

## Supplementary Materials

**Supplementary Table S1.** Contains the full list of topics identified by BERTopic, in order of size, for the peri-implantitis dataset. Non-dental topics are highlighted in bold.

Topic	Count	Name	KeyBERT	LLM
-1	357	-1_treatment_hydroxyapatite_bone_implant	['peri implantitis', 'hydroxyapatite coated', 'coated implants', 'dental implant', 'dental implants', 'spinal implant', 'peri implant', 'hydroxyapatite', 'implantitis', 'implant']	Treating Implant Infections
0	3733	0_implant_implants_peri_bone	['peri implantitis', 'implant bone', 'dental implant', 'peri implant', 'dental implants', 'implant placement', 'implants placed', 'bone regeneration', 'implant', 'implantitis']	Peri-Implant Bone Study
1	587	1_valve_coronary_stent_patients	['coronary stent', 'stent implantation', 'eluting stents', 'eluting stent', 'stents', 'artery bypass', 'stent', 'coronary artery', 'patients coronary', 'stenting']	Valves and Stents in Coronary Arteries
2	232	2_cataract_intraocular_cataract_surgery_lens	['inflammation cataract', 'lens implantation', 'incision cataract', 'intraocular lens', 'following cataract', 'extracapsular cataract', 'intraocular lenses', 'postoperative inflammation', 'cataract extraction', 'cataract surgery']	Intraocular Lens Inflammation

3	192	3_breast_breast reconstruction_reconstruction_breast implants	['breast reconstruction', 'reconstruction breast', 'mammary implants', 'breast implant', 'implant breast', 'breast augmentation', 'prosthetic breast', 'breast prostheses', 'breast implants', 'breast surgery']	Breast Reconstruction and Implants
4	174	4_stimulation_parkinson_parkinson disease_brain	['stimulation parkinson', 'subthalamic stimulation', 'nucleus stimulation', 'nucleus parkinson', 'brain stimulation', 'implants parkinson', 'nerve stimulation', 'stimulation subthalamic', 'neuromodulation', 'parkinson disease']	Parkinson's Disease and Deep Brain Stimulation
5	144	5_sinus_floor_sinus floor_elevation	['sinus floor', 'sinus elevation', 'osteotome sinus', 'sinus augmentation', 'sinus surgery', 'maxillary sinus', 'sinus implants', 'sinus lift', 'transcrestal sinus', 'eluting sinus']	Sinus Floor Elevation
6	137	6_laser_therapy_photodynamic_photodynamic therapy	['implantitis laser', 'peri implantitis', 'implantitis randomized', 'peri implant', 'laser therapy', 'implantitis', 'laser treatment', 'implant diseases', 'laser peri', 'photodynamic therapy']	Photodynamic Therapy for Peri-implantitis Treatment
7	132	7_overdentures_mandibular_mandibular overdentures_retained	['implant overdentures', 'mandibular overdentures', 'mandibular overdenture', 'implants mandibular', 'mandibular implant',	Implant-retained Mandibular Overdentures

			'maxillary over-dentures', 'retained overdentures', 'overdentures re-tained', 'supported mandibular', 'over-dentures sup-ported']	
8	127	8_orbital_porous_polyethylene_porous polyethylene	['implants orbital', 'orbital implant', 'orbital implants', 'hydroxyapatite orbital', 'polyethylene implants', 'polyethylene im-plant', 'implant re-pair', 'treatment orbital', 'implant enucleation', 'or-bital fractures']	Orbital Recon-struction Implants
9	96	9_cochlear_cochlear implantation_hearing implantation	['cochlear implan-tation', 'cochlear implants', 'coch-lear implant', 'im-plants cochlear', 'undergoing coch-lear', 'unilateral cochlear', 'pediat-ric cochlear', 'fol-lowing cochlear', 'hearing implants', 'outcomes coch-lear']	Cochlear Implan-tation
10	89	10_fusion_cervi-cal_lumbar_disc	['cervical disc', 'cervical discec-tomy', 'disc arthro-plasty', 'discec-tomy fusion', 'lumbar fusion', 'cervical spine', 'spinal fusion', 'disc disease', 'an-terior cervical', 'degenerative lum-bar']	Cervical Fusion and Disc Disease
11	76	11_endometrio-sis_endome-trial_borderline_en-dometrium	['tumors ovary', 'ovarian serous', 'ovary clinicopath-ologic', 'borderline ovarian', 'serous tumors', 'endome-triosis', 'borderline tumors', 'human	Serous Borderline Ovary Tumors.

12	61	12_zirconia_abutments_clinical_single	<b>endometrium', 'ovarian', 'endo- metrium']</b> ['zirconia im- plants', 'zirconia dental', 'veneered zirconia', 'zirconia abutments', 'tooth implant', 'implant reconstructions', 'dental implants', 'zirconia oral', 'oral implants', 'implant abutments']	Zirconia Implants and Abutments
----	----	---------------------------------------	---	------------------------------------

**Supplementary Table S2.** contains the list of topics identified by BERTopic, in order of size, for the bone augmentation dataset. Non-dental topics are highlighted in bold.

Topic	Count	Name	KeyBERT	LLM
-1	1515	-1_bone_im- plant_im- plants_dental	['bone augmenta- tion', 'implant placement', 'im- plants placed', 'dental implant', 'bone regenera- tion', 'dental im- plants', 'implant', 'peri implant', 'im- plants', 'osseointe- gration']	Dental Implant Studies
0	727	0_implants_im- plant_immedi- ate_year	['dental implant', 'dental implants', 'single implants', 'implant place- ment', 'implants placed', 'edentu- lous maxilla', 'im- plant stability', 'edentulous pa- tients', 'implants year', 'posterior mandible']	Dental Implants in Edentulous Pa- tients
1	692	1_sinuses_maxillary sinus_sinuses floor_floor	['sinus grafting', 'sinus augmenta- tion', 'sinus floor', 'osteotome sinus', 'maxillary sinus', 'sinus elevation', 'sinus lift', 'sinus membrane', 'bone graft', 'lateral si- nus']	Sinus Floor Eleva- tion

2	296	2_hip_arthroplasty_total_femoral	['hip arthroplasty', 'hip replacement', 'revision hip', 'total hip', 'femoral stem', 'femoral stems', 'acetabular revision', 'arthroplasty using', 'knee arthroplasty', 'bone grafting']	Hip Arthroplasty
3	265	3_alveolar_alveolar_ridge_ridge_preservation	['alveolar ridge', 'alveolar ridges', 'alveolar bone', 'placement alveolar', 'study alveolar', 'trial alveolar', 'vertical alveolar', 'following alveolar', 'alveolar distraction', 'alveolar cleft']	Alveolar Ridge Augmentation Techniques
4	225	4_titanium_titanium_implants_surface_implants	['titanium dental', 'titanium implant', 'titanium implants', 'osseointegration titanium', 'implant surfaces', 'etched titanium', 'titanium surfaces', 'titanium surface', 'dental implants', 'porous titanium']	Titanium Implants Surface Acid-Etching Osse
5	167	5_ridge_ridge_augmentation_ridge_preservation_preservation	['bone allograft', 'tooth extraction', 'ridge preservation', 'autogenous bone', 'dried bone', 'ridge augmentation', 'bone mineral', 'molar extraction', 'tooth', 'bovine bone']	Ridge Preservation Bone Allograft
6	147	6_bone_guided_regeneration_guided_bone	['implants regenerated', 'bone regeneration', 'bone grafting', 'dental implants', 'dental implant', 'bone grafts', 'implants using', 'bone augmentation', 'bone	Bone Grafting for Dental Implants

			graft', 'immediate implant']	
			['mucosa implants', 'implant mucosa', 'tissue augmentation', 'dental implants', 'implant soft', 'buccal dehiscence', 'buccal soft', 'immediate implant', 'implant placement', 'dermal graft']	
7	146	7_buccal_tissue_soft_soft tissue	['peri implantitis', 'peri implant', 'implantitis randomized', 'implantitis prospective', 'implantitis using', 'implantitis systematic', 'implantitis defects', 'implantitis lesions', 'implantitis impact', 'implant health']	Soft Tissue Augmentation for Dental Implants
8	140	8_peri_peri implantitis_implantitis_peri implant	['socket implant', 'grafted sockets', 'extraction socket', 'sockets clinical', 'socket augmentation', 'healing extraction', 'implant placement', 'socket preservation', 'extraction sockets', 'implants placed']	Peri-Implantitis Treatment
9	138	9_sockets_extraction_socket_extraction sockets	['ventricular assist', 'biventricular assist', 'circulatory support', 'heart transplantation', 'cardiogenic shock', 'life support', 'heart transplant', 'bridge heart', 'left	Implants in Fresh Extraction Sockets
10	117	10_assist_ventricular_heart_ventricular assist		Ventricular Assist Devices

11	102	11_platelet_platelet rich_rich_rich fibrin	ventricular', 'extracorporeal'] ['implants platelet', 'fibrin socket', 'implant stability', 'using platelet', 'platelet gel', 'fibrin membrane', 'use platelet', 'effects platelet', 'influence platelet', 'bone healing']	Platelet-Rich Fibrin Effects on Dental Implants
12	93	12_fusion_lumbar _cervical_interbod y	['cervical fusion', 'cervical discectomy', 'cervical disc', 'lumbar fusion', 'disc arthroplasty', 'discectomy fusion', 'fusion lumbar', 'spine fusion', 'spine surgery', 'cervical spine'] ['bone morphogenetic', 'recombinant bone', 'bone regeneration', 'osteogenesis', 'bone formation', 'osteoconductive bulking', 'morphogenetic protein', 'protein bone', 'morphogenetic proteins', 'osseointegration dental']	Cervical and Lumbar Fusion Studies
13	89	13_bone morphogenetic_mo rphogenetic_protei n_morphogenetic protein	['hydroxyapatite implants', 'hydroxyapatite implant', 'hydroxyapatite coated', 'hydroxyapatite coating', 'treated hydroxyapatite', 'nanocrystalline hydroxyapatite', 'nano hydroxyapatite',	Bone Regeneration Recombinant Human BMP
14	81	14_hydroxyapatite _hydroxyapatite coated_coated_imp lants		Hydroxyapatite- coated Dental Implant Studies

			'ceramic hydroxyapatite', 'threaded hydroxyapatite', 'supported hydroxyapatite'] ['periodontal inrabony', 'inrabony periodontal', 'periodontal therapy', 'treatment periodontal', 'periodontal defects', 'periodontal inrabony', 'human periodontal', 'periodontal', 'enamel matrix', 'inrabony defects'] ['bone regeneration', 'linked collagen', 'membrane collagen', 'regeneration dental', 'collagen membrane', 'collagen membranes', 'guided tissue', 'guided bone', 'collagen', 'resorbable membranes'] ['implant overdentures', 'mandibular overdentures', 'mandibular overdenture', 'implants mandibular', 'mandibular implant', 'retained overdentures', 'maxillary overdentures', 'overdentures retained', 'retained mandibular',	Periodontal defect treatment
15	73	15_periodontal_def ects_inrabony_trea tment		
16	71	16_membranes_gui ded bone_guided_mem brane	Collagen Membranes for Guided Bone Regeneration	
17	64	17_overdentures_r etained_mandibula r_mandibular overdentures	Implant-retained Mandibular Overdentures	



			'retained overdenture'] ['implant infections', 'antibiotic prophylaxis', 'prophylactic antibiotic', 18_antibiotic_antibi otics_implant_infec tion 57 'infection dental', 'antibiotics clinical', 'antibiotic regimens', 'antimicrobial', 'preoperative antibiotics', 'dental implant', 'dental implants'] ['cochlear implants', 'cochlear implantation', 'cochlear implant', 19_hearing_anchor ed hearing_bone anchored_anchore d 54 'hearing implant', 'hearing implants', 'implant bone', 'anchored hearing', 'auditory osseointegrated', 'hearing aids', 'pediatric cochlear'] ['orbital implant', 'orbital implants', 'retinal prosthesis', 'infancy orbital', 'retinal detachment', 20_orbital_retinal_ lens_intraocular 50 'inferior orbital', 'acrylic intraocular', 'study retinal', 'intraocular', 'intraocular lens'] Antibiotic Prophylaxis for Dental Implants Bone Anchored Hearing Implant Orbital and Retinal Implants
--	--	--	--

Supplementary Table S3. contains the comparison between the performance of BERTopic, latent semantic analysis (LDA), and latent Dirichlet allocation (LDA) on sensitivity, specificity, and F1 score for both dataset 1 on peri-implantitis and dataset 2 on bone regeneration. The number of topics for LSA and LDA algorithms was set to 14 topics for dataset 1 and 22 topics for dataset 2, based on BERTopic results. Only titles were analyzed in all three algorithms. Text was preprocessed by lowercasing it and by removing stopwords prior to LSA or LDA.

Dataset	Algorithm	Sensitivity	Specificity	F1
1	LSA	0.34	0.87	0.43
1	LDA	0.23	0.60	0.25

1	BERTopic	0.79	0.99	0.88
2	LSA	0.13	0.93	0.17
2	LDA	0.27	0.58	0.15
2	BERTopic	0.74	1	0.85