

## DAFTAR PUSTAKA

- Abdulkareem, A. A., Al-Taweel, F. B., Al-Sharqi, A. J. B., Gul, S. S., Sha, A., & Chapple, I. L. C. (2023b). Current concepts in the pathogenesis of periodontitis: from symbiosis to dysbiosis. *Journal of Oral Microbiology*, 15(1). <https://doi.org/10.1080/20002297.2023.2197779>
- Ajuwon, O. R., Marnewick, J. L., Oguntibeju, O. O., & Davids, L. M. (2022). Red Palm Oil Ameliorates Oxidative Challenge and Inflammatory Responses Associated with Lipopolysaccharide-Induced Hepatic Injury by Modulating NF- $\kappa$ B and Nrf2/GCL/HO-1 Signaling Pathways in Rats. *Antioxidants*, 11(8). <https://doi.org/10.3390/antiox11081629>
- Alaraby, A. A., Ismail, R. M., & El Din, W. I. S. (2024). Locally delivered coconut oil in nonsurgical therapy of stage II and III grade B periodontitis: A randomized controlled clinical trial. *Tanta Dental Journal*, 21(4), 507–513. [https://doi.org/10.4103/tdj.tdj\\_33\\_24](https://doi.org/10.4103/tdj.tdj_33_24)
- Alsinaidi, A. A. (2021). Periodontitis, the Current Cellular and Molecular Histopathologic Representation: A Narrative Review. *Journal of Research in Medical and Dental Science*, 9(3), 126–131.
- Althubaiti, A. (2023). Sample size determination: A practical guide for health researchers. In *Journal of General and Family Medicine* (Vol. 24, Number 2, pp. 72–78). John Wiley and Sons Inc. <https://doi.org/10.1002/jgf2.600>
- Álvarez, S., Leiva-Sabadini, C., Schuh, C. M. A. P., & Aguayo, S. (2022). Bacterial adhesion to collagens: implications for biofilm formation and disease progression in the oral cavity. *Critical Reviews in Microbiology*, 48(1), 83–95. <https://doi.org/10.1080/1040841X.2021.1944054>
- Andrei, V., Andrei, S., Gal, A. F., Rus, V., Gherman, L. M., Boşca, et al. (2023). Immunomodulatory Effect of Novel Electrospun Nanofibers Loaded with Doxycycline as an Adjuvant Treatment in Periodontitis. *Pharmaceutics*, 15(2). <https://doi.org/10.3390/pharmaceutics15020707>
- Anggreni, D. (2022). *Metodologi Penelitian Kesehatan*. Penerbit STIKes Majapahit Mojokerto.
- Aral, K., Milward, M. R., Kapila, Y., Berdeli, A., & Cooper, P. R. (2020). Inflammasomes and their regulation in periodontal disease: A review. In *Journal of Periodontal Research* (Vol. 55, Number 4, pp. 473–487). Blackwell Munksgaard. <https://doi.org/10.1111/jre.12733>

- Atanasova, T., Stankova, T., Bivolarska, A., & Vlaykova, T. (2023). Matrix Metalloproteinases in Oral Health—Special Attention on MMP-8. In *Biomedicines* (Vol. 11, Number 6). MDPI. <https://doi.org/10.3390/biomedicines11061514>
- Athul, A., Arulmari, S., Muthukali, S., Balachandran, A., Vijayarangan, A., & Elumalai, A. (2022). Periodontal Wound Healing- A Review. *International Journal of Dentistry Research*, 7(3), 78–82. <https://doi.org/10.31254/dentistry.2022.7308>
- Baima, G., Arce, M., Romandini, M., & Van Dyke, T. (2025). Inflammatory and Immunological Basis of Periodontal Diseases. *Journal of Periodontal Research*, 1–34. <https://doi.org/10.1111/jre.70040>
- Balta, M. G., Papathanasiou, E., Blix, I. J., & Van Dyke, T. E. (2021). Host Modulation and Treatment of Periodontal Disease. *Journal of Dental Research*, 100(8), 798–809. <https://doi.org/10.1177/0022034521995157>
- Bang, E., Oh, S., Ju, U., Chang, H. E., Hong, J. S., Baek, H. J., et al. (2023). Factors influencing oral microbiome analysis: from saliva sampling methods to next-generation sequencing platforms. *Scientific Reports*, 13(1). <https://doi.org/10.1038/s41598-023-37246-2>
- Basudan, A. M., Abas, I., Shaheen, M. Y., & Alghamdi, H. S. (2024). Effectiveness of Topical Oxygen Therapy in Gingivitis and Periodontitis: Clinical Case Reports and Review of the Literature. *Journal of Clinical Medicine*, 13(5). <https://doi.org/10.3390/jcm13051451>
- Becerra-Ruiz, J. S., Guerrero-Velázquez, C., Martínez-Esquivias, F., Martínez-Pérez, L. A., & Guzmán-Flores, J. M. (2022). Innate and adaptive immunity of periodontal disease. From etiology to alveolar bone loss. In *Oral Diseases* (Vol. 28, Number 6, pp. 1441–1447). John Wiley and Sons Inc. <https://doi.org/10.1111/odi.13884>
- Berger, V. W., Bour, L. J., Carter, K., Chipman, J. J., Everett, C. C., Heussen, et al. (2021). A roadmap to using randomization in clinical trials. *BMC Medical Research Methodology*, 21(1), 1–24. <https://doi.org/10.1186/s12874-021-01303-z>
- Bernabe, E., Marcenes, W., Hernandez, C. R., Bailey, J., Abreu, L. G., Alipour, V., et al. (2020). Global, Regional, and National Levels and Trends in Burden of Oral Conditions from 1990 to 2017: A Systematic Analysis for the Global Burden of Disease 2017 Study. In *Journal of Dental Research* (Vol. 99, Number 4, pp. 362–373). SAGE Publications Inc. <https://doi.org/10.1177/0022034520908533>

- Boivin, W. G., Cory, M. T., Kormas, I., & Wolff, L. F. (2025). Adjunctive Local Agents to Subgingival Instrumentation in the Treatment of Periodontitis: A Review of Recent Clinical Trials and Future Perspectives. *Pharmaceutics*, 17(6), 1–20. <https://doi.org/10.3390/pharmaceutics17060697>
- Boynes, S., Sofiyeva, N., Saw, T., Nieto, V., & Palomo, L. (2025). Assessment of salivary matrix metalloproteinase (MMP8) and activated salivary matrix metalloproteinase (aMMP8) in periodontitis patients: a systematic review and meta-analysis. *\*Frontiers in Oral Health*, 6\*. <https://doi.org/10.3389/froh.2025.1444399>
- Buduneli, N. (2020). Biomarkers In Periodontal Health And Disease. In *Springer International Publishing*.
- Butera, A., Gallo, S., Pascadopoli, M., Maiorani, C., Milone, A., Alovise, M., et al. (2022). Paraprobiotics in Non-Surgical Periodontal Therapy: Clinical and Microbiological Aspects in a 6-Month Follow-Up Domiciliary Protocol for Oral Hygiene. *Microorganisms*, 10(2). <https://doi.org/10.3390/microorganisms10020337>
- Cabral-Pacheco, G. A., Garza-Veloz, I., Rosa, C. C. D. La, Ramirez-Acuña, J. M., Perez-Romero, B. A., Guerrero-Rodriguez, J. F., et al. (2020). The roles of matrix metalloproteinases and their inhibitors in human diseases. *International Journal of Molecular Sciences*, 21(24), 1–53. <https://doi.org/10.3390/ijms21249739>
- Cho, Y. D., Kim, K. H., Lee, Y. M., Ku, Y., & Seol, Y. J. (2021). Periodontal wound healing and tissue regeneration: A narrative review. In *Pharmaceutics* (Vol. 14, Number 5). MDPI. <https://doi.org/10.3390/ph14050456>
- Cugini, C., Ramasubbu, N., Tsiagbe, V. K., & Fine, D. H. (2021). Dysbiosis From a Microbial and Host Perspective Relative to Oral Health and Disease. In *Frontiers in Microbiology* (Vol. 12). Frontiers Media S.A. <https://doi.org/10.3389/fmicb.2021.617485>
- Darawsha, A., Trachtenberg, A., Levy, J., & Sharoni, Y. (2021). The protective effect of carotenoids, polyphenols, and estradiol on dermal fibroblasts under oxidative stress. *Antioxidants*, 10(12). <https://doi.org/10.3390/antiox10122023>
- de Molon, R. S., Vernal, R., Oliveira, G. E., Steffens, J. P., Ervolino, E., Theodoro, L. H., et al. (2026). Inflammatory bone loss and signaling pathways in periodontitis: mechanistic insights and emerging



- therapeutic strategies. *Bone Research*, 14(1).  
<https://doi.org/10.1038/s41413-025-00478-1>
- Dermoredjo, S. K., Darmawan, D. H. A., Sumedi, Mutaqin, Dani, F. Z. D. P., et al. (2025). The global sway of Indonesian palm oil: An export analysis. *Journal of Agriculture and Food Research*, 22(May), 102064.  
<https://doi.org/10.1016/j.jafr.2025.102064>
- Diaz, P. I., & Valm, A. M. (2020). Microbial Interactions in Oral Communities Mediate Emergent Biofilm Properties. In *Journal of Dental Research* (Vol. 99, Number 1, pp. 18–25). SAGE Publications Inc.  
<https://doi.org/10.1177/0022034519880157>
- Dolinska, E., Wiśniewski, P., & Pietruska, M. (2024). Periodontal molecular diagnostics: State of knowledge and future prospects for clinical application. *International Journal of Molecular Sciences*, 25(23), 12624.  
<https://doi.org/10.3390/ijms252312624>
- Domokos, Z., Simon, F., Uhrin, E., Szabó, B., Váncsa, S., Varga, G., Hegyi, P., Kerémi, B., & Németh, O. (2024). Evaluating salivary MMP-8 as a biomarker for periodontal diseases: A systematic review and meta-analysis. *Heliyon*, 10(22). <https://doi.org/10.1016/j.heliyon.2024.e40402>
- Doshi, D., Kumar, S., Patel, B., Chaudhari, D., Patel, S., Hirani, T., Patadiya, H. H., Bhingradia, I. R., & Haque, M. (2025). Micronutrients and the Periodontium: A Narrative Review. *Cureus*.  
<https://doi.org/10.7759/cureus.81694>
- Elgezawi, M., Haridy, R., Almas, K., Abdalla, M. A., Omar, O., Abuohashish, H., et al. (2022). Matrix Metalloproteinases in Dental and Periodontal Tissues and Their Current Inhibitors: Developmental, Degradational and Pathological Aspects. In *International Journal of Molecular Sciences* (Vol. 23, Number 16). MDPI.  
<https://doi.org/10.3390/ijms23168929>
- Fragkioudakis, I., Riggio, M. P., & Apatzidou, D. A. (2020). Understanding the microbial components of periodontal diseases and periodontal treatment-induced microbiological shifts. In *Journal of Medical Microbiology* (Vol. 70, Number 1). Microbiology Society.  
<https://doi.org/10.1099/JMM.0.001247>
- Fraser, D., Caton, J., & Benoit, D. S. W. (2022). Periodontal Wound Healing and Regeneration: Insights for Engineering New Therapeutic Approaches. In *Frontiers in Dental Medicine* (Vol. 3). Frontiers Media S.A. <https://doi.org/10.3389/fdmed.2022.815810>

- G. Caton, J., Armitage, G., Berglundh, T., Chapple, I. L. C., Jepsen, S., Kornman, K., L. et al. (2018). A new classification scheme for periodontal and peri-implant diseases and conditions – Introduction and key changes from the 1999 classification. *Journal of Clinical Periodontology*, 45(March), S1–S8. <https://doi.org/10.1111/jcpe.12935>
- Gómez-Polo, C., Montero, J., & Martín Casado, A. M. (2024). Explaining the colour of natural healthy gingiva. *Odontology*, 112(4), 1284–1295. <https://doi.org/10.1007/s10266-024-00906-4>
- Goyal, L., Gupta, M., Sareen, S., Aji, N. R. A. S., Sahni, V., Thomas, J. T., et al. (2025). Active Matrixmetalloproteinase-8 in Periodontal Diagnosis: A Scoping Review. *Diagnostics*, 15(22), 1–19. <https://doi.org/10.3390/diagnostics15222932>
- Grassi, R., Ciccone, F., De Falco, D., Castaldi, M., Agneta, M. T., Nardi, G. M., et al. (2025). Clinical and Microbiological Study on Local Application of an Ozonated Olive Oil Gel in the Periodontal Pockets: A Randomized Double-Blind Trial. *Journal of Clinical Medicine*, 14(15). <https://doi.org/10.3390/jcm14155182>
- Greenwood, D., Afacan, B., Emingil, G., Bostanci, N., & Belibasakis, G. N. (2020). Salivary Microbiome Shifts in Response to Periodontal Treatment Outcome. *Proteomics - Clinical Applications*, 14(3). <https://doi.org/10.1002/prca.202000011>
- Gupta, V., Rastogi, P. P., Ajay, S., Lal, N., Verma, U. P., Singhal, R., Pathak, A. K., Nigam, N., & Rastogi, P. P. (2025). To evaluate the effect of oral zinc supplementation on salivary MMP-8 levels in periodontitis: A randomized, double-blind, placebo-controlled study. *Journal of Oral Biology and Craniofacial Research*, 15(3), 493–499. <https://doi.org/10.1016/j.jobcr.2025.02.013>
- Hajishengallis, G., Chavakis, T., & Lambris, J. D. (2020). Current understanding of periodontal disease pathogenesis and targets for host-modulation therapy. In *Periodontology 2000* (Vol. 84, Number 1, pp. 14–34). Blackwell Munksgaard. <https://doi.org/10.1111/prd.12331>
- Hashim, N. T., Babiker, R., Chaitanya, N. C. S. K., Mohammed, R., Priya, S. P., Padmanabhan, V., et al. (2025). New Insights in Natural Bioactive Compounds for Periodontal Disease: Advanced Molecular Mechanisms and Therapeutic Potential. *Molecules*, 30(4). <https://doi.org/10.3390/molecules30040807>
- Hashim, N. T., Babiker, R., Padmanabhan, V., Ahmed, A. A. T., Chaitanya, N. C. S. K., Mohammed, R., et al. (2025). The Global Burden of Periodontal

- Disease: A Narrative Review on Unveiling Socioeconomic and Health Challenges. *International Journal of Environmental Research and Public Health*, 22(4). <https://doi.org/10.3390/ijerph22040624>
- Hussein, M. H., Badr, B. M., Hassan, K. S., & Ibrahim, I. H. (2024). Evaluation of the Effect of Topically Applied Resveratrol Gel as Adjunctive Treatment for Periodontitis. *European Journal of General Dentistry*, 14(3), 270–277. <https://doi.org/10.1055/s-0044-1795084>
- Iniesta, M., Vasconcelos, V., Sanz, M., & Herrera, D. (2024). Supra- and Subgingival Microbiome in Gingivitis and Impact of Biofilm Control: A Comprehensive Review. In *Antibiotics* (Vol. 13, Number 6). Multidisciplinary Digital Publishing Institute (MDPI). <https://doi.org/10.3390/antibiotics13060571>
- Ishak, S., Choirunnisa, R., Purnama, A. Y., Mua, V. S. A. E. L., Heryyanoor, & Al, E. (2023). *Metodologi Penelitian Kesehatan* (Number November). Penerbit Media Sains Indonesia.
- Jakubovics, N. S., Goodman, S. D., Mashburn-Warren, L., Stafford, G. P., & Cieplik, F. (2021). The dental plaque biofilm matrix. *Periodontology* 2000, 86(1), 32–56. <https://doi.org/10.1111/prd.12361>
- Kasuma, N., Oenzil, F., Darwin, E., & Sofyan, Y. (2018). The analysis of matrix metalloproteinase-8 in gingival crevicular fluid and periodontal diseases. *Indian Journal of Dental Research*, 29(4), 450–454. [https://doi.org/10.4103/ijdr.IJDR\\_97\\_15](https://doi.org/10.4103/ijdr.IJDR_97_15)
- Kementerian Kesehatan Republik Indonesia. (2019). Riset Kesehatan Dasar 2018. In *Kementerian Kesehatan Republik Indonesia*.
- Kementerian Kesehatan Republik Indonesia. (2023). *Survei Kesehatan Indonesia (SKI) 2023*.
- Kementerian Pertanian Republik Indonesia. (2022). *Statistik Perkebunan Unggulan Nasional 2020-2022*.
- Khor, B. H., Tiong, H. C., Tan, S. C., Wong, S. K., Chin, K. Y., Karupaiah, T., et al. (2021). Effects of tocotrienols supplementation on markers of inflammation and oxidative stress: A systematic review and meta-analysis of randomized controlled trials. *PLoS ONE*, 16(July), 1–20. <https://doi.org/10.1371/journal.pone.0255205>
- Kim, H. N. (2022). Changes in salivary matrix metalloproteinase-3, -8, and -9 concentrations after 6 weeks of non-surgical periodontal therapy. *BMC Oral Health*, 22(1). <https://doi.org/10.1186/s12903-022-02185-3>



- Kim, J.-Y., & Kim, H. (2020). Changes in Inflammatory Cytokines in Saliva after Non-Surgical Periodontal Therapy: A Systematic Review and Meta-Analysis. *International Journal of Environmental Research and Public Health*, 18\*. <https://doi.org/10.3390/ijerph18010194>
- Koidou, V. P., Cavalli, N., Hagi-Pavli, E., Nibali, L., & Donos, N. (2020). Expression of inflammatory biomarkers and growth factors in gingival crevicular fluid at different healing intervals following non-surgical periodontal treatment: A systematic review. In *Journal of Periodontal Research* (Vol. 55, Number 6, pp. 801–809). Blackwell Munksgaard. <https://doi.org/10.1111/jre.12795>
- Koka, K. M., Pillarisetti, P., & Yasangi, M. K. (2021). Dental Plaque Biofilm: Development, Pathogenicity and Analysis. *International Journal of Science and Healthcare Research*, 6(3), 127–134. <https://doi.org/10.52403/ijshr.20210721>
- Kowalski, J., Nowak, M., Górski, B., & Górski, R. (2022). What Has Immunology Brought to Periodontal Disease in Recent Years? *Archivum Immunologiae et Therapiae Experimentalis*, 70(1), 1–10. <https://doi.org/10.1007/s00005-022-00662-9>
- Krasniqi, M. S., Dalipi, Z. S., Shabani, D. B., & Droboniku, E. (2025). *Inflammatory Cytokine Variations After Non-Surgical Periodontal Therapy Across Periodontal Stages and Grades*. 1–13.
- Łasica, A., Golec, P., Laskus, A., Zalewska, M., Gędaj, M., & Popowska, M. (2024). Periodontitis: etiology, conventional treatments, and emerging bacteriophage and predatory bacteria therapies. *Frontiers in Microbiology*, 15(September). <https://doi.org/10.3389/fmicb.2024.1469414>
- Lee, Y.-H., Hong, J.-Y., & Lee, G.-J. (2022). Composition and Diversity of Salivary Microbiome Affected by Sample Collection Method. *Journal of Oral Medicine and Pain*, 47(1), 10–26. <https://doi.org/10.14476/jomp.2022.47.1.10>
- Lendhey, S. S., Kale, T., Seth, T., Bhartiya, G., & Hudwekar, A. (2020). Effect of subgingival application of ozone oil versus olive oil as an adjunct to scaling and root planing in chronic periodontitis: A clinical and microbiological study. *Journal of Oral Research and Review*, 12(2), 63–69. [https://doi.org/10.4103/jorr.jorr\\_23\\_19](https://doi.org/10.4103/jorr.jorr_23_19)
- Liakos, A., Pagkalidou, E., Karagiannis, T., Malandris, K., Avgerinos, I., Gigi, E., et al. (2025). A Simple Guide to Randomized Controlled Trials. *International Journal of Lower Extremity Wounds*, 24(3), 518–524.

<https://doi.org/10.1177/15347346241236385>

- Liu, Y., Duan, D., R., Ding, Y., Xu, Y., Zhou, X., Zhao, L., et al. (2020). The combined use of salivary biomarkers and clinical parameters to predict the outcome of scaling and root planing: a cohort study.. *\*Journal of clinical periodontology\**. <https://doi.org/10.1111/jcpe.13367>
- López-Valverde, N., López-Valverde, A., Montero, J., Rodríguez, C., Macedo de Sousa, B., & Aragoneses, J. M. (2023). Antioxidant, anti-inflammatory and antimicrobial activity of natural products in periodontal disease: a comprehensive review. *Frontiers in Bioengineering and Biotechnology*, *11*(August), 1–14. <https://doi.org/10.3389/fbioe.2023.1226907>
- Luchian, I., Goriuc, A., Sandu, D., & Covasa, M. (2022a). The Role of Matrix Metalloproteinases (MMP-8, MMP-9, MMP-13) in Periodontal and Peri-Implant Pathological Processes. *International Journal of Molecular Sciences*, *23*(3). <https://doi.org/10.3390/ijms23031806>
- Lv, C., Wang, Z., Li, Z., Shi, X., Xiao, M., & Xu, Y. (2025). Formation, architecture, and persistence of oral biofilms: recent scientific discoveries and new strategies for their regulation. *Frontiers in Microbiology*, *16*(July), 1–10. <https://doi.org/10.3389/fmicb.2025.1602962>
- Madoromae, H., & Lertcanawanichakul, M. (2025). Red Palm Oil: Nutritional Composition, Bioactive Properties, and Potential Applications in Health and Cosmetics: A Narrative Review. *Molecules*, *30*(22). <https://doi.org/10.3390/molecules30224402>
- Maier, B. (2021). How Physical Interactions Shape Bacterial Biofilms. *Annual Review of Biophysics*, *50*, 401–417. <https://doi.org/10.1146/annurev-biophys-062920-063646>
- Masri, S., Mohd, N., Abu Kasim, N. H., & Razali, M. (2025). Mechanistic Insight into the Antioxidant and Antimicrobial Activities of Palm Oil-Derived Biomaterials: Implications for Dental and Therapeutic Applications. In *International Journal of Molecular Sciences* (Vol. 26, Number 14). Multidisciplinary Digital Publishing Institute (MDPI). <https://doi.org/10.3390/ijms26146975>
- Miola, A. C., Espósito, A. C. C., & Miot, H. A. (2024). Techniques for randomization and allocation for clinical trials. *Jornal Vascular Brasileiro*, *23*. <https://doi.org/10.1590/1677-5449.202400462>
- Molière, S., Jaulin, A., Tomasetto, C. L., & Dali-Youcef, N. (2023). Roles of Matrix Metalloproteinases and Their Natural Inhibitors in Metabolism:



Insights into Health and Disease. In *International Journal of Molecular Sciences* (Vol. 24, Number 13). Multidisciplinary Digital Publishing Institute (MDPI). <https://doi.org/10.3390/ijms241310649>

Mukherjee, K., Amaranath, B. J., Das, N., Dhanai, A., Pallavi, K., & Katiyar, P. (2024). Efficacy of Olive Oil, Ozonated Olive Oil, and Chlorhexidine Gel as an Adjunct to Scaling and Root Planing in Chronic Periodontitis: A Clinical Study. *Journal of Pharmacy and Bioallied Sciences*, 16(Suppl 4), S3332–S3334. [https://doi.org/10.4103/jpbs.jpbs\\_738\\_24](https://doi.org/10.4103/jpbs.jpbs_738_24)

Mulyasari, G., Djarot, I. N., Sasongko, N. A., & Putra, A. S. (2023). Social-life cycle assessment of oil palm plantation smallholders in Bengkulu province, Indonesia. *Heliyon*, 9(8), e19123. <https://doi.org/10.1016/j.heliyon.2023.e19123>

Nair, A. B., Gorain, B., Pandey, M., Jacob, S., Shinu, P., Aldhubiab, B., et al. (2022). Tocotrienol in the Treatment of Topical Wounds: Recent Updates. *Pharmaceutics*, 14(11), 1–19. <https://doi.org/10.3390/pharmaceutics14112479>

Nardi, G., Cesarano, F., Papa, G., Chiavistelli, L., Ardan, R., Jedliński, M., et al. (2020). Evaluation of Salivary Matrix Metalloproteinase (MMP-8) in Periodontal Patients Undergoing Non-Surgical Periodontal Therapy and Mouthwash Based on Ozonated Olive Oil: A Randomized Clinical Trial. *International Journal of Environmental Research and Public Health*, 17\*. <https://doi.org/10.3390/ijerph17186619>

Naruishi, K. (2020). Carotenoids and periodontal infection. *Nutrients*, 12(1). <https://doi.org/10.3390/nu12010269>

Neurath, N., & Kesting, M. (2024). Cytokines in gingivitis and periodontitis: from pathogenesis to therapeutic targets. *Frontiers in Immunology*, 15(August), 1–13. <https://doi.org/10.3389/fimmu.2024.1435054>

Newman, M. G., Klokkevold, P. R., Elangovan, S., & Hernandez-Kapila, Y. (2024). *Newman and Carranza's Clinical Periodontology and Implantology* (14th ed.). Elsevier.

Panlilio, H., & Rice, C. V. (2021). The role of extracellular DNA in the formation, architecture, stability, and treatment of bacterial biofilms. *Biotechnology and Bioengineering*, 118(6), 2129–2141. <https://doi.org/10.1002/bit.27760>

Patil, R. T., Dhadse, P. V., Salian, S. S., & Punse, S. D. (2024). Role of Oxidative Stress in Periodontal Diseases. *Cureus*, 16(5), 1–8. <https://doi.org/10.7759/cureus.60779>

- Pilloni, A., Marini, L., Zeza, B., Ferlosio, A., & Aghazada, R. (2021). Histologic analysis of clinically healthy human gingiva in patients with altered passive eruption. *Dentistry Journal*, 9(3). <https://doi.org/10.3390/dj9030029>
- Primabudi, A. R. I., Budi, A. S., Nata'atmadja, B. S., & Jassey, B. (2025). Topical Vitamin E (Alpha-tocopherol) from Red Palm Oil (*Elaeis guineensis*) Improved Full-thickness Wound Healing in Male Wistar Rats (*Rattus norvegicus*). *Biomolecular and Health Science Journal*, 8(1), 30–35. [https://doi.org/10.4103/bhsj.bhsj\\_7\\_25](https://doi.org/10.4103/bhsj.bhsj_7_25)
- Purnama, K. O., Setyaningsih, D., Hambali, E., & Taniwiryono, D. (2020a). Processing, Characteristics, and Potential Application of Red Palm Oil - A review. *International Journal of Oil Palm*, 3(2), 40–55. <https://doi.org/10.35876/ijop.v3i2.47>
- Pyo, Y., Kwon, K. H., & Han, K. (2025). Therapeutic potential of red palm oil as antioxidant for men's health. *\*Journal of Men's Health\**. <https://doi.org/10.22514/jomh.2025.112>
- Raeeszadeh-Sarmazdeh, M., Do, L. D., & Hritz, B. G. (2020). Metalloproteinases and Their Inhibitors: Potential for the Development of New Therapeutics. In *Cells* (Vol. 9, Number 5). NLM (Medline). <https://doi.org/10.3390/cells9051313>
- Rakprasoot, J., Surayot, U., & Raviyan, P. (2025). Characterization of Red Palm Oil from *Elaeis guineensis* Produced by Multi-step Fractionation and Assessment of Anti-inflammatory Activity. *ASEAN Journal of Scientific and Technological Reports*, 28(2). <https://doi.org/10.55164/ajstr.v28i2.2556339>
- Ramadan, D. E., Hariyani, N., Indrawati, R., Ridwan, R. D., & Diyatri, I. (2020). Cytokines and Chemokines in Periodontitis. *European Journal of Dentistry*, 14(3), 483–495. <https://doi.org/10.1055/s-0040-1712718>
- Ramenzoni, L. L., Hofer, D., Solderer, A., Wiedemeier, D., Attin, T., & Schmidlin, P. R. (2021). Origin of MMP-8 and Lactoferrin levels from gingival crevicular fluid, salivary glands and whole saliva. *BMC Oral Health*, 21(1). <https://doi.org/10.1186/s12903-021-01743-5>
- Ramji, N., Hu, P., Muñoz Bodnar, A., Braga, C. P., Snowball, J., Swift, D, et al. (2025). Multi-Omics Insights into Gingivitis from a Clinical Trial: Understanding the Role of Bacterial and Host Factors. *Microorganisms*, 13(10), 1–20. <https://doi.org/10.3390/microorganisms13102371>

- Rath, S., Bal, S. C. B., & Dubey, D. (2021). Oral Biofilm: Development Mechanism, Multidrug Resistance, and Their Effective Management with Novel Techniques. *Rambam Maimonides Medical Journal*, 12(1), 1–8. <https://doi.org/10.5041/RMMJ.10428>
- S Preethanath, R., I. Ibraheem, W., & Anil, A. (2020). Pathogenesis of Gingivitis. In *Oral Diseases*. IntechOpen. <https://doi.org/10.5772/intechopen.91614>
- Şahin, A. B., & Aydın, T. (2026). Clinical evaluation of edible oils used in traditional oil pulling therapy for plaque control and tooth discoloration: A randomized trial. *Healthcare*, 14(13), 1985. <https://doi.org/10.3390/healthcare14131985>
- Santi-Rocca, J., Martín-García, D. F., Lorca-Alonso, I., la González-de la Fuente, S., Aguado, B., et al. (2025). Microbial Complexes in Subgingival Plaque: A Bacterial Meta-Taxonomic Study. *Journal of Clinical Periodontology*, 52(7), 983–998. <https://doi.org/10.1111/jcpe.14138>
- Sari, A., Santamaria, P., & Nibali, L. (2025). The effect of non-surgical periodontal treatment on progranulin levels. *Journal of Periodontology*, (February), 1–13. <https://doi.org/10.1002/jper.11396>
- Scannapieco, F. A., & Dongari-Bagtzoglou, A. (2021). Dysbiosis revisited: Understanding the role of the oral microbiome in the pathogenesis of gingivitis and periodontitis: A critical assessment. In *Journal of Periodontology* (Vol. 92, Number 8, pp. 1071–1078). John Wiley and Sons Inc. <https://doi.org/10.1002/JPER.21-0120>
- Schoenmakers, M. G. P., Willems, E. J. S., Slot, D. E., & Van der Weijden, G. A. (2022). Success of supportive periodontal therapy in periodontitis patients – A retrospective analysis. *International Journal of Dental Hygiene*, 20(2), 318–327. <https://doi.org/10.1111/idh.12521>
- Schulz, S., Stein, J. M., Schumacher, A., Kupietz, D., Yekta-Michael, S. S., Schittenhelm, F., et al. (2022). Nonsurgical Periodontal Treatment Options and Their Impact on Subgingival Microbiota. *Journal of Clinical Medicine*, 11(5). <https://doi.org/10.3390/jcm11051187>
- Sczepanik, F. S. C., Grossi, M. L., Casati, M., Goldberg, M., Glogauer, M., Fine, N., & Tenenbaum, H. C. (2020). Periodontitis is an inflammatory disease of oxidative stress: We should treat it that way. *Periodontology 2000*, 84(1), 45–68. <https://doi.org/10.1111/prd.12342>



- Senthilnathan, P., Mugil, M. S., & Bhuvaneshwari, B. (2025). Evaluating the Efficacy of Vitamin E Oral Supplementation as an Adjuvant to Scaling and Root Planing in the Treatment of Generalized Chronic Periodontitis: A Pilot Study. *Journal of Interdisciplinary Dentistry*, 15(2), 132–137. [https://doi.org/10.4103/jid.jid\\_205\\_24](https://doi.org/10.4103/jid.jid_205_24)
- Serrano Matos, Y. A., Cano, J., Shafiq, H., Williams, C., Sunny, J., & Cowardin, C. A. (2024). Colonization during a key developmental window reveals microbiota-dependent shifts in growth and immunity during undernutrition. *Microbiome*, 12(1). <https://doi.org/10.1186/s40168-024-01783-3>
- Shadisvaaran, S., Chin, K. Y., Shahida, M. S., Ima-Nirwana, S., & Leong, X. F. (2021). Effect of vitamin E on periodontitis: Evidence and proposed mechanisms of action. *Journal of Oral Biosciences*, 63(2), 97–103. <https://doi.org/10.1016/j.job.2021.04.001>
- Siddiqui, R., Badran, Z., Boghossian, A., Alharbi, A. M., Alfahemi, H., & Khan, N. A. (2023). The increasing importance of the oral microbiome in periodontal health and disease. In *Future Science OA* (Vol. 9, Number 8). Future Science Ltd. <https://doi.org/10.2144/fsoa-2023-0062>
- Silveira, G. R. C., Ganzaroli, V. F., Toro, L. F., da Costa, L. L., Pereira, R. I. L., da Silva, A. B et al. (2025). Brazilian Green Propolis Carried in Lipid-Based Nanostructures: A Potent Adjuvant Therapy to Non-Surgical Periodontal Treatment in the Management of Experimental Periodontitis. *Biomedicines*, 13(7). <https://doi.org/10.3390/biomedicines13071643>
- Skurska, A., Chwiedosik, M., Milewska, A., Milewski, R., Pawłowski, M., Alberichi, J., et al. (2025). The Influence of Injectable Platelet-Rich Fibrin on the Clinical Parameters and the Levels of MMP-8 in the GCF in Non-Surgical Treatment of Periodontitis—Randomized Trial. *Journal of Functional Biomaterials*, 16\*. <https://doi.org/10.3390/jfb16060202>
- Srivastava, V., Dwivedi, S., & Sharma, S. (2022). Periodontal wound healing: An absolute literature review. *Journal of Clinical Images and Medical Case Reports*, 3(3). <https://doi.org/10.52768/2766-7820/1726>
- Steigmann, L., Maekawa, S., Sima, C., Travan, S., Wang, C.-W., & Giannobile, W. V. (2020). Biosensor and lab-on-a-chip biomarker-identifying technologies for oral and periodontal diseases. *Frontiers in Pharmacology*, 11, 588480. <https://doi.org/10.3389/fphar.2020.588480>
- Sundalian, M., Zainuddin, A., & Anita. (2022). Analysis of carotenoid

composition in oil palm fruits (*Elaeis guineensis* jacq.) from several varieties: A review. *Biointerface Research in Applied Chemistry*, 12(2), 1470–1479. <https://doi.org/10.33263/BRIAC122.14701479>

Taha, N. T. H., M.Halawa, A., Magdy Amin, R., & Fathy, I. (2024). Reversing gingival symptoms of vitamin A deficiency by Red palm oil supplementation. *Al-Azhar Journal of Dental Science*, 27(3), 357–366. <https://doi.org/10.21608/ajdsm.2024.283190.1531>

Tan, C. H., Lee, C. J., Tan, S. N., Poon, D. T. S., Chong, C. Y. E., & Pui, L. P. (2021). Red palm oil: A review on processing, health benefits and its application in food. *Journal of Oleo Science*, 70(9), 1201–1210. <https://doi.org/10.5650/jos.ess21108>

Teles, F., Chandrasekaran, G., Martin, L., Patel, M., Kallan, M., Furquim, C., et al. (2024). Salivary and Serum Inflammatory Biomarkers During Periodontitis Progression and After Treatment. *\*Journal of clinical periodontology*, 51\*, 1619 - 1631. <https://doi.org/10.1111/jcpe.14048>

Teschler, J. K., Nadell, C. D., Drescher, K., & Yildiz, F. H. (2022). Mechanisms Underlying *Vibrio cholerae* Biofilm Formation and Dispersion. *Annual Review of Microbiology*, 76, 503–532. <https://doi.org/10.1146/annurev-micro-111021-053553>

Tjandra, A., Murdiastuti, K., Soesilowati, A. S. K., & Yuniawati, F. (2022). The difference in scaling root-planing results between addition of photodynamic therapy and application of metronidazole gel of 25% in chronic periodontitis treatment. *Majalah Kedokteran Gigi Indonesia*, 7(3), 125. <https://doi.org/10.22146/majkedgiind.54560>

Toma, A. I., Fuller, J. M., Willett, N. J., & Goudy, S. L. (2021). Oral wound healing models and emerging regenerative therapies. *Translational Research*, 236, 17–34. <https://doi.org/10.1016/j.trsl.2021.06.003>

Tufanaru, C., Munn, Z., Aromataris, E., Campbell, J., & Hopp, L. (2020). JBI Critical Appraisal Checklist for Randomized Controlled Trials. *JBI Global*. <https://synthesismanual.jbi.global>

Vasiliu, B., Tărăboanță, I., Teodorescu, A. C., Lodbă, A., Rotundu, G., Anisie, E., Luchian, I., & Solomon, S. (2026). Differential Response of Salivary MMP-8 and MMP-9 to Full-Mouth Disinfection: Implications for Biomarker Sensitivity in Periodontal Therapy. *\*Dentistry Journal*, 14\*. <https://doi.org/10.3390/dj14050283>

Vo, T. T. T., Chu, P., Tuan, V. P., Te, J. S.-L., & Lee, I.-T. (2020). The Promising Role of Antioxidant Phytochemicals in the Prevention and Treatment

of Periodontal Disease via the Inhibition of Oxidative Stress Pathways:  
Updated Insights. \*Antioxidants, 9\*.  
<https://doi.org/10.3390/antiox9121211>

Vy, H., Vo, T., Nguyen, Y. T., & Kim, N. (2023). *Vitamin A , D , E , and K as Matrix Metalloproteinase-2 / 9 Regulators That Affect Expression and Enzymatic Activity.*

Wang, Y., Zhuo, L., Yang, S., Dong, C., & Shu, P. (2025). Burden of periodontal diseases in young adults. *Scientific Reports*, 15(1), 1–9.  
<https://doi.org/10.1038/s41598-025-88249-0>

Woelber, J. P., & Vach, K. (2023). Healthier Smile: The Role of Diet and Nutrition in the Prevention and Therapy of Caries, Gingivitis, and Periodontitis. In *Nutrients* (Vol. 15, Number 20). Multidisciplinary Digital Publishing Institute (MDPI). <https://doi.org/10.3390/nu15204319>

Xu, X. W., Liu, X., Shi, C., & Sun, H. C. (2022). Roles of Immune Cells and Mechanisms of Immune Responses in Periodontitis. *The Chinese Journal of Dental Research: The Official Journal of the Scientific Section of the Chinese Stomatological Association (CSA)*, 24(4), 219–230. <https://doi.org/10.3290/j.cjdr.b2440547>

Yilmaz, B., & Ağagündüz, D. (2022). Fractionated palm oils: emerging roles in the food industry and possible cardiovascular effects. *Critical Reviews in Food Science and Nutrition*, 62(7), 1990–1998.  
<https://doi.org/10.1080/10408398.2020.1869694>

Zhuang, C., Yuan, J., Du, Y., Zeng, J., Sun, Y., et al. (2022). Effects of Oral Carotenoids on Oxidative Stress: A Systematic Review and Meta-Analysis of Studies in the Recent 20 Years. *Frontiers in Nutrition*, 9(April), 1–15. <https://doi.org/10.3389/fnut.2022.754707>