

SUPPLEMENTARY MATERIAL

Supplementary Table S1. Studies excluded of PRISMA selection during the stage of eligibility with their exclusion criteria [35–46].

NAME OF THE STUDY	TYPE OF STUDY	EXCLUSION CRITERIA
AGLIETTA et al. 2011 [35]	Analytical retrospective cohort study	Similar database to a study already included
MATARASSO et al. 2011 [36]	Analytical retrospective cohort study	Similar database to a study already included
HORWITZ et al. 2012 [37]	Descriptive prospective cohort study	Immediate implantation
ORMIANER et al. 2012 [38]	Analytical retrospective cohort study	Immediate implantation
AGUIRRE et al. 2013 [39]	Analytical prospective cohort study	Only 1 year of loading, follow-up time too short
APATZIDOU et al. 2017 [40]	Analytical retrospective cohort study	N<15 study power too low
CORREIA et al. 2017 [41]	Analytical retrospective cohort study	Attrition of 25% \geq 20% (adequate attrition rate)
ZEZA et al. 2017 [42]	Analytical prospective cohort study	Attrition of 40% \geq 20% (adequate attrition rate)
ALTAY et al. 2018 [43]	Pilot study	N<15 study power too low
SUNG et al. 2018 [44]	Descriptive transversal study	Patients diagnosed with active periodontitis during the study
GALLEGO et al. 2018 [45]	Descriptive retrospective cohort study	Attrition of 75% \geq 20% (adequate attrition rate)
LIU et al. 2019 [46]	Case-control study	Immediate implantation

Supplementary Table S2. Characteristics of included studies [13–16,21–34].

Study (follow-up)	Population characteristics	Intervention characteristics	Outcome measures	Funding
	-Sample size (diagnosis) -Age -Recruitment -Number of center	-Number of implants -Implant type -Surface treatment -Regular maintenance	-Peri-implantitis rate (%) -Survival rate (%) -Mean of pocket depth (mm) -Mean of alveolysis (mm)	
QUANTITATIVE SYNTHESIS				
CASADO et al. 2013 (8 years) [14]	-N=215 (CP) -55 \pm 12.5 -University based -1 center	-N=754 -NR -NR -Yes	-CP 59% / H 27% -NR -CP 2.1 \pm 1.21 / H 1.74 \pm 0.88 - CP 2.23 mm \pm 2.55 H 1.70 mm \pm 2.16	NR
CHO-YAN LEE et al. 2012 (14 years) [27]	-N=30 (CP) / N=30 (H) -57.36 \pm 7.28 (CP)- 58.28 \pm 6.60 (H) -Private practice -1 center	-N=117 -Straumann -SLA/ TPS -Yes	-CP 26.7% / H 13.1% -NR - CP 2.83 \pm 0.59 H 2.81 \pm 0.49 - CP 0.45 \pm 0.94 H 0.26 \pm 0.72	Non-governmental funding
GRAETZ et al. 2017	-N=29 (CP) / N=29 (H) -23 to 76	-N=145 -NR	-NR	Self-funding

(10 years) [15]	-Hospital and university based -2 centers	-NR -Yes	- 5 y. PC 97.1% / H 97.4% 10 y. PC 92.5% / H 91.4% -CP4.2±1.6mm H2.9±0.8mm CP18.7±18.2% H12.5±21.3%	and Kiel University
JIANG et al.2013 (2 years) [25]	-N=30 (CP) / N=30 (H) -18 to 50 -NR -NR	-N=276 -NR -NR -Yes	-NR - CP 95.97 % H 97.60 % -NR -NR	Governmental funding
LEVIN et al.2011 (12 years) [23]	-N=149 (PCM) / N=285 (PCS) / 283 (H) -51.13 ± 12.35 - Hospital and university based / Clinical practice -1 center	-N=2259 -NR -NR -Yes	-NR -MCP 96.6% SCP 94.8% / H 96.9% - NR - NR	Self-funding
RASPERINI et al. 2014 (10 years) [21]	-N=60 (CP) / N=60 (H) - Sm/H (TS 51.2 ± 2.39 / TPS 51.5 ± 2.68) Sm/PC (TS 51.3 ± 3.23/ TPS 51.7 ± 3.5) NSm/H (ST 47.5 ± 2.9 / TPS 48.1 ± 2.1) NSm/PC (ST 47.2 ± 1.4 / TPS 46.5 ± 1.7) -Hospital and university based / Private practice -2 centers	-N=120 -Branemark/ Straumann -MS / TPS -Yes	-NR - CP S 85% CP NS 90% H 95% (S et NS) - NR -2.28 ± 0.72	Department university funding
ROCCUZZO et al. 2010- 2012 (10 years) [13]	- N=80 (CP) / N=32 (H) - SCP 44±8.6 / MCP 49±15.3 / H 45±13 -Private practice -1 center	-N=246 -Straumann -TPS -Yes	-H 10.7% MCP 27% SCP 47.2% -H 96.6% MCP 92.8% SCP 90% -H 3.1±0.5 MPC 3.5±0.9 SCP 3.9±0.7 -H 0.75±0.88 MPC 1.14±1.11 SCP 0.98±1.22	NR
ROCCUZZO et al. 2014 (10 years) [26]	-N=91 (CP) / N=32 (H) -MCP 53.3 ± 10.7/ SCP 52.7 ± 8.4/ H 43.3±12.4 -Private clinic of periodontology -1 center	-N=252 -Straumann -SLA -Yes	- H 18.8% MPC 2.2% SCP 66.7% -H 100% MCP 96.9% SCP 97.1% -MCP 4.6±1.3 SCP 4.8±1.4 H 4.4±1.1 -NR	NR
SWIERKOT et al. 2012 (16 years) [24]	-N=35 (AP) / N=18 (H) -20 to 56 years -Hospital and university based -1 center	-N=179 -Branemark (MKII) Nobel Biocare, Osseotite BIOMET 3i - MS -Yes	-H 10% AP 26% -H 100% AP 96% -NR-NR	No external funding
THÖNE-MÜHLING et al. 2016 (4 years) [22]	-N=35 (AP) / N=18 (H) -27 to 56 years (AP) / 25 to 57 years (H) -Faculty of dental medicine	-N=179 - Branemark (MK II) Nobel Biocare, Osseotite Biomet 3i -MS -Yes	-NR -AP 97.3% H 100% -AP 3.50 ± 0.70 H 3.42 ± 0.81 -NR	No conflict of interest with financial

	-1 center			organization
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Table 2. (Continued)

Study (follow-up)	Population characteristics	Intervention characteristics	Outcome measures	Funding
	-Sample size (diagnosis) -Age -Recruitment -Number of centers	-Number of implants -Implant type -Surface treatment -Regular maintenance	-Peri-implantitis rate (%) -Survival rate (%) -Mean of pocket depth (mm) -Mean of alveolysis (mm)	
QUALITATIVE SYNTHESIS				
AGUIRRE et al. 2015 (17 years) [16]	-N=69 (AP)/N=170 (CP) -53 years (49-79) - Private clinic of periodontology -1 center	-N=786 - TiOBlast Astra Tech/ TiUnite Nobel Biocare/ Steri-Oss -Sandblasted/ Anodic oxidation -Yes	-NR -NR -NR -4.3mm±1.9	NR
DI GUARNIERI et al. 2020 (10 years) [30]	-N=58 (CP) -55 years -Private clinic of periodontology -1 center	-N=127 -NR -NR -Yes	-NR -90% -NR -3.1±1.2 mm	NR
MEYLE et al. 2014 (10 years) [29]	-N=20 (CP) -48.7 ± 8.9 years -Hospital and university based -1 center	-N=54 -Frialit 2-Dentsply -SLA -Yes	- 23.8% -96.3% -3.3±1.0 -0.63±0.26mm	Self-funding and no external founding
PANDOLFI et al. 2020 (10 years) [31]	-N=475 (CP) -≥61 years 15.8% ≤60 years 84.2% -Private clinic -1 center	-N=1991 -Straumann -SLA -Yes	-12.9% -96.1% -NR -NR	Self-funding
RAES et al. 2018 (5 years) [33]	-N=18-3=15 (AP) -64 years (46 à 72) - Hospital and university based -1 center	-N=84 -Branemark MK III -MS / TiUnite (oxyded surface) -Yes	- Tur 7.14% TiU 28.57% -Tur 97.6% TiU 100% -Tur 3.1±1.0mm TiU 4.2±2.6mm - Tur 1.0±0.9mm TiU 1.7±1.7mm	Funding by dentsply Sirona, Intra-Lock et Nobel Biocare and by the hospital-university
SAYARDOUST et al. 2013 (5 years) [28]	-N=80 (CP) -53.5-54.2 years (Sm) 59.8-63.2 years (NSm) -Hospital and university based -1 center	-N=252 -Branemark -MS/ TiUnite -Yes	-NR -92.9% -NR -S 1.39mm (1.57) NS : 1.01mm (1.09)	Departmental funding
VAGIA et al. 2021 (10 years) [32]	-N=86 -66 years -Hospital and university based	-N=260 -Straumann -NR -Yes	-12,8% -NR -NR -NR	Self-funding

	-1 center			
XU et al. 2023 (5 years) [34]	-N=1528 -42.03 ± 15.00 -Hospital and university based -1 center	-N=2998 -Nobel Biocare NAI -Tapered-thread -Yes	-NR -95,39% -NR -NR	National Natural Science Foundation of China – Key Research and Development

Legends: AP: Aggressive Periodontitis; CP: Chronic Periodontitis; H: Health; MS: machined surface; MCP: Moderate Chronic Periodontitis; NR: not reported; NSm: Non Smokers; Sm: Smokers; SCP: Severe Chronic Periodontitis; SLA: Sand blast, Large grit, Acid-etch (implant surface); TPS: titanium plasma sprayed (implant surface)

Supplementary Figure S1. Graph regarding bias assessment of analytic retrospective cohort studies [14,15,21,22] using the Newcastle-Ottawa Scale (NOS)

	Casado et al.	Graetz et al.	Rasperini et al.	Thöne-Mühling et al.
Representativeness of the exposed cohort	*	*	*	
Selection of the non-exposed cohort	*	*	*	*
Ascertainment of exposure	*	*	*	*
Demonstration that outcome of interest was not present at start of the study	*	*	*	*
Comparability of cohorts on the basis of the design or analysis study controls for the most important factor	*	*	*	*
Comparability of cohorts on the basis of the design or analysis study controls for any additional factor			*	*
Assessment of outcome	*	*	*	*
Was follow-up long enough for outcomes to occur?	*	*	*	*
Adequacy of follow-up of cohorts	*	*	*	*

Supplementary Figure S2. Graph regarding bias assessment of analytic prospective cohort studies [13,23–26] using the Newcastle-Ottawa Scale (NOS)

	Roccuzzo et al. 2010	Swierkot et al.	Lian et al.	Levin et al.	Roccuzzo et al. 2014
Selection of the non-exposed cohort	*	*	*	*	*
Ascertainment of exposure	*	*	*	*	*
Demonstration that outcome of interest was not present at start of the study	*	*	*		*
Comparability of cohorts on the basis of the design or analysis study controls for the most important factor	*	*	*	*	*
Comparability of cohorts on the basis of the design or analysis study controls for any additional factor	*	*		*	*
Assessment of outcome	*	*	*	*	*

Was follow-up long enough for outcomes to occur?	*	*	*	*	*
Adequacy of follow-up of cohorts	*	*	*	*	*

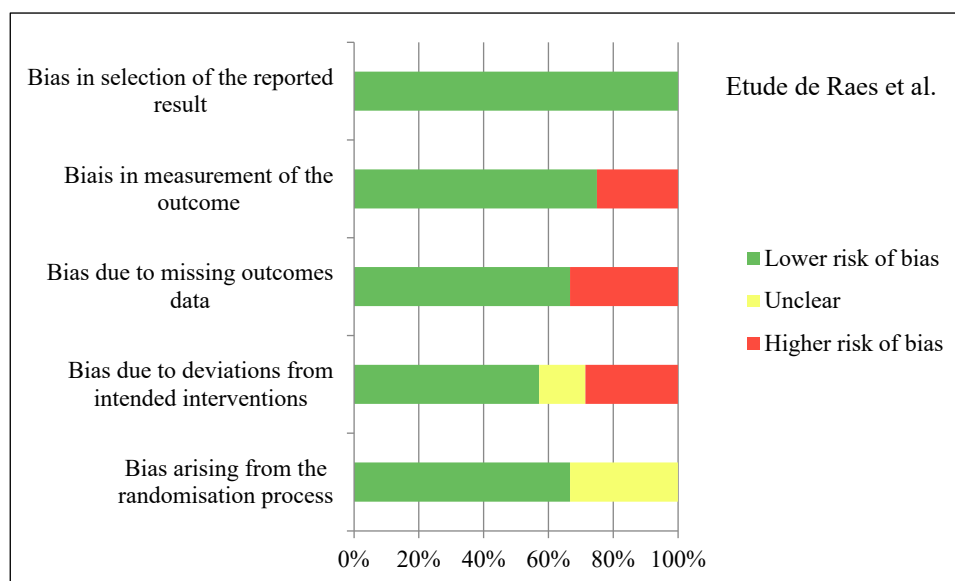
Supplementary Figure S3. Graph regarding bias assessment of the retrospective case-control study [27,32,34] using the Newcastle-Ottawa Scale (NOS)

		Cho-Yan Lee et al.	Vagia et al.	Xu et al.
Is the case definition adequate		*	*	*
Representativeness of the cases		*	*	*
Selection of controls		*	*	*
Definition of controls		*	*	*
Comparability of cases and controls on the basis of the basis of design or analysis study controls for the most important factor		*	*	*
Comparability of cases and controls on the basis of the basis of design or analysis study controls for any additional factor		*	*	*
Ascertainment of exposure		*	*	*
Same method of ascertainment for cases and controls		*	*	*
Non –Response rate		*	*	*

	Aguirre et al. 2014	Guarnieri et al.	Pandolfi et al.	Savardoust et al.	Meyle et al.
Were the criteria for inclusion in the sample clearly defined?	*	*	*	*	*
Were the study subjects and the setting described in detail?			*	*	*
Was the exposure measured in a valid and reliable way?	*	*	*	*	*
Were objective, standard criteria used for measurement of the condition?	*	*	*	*	*
Were confounding factors identified?				*	*
Were strategies to deal with confounding factors stated?	*	*	*	*	*
Were outcomes measured in a reliable way?	*	*	*	*	*
Was appropriate statistical analysis used?	*	*	*	*	*

Supplementary Figure S4. Graph regarding bias assessment of cross-sectional studies [16,28–31] using the Joanna Briggs Institute scale (JBI)

Supplementary Figure S5. Graph regarding the assessment of bias in randomized clinical trials [33] using the Risk of Bias scale (RoB 2)



Supplementary Figure S6. Results of heterogeneity tests, regarding the peri-implantitis rate of studies included in the quantitative synthesis.

Model		Heterogeneity			
Model	Number Studies	Q-value	df (Q)	P-value	I-squared
Random	7	2,436	6	0,876	0,000

Supplementary Figure S7. Results of heterogeneity tests, regarding the survival rate of studies included in the quantitative synthesis.

Model		Heterogeneity			
Model	Number	Q-value	df (Q)	P-value	I-squared
Random	14	6,981	13	0,903	0,000

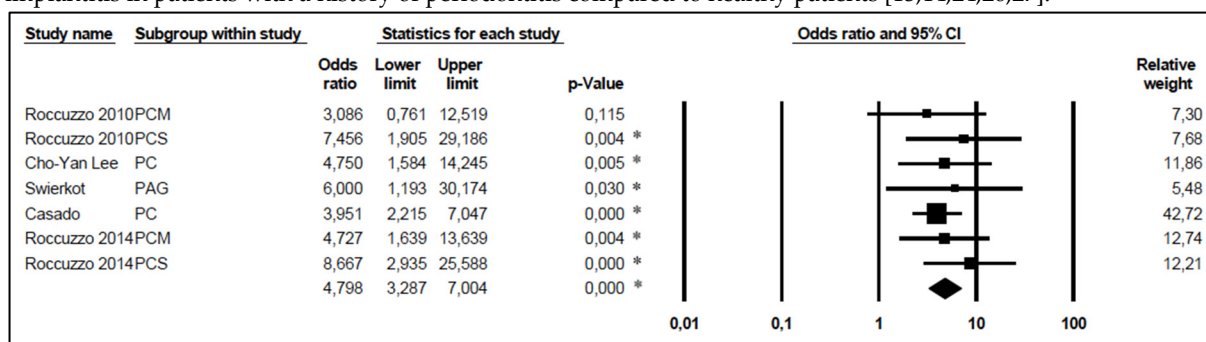
Supplementary Figure S8. Results of heterogeneity tests, regarding the alveolysis mean of studies included in the quantitative synthesis

Model		Heterogeneity			
Model	Number	Q-value	df (Q)	P-value	I-squared
Random	7	42,967	6	0,000 *	86,036

Supplementary Figure S9. Results of heterogeneity tests, regarding the alveolysis mean of studies included in the quantitative synthesis.

Model		Heterogeneity			
Model	Number	Q-value	df (Q)	P-value	I-squared
Random	7	28,671	6	0,000 *	79,073

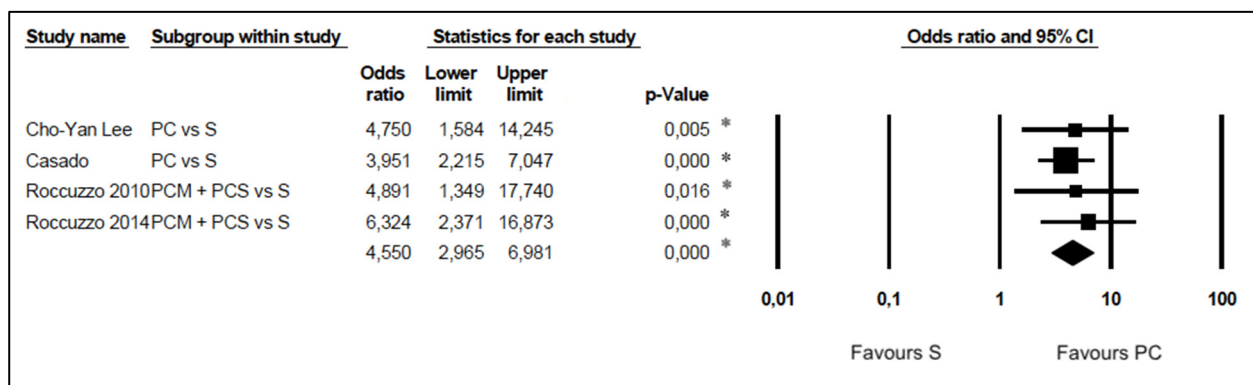
Supplementary Figure S10. Forest-Plot and Odds Ratio results, 95% CI, allowing the comparison of the rate of peri-implantitis in patients with a history of periodontitis compared to healthy patients [13,14,24,26,27].



*p-Value < 0.05: significant difference

Legends: PAG: Generalized Aggressive Periodontitis; PC: Chronic Periodontitis; PCM: Moderate Chronic Periodontitis; PCS: Severe Chronic Periodontitis

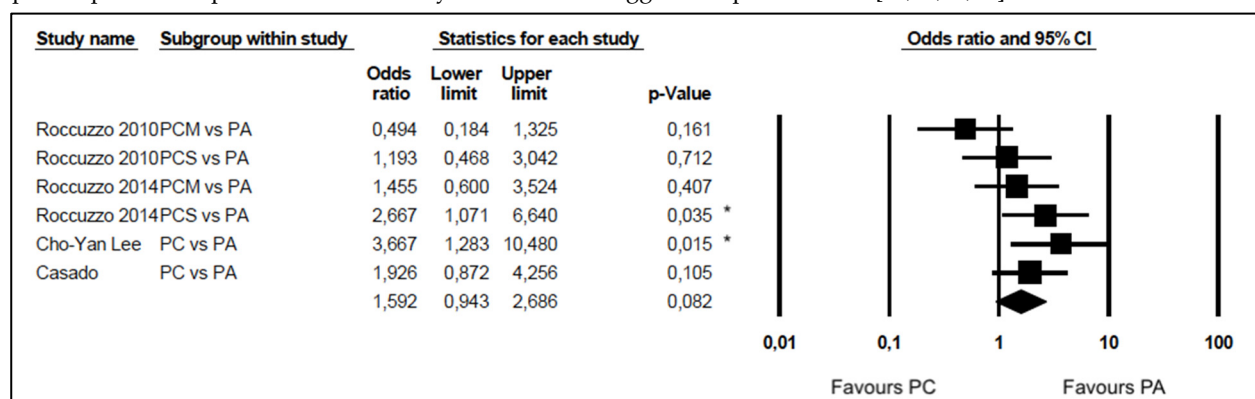
Supplementary Figure S11. Forest-Plot and Odds Ratio results, 95% CI, allowing the comparison of the rate of peri-implantitis in patients with a history of chronic periodontitis compared to healthy patients [13,14,26,27].



*p-Value < 0.05: significant difference

Legends: PC: Chronic Periodontitis; PCM: Moderate Chronic Periodontitis; PCS: Severe Chronic Periodontitis; S: Healthy Patient [13]

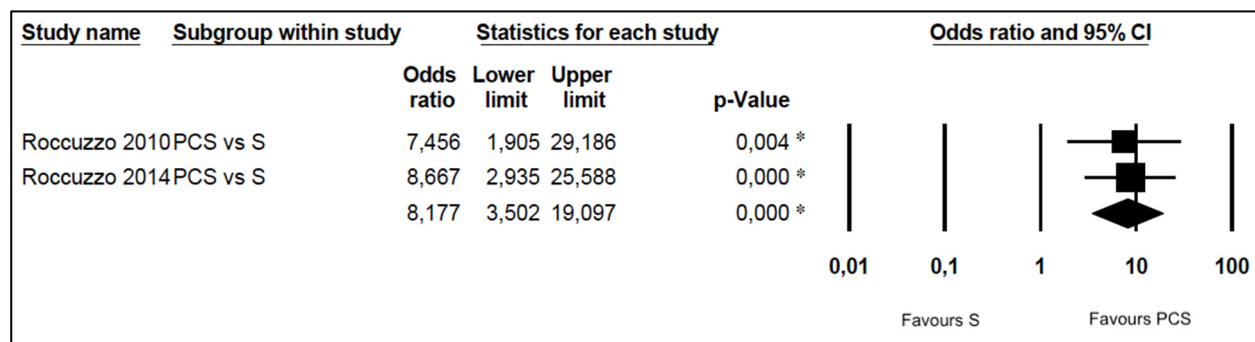
Supplementary Figure S12. Forest-Plot and Odds Ratio results, 95% CI, allowing the comparison of the rate of peri-implantitis in patients with a history of chronic and aggressive periodontitis [13,14,26,27].



*p-Value < 0.05: significant difference

Legends: PA: Aggressive Periodontitis; PC: Chronic Periodontitis; PCM: Moderate Chronic Periodontitis; PCS: Severe Chronic Periodontitis

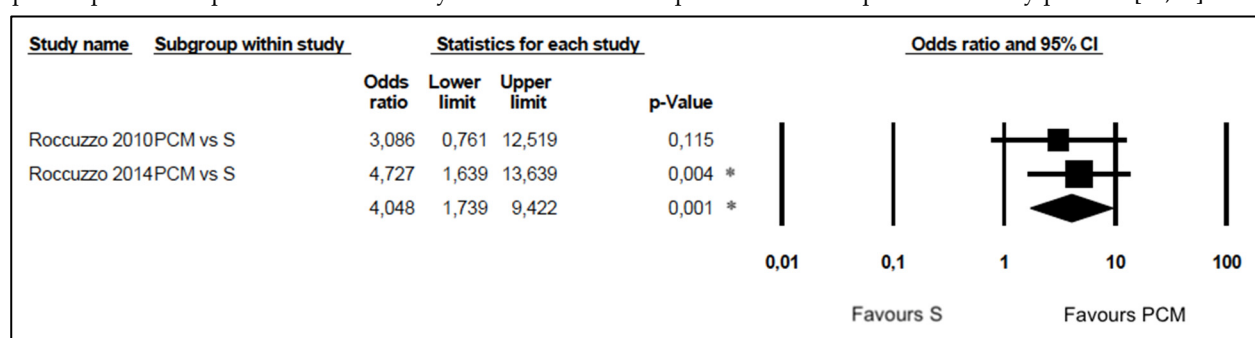
Supplementary Figure S13. Forest-Plot and Odds Ratio results, 95% CI, allowing the comparison of the rate of peri-implantitis in patients with a history of severe chronic periodontitis compared to healthy patients [13,26].



*p-Value < 0.05: significant difference

Legends: PCS: Severe Chronic Periodontitis; S: Healthy Patient

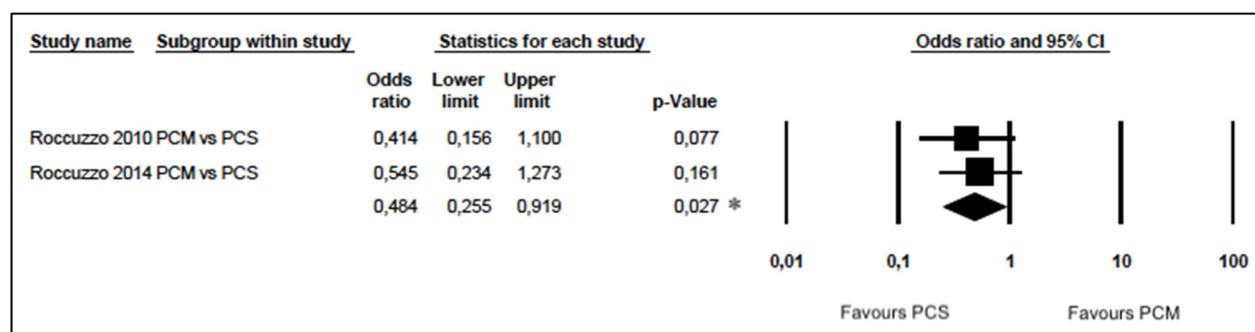
Supplementary Figure S14. Forest-Plot and Odds Ratio results, 95% CI, allowing the comparison of the rate of peri-implantitis in patients with a history of moderate chronic periodontitis compared to healthy patients [13,26].



*p-Value < 0.05: significant difference

Legends: PCM: Moderate Chronic Periodontitis; S: Healthy Patient

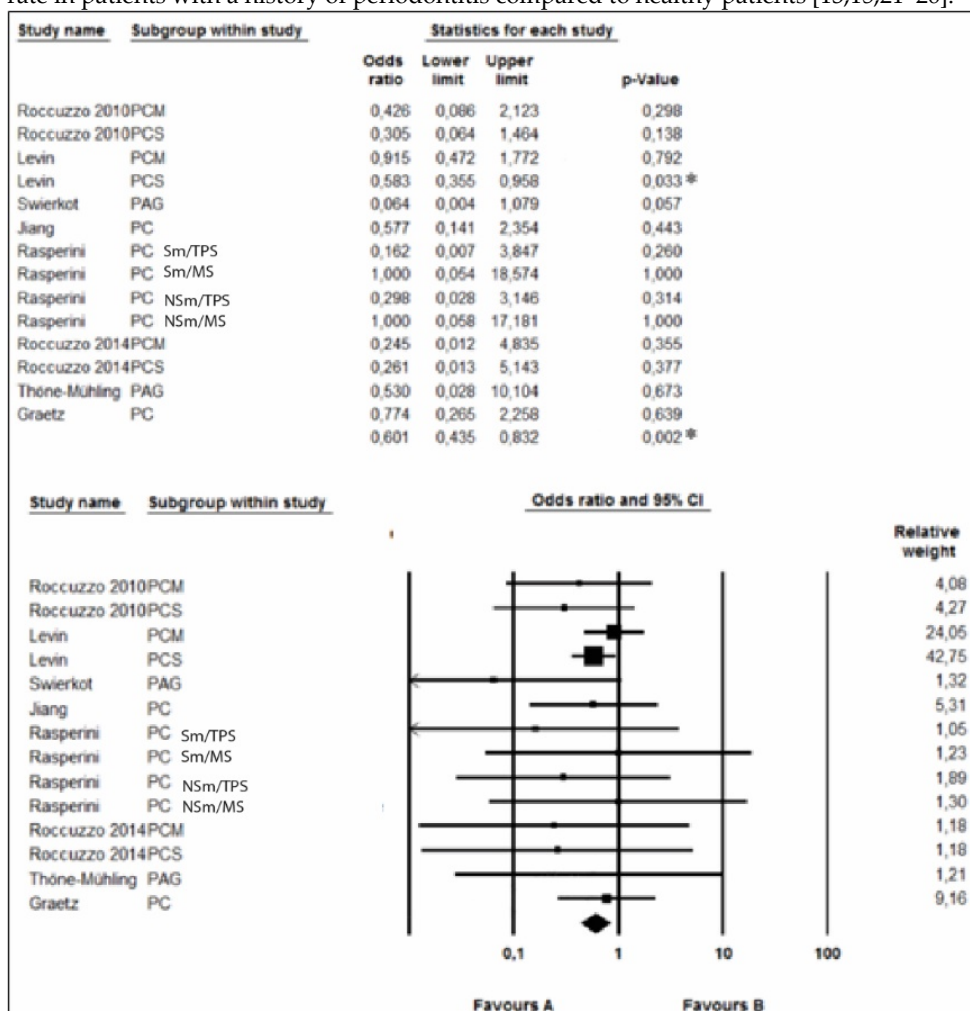
Supplementary Figure S15. Forest-Plot and Odds Ratio results, 95% CI, allowing the comparison of the rate of peri-implantitis in patients with a history of moderate and severe chronic periodontitis [13,26].



*p-Value < 0.05: significant difference

Legends: PCM: Moderate Chronic Periodontitis; PCS: Severe Chronic Periodontitis

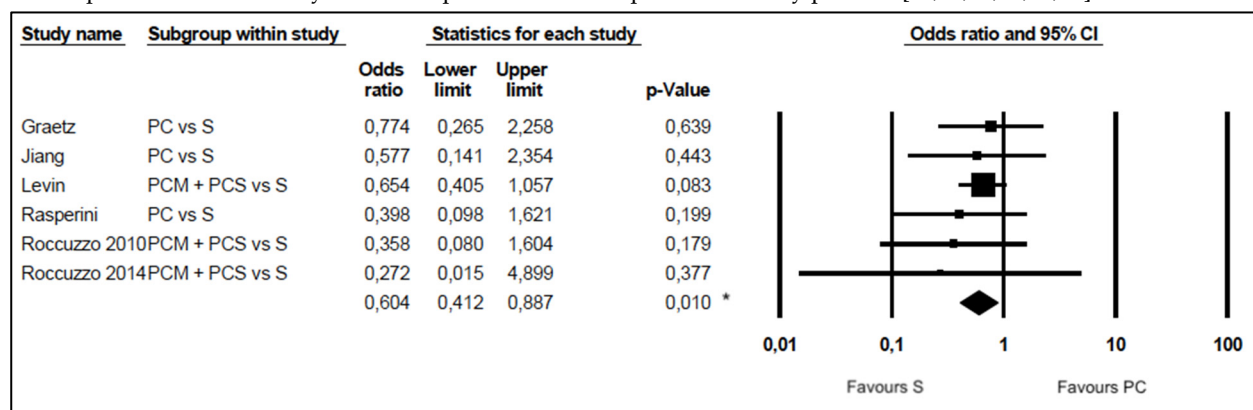
Supplementary Figure S16. Forest-Plot and Odds Ratio results, 95% CI, allowing the comparison of the survival rate in patients with a history of periodontitis compared to healthy patients [13,15,21–26].



*p-Value < 0.05: significant difference

Legends: PAG: Generalized Aggressive Periodontitis; PC: Chronic Periodontitis; PCM: Moderate Chronic Periodontitis; PCS: Severe Chronic Periodontitis; NSm: Non-Smokers; Sm: Smokers; MS: machined surface; TPS: titanium plasma sprayed (implant surface)

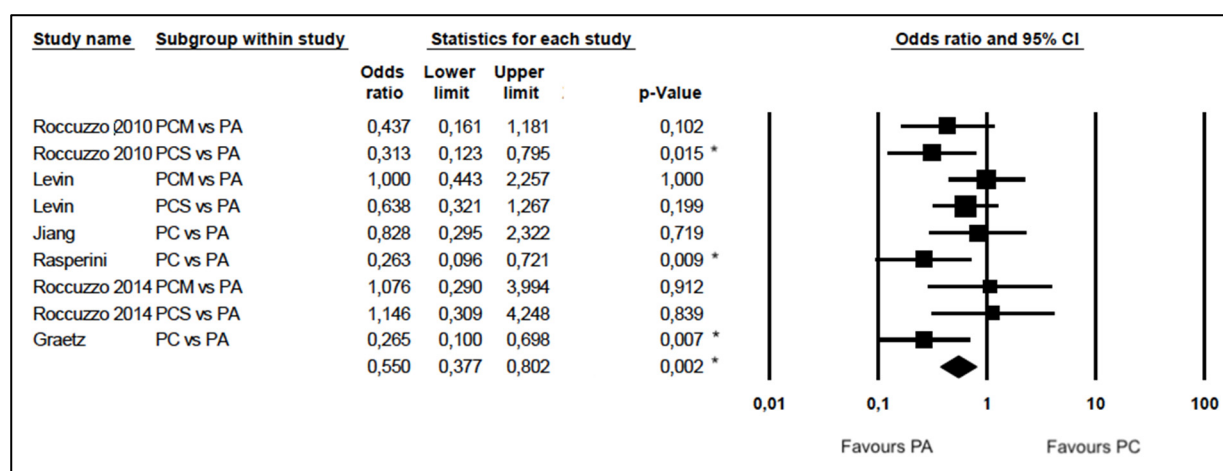
Supplementary Figure S17. Forest-Plot and Odds Ratio results, 95% CI, allowing the comparison of the survival rate in patients with a history of chronic periodontitis compared to healthy patients [13,15,21,23,25,26].



*p-Value < 0.05: significant difference

Legends: PC: Chronic Periodontitis; PCM: Moderate Chronic Periodontitis; PCS: Severe Chronic Periodontitis; S: Healthy Patient

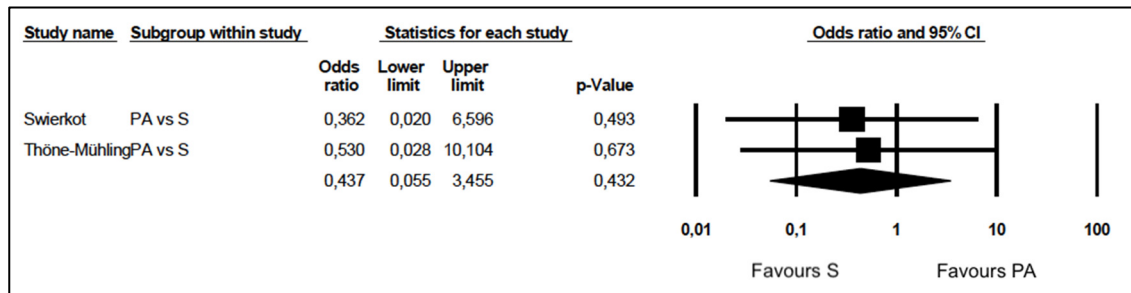
Supplementary Figure S18. Forest-Plot and Odds Ratio results, 95% CI, allowing the comparison of the survival rate in patients with a history of chronic and aggressive periodontitis [13,15,21,23,25,26].



*p-Value < 0.05: significant difference

Legends: PA: Aggressive Periodontitis; PC: Chronic Periodontitis; PCM: Moderate Chronic Periodontitis; PCS: Severe Chronic Periodontitis

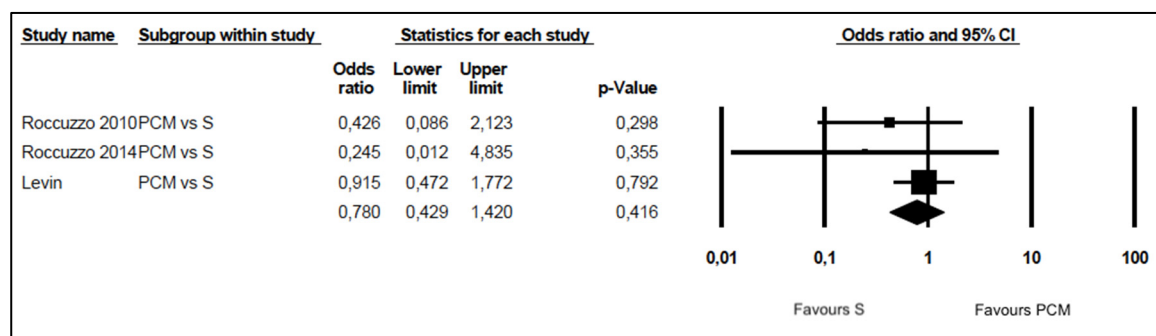
Supplementary Figure S19. Forest-Plot and Odds Ratio results, 95% CI, allowing the comparison of the survival rate in patients with a history of aggressive periodontitis compared to healthy patients [22,24].



*p-Value < 0.05: significant difference

Legends: PA: Aggressive Periodontitis; S: Healthy Patient

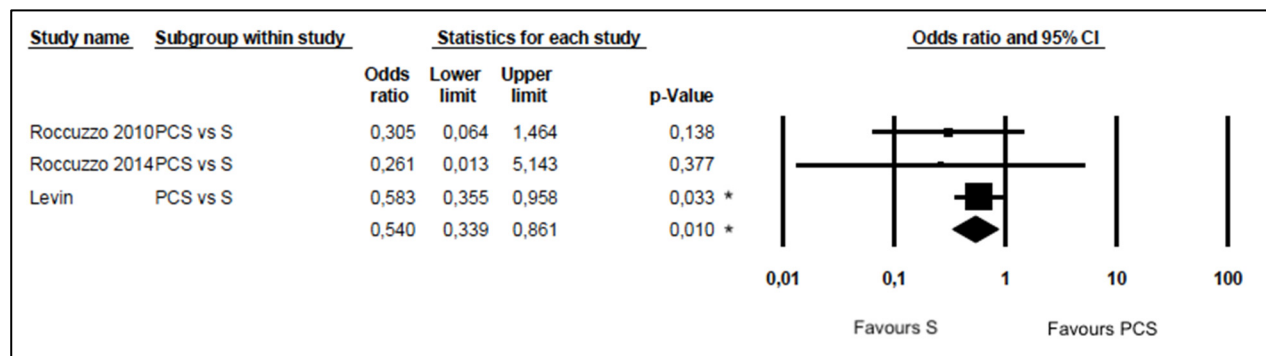
Supplementary Figure S20. Forest-Plot and Odds Ratio results, 95% CI, allowing the comparison of the survival rate in patients with a history of moderate chronic periodontitis compared to healthy patients [13,23,26].



*p-Value < 0.05: significant difference

Legends: PCM: Moderate Chronic Periodontitis; S: Healthy Patient

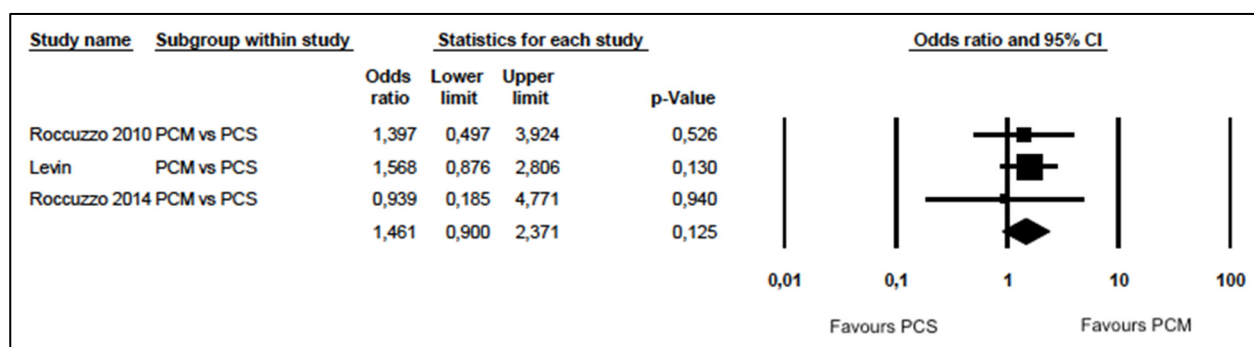
Supplementary Figure S21. Forest-Plot and Odds Ratio results, 95% CI, allowing the comparison of the survival rate in patients with a history of severe chronic periodontitis compared to healthy patients [13,23,26].



*p-Value < 0.05: significant difference

Legends: PCS: Severe Chronic Periodontitis; S: Healthy Patient

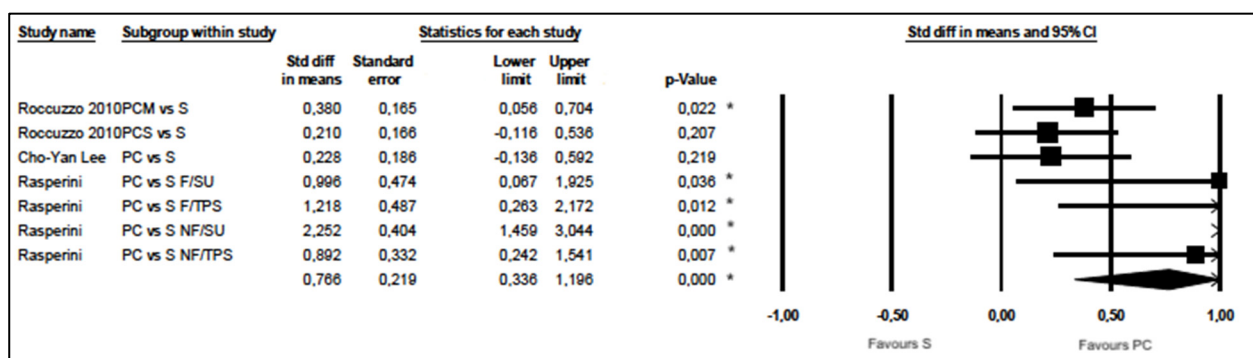
Supplementary Figure S22. Forest-Plot and Odds Ratio results, 95% CI, allowing the comparison of the survival rate in patients with a history of moderate and severe chronic periodontitis [13,23,26].



*p-Value < 0.05: significant difference

Legends: PCM: Moderate Chronic Periodontitis; PCS: Severe Chronic Periodontitis

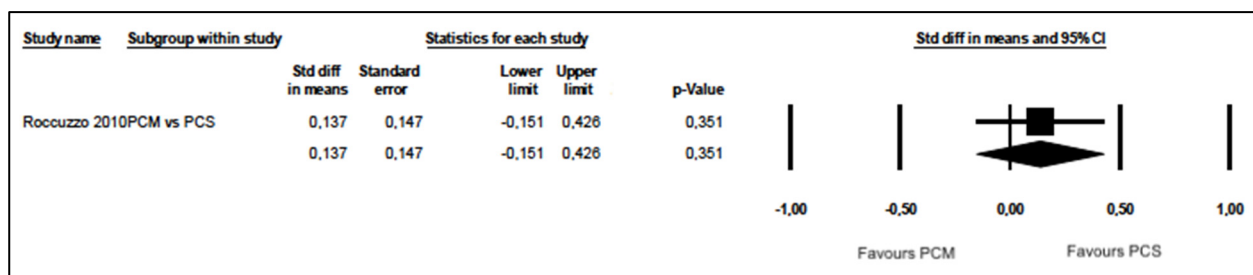
Supplementary Figure S23. Forest-Plot and results of the standardized difference in means and its standard error, concerning alveolysis, between patients with treated chronic periodontitis and healthy patients [13,21,27].



*p-Value < 0.05: significant difference

Legends: PC: Chronic Periodontitis; PCM: Moderate Chronic Periodontitis; PCS: Severe Chronic Periodontitis; S: Healthy Patient

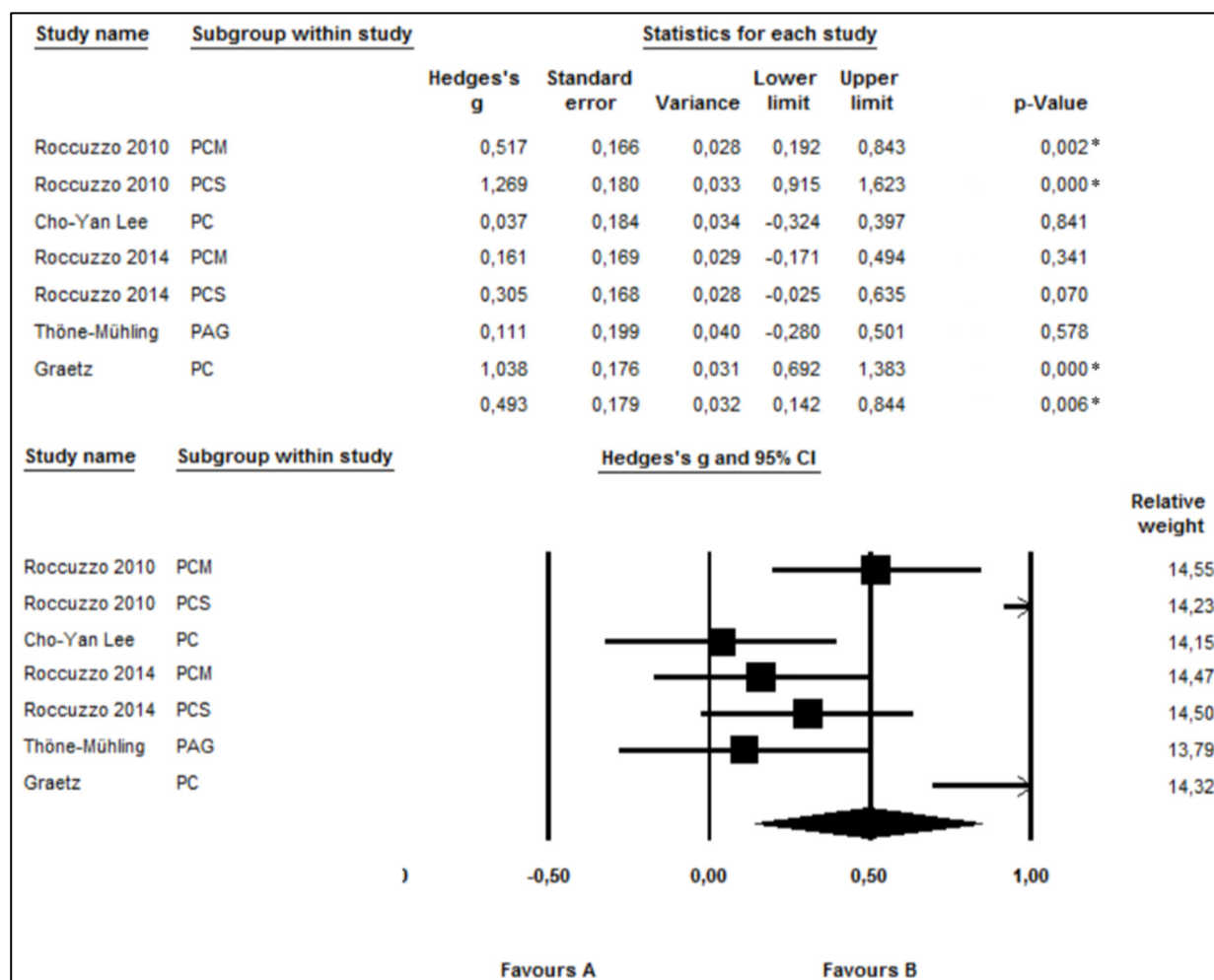
Supplementary Figure S24. Forest-Plot and results of the standardized difference in means and its standard error, concerning alveolysis, between patients with treated moderate chronic periodontitis and treated severe chronic periodontitis [13].



*p-Value < 0.05: significant difference

Legends: PCM: Moderate Chronic Periodontitis; PCS: Severe Chronic Periodontitis

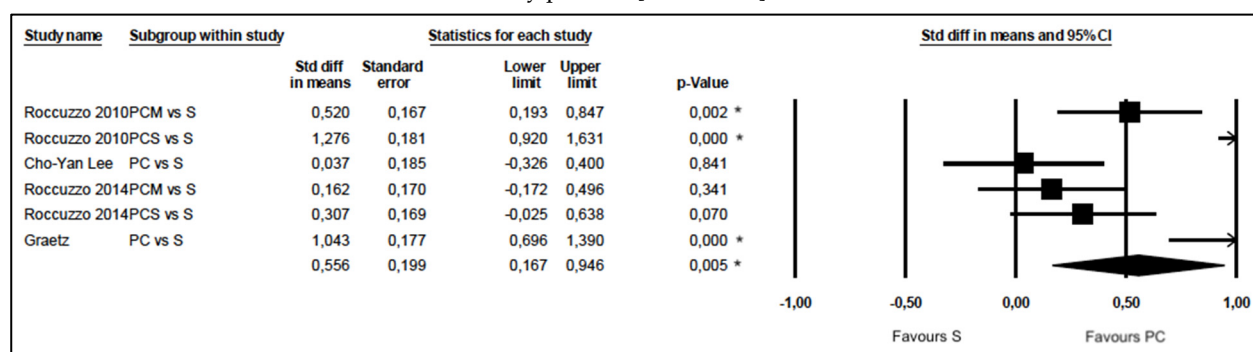
Supplementary Figure S25. Forest-Plot and results of Hedges's "g" and its standard deviation, for the different groups of periodontitis compared to the corresponding healthy group [13,15,22,26,27].



*p-Value < 0.05: significant difference

Legends: PAG: Generalized Aggressive Periodontitis; PC: Chronic Periodontitis; PCM: Moderate Chronic Periodontitis; PCS: Severe Chronic Periodontitis

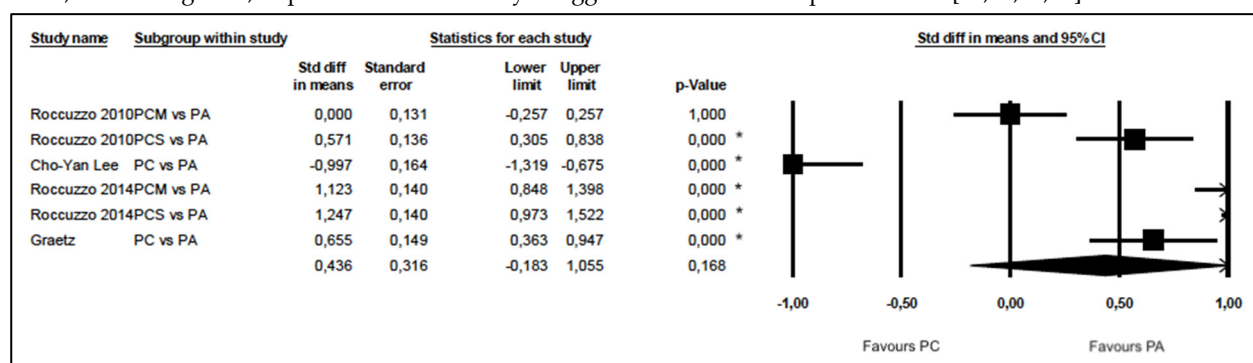
Supplementary Figure S26. Forest-Plot and results of the standardized difference in means and its standard error, concerning PPD, in patients with a history of chronic periodontitis, whatever the severity, compared to healthy patients [13,15,26,27].



*p-Value < 0.05: significant difference

Legends: PC: Chronic Periodontitis; PCM: Moderate Chronic Periodontitis; PCS: Severe Chronic Periodontitis; S: Healthy Patient

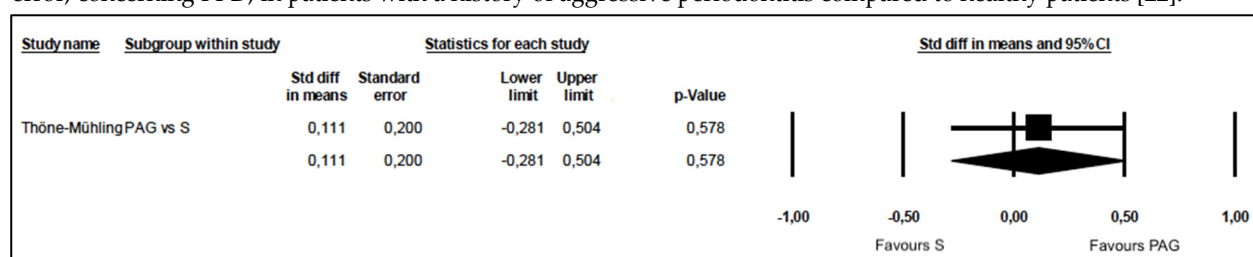
Supplementary Figure S27. Forest-Plot and results of the standardized difference in means and its standard error, concerning PPD, in patients with a history of aggressive and chronic periodontitis [13,15,26,27].



*p-Value < 0.05: significant difference

Legends: PA: Aggressive Periodontitis; PC: Chronic Periodontitis; PCM: Moderate Chronic Periodontitis; PCS: Severe Chronic Periodontitis

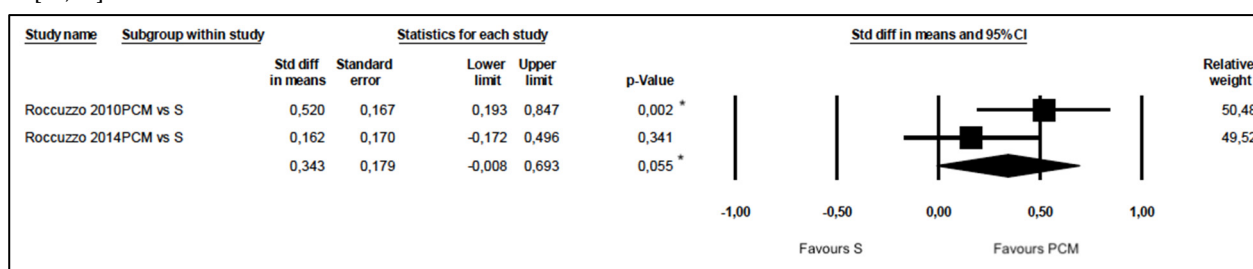
Supplementary Figure S28. Forest-Plot and results of the standardized difference in means and its standard error, concerning PPD, in patients with a history of aggressive periodontitis compared to healthy patients [22].



*p-Value < 0.05: significant difference

Legends: PAG: Generalize Aggressive Periodontitis; S: Healthy Patient

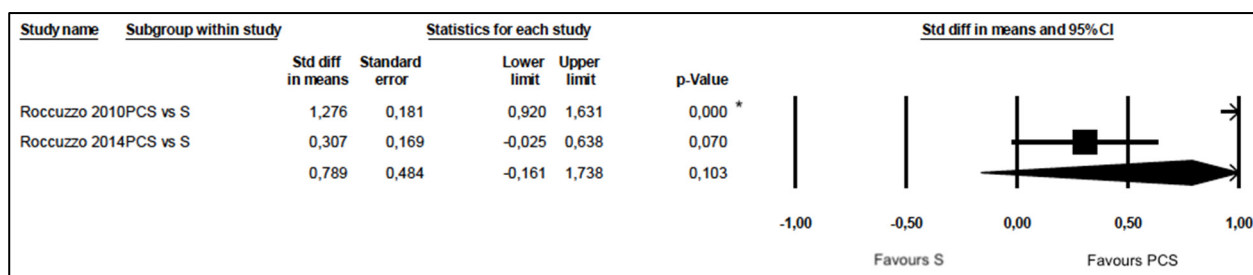
Supplementary Figure S29. Forest-Plot and results of the standardized difference in means and its standard error, concerning PPD, in patients with a history of moderate chronic periodontitis compared to healthy patients [13,26].



*p-Value < 0.05: significant difference

Legends: PCM: Moderate Chronic Periodontitis; S: Healthy Patient

Supplementary Figure S30. Forest-Plot and results of the standardized difference in means and its standard error, concerning PPD, in patients with a history of severe chronic periodontitis compared to healthy patients [13,26].



*p-Value < 0.05: significant difference