

Appendix Table S1: Search strategies (Until April 4, 2023)

Scopus (n= 2,805)	TITLE-ABS-KEY("Immediate Dental Implant Loading" OR "Early Dental Implant Loading" OR "Dental Implant Loading" OR "Socket-Shield Technique" OR "Socket Shield Technique" OR "Partial Extraction" OR "Partial Root Retention" OR "Ridge Preservation" OR "Tooth Root" OR "Root Membrane") AND TITLE-ABS-KEY("Dental Implant" OR "Immediate Implant" OR "Dental Implantation" OR "Dental Implant Therapy" OR "Dental Prosthesis Implantation" OR "Surgical Dental Prosthesis" OR "Surgical Dental Prostheses")
PubMed (n= 2,555)	#3: #1 AND #2 #1: "Immediate Dental Implant Loading"[MeSH Terms] OR "Immediate Dental Implant Loading"[All Fields] OR "Early Dental Implant Loading"[All Fields] OR "Dental Implant Loading"[All Fields] OR "socket shield technique"[All Fields] OR "socket shield technique"[All Fields] OR "Partial Extraction"[All Fields] OR "Ridge Preservation"[All Fields] OR "Tooth Root"[All Fields] OR "Root Membrane"[All Fields] #2: "Dental Implants"[MeSH Terms] OR "dental implants, single tooth"[MeSH Terms] OR "Dental Implant"[All Fields] OR "Immediate Implant"[All Fields] OR "Dental Implantation"[All Fields] OR "Dental Implant Therapy"[All Fields] OR "Dental Prosthesis Implantation"[All Fields] OR "Surgical Dental Prosthesis"[All Fields] OR ("Dental Implants"[MeSH Terms] OR "Dental Implants"[All Fields])
Embase (n= 2,453)	#4: #1 AND #2 AND #3 #1: 'Immediate Dental Implant Loading'/de OR 'Immediate Dental Implant Loading'/exp OR 'Early Dental Implant Loading'/exp OR 'Dental Implant Loading'/exp OR 'Socket-Shield Technique'/exp OR 'Socket Shield Technique'/exp OR 'Partial Extraction'/exp OR 'Partial Root Retention'/exp OR 'Ridge Preservation'/exp OR 'Tooth Root'/exp OR 'Root Membrane'/exp #2: 'Dental Implants'/de OR 'Dental Implants, Single-Tooth'/de OR 'Dental Implant'/exp OR 'Immediate Implant'/exp OR 'Dental Implantation'/exp OR 'Dental Implant Therapy'/exp OR 'Dental Prosthesis Implantation'/exp OR 'Surgical Dental Prosthesis'/exp OR 'Surgical Dental Prostheses'/exp #3: 'randomized controlled trial'/de OR 'clinical trial'/de OR 'controlled clinical trial'/de
Cochrane Library (n= 439)	#5: (#1 OR #2) AND (#3 OR #4) #1: MeSH descriptor: [Immediate Dental Implant Loading] explode all trees #2: "Immediate Dental Implant Loading" OR "Early Dental Implant Loading" OR "Dental Implant Loading" OR "Socket-Shield Technique" OR "Socket Shield Technique" OR "Partial Extraction" OR "Partial Root Retention" OR "Ridge Preservation" OR "Tooth Root" OR "Root Membrane" #3: MeSH descriptor: [Dental Implants] explode all trees #4: "Dental Implant" OR "Immediate Implant" OR "Dental Implantation" OR "Dental Implant Therapy" OR "Dental Prosthesis Implantation" OR "Surgical Dental Prosthesis" OR "Surgical Dental Prostheses"
Web of Science (n= 350)	#4: #1 AND #2 AND #3 #1: TS=("Immediate Dental Implant Loading") OR TS=("Early Dental Implant Loading") OR TS=("Dental Implant Loading") OR TS=("Socket-Shield Technique") OR TS=("Socket Shield Technique") OR TS=("Partial Extraction") OR TS=("Partial Root Retention") OR TS=("Ridge Preservation") OR TS=("Tooth Root") OR TS=("Root Membrane") #2: TS=("Dental Implant") OR TS=("Immediate Implant") OR TS=("Dental Implantation") OR TS=("Dental Implant Therapy") OR TS=("Dental Prosthesis Implantation") OR TS=("Surgical Dental Prosthesis") OR TS=("Surgical Dental Prostheses") #3: TS=("Controlled Clinical Trial") OR TS=("Randomized Clinical Trial") OR TS=("Randomized Controlled Clinical Trial") OR TS=("Clinical Trial")
ProQuest (n= 51)	ABSTRACT("Immediate Dental Implant Loading" OR "Early Dental Implant Loading" OR "Dental Implant Loading" OR "Socket-Shield Technique" OR "Socket Shield Technique" OR "Partial Extraction" OR "Partial Root Retention" OR "Ridge Preservation" OR "Tooth Root" OR "Root Membrane") AND ABSTRACT("Dental Implant" OR "Immediate Implant" OR "Dental Implantation" OR "Dental Implant Therapy" OR "Dental Prosthesis Implantation" OR "Surgical Dental Prosthesis" OR "Surgical Dental Prostheses")
EBSCOhost (n= 14)	AB("Immediate Dental Implant Loading" OR "Early Dental Implant Loading" OR "Dental Implant Loading" OR "Socket-Shield Technique" OR "Socket Shield Technique" OR "Partial Extraction" OR "Partial Root Retention" OR "Ridge Preservation" OR "Tooth Root" OR "Root Membrane") AND AB("Dental Implant" OR "Immediate Implant" OR "Dental Implantation" OR "Dental Implant Therapy" OR "Dental Prosthesis Implantation" OR "Surgical Dental Prosthesis" OR "Surgical Dental Prostheses")
Clinical trials (n= 17)	"Dental Implant" OR "Immediate Implant" "Socket Shield" OR "Socket-Shield"
ICTRP (n= 2)	in the Title: ("Controlled Clinical Trial" OR "Randomized Clinical Trial" OR "Randomized Controlled Clinical Trial" OR "Clinical Trial") AND in the Condition: ("Dental Implant" OR "Immediate Implant" OR "Dental Implantation" OR "Dental Implant Therapy" OR "Dental Prosthesis Implantation" OR "Surgical Dental Prosthesis" OR "Surgical Dental Prostheses") AND in the Intervention: ("Immediate Dental Implant Loading" OR "Early Dental Implant Loading" OR "Dental Implant Loading" OR "Socket-Shield Technique" OR "Socket Shield Technique" OR "Partial Extraction" OR "Partial Root Retention" OR "Ridge Preservation" OR "Tooth Root" OR "Root Membrane")

Appendix Table S2: Excluded studies after the full-text screening (n= 68)

Study	Title	DOI	Reason for exclusion
Hürzeler et al. (2010)	The socket-shield technique: a proof-of-principle report.	10.1111/j.1600-051X.2010.01595.x	Animal study
Chen et al. (2013)	Socket shield technique for ridge preservation: A case report.	10.6926/JPI.201312_2(2).0003	Case report
Kan et al. (2013)	Proximal socket shield for interimplant papilla preservation in the esthetic zone.	10.11607/prd.1346	Literature review
Viña-Almunia et al. (2013)	Buccal bone crest dynamics after immediate implant placement and ridge preservation techniques: Review of morphometric studies in animals.	10.1097/ID.0b013e318287a947	Literature review
Abadzhev et al. (2014)	Conventional immediate implant placement and immediate placement with socket-shield technique – which is better.	NA	Non-randomized trial
Cherel et al. (2014)	Papilla preservation between two implants: A modified socket-shield technique to maintain the scalloped anatomy? A case report.	10.3290/j.qi.a30765	Case report
Glocker et al. (2014)	Ridge preservation with modified “socket-shield” technique: a methodological case series.	10.3390/dj2010011	Case series
Kotsakis et al. (2014)	Flapless alveolar ridge preservation utilizing the “socketplug” technique: clinical technique and review of the literature.	10.1563/AAID-JOJID-12-00028	Literature review
Siormpas et al. (2014)	Immediate implant placement in the esthetic zone utilizing the “root-membrane” technique: clinical results up to 5 years postloading.	10.11607/jomi.3707	Case series
Troiano et al. (2014)	Bundle bone preservation with Root-T-Belt: Case study.	NA	Case report
Al Dary et al. (2015)	The socket shield technique using bone trephine: a case report.	NA	Case report
Bäumer et al. (2015)	The Socket-Shield Technique: First Histological, Clinical, and Volumetrical Observations after Separation of the Buccal Tooth Segment – A Pilot Study	10.1111/cid.12076	Animal study
Gluckman et al. (2015)	The management of recession midfacial to immediately placed implants in the aesthetic zone.	NA	Case series
Gluckman et al. (2015)	The socket-shield technique to support the buccofacial tissues at immediate implant placement.	NA	Case report
Mitsias et al. (2015)	A step-by-step description of pdl mediated ridge preservation for immediate implant rehabilitation in the esthetic region.	NA	Case report
Wadhwani et al. (2015)	Socket shield technique: a new concept of ridge preservation.	NA	Case report
Abitbol et al. (2016)	Implant insertion after tooth extraction: Clinical outcomes with different approaches (including socket preservation, immediate, early and delayed placement).	NA	Full-text not available
Al Dary et al. (2016)	Socket shield technique with and without implant placement to maintain pink aesthetics: case report	NA	Case report
Calvo-Guirado et al. (2016)	Different configuration of socket shield technique in peri-implant bone preservation: an experimental study in dog mandible.	10.1016/j.aanat.2016.06.008	Animal study
Chen et al. (2016)	A preliminary clinical study of buccal bone alteration using the socket-shield technique and immediate implant placement.	NA	Case report
Gluckman et al. (2016)	Partial extraction therapies (PET) Part 1: maintaining alveolar ridge contour at pontic and immediate implant sites	10.11607/prd.2783	Literature review
Bäumer et al. (2017)	Socket Shield Technique for immediate implant placement – clinical, radiographic and volumetric data after 5 years	10.1111/clr.13012	Case series
Gharpure et al. (2017)	Current evidence on the socket-shield technique: a systematic review.	10.1563/aaid-joi-D-17-00118	Systematic review
Gluckman et al. (2017)	A retrospective evaluation of 128 socket-shield cases in the esthetic zone and posterior sites: Partial extraction therapy with up to 4 years follow-up.	10.1111/cid.12554	Retrospective design
Gluckman et al. (2017)	Partial extraction therapies (PET) Part 2: procedures and technical aspects	10.11607/prd.3111	Literature review

Huang et al. (2017)	Immediate implants combined with modified socket-shield technique: a case letter.	10.1563/aaid-joi-D-16-00107	Case report
Mitsias et al. (2017)	The root membrane technique: human histologic evidence after five years of function.	10.1155/2017/7269467	Case report
Petsch et al. (2017)	Socket Shield Technique for Implant Placement in the Esthetic Zone: A Case Report.	10.11607/prd.2729	Case report
Roe et al. (2017)	Residual root preparation for socketshield procedures: a facial window approach.	PMID:28717791	Literature review
Saeidi Pour et al. (2017)	Clinical benefits of the immediate implant socket shield technique.	10.1111/jerd.12291	Case report
Abdullatif (2018)	3-dimensional volumetric analysis of double socketshield for maximum tissue preservation at immediate implant replacement of multi-rooted teeth, a case report.	10.12691/ijdsr-6-3-2	Case report
Aslan (2018)	Improved volume and contour stability with thin socket-shield preparation in immediate implant placement and provisionalization in the esthetic zone	PMID: 29687096	Case report
Dayakar et al. (2018)	The socket-shield technique and immediate implant placement.	10.4103/jisp.jisp_240_18	Case report
Dohiem et al. (2018)	Immediate implant placement in canine region using root membrane technique with follow up 2 years case report.	10.1016/j.fdj.2018.01.002	Case report
Esteve-Pardo et al. (2018)	Clinical application of the socket-shield concept in multiple anterior teeth.	10.1155/2018/9014372	Case report
Guo et al. (2018)	Tissue preservation through socket-shield technique and plateletrich fibrin in immediate implant placement: A case report.	10.1097/MD.00000000000013175	Case report
Han et al. (2018)	The Modified Socket Shield Technique.	10.1097/SCS.00000000000004494	Case series
Hinze et al. (2018)	Volumetric alterations around single-tooth implants using the socket-shield technique: Preliminary results of a prospective case series.	PMID: 29687095	Case series
Mattiola et al. (2018)	The rigid-shield technique: a new contour and clot stabilizing method for ridge preservation.	10.3390/dj6020021	Case report
Mujawar et al. (2018)	Socket shield technique: a review.	NA	Literature review
Pal et al. (2018)	The socket shield technique.	NA	Full-text not available
Siormpas et al. (2018)	The root membrane technique: a retrospective clinical study with up to 10 years of follow-up.	10.1097/ID.00000000000000818	Retrospective design
Tan et al. (2018)	The effect of the heights and thicknesses of the remaining root segments on buccal bone resorption in the socket-shield technique: an experimental study in dogs.	10.1111/cid.12588	Animal study
Verma et al. (2018)	Socket shield technique—A new approach to immediate implant placement.	NA	Case report
Zhu et al. (2018)	Clinical evaluation of socket shield technique in maxillary anterior region.	10.3760/cma.j.issn.1002-0098.2018.10.004	Case series
Arabbi et al. (2019)	Socket shield: a case report.	10.4103/jpbs.JPBS_228_18	Case report
Calvo-Guirado et al. (2019)	Socket-shield technique: the influence of the length of the remaining buccal segment of healthy tooth structure on peri-implant bone and socket preservation. A study in dogs.	10.1016/j.aanat.2018.09.003	Animal study
Mourya et al. (2019)	Socket-shield technique for implant placement to stabilize the facial gingival and osseous architecture: a systematic review.	10.1111/jicd.12449	Systematic review
Schwimer et al. (2019)	The socket-shield technique at molar sites: a proof-of-principle technique report.	10.1016/j.prosdent.2018.05.006	Literature review
Xu et al. (2019)	Comparison of clinical effects of a modified socket shield technique and the conventional immediate implant placement	10.7518/hxkq.2019.05.007	Non-English study
Zhang et al. (2019)	Effect of socket-shield technique on alveolar ridge soft and hard tissue in dogs.	10.1111/jcpe.13073	Animal study

BinLihua et al. (2020)	Short-term effect comparison of a modified socket shield technique and conventional flapless immediate implant and immediate restoration in maxillary aesthetic area	10.3969/j.issn.2095-4344.2344	Non-English study
Blaschke et al. (2020)	The socket-shield technique: a critical literature review.	10.1186/s40729-020-00246-2	Literature review
Gandhi et al. (2020)	Inappropriate socket shield protocol as a probable cause of peri-implant bone resorption: a case report.	10.1007/s12663-019-01301-1	Case report
Mathew et al. (2020)	Comparative Evaluation of Socket Shield and Immediate Implant Placement	NA	Non-randomized trial
Mitsias et al. (2020)	Root Membrane Group Longitudinal Soft Tissue Changes During Periodontal Ligament-Mediated Immediate Implant Placement with the Root-Membrane Technique.	10.11607/jomi.7245	Case series
Nguyen et al. (2020)	Socket shield technique used in conjunction with immediate implant placement in the anterior maxilla: a case series.	10.1002/cap.10087	Case series
Staehler et al. (2020)	The socket-shield technique: A step-by-step protocol after 12 years of experience.	PMID: 32760924	Case report
Zuhr et al. (2020)	Complication Management of a Socket Shield Case After 6 Years of Function.	10.11607/prd.4648	Case report
Atieh et al. (2021)	The socket shield technique for immediate implant placement: A systematic review and meta-analysis.	10.1111/jerd.12812	Systematic review
Bohórquez et al. (2021)	Failure Rate, Marginal Bone Loss, and Pink Esthetic with Socket-Shield Technique for Immediate Dental Implant Placement in the Esthetic Zone. A Systematic Review and Meta-Analysis	10.3390/biology10060549	Systematic review
De Angelis et al. (2021)	Immediate Implants in the Aesthetic Zone: Is Socket Shield Technique a Predictable Treatment Option? A Narrative Review	10.3390/jcm10214963	Literature review
de Oliveira et al. (2021)	Evaluation of alveolar process resorption after tooth extraction using the socket shield technique without immediate installation of implants: a randomised controlled clinical trial	10.1016/j.bjoms.2021.04.001	Irrelevant outcome
Sáez-Alcaide et al. (2021)	Socket shield technique: A systematic review of human studies	10.1016/j.aanat.2021.151779	Systematic review
Yunbin Li (2021)	Comparison of modified shield technique and traditional immediate implant in the treatment of patients with single dental implant in maxillary esthetic area.	10.3969/j.issn.1672-0369.2021.08.054	Non-English study
Gómez-Meda et al. (2022)	Dimensional Changes in the Alveolus after a Combination of Immediate Postextraction Implant and Connective Grafting and/or Socket Shield Technique	10.3390/ijerph19052795	Cohort study
Ogawa et al. (2022)	Effectiveness of the socket shield technique in dental implant: A systematic review	10.2186/jpr.JPR_D_20_00054	Systematic review
Zhang et al. (2022)	Could the socket shield technique be better than conventional immediate implantation? A meta-analysis	10.1007/s00784-021-04266-z	Systematic review

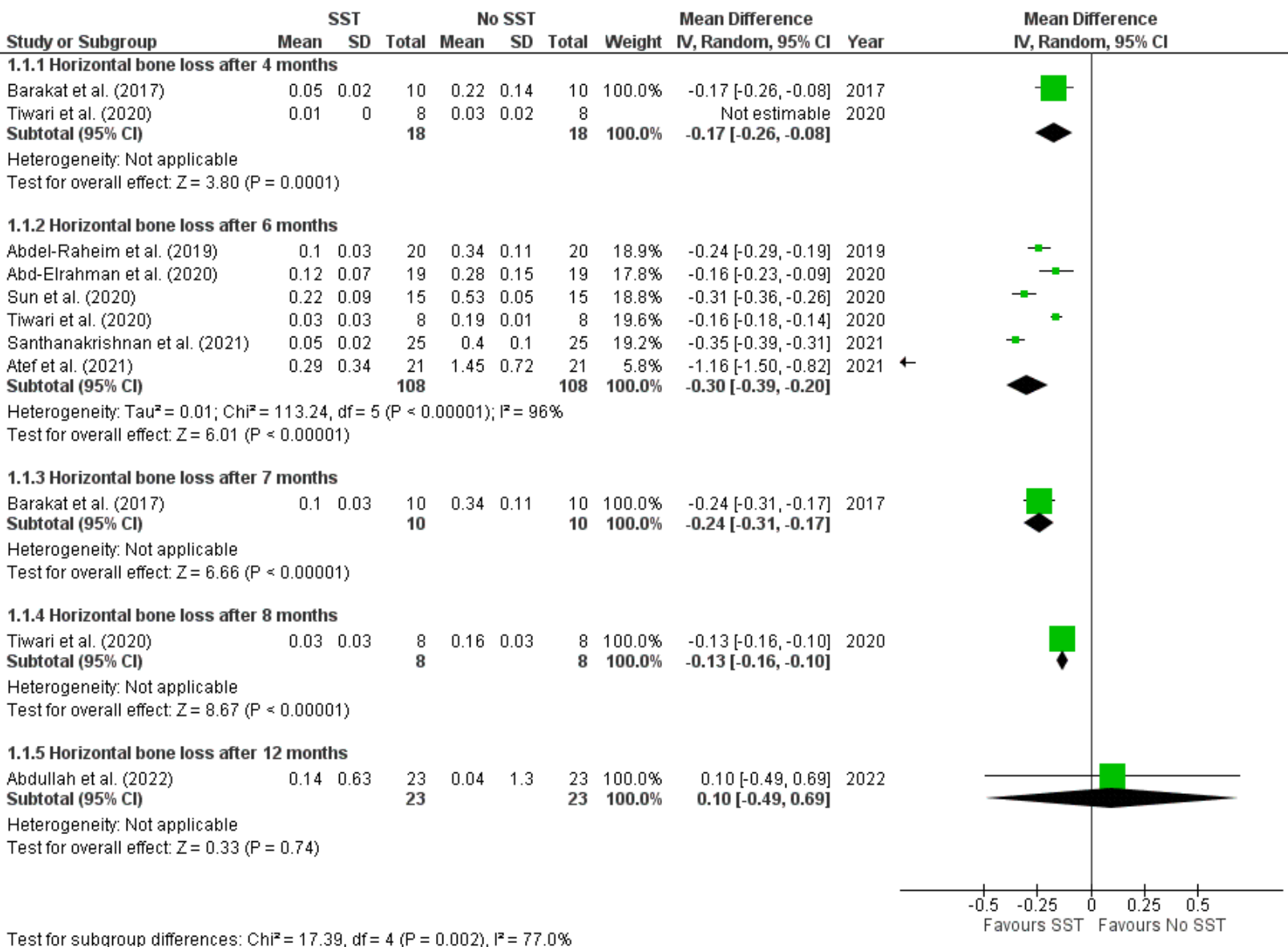
Appendix Table S3: Results of all outcomes during follow-ups

Study	Horizontal bone loss (Changes in buccal bone width) (mm)		Vertical bone loss (Changes in buccal bone height) (mm)		Implant Stability Quotient (ISQ)		Pink Esthetic Score (PES)		Crestal bone loss (Changes in marginal bone levels) (mm)		Probing depth		Dropouts n (%)		Complications n (%)		Implant Failure n (%)	
	SST	No SST	SST	No SST	SST	No SST	SST	No SST	SST	No SST	SST	No SST	SST	No SST	SST	No SST	SST	No SST
At implantation																		
Barakat et al. (2017)	NR	NR	NR	NR	60.30 ± 6.43	57.20 ± 9.15	NR	NR	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Abdel-Raheim et al. (2019)	NR	NR	NR	NR	60.30 ± 6.43	57.20 ± 9.15	NR	NR	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Abd-Elrahman et al. (2020)	NR	NR	NR	NR	68.6 ± 3.81	66.4 ± 5.64	NR	NR	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Hana et al. (2020)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Sun et al. (2020)	NR	NR	NR	NR	76.01 ± 1.31	75.56 ± 1.07	NR	NR	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Abdullah et al. (2022)	NR	NR	NR	NR	57.75 ± 13.9	48.5 ± 10.6	NR	NR	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
After 3 months																		
Bramanti et al. (2018)	NR	NR	NR	NR	NR	NR	12.5 ± 0.94	11.45 ± 1.6	0.32 ± 0.05	0.79 ± 0.08	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Fattouh (2018)	NR	NR	NR	NR	NR	NR	11.4 ± 0.84	10.6 ± 0.69	0.42 ± 0.14	0.62 ± 0.12	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
After 4 months																		
Barakat et al. (2017)	0.05 ± 0.02	0.22 ± 0.14	0.16 ± 0.13	0.86 ± 0.76	69.80 ± 3.77	65.60 ± 5.66	NR	NR	NR	NR	2.05 ± 0.31	2.75 ± 0.70	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Tiwari et al. (2020)	0.01 ± 0.00	0.03 ± 0.02	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Kumar et al. (2021)	NR	NR	NR	NR	NR	NR	9.13 ± 1.03	6.87 ± 1.36	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
After 6 months																		
Bramanti et al. (2018)	NR	NR	NR	NR	NR	NR	12.3 ± 0.86	11.05 ± 1.53	0.54 ± 0.06	1.02 ± 0.10	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Fattouh (2018)	NR	NR	NR	NR	NR	NR	11.2 ± 0.91	10.3 ± 0.48	0.64 ± 0.12	0.98 ± 0.17	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Abdel-Raheim et al. (2019)	0.10 ± 0.03	0.34 ± 0.11	0.44 ± 0.24	1.61 ± 0.78	69.80 ± 3.77	65.60 ± 5.66	NR	NR	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Abd-Elrahman et al. (2020)	0.12 ± 0.07	0.28 ± 0.15	0.34 ± 0.12	0.77 ± 0.35	76.71 ± 3.49	75.5 ± 4.4	12.00 ± 1.12	8.85 ± 1.81	NR	NR	NR	NR	0 (0%)	0 (0%)	2* (5%)	0 (0%)	0 (0%)	0 (0%)
Sun et al. (2020)	0.22 ± 0.09	-0.53 ± 0.05	0.28 ± 0.08	0.87 ± 0.12	NR	NR	12.00 ± 1.77	11.73 ± 1.67	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Atef et al. (2021)	0.29 ± 0.34	1.45 ± 0.72	0.36 ± 0.62	1.71 ± 1.02	NR	NR	NR	NR	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Santhanakrishna n et al. (2021)	0.05 ± 0.02	0.4 ± 0.1	NR	NR	NR	NR	11.7 ± 1.8	11.2 ± 2.1	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Abdullah et al. (2022)	NR	NR	NR	NR	68.63 ± 7.73	62.75 ± 5.70	12.12 ± 1.55	12.12 ± 1.64	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
After 7 months																		
Barakat et al. (2017)	0.10 ± 0.03	0.34 ± 0.11	0.44 ± 0.24	1.61 ± 0.78	NR	NR	NR	NR	NR	NR	1.73 ± 0.28	2.12 ± 0.64	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
After 8 months																		

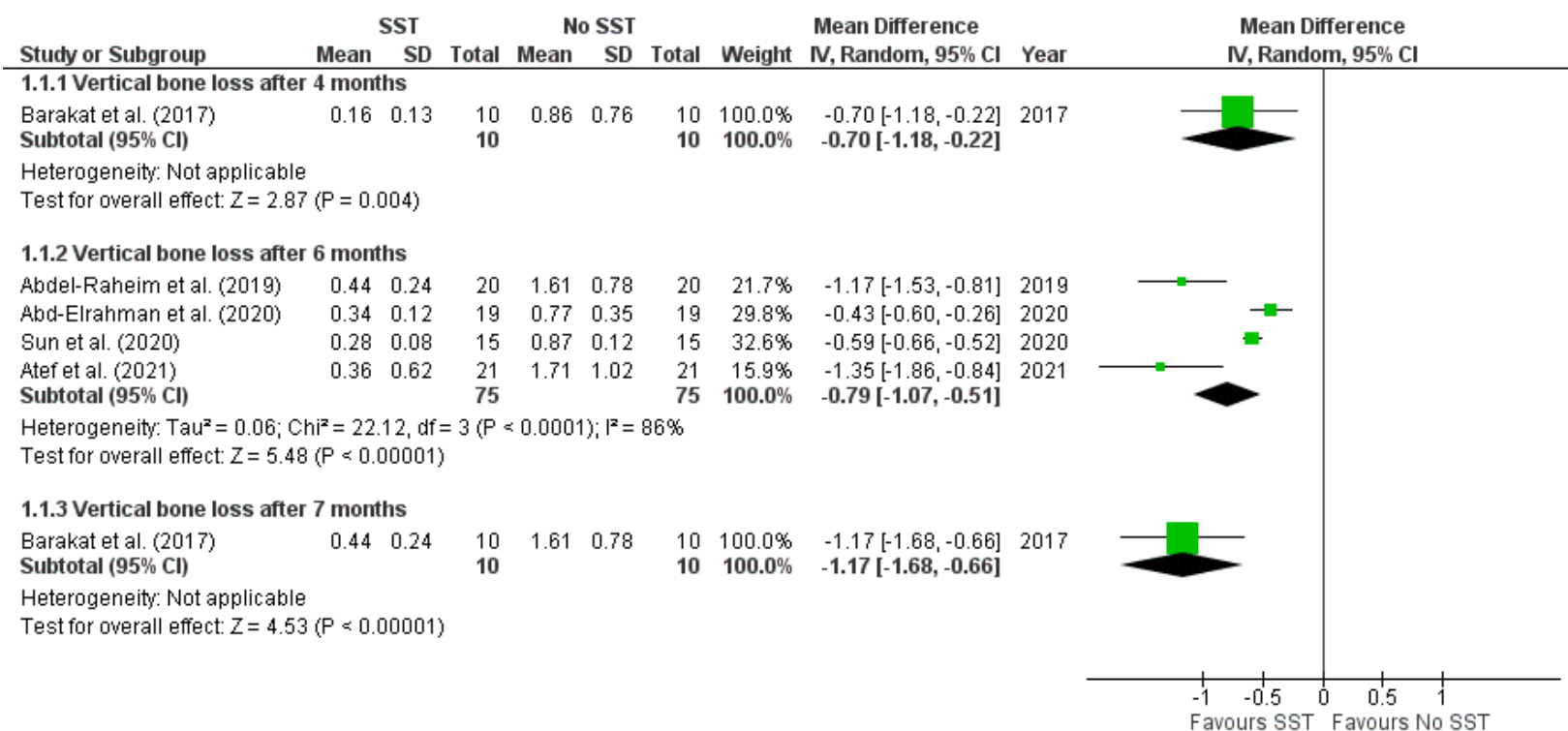
Tiwari et al. (2020)	0.03 ± 0.03	0.16 ± 0.03	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
After 12 months																		
Fattouh (2018)	NR	NR	NR	NR	NR	NR	11.1 ± 0.73	10.2 ± 0.42	0.69 ± 0.11	1.06 ± 0.24	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Hana et al. (2020)	NR	NR	NR	NR	NR	NR	12.26 ± 1.04	9.63 ± 1.34	NR	NR	NR	NR	0 (0%)	0 (0%)	2 ^b (10%)	5 ^c (25%)	0 (0%)	0 (0%)
Sun et al. (2020)	NR	NR	NR	NR	NR	NR	12.20 ± 1.57	11.53 ± 1.73	NR	NR	1.22 ± 0.03	1.90 ± 0.09	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Tiwari et al. (2020)	0.03 ± 0.03	0.19 ± 0.01	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Atef et al. (2021)	NR	NR	NR	NR	NR	NR	12.12 ± 0.64	11.86 ± 0.35	NR	NR	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Abdullah et al. (2022)	0.14 ± 0.63	0.04 ± 1.30	NR	NR	NR	NR	12.9 ± 1.69	12.38 ± 2.20	0.26 ± 0.52	0.34 ± 0.31	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
After 24 months																		
Sun et al. (2020)	NR	NR	NR	NR	NR	NR	12.07 ± 1.62	11.33 ± 1.76	NR	NR	1.23 ± 0.02	2.00 ± 0.09	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
After 36 months																		
Bramanti et al. (2018)	NR	NR	NR	NR	NR	NR	12.15 ± 0.87	10.3 ± 1.59	0.61 ± 0.06	1.12 ± 0.13	NR	NR	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Explanations:

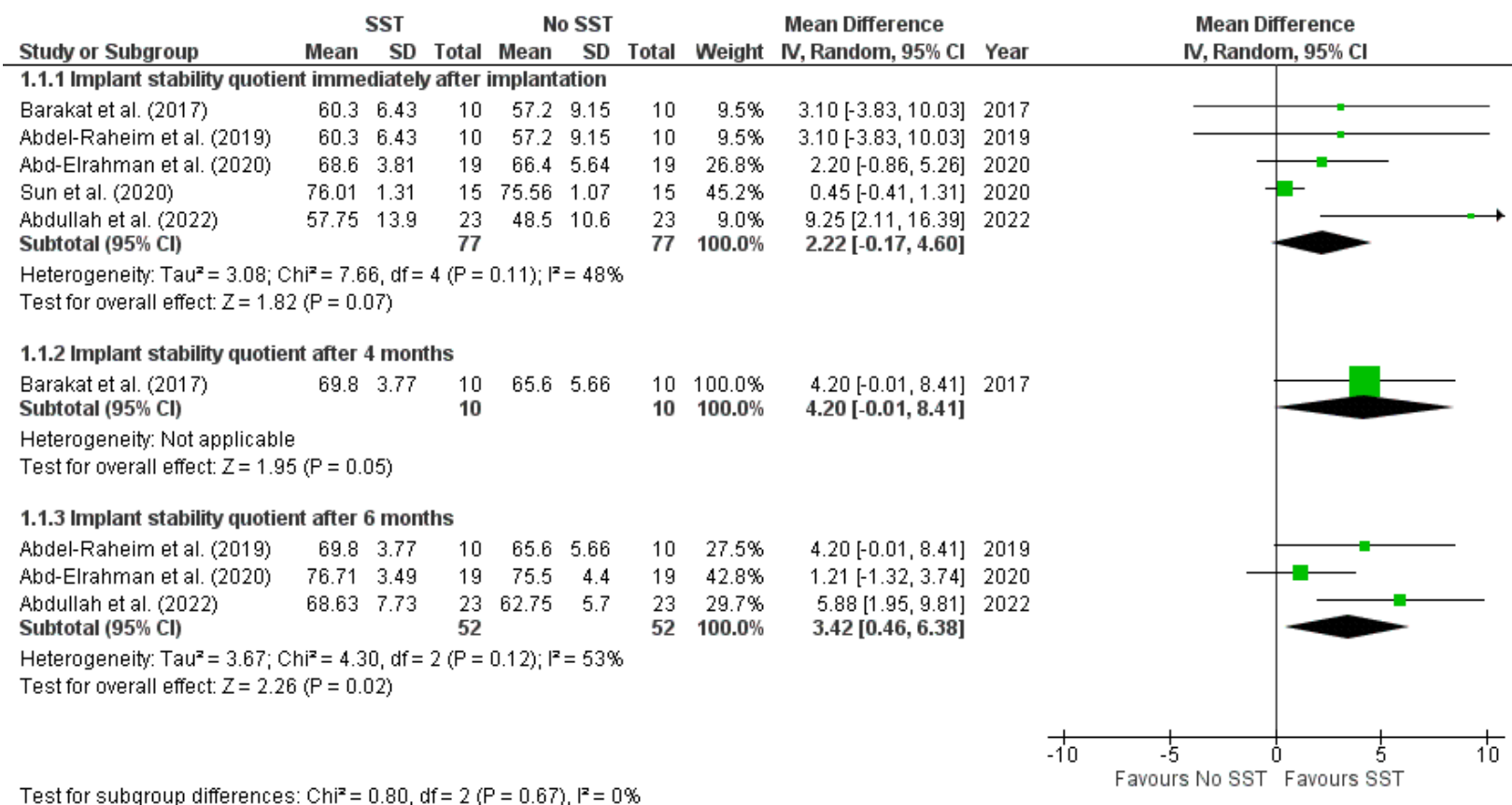
- a. Internal shield exposure
- b. External and Internal shield exposure
- c. Inadequate keratinized tissue and gum recession



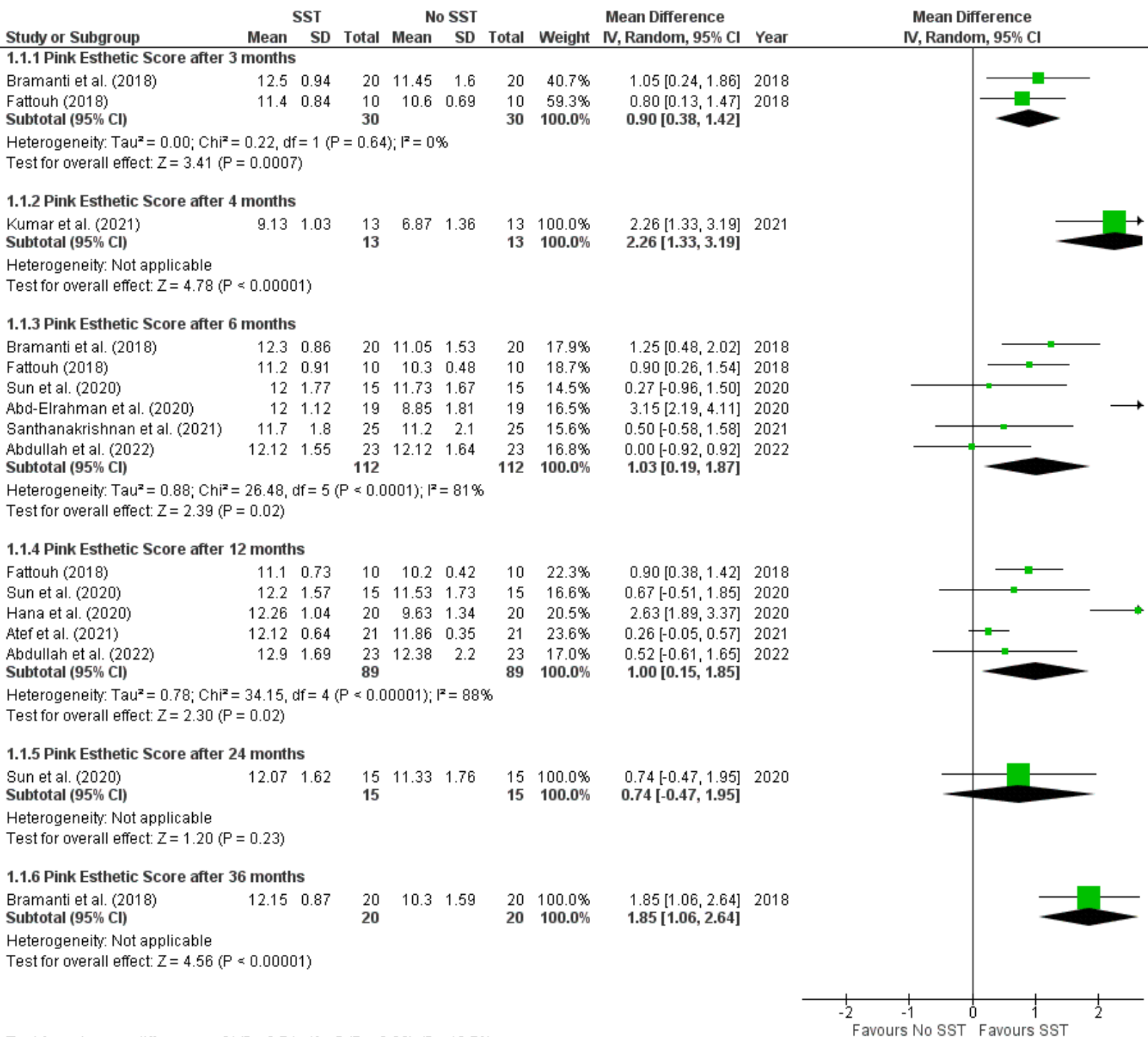
Appendix Figure S1. Sensitivity analysis measuring the amount of horizontal bone loss at different follow-ups



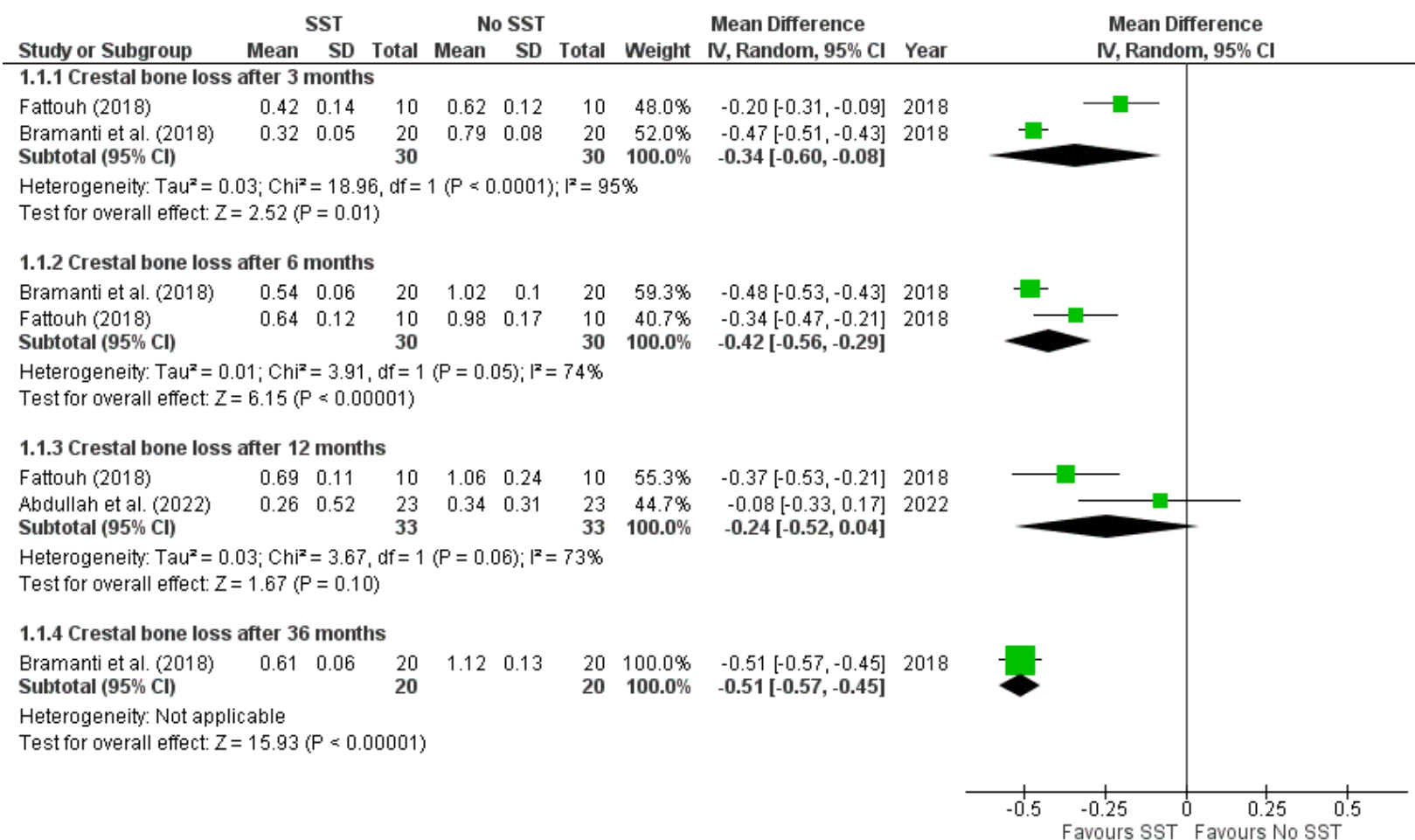
Appendix Figure S2. Sensitivity analysis measuring the amount of vertical bone loss at different follow-ups



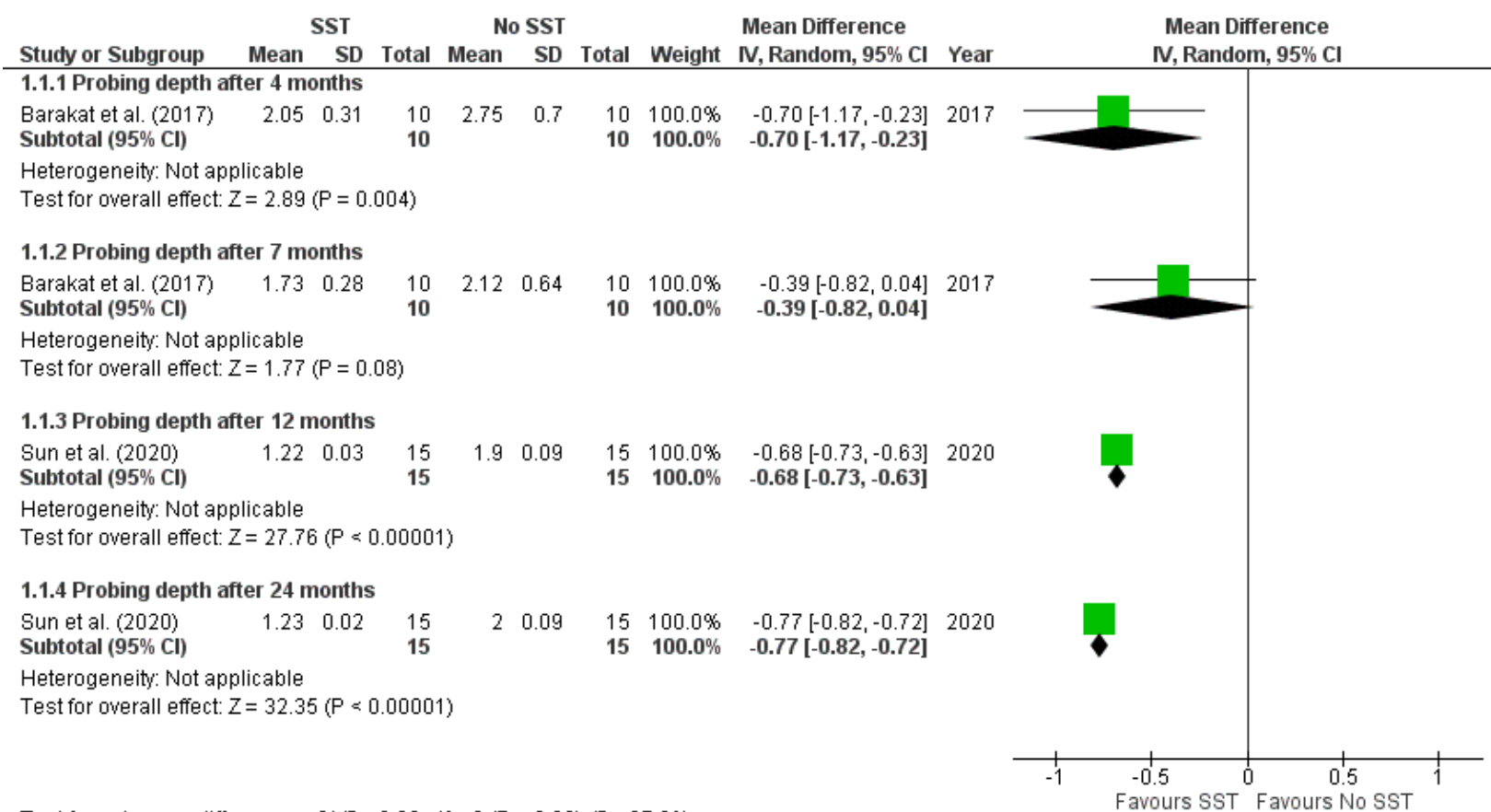
Appendix Figure S3. Sensitivity analysis measuring the implant stability quotient at different follow-ups



Appendix Figure S4. Sensitivity analysis measuring the pink esthetic score at different follow-ups



Appendix Figure S5. Sensitivity analysis measuring the amount of crestal bone loss at different follow-ups



Appendix Figure S6. Sensitivity analysis measuring the probing depth at different follow-ups

PRISMA 2020 Main Checklist

Topic	No.	Item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Section 1, Page 1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Section 1, Line 46
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Line 95-102
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Line 110-132
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Line 135-142
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Line 141-142
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Line 143-147
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Line 148-155

Topic	No.	Item	Location where item is reported
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Line 148-155
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Line 148-155
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Line 156-166
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Line 168-175
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item 5)).	Line 176-192
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Line 182-188
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Line 176-192
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Line 176-192
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Line 173-175
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Line 191-192
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Line 191-192
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Line 193-202

Topic	No.	Item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Line 206-212
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Line 210-212
Study characteristics	17	Cite each included study and present its characteristics.	Line 214-239
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Line 241-250
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Line 309-313
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Line 314-389
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Line 314-389
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Line 391-396
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Line 391-396
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	NA
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Line 397-400
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Line 413-442
	23b	Discuss any limitations of the evidence included in the review.	Line 484-512

Topic	No.	Item	Location where item is reported
	23c	Discuss any limitations of the review processes used.	Line 484-512
	23d	Discuss implications of the results for practice, policy, and future research.	Line 513-520
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	NA
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	NA
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	NA
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Line 526
Competing interests	26	Declare any competing interests of review authors.	Line 528
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Line 529-530

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