

Topic	Count	Name	KeyBERT	MMR	LLM
-1	43271	- 1_periodontal_study_oral_periodontitis	['periodontal disease', 'periodontitis', 'chronic periodontitis', 'periodontal', 'periodontal ligament', 'oral health', 'endodontic', 'dental', 'gingival', 'orthodontic']	['periodontal', 'study', 'oral', 'periodontitis', 'dental', 'treatment', 'patients', 'clinical', 'bone', 'gingival']	Periodontal Health and Treatment
0	11715	0_cells_periodontal_stem_stem cells	['periodontal regeneration', 'periodontal tissue', 'human periodontal', 'periodontal ligament', 'bone regeneration', 'osteogenic differentiation', 'stem cells', 'periodontal disease', 'stem cell', 'tissue regeneration']	['cells', 'periodontal', 'stem', 'stem cells', 'ligament', 'periodontal ligament', 'bone', 'human', 'regeneration', 'periodontitis']	Periodontal Stem Cells Regeneration
1	7847	1_implant_implants_peri_bone	['implant placement', 'dental implant', 'dental implants', 'implants placed', 'immediate implant', 'peri implant', 'peri implantitis', 'ridge augmentation', 'alveolar ridge', 'implant supported']	['implant', 'implants', 'peri', 'bone', 'ridge', 'immediate', 'peri implant', 'study', 'clinical', 'implantitis']	Peri-Implant Soft Tissue Stability
2	6649	2_health_oral health_oral_dental	['periodontal health', 'oral health', 'periodontal diseases', 'periodontal disease', 'periodontitis', 'periodontal therapy', 'dental care', 'oral hygiene', 'periodontal', 'aggressive periodontitis']	['health', 'oral health', 'oral', 'dental', 'periodontal', 'status', 'adults', 'study', 'care', 'tooth loss']	Oral Health Quality of Life
3	3796	3_case_report_case report_cell	['cell granuloma', 'granuloma', 'pyogenic granuloma', 'gingival fibromatosis', 'cell carcinoma', 'ossifying fibroma', 'giant cell', 'squamous cell', 'ameloblastoma', 'gingival']	['case', 'report', 'case report', 'cell', 'granuloma', 'giant', 'giant cell', 'cancer', 'oral', 'cyst']	Giant Cell Granuloma Cases
4	2052	4_cone beam_beam_cone_compu ted	['mandibular molar', 'alveolar bone', 'mandibular molars', 'maxillary central', 'maxillary anterior', 'impacted mandibular', 'beam ct', 'computed tomography', 'central incisor', 'cone beam']	['cone beam', 'beam', 'cone', 'computed', 'tomography', 'computed tomography', 'beam computed', 'mandibular', 'maxillary', 'molar']	Cone Beam Computed Tomography Applications
5	1969	5_laser_therapy_photodyn gingival_photodynamic therapy	['periodontal treatment', 'periodontal therapy', 'surgical periodontal', 'laser therapy', 'photodynamic therapy', 'laser treatment', 'periodontitis', 'chronic periodontitis', 'laser irradiation', 'photobiomodulation therapy']	['laser', 'therapy', 'photodynamic', 'photodynamic therapy', 'diode', 'diode laser', 'antimicrobial photodynamic', 'yag', 'antimicrobial', 'er']	Antimicrobial Photodynamic Therapy with Diode Laser
6	1792	6_porphyrromonas_porphyr romonas gingivalis_lipopo lysaccharide	['porphyromonas gingivalis', 'gingivalis porphyromonas', 'pathogen porphyromonas', 'lipopolysaccharide porphyromonas', 'gingivalis infection', 'gingivalis lipopolysaccharide', 'infection porphyromonas', 'gingivalis induces', 'periodontitis', 'gingivalis fima']	['porphyromonas', 'porphyromonas gingivalis', 'gingivalis', 'lipopolysaccharide', 'gingivalis lipopolysaccharide', 'cells', 'induced', 'human', 'expression', 'response']	Porphyromonas Gingivalis Effects
7	1438	7_zirconia_resin_composit e_ceramic	['ceramic crowns', 'resin composites', 'dental prostheses', 'composite resin', 'resin composite', 'composite restorations', 'denture', 'resins', 'zirconia crowns', 'resin based']	['zirconia', 'resin', 'composite', 'ceramic', 'restorations', 'strength', 'crowns', 'bond', 'bond strength', 'adhesive']	Bond Strength of Dental Restorations
8	1177	8_chlorhexidine_plaque_m outhwash_gingivitis	['chlorhexidine mouthwash', 'gingivitis randomized', 'plaque gingivitis', 'gingivitis', 'gingival inflammation', 'induced gingivitis', 'mouthwashes', 'mouthwash', 'mouth rinse', 'periodontitis']	['chlorhexidine', 'plaque', 'mouthwash', 'gingivitis', 'extract', 'efficacy', 'randomized', 'oil', 'clinical', 'trial']	Chlorhexidine & herbal mouthwash
9	1126	9_root_canal_root canal_apical	['root canal', 'apical periodontitis', 'canal treatment', 'canal fillings', 'endodontic treatment', 'canal therapy', 'periodontitis', 'regenerative endodontic', 'periodontal', 'endodontic']	['root', 'canal', 'root canal', 'apical', 'endodontic', 'root resorption', 'teeth', 'resorption', 'canal treatment', 'immature']	Root Canal Therapy Outcomes
10	1003	10_diabetes_type_mellitus _type diabetes	['diabetes periodontal', 'diabetes periodontitis', 'periodontitis diabetes', 'periodontal disease', 'periodontal treatment', 'periodontitis patients', 'periodontal therapy', 'chronic periodontitis', 'periodontitis', 'effect periodontal']	['diabetes', 'type', 'mellitus', 'type diabetes', 'diabetes mellitus', 'periodontitis', 'periodontal', 'patients', 'diabetic', 'periodontal disease']	Diabetes and Periodontal Disease
11	961	11_microbiome_oral_micr obiota_oral microbiome	['oral microbiota', 'oral microbiome', 'salivary microbiota', 'salivary microbiome', 'oral microbial', 'oral bacteria', 'periodontal pathogens', 'gut microbiota', 'microbiome', 'periodontopathic bacteria']	['microbiome', 'oral', 'microbiota', 'oral microbiome', 'periodontitis', 'periodontal', 'microbial', 'subgingival', 'pathogens', 'bacteria']	Oral Microbiome and Health
12	920	12_graft_recession_connec tive tissue_connective	['gingival graft', 'adjacent gingival', 'gingival recessions', 'multiple gingival', 'gingival recession', 'treatment gingival', 'ii gingival', 'flap treatment', 'gingival', 'free gingival']	['graft', 'recession', 'connective tissue', 'connective', 'gingival', 'flap', 'coronally', 'tissue graft', 'coronally advanced', 'advanced']	Gingival Recessions Treatment
13	898	13_smoking_tobacco_smo kers_cigarette	['smoking periodontal', 'periodontal health', 'periodontal disease', 'periodontal therapy', 'periodontitis', 'smoking gingival', 'chronic periodontitis', 'periodontal status', 'periodontal', 'oral health']	['smoking', 'tobacco', 'smokers', 'cigarette', 'nicotine', 'periodontal', 'smoke', 'cessation', 'electronic', 'periodontitis']	Smoking and Periodontal Disease
14	854	14_pregnancy_birth_pregn ant_women	['maternal periodontal', 'periodontitis preterm', 'maternal periodontitis', 'pregnancy gingivitis', 'periodontal health', 'health pregnancy', 'periodontal diseases', 'periodontal disease', 'health pregnant', 'pregnancy outcomes']	['pregnancy', 'birth', 'pregnant', 'women', 'preterm', 'pregnant women', 'preterm birth', 'maternal', 'birth weight', 'periodontal']	Periodontal disease and pregnancy complications
15	851	15_sinus_maxillary sinus_floor_maxillary	['maxillary sinus', 'sinus augmentation', 'sinus grafting', 'sinus floor', 'sinus lift', 'sinus elevation', 'osteotome sinus', 'transcrestal sinus', 'window sinus', 'posterior maxilla']	['sinus', 'maxillary sinus', 'floor', 'maxillary', 'sinus floor', 'elevation', 'augmentation', 'sinus augmentation', 'floor elevation', 'bone']	Sinus Augmentation
16	664	16_aggregatibacter_actino mycetecommitans_aggreg atibacter actinomycetemcomitans_f usobacterium	['aggregatibacter actinomycetemcomitans', 'actinomycetemcomitans fusobacterium', 'induced aggregatibacter', 'actinomycetemcomitans leukotoxin', 'actinomycetemcomitans infection', 'pathogen aggregatibacter', 'actinomycetes', 'actinobacillus', 'actinomycosis', 'actinomycetemcomitans']	['aggregatibacter', 'actinomycetemcomitans', 'aggregatibacter actinomycetemcomitans', 'fusobacterium', 'nucleatum', 'fusobacterium nucleatum', 'prevotella', 'jp2', 'leukotoxin', 'serotype']	Aggregatibacter Actinomycetemcomitans Infections
17	553	17_biofilm_probiotics_pro biotic_biofilms	['probiotics periodontal', 'probiotics oral', 'probiotics', 'periodontal pathogens', 'role probiotics', 'oral biofilms', 'oral biofilm', 'periodontitis', 'probiotic lactobacillus', 'probiotic']	['biofilm', 'probiotics', 'probiotic', 'biofilms', 'lactobacillus', 'oral', 'reuteri', 'lactobacillus reuteri', 'periodontitis', 'subgingival']	Probiotics Periodontal Health
18	528	18_cardiovascular_disease _periodontitis_cardiovascu lar disease	['periodontitis cardiovascular', 'periodontitis atherosclerosis', 'periodontitis atherosclerotic', 'periodontitis risk', 'periodontal disease', 'periodontal diseases', 'periodontitis hypertension', 'hypertension periodontitis', 'disease periodontal', 'periodontitis associated']	['cardiovascular', 'disease', 'periodontitis', 'cardiovascular disease', 'periodontal', 'coronary', 'hypertension', 'periodontal disease', 'association', 'risk']	Periodontal-Cardiovascular Disease Link
19	483	19_covid_covid 19_19_sars	['pandemic dental', 'pandemic oral', 'periodontitis covid', 'oral health', 'dental care', 'covid 19', 'patients covid', '19 pandemic', 'dental', 'cov pandemic']	['covid', 'covid 19', '19', 'sars', 'cov', 'pandemic', 'sars cov', '19 pandemic', 'dental', 'impact covid']	COVID-19 and Dental Practice
20	470	20_arthritis_rheumatoid_r heumatoid arthritis_patients rheumatoid	['periodontitis rheumatoid', 'arthritis periodontitis', 'arthritis periodontal', 'association periodontitis', 'periodontitis patients', 'periodontal disease', 'periodontitis', 'periodontal treatment', 'periodontal', 'arthritis oral']	['arthritis', 'rheumatoid', 'rheumatoid arthritis', 'patients rheumatoid', 'patients', 'periodontitis rheumatoid', 'periodontitis', 'arthritis patients', 'lupus', 'lupus erythematosus']	Rheumatoid Arthritis and Periodontal Disease
21	437	21_titanium_surfaces_tita nium_surfaces_surface	['treatment titanium', 'adhesion titanium', 'titanium surfaces', 'titanium dental', 'titanium surface', 'fibroblasts titanium', 'titanium implants', 'attachment titanium', 'coated titanium', 'titanium implant']	['titanium', 'surfaces', 'titanium surfaces', 'surface', 'titanium surface', 'adhesion', 'vitro', 'human', 'plasma', 'fibroblasts']	Titanium Surface Studies

22	415	22_cleft_cleft lip_lip_palate	['cleft palate', 'cleft lip', 'cleft repair', 'alveolar cleft', 'alveolar clefts', 'cleft patients', 'grafting cleft', 'treatment cleft', 'lip cleft', 'patients cleft']	['cleft', 'cleft lip', 'lip', 'palate', 'lip palate', 'unilateral', 'unilateral cleft', 'alveolar', 'nasalveolar', 'molding']	Cleft Lip and Palate Treatment
23	364	23_toothbrush_plaque_ma nual_toothbrushes	['toothbrushes plaque', 'toothbrush versus', 'manual toothbrushes', 'manual toothbrush', 'electric toothbrush', 'power toothbrush', 'power toothbrushes', 'powered toothbrush', 'powered toothbrushes', 'plaque gingivitis']	['toothbrush', 'plaque', 'manual', 'toothbrushes', 'interdental', 'efficacy', 'randomized', 'powered', 'cleaning', 'plaque removal']	Toothbrush Plaque Removal
24	327	24_kidney_kidney disease_chronic kidney_disease	['periodontitis chronic', 'periodontal disease', 'periodontitis', 'patients periodontal', 'periodontal treatment', 'periodontal status', 'periodontal', 'hemodialysis oral', 'surgical periodontal', 'chronic kidney']	['kidney', 'kidney disease', 'chronic kidney', 'disease', 'renal', 'hemodialysis', 'chronic', 'patients', 'dialysis', 'renal disease']	Periodontitis- CKD association
25	314	25_hiv_virus_immunodeficiency_infect ed	['periodontitis hiv', 'periodontal disease', 'aggressive periodontitis', 'periodontitis', 'manifestations hiv', 'oral health', 'periodontal', 'hiv infection', 'hiv associated', 'oral manifestations']	['hiv', 'virus', 'immunodeficiency', 'infected', 'hiv infected', 'human immunodeficiency', 'immunodeficiency virus', 'oral', 'antiretroviral', 'antiretroviral therapy']	HIV and Periodontal Disease
26	300	26_vitamin_25_vitamin receptor_d3	['vitamin periodontal', 'periodontitis vitamin', 'periodontal disease', 'chronic periodontitis', 'periodontitis', 'periodontitis patients', 'disease vitamin', 'patients periodontitis', 'human periodontal', 'aggressive periodontitis']	['vitamin', '25', 'vitamin receptor', 'd3', 'receptor', 'periodontitis', 'receptor gene', 'hydroxyvitamin', '25 hydroxyvitamin', '25 dihydroxyvitamin']	Vitamin D and Periodontitis
27	269	27_bisphosphonate_osteo necrosis_bisphosphonates _bisphosphonate related	['bisphosphonates osteonecrosis', 'jaw bisphosphonate', 'osteonecrosis jaw', 'jaw osteonecrosis', 'osteonecrosis jaws', 'bisphosphonate associated', 'oral bisphosphonates', 'oral bisphosphonate', 'bisphosphonate related', 'effects bisphosphonates']	['bisphosphonate', 'osteonecrosis', 'bisphosphonates', 'bisphosphonate related', 'osteonecrosis jaw', 'related osteonecrosis', 'jaw', 'related', 'osteonecrosis jaws', 'jaws']	Bisphosphonat e-related Osteonecrosis
28	267	28_fluoride_hypersensitiv ity_dentin_dentin hypersensitivity	['dentin hypersensitivity', 'dentine hypersensitivity', 'dental hypersensitivity', 'management dentin', 'dentifrice containing', 'fluoride dentifrice', 'dentine', 'dentin', 'dentifrices', 'enamel caries']	['fluoride', 'hypersensitivity', 'dentin', 'dentin hypersensitivity', 'enamel', 'erosion', 'containing', 'calcium', 'dentifrice', 'sodium']	Dentin Hypersensitiv ity Management
29	261	29_smile_esthetics_smile esthetics_gummy	['gingival smile', 'smile esthetic', 'smile esthetics', 'smile aesthetics', 'esthetics smile', 'smile design', 'gummy smile', 'display smile', 'smile attractiveness', 'smile']	['smile', 'esthetics', 'smile esthetics', 'gummy', 'gummy smile', 'display', 'esthetic', 'gingival display', 'lip', 'perception']	Smile Aesthetics

Supplementary Table S1: List of the low granularity topics in the 2009-2023 period sorted by topic size (Count= number of paper in the cluster). The table includes the KeyBERT and MMR keywords, and the LLM-generated label