

REVIEW ARTICLE

Microbiological Study of Periodontal Disease in Populations with HIV: a Systematic Review and Meta-Analysis

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SUMMARY

Background: No systematic review/meta-analysis has been conducted on the microbiological profile associated with the occurrence of periodontitis in patients with HIV. The aim of this study was to evaluate the prevalence of identified bacteria in HIV-infected patients with periodontal disease.

Methods: Three English electronic databases (MEDLINE (via PubMed), SCOPUS, and Web of Science) were searched systematically from the beginning to February 13, 2021. The frequency of each identified bacteria in HIV-infected patients with periodontal disease was extracted. All meta-analysis methods were performed using STATA software.

Results: Twenty-two articles met inclusion criteria and were enrolled into the systematic review. This review analyzed a total of 965 HIV-infected patients with periodontitis. The prevalence of periodontitis was higher in HIV-infected male patients (83% (CI 95%: 76 - 88%)) compared to females (28% (CI 95%: 17 - 39%)). In our study, the pooled prevalence of necrotizing ulcerative periodontitis and necrotizing ulcerative gingivitis in patients with HIV infection was 67% (CI 95%: 52 - 82%) and 60% (CI 95%: 45 - 74%), while a lower prevalence of linear gingivitis erythema was reported (11% (CI 95%: 5 - 18%)). More than 140 bacterial species were identified from HIV-infected patients with periodontal disease. High prevalence of *Tannerella forsythia* (51% (CI 95%: 5 - 96%)), *Fusobacterium nucleatum* (50% (CI 95%: 21 - 78%)), *Prevotella intermedia* (50% (CI 95%: 32 - 68%)), *Peptostreptococcus micros* (44% (CI 95%: 25 - 65%)), *Campylobacter rectus* (35% (CI 95%: 25 - 45%)), and *Fusobacterium* spp. (35% (CI 95%: 3 - 78%)) in HIV-infected patients with periodontal disease was found.

Conclusions: Our study demonstrated that the prevalence of the red and orange complex of bacteria in HIV patients with periodontal disease is relatively high.

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Supplementary Data

Table S1. The frequency of identified bacteria from clinical samples of HIV- infected patients with periodontal disease.

	Botero J. E.	Brady L. J.	Brito A.	Cembranelli S. B. S.	Chatfin B. R.	Cobb C. M.	Dai L.	Junior E. G.	Grande S. R.	Gusic, I.	Hofer D.	Jordan R. A.	Lucht E.	Lucht E.	Mellanen L.	Moore L. V. H.	Nakou M.	Rams T. E.	Rosenstein D. I.	Teapaisan R.	Tsang C. S.	Zambon J. J.
Sample size	31	25	32	82	67	16	53	80	50	60	7	11	45	30	56	39	60	14	11	50	21	50
<i>F. nucleatum</i>												9				33	14				9	10
<i>F. necrophorum</i>																	4	2			6	
<i>F. mortiferum</i>																					2	
<i>T. forsythia</i>	4	4							48			8										
<i>P. intermedia</i>	14	8	24							9		6			39	34	15			12	16	
<i>A. actinomycetemcomitans</i>	2	2	9		28				10		1	2		3	8	1	2	7			2	16
<i>P. gingivalis</i>	20	5	1		31							5			9	2	30			5	1	11
<i>C. gingivalis</i>																7	6					
<i>B. gingivalis</i>														2								
<i>C. concisus</i>																	12					5
<i>E. corrodens</i>	4	9										1					10				6	2
<i>W. recta</i>																		13				25
<i>C. rectus</i>		10										7			18	8	22					
<i>C. sputonim</i>																						4
<i>B. forsythus</i>																	24					
<i>C. ochracea</i>																10	12					
<i>P. acnes</i>																					3	1
<i>Veillonella spp.</i>									1												14	
<i>V. dispar</i>																					6	3
<i>V. atypica</i>																21						
<i>V. parvula</i>																11	8	3				
<i>D. pneumosintes</i>	4																					
<i>Streptococcus spp.</i>																		2				
<i>P. disiens</i>																					1	
<i>P. loescheii</i>																					16	
<i>P. corporis</i>																					10	
<i>P. oralis</i>										7											4	
<i>S. oralis</i>																21						
<i>B. oralis</i>																		1				
<i>S. bovis</i>																					1	1
<i>S. dianae</i>																8						

Table S1. The frequency of identified bacteria from clinical samples of HIV- infected patients with periodontal disease (continued).

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Sample size	31	25	32	82	67	16	53	80	50	60	7	11	45	30	56	39	60	14	11	50	21	50
<i>Capnocytophaga</i> spp.																					14	2
<i>C. sputigena</i>																2	13					
<i>Selemonomonas sputigena</i>																23	6					
<i>B. Intermedius</i>																		7				29
<i>S. intermedius</i>																24	4	1			7	
<i>P. asaccharolytica</i>																					2	
<i>P. endodontalis</i>																				8		
<i>P. denticula</i>																	10			15	3	
<i>T. denticula</i>											9											
<i>B. gracilis</i>																18	10				7	2
<i>B. ureolyticus</i>									4												2	
<i>B. fragilis</i>																		1				
<i>B. capillosus</i>																					1	
<i>B. disiens</i>																		1				
<i>B. pneumosintes</i>																8						
<i>Actinomyces</i> spp.										2											4	
<i>A. meyeri</i>																					8	1
<i>A. naeslundii</i>																18	10	3			2	9
<i>A. israelii</i>																	11	1			11	1
<i>A. viscosus</i>											4					7	10	4				9
<i>A. odontolyticus (purple)</i>																		2			6	1
<i>S. agalactiae</i>																					1	
<i>S. mutans</i>																						1
<i>S. salivarius</i>																					4	2
<i>S. milleri</i>																	3					2
<i>Streptococcus</i> group C/G																					18	

Table S1. The frequency of identified bacteria from clinical samples of HIV- infected patients with periodontal disease (continued).

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Sample size	31	25	32	82	67	16	53	80	50	60	7	11	45	30	56	39	60	14	11	50	21	50	
<i>S. constellatus</i>																3	6	8					
<i>S. mitis</i>																		3			8	3	
<i>S. sanguinis</i>																10	5	1			18	10	
<i>S. morbillorum</i>																		3					
<i>G. morbillorum</i>										2											8		
<i>Campylobacter</i> spp.	3																				4		
<i>E. avium</i>																	2					1	
<i>P. tetradius</i>																					1		
<i>P. micros</i>												7			26	17	8	11			15	7	
<i>M. micros</i>																							
<i>E. aerofaciens</i>																		2					
<i>E. timidum</i>																18							
<i>E. lentum</i>																	6				6		
<i>E. alactolyticum</i>																	5						
<i>E. limosum</i>										3											1		
<i>Eubacterium</i> D06																8							
<i>Eubacterium</i> spp.	6																					1	
<i>Fusobacterium</i> spp.	23																	2			13	2	
<i>P. buccae</i>										2											6		
<i>P. anaerobius</i>										2							3				1		
<i>B. adolescentis</i>										2													
<i>P. prevotii</i>																						1	
<i>A. prevotii</i>										3													
<i>P. granulosum</i>										4								1			2		
<i>P. avidum</i>																					7		
<i>A. propionica</i>																						1	
<i>P. propionica</i>																					4		
<i>Neisseria</i> spp.																		4					

Table S1. The frequency of identified bacteria from clinical samples of HIV- infected patients with periodontal disease (continued).

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Sample size	31	25	32	82	67	16	53	80	50	60	7	11	45	30	56	39	60	14	11	50	21	50	
<i>N. mucosa</i>																						4	
<i>N. gonorrhoeae</i>																						2	
<i>N. lactamica</i>																						2	
<i>N. sicca/subflava</i>																						3	
<i>E. lente</i>										4													
<i>C. difficile</i>																	6						1
<i>Clostridium spp.</i>										8													1
<i>C. clostridiiforme</i>																							1
<i>C. innocuum</i>																						1	
<i>C. ramosum</i>																						2	
<i>L. buccalis</i>																						6	1
<i>E. faecalis</i>																	2						1
<i>P. aeruginosa</i>																	10	1					
<i>B. melaninogenicus</i>																		3					1
<i>P. melaninogenica</i>																						4	
<i>S. anginosus</i>																						15	
<i>M. incognitum</i>																	6						
<i>H. segnis</i>																1							
<i>H. aphrophilus</i>																						1	
<i>H. ducreyi</i>																						4	
<i>H. parainfluenzae</i>																						1	
<i>K. pneumoniae</i>																							1
<i>K. oxytoca</i>								2										1					
<i>L. rimae</i>																15							
<i>L. uli</i>																18							
<i>L. acidophilus</i>																							6
<i>Lactobacillus spp.</i>																						18	
<i>F. varium</i>																	13	4				2	
<i>P. nigrescence</i>																	8			12			
<i>E. gingivalis</i>				52									10										
<i>Staphylococcus spp.</i>																						9	
<i>S. aureus</i>							38										6	1					

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Sample size	31	25	32	82	67	16	53	80	50	60	7	11	45	30	56	39	60	14	11	50	21	50
<i>S. saccharolyticus</i>																					1	
<i>S. epidermidis</i>																		2				6
<i>E. coli</i>																4						
<i>E. sakazakii</i>								4														
<i>E. agglomerans</i>																		1				
<i>E. cloacae</i>								4									4	2				
<i>S. pneumoniae</i>																					5	
<i>Enterococcus spp.</i>								2														
<i>G. haemolysans</i>																					3	2
<i>A. viridans</i>																					3	
<i>S. liquefaciens</i>								1														
<i>A. haemolyticum</i>																					3	
<i>Bifidobacterium spp.</i>																					2	
<i>Cellulomonas spp.</i>																					1	
<i>Corynebacterium spp.</i>																					2	
<i>C. matruchotii</i>																						1
<i>Listeria spp.</i>																					1	
<i>K. denitrificans</i>																					3	
<i>K. kingae</i>																					5	
<i>Wolinella spp.</i>																						1
<i>R. dtocarioensa</i>																						1
<i>Spirochetes</i>						14													10			
<i>Short and long rods/cocci</i>						3																
<i>Black-pigmented bacteroides</i>														11						32		
<i>Black-pigmented anaerobic rods</i>					51																	
<i>Gram-negative enteric rods</i>	23																					
<i>Mycoplasma species</i>					12																	
<i>Red complex</i>												4										
<i>Orange complex</i>												3										