

Emily Davison
4th year dental student

Glasgow Dental School
378 Sauchiehall St, Glasgow, United Kingdom G2 3JZ

“Why I would consider a career in periodontology”

There is no better time to consider a career in periodontology; a field providing the opportunity to combine working in a biologically orientated discipline, engage in cutting edge scientific research, and above all provide patient centred care. My intent to pursue a career in periodontology stems from my keen interest in the immune system and how immune dysregulation can link oral disease with systemic disease, as well as desire to work with patients to provide optimal care and empower them to make the right health care decisions. Furthermore, periodontology is fundamental to all other aspects of oral health. Without a good foundation in periodontal health, most other dentistry is destined to fail.

I firmly believe that evidence based dentistry and continual investment into research are fundamental and should be at the forefront of any discipline. In the field of periodontology, there are numerous exciting and continually emerging developments regarding underlying knowledge of the pathogenesis of periodontal disease; such as evidence for the role of diverse dysbiotic microbial communities in disease pathogenesis (Mira, Simon-Soro & Curtis, 2017), new diagnostic technology measuring disease biomarkers to predict disease progression (Sorsa, Gieselmann, Arweiler & Hernández, 2017), and innovative new management strategies targeting disease through immune modulation (Preshaw, 2017).

Another fascinating development in periodontology is the emerging evidence for the bi-directional relationship of the oral cavity and periodontal health with systemic disease (Winning & Linden, 2015). It is alarming that periodontitis, whilst the sixth most prevalent condition worldwide (Marcenes et al., 2013, Kassebaum et al., 2014), remains amongst the least acknowledged. Given recent evidence of the implications of periodontal disease on chronic inflammatory disease, it isn't difficult to imagine the difference acknowledgement of this relationship could have on the quality of life for patients suffering with these conditions. Classic studies such as Jan Lindhe's landmark study on plaque induced periodontitis in beagles, where two of the eight dogs failed to develop periodontitis despite the presence of plaque and gingivitis (Lindhe, Hamp & Loe, 1975), suggest that pathogens are necessary, yet not sufficient to cause the clinical presentation of periodontitis alone. Since then, research into the field of periodontal diseases has progressed dramatically around the association of periodontitis with the expression of disease modifying factors, e.g. smoking, that shift the immunological inflammatory responses beyond normal limits (Kornman, 2008). Evidence already links periodontitis as a risk factor for cardiovascular disease, glycemic control in diabetes and adverse outcomes in pregnancy (Winning & Linden, 2015). Furthermore, associations are emerging around chronic diseases with complex pathogenesis including rheumatoid arthritis, respiratory disease, chronic renal disease, obesity, metabolic syndrome, cognitive impairment and cancer (Linden & Herzberg, 2013).

The epidemiological association between periodontitis and rheumatoid arthritis (Hajishengallis, 2015, Potempa, Mydel & Koziel, 2017), is of personal interest to me. Many rheumatoid arthritis

patients present with antibodies to citrullinated proteins (ACPAs) prior to clinical onset of symptoms. In rheumatoid arthritis an unknown trigger causes circulation of connective tissue proteins in the joints. ACPAs and auto-reactive CD4 T cells then influx into the joints causing inflammation and tissue destruction. Periodontitis is thought to cause citrullination of host and bacterial peptides, which may be associated with the formation of these ACPAs in rheumatoid arthritis patients (Hajishengallis, 2014; Potempa, Mydel and Koziel, 2017). During my degree I was inspired to engage with research at the University of Glasgow; working in a laboratory investigating T cells responses to citrullinated protein in rheumatoid arthritis. This experience led me to organise to work with a research group at the Karolinska Institute for my upcoming elective that investigate the connections of rheumatoid arthritis with periodontitis associated bacteria *P. gingivalis* (Kharlamova et al., 2016). These are novel and exciting studies, and in the future I hope to similarly combine providing clinical treatment to complex patient cohorts with relevant laboratory based research.

The recent EFP manifesto highlighted the need for future research to provide solid scientific evidence to substantiate the emerging data that associates periodontal disease with systemic disease ("The EFP Manifesto: Perio and General Health", 2018). Clearly, the opportunities and options in this field are extremely exciting for young dentists and students at the beginning of their careers who possess a desire for research and discovery. Opportunities are many, including lab based, epidemiological and clinical work with affected patient cohorts.

In periodontology, undoubtedly the patients themselves are paramount. Healthcare as a concept is changing; the locus of control is shifting from health care practitioner to patient and periodontology is one of the disciplines which pioneered this shift (Derbyshire, 1970). Having worked with patients with periodontal disease who have subsequently lost teeth, I have witnessed the impact this can have on quality of life (Gerritsen, Allen, Witter, Bronkhorst & Creugers, 2010). Educating patients and handing them the locus of control of their own disease through encouraging them to make the right health care choices is powerful and it is our duty as health care providers to enable patients to make the choices that can influence not just their oral health but health in its entirety.

Periodontology provides a unique blend of clinical therapy, holistic patient care, behavioural management and engaging scientific research, making it evident that periodontal treatment affects the whole body, not just the mouth. I feel lucky to have started dentistry at a time where periodontology is such a dynamic, ever evolving field and aspire to do a PhD post-graduation, pursuing a career combining academic and clinical periodontology. My prediction for periodontal treatment in 20 years, is that as our molecular and immunological understanding of periodontal disease increases, there will be a shift towards individualised diagnosis and targeted treatment based on the genetics, microbiome and immunological profile of patients, and increased cooperation with medical colleagues as the links with chronic inflammatory diseases become recognised. The face of periodontology is changing and it does not take a lot of imagination to see that with it comes the opportunity to make a real and lasting difference to oral health.

References

- Derbyshire, J. (1970). Patient Motivation in Periodontics. *Journal Of Periodontology*, 41(41), 630-635. <https://doi.org/10.1902/jop.1970.41.11.630>
- Gerritsen, A., Allen, P., Witter, D., Bronkhorst, E., & Creugers, N. (2010). Tooth loss and oral health-related quality of life: a systematic review and meta-analysis. *Health And Quality Of Life Outcomes*, 8(1), 126. <https://doi.org/10.1186/1477-7525-8-126>
- Hajishengallis, G. (2015). Periodontitis: from microbial immune subversion to systemic inflammation. *Nature Reviews Immunology*, 15(1), 30-44. <https://doi.org/10.1038/nri3785>
- Kassebaum, N., Bernabé, E., Dahiya, M., Bhandari, B., Murray, C., & Marcenes, W. (2014). Global Burden of Severe Periodontitis in 1990-2010. *Journal Of Dental Research*, 93(11), 1045-1053. <http://doi.org/10.1177/0022034514552491>
- Kharlamova, N., Jiang, X., Sherina, N., Potempa, B., Israelsson, L., & Quirke, A. , . . . Lundberg, K. (2016). Antibodies to *Porphyromonas gingivalis* Indicate Interaction Between Oral Infection, Smoking, and Risk Genes in Rheumatoid Arthritis Etiology. *Arthritis & Rheumatology*, 68(3), 604-613. <https://doi.org/10.1002/art.39491>
- Kornman, K. (2008). Mapping the Pathogenesis of Periodontitis: A New Look. *Journal Of Periodontology*, 79(8s), 1560-1568. <https://doi.org/10.1902/jop.2008.080213>
- Linden, G., & Herzberg, M. (2013). Periodontitis and systemic diseases: a record of discussions of working group 4 of the Joint EFP/AAP Workshop on Periodontitis and Systemic Diseases. *Journal Of Clinical Periodontology*, 40, S20-S23. <https://doi.org/10.1111/jcpe.12091>
- Lindhe, J., Hamp, S., & Loe, H. (1975). Plaque induced periodontal disease in beagle dogs. *Journal Of Periodontal Research*, 10(5), 243-255. <https://doi.org/10.1111/j.1600-0765.1975.tb00031.x>
- Marcenes, W., Kassebaum, N., Bernabé, E., Flaxman, A., Naghavi, M., Lopez, A., & Murray, C. (2013). Global Burden of Oral Conditions in 1990-2010. *Journal Of Dental Research*, 92(7), 592-597. <http://doi.org/10.1177/0022034513490168>
- Mira, A., Simon-Soro, A., & Curtis, M. (2017). Role of microbial communities in the pathogenesis of periodontal diseases and caries. *Journal Of Clinical Periodontology*, 44, S23-S38. <https://doi.org/10.1111/jcpe.12671>
- Potempa, J., Mydel, P., & Koziel, J. (2017). The case for periodontitis in the pathogenesis of rheumatoid arthritis. *Nature Reviews Rheumatology*, 13(10), 606-620. <http://doi.org/10.1038/nrrheum.2017.132>

- Preshaw, P. (2017). Host modulation therapy with anti-inflammatory agents. *Periodontology* 2000, 76(1), 131-149. <http://doi.org/10.1111/prd.12148>
- Sorsa, T., Gieselmann, D., Arweiler, N., & Hernández, M. (2017). A quantitative point-of-care test for periodontal and dental peri-implant diseases. *Nature Reviews Disease Primers*, 3, 17069. <http://doi.org/10.1038/nrdp.2017.69>
- The EFP Manifesto: Perio and General Health. (2018). Efp.org. Retrieved 4 March 2018, from <https://www.efp.org/efp-manifesto/manifesto.html>
- Tonetti, M., Jepsen, S., Jin, L., & Otomo-Corgel, J. (2017). Impact of the global burden of periodontal diseases on health, nutrition and wellbeing of mankind: A call for global action. *Journal Of Clinical Periodontology*, 44(5), 456-462. <http://doi.org/10.1111/jcpe.12732>
- Winning, L., & Linden, G. (2015). Periodontitis and systemic disease. *BDJ Team*, 2(10), 15163. <http://doi.org/10.1038/bdjteam.2015.163>