sodium chloride - pH=4, 5.5 and 7.4 - 21 days

Zin EI et al., 2018 ^[28]	<ul style="list-style-type: none"> - Deionized water - 15 days - +
Kosior et al., 2017 ^[21]	<ul style="list-style-type: none"> - Saline - 14 weeks - +
Nakamura et al., 2017 ^[20]	<ul style="list-style-type: none"> - Deionized water - 5 weeks - +
Surintanasarn et al., 2017 ^[41]	<ul style="list-style-type: none"> - Deionized water - 27 days - +
Dionysopoulos et al., 2016 ^[18]	<ul style="list-style-type: none"> - Deionized water - 28 days
Munhoz et al., 2016 ^[42]	<ul style="list-style-type: none"> - Deionized water - 15 days
Salmerón-Valdés et al., 2016 ^[43]	<ul style="list-style-type: none"> - Deionized water - 60 days - +
Fan et al., 2013 ^[46]	<ul style="list-style-type: none"> - Deionized water - 14 days - +
Shimazu et al., 2011 ^[49]	<ul style="list-style-type: none"> - Distilled water - 15 days - +
Kaga et al., 2011 ^[50]	<ul style="list-style-type: none"> - Distilled water - 84 days - +
Wang et al., 2011 ^[51]	<ul style="list-style-type: none"> - Latic acid. - pH=4 - 1 day
Bayrak et al., 2010 ^[53]	<ul style="list-style-type: none"> - Ultrapure water - 21 days - +

Shen et al., 2010 ^[54]	<ul style="list-style-type: none"> - Sodium acetate-acetic acid buffer - PH 4.0, 5.0, and 6.0 - 120 days
Kuşgöz et al., 2010 ^[55]	<ul style="list-style-type: none"> - Ultrapure water - 21 days - +
Silva et al., 2010 ^[57]	Not mentioned.
Motohashi et al., 2010 ^[56]	<ul style="list-style-type: none"> - lactic acid - pH=5.7 - 14 days
Cildir et al., 2007 ^[58]	<ul style="list-style-type: none"> - Distilled deionized water - 28 days - +
Lobo et al., 2005 ^[32]	<ul style="list-style-type: none"> - Demineralizing solution 6h - pH=4.3 - Remineralizing solution 18h - pH=7 - 5 days - +
Loyola-Rodriquez et al., 1996 ^[59]	<ul style="list-style-type: none"> - Double distilled deionized water - 7 days - +
Roberts et al., 1984 ^[60]	<ul style="list-style-type: none"> - Distilled water - 180 days - +
Swartz et al., 1976 ^[61]	<ul style="list-style-type: none"> - Distilled water - 4 days
+ : This study measured the ions release at multiple timepoints, but not all timepoints are reported here.	