

Looking for an Oasis in a Desert:



Clinical Aspects & Potential Biomarkers of Dry Mouth and Dry Eye

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On June 30, 2022, Håvard Hynne defended his thesis “Clinical Aspects and Potential Biomarkers in Dry Mouth and Dry Eye Disease” at the Department of Oral Surgery and Oral Medicine, Faculty of Dentistry, University of Oslo (UiO). The PhD project was supervised by Professor Janicke Liaaen Jensen, Faculty of Dentistry, UiO; Professor Hilde Kanli Galtung, Faculty of Dentistry, UiO; Professor Tor Paaske Utheim, Department of Ophthalmology/Medical Biochemistry, Oslo University Hospital; and Associate Professor Lara Adnan Aqrabi, Kristiania University College.

Dry mouth and dry eye are common findings, particularly in the older population, and may be related to various conditions. The autoimmune disease primary Sjögren’s syndrome (pSS) is one known cause of dry mouth and dry eye. Additionally, the most common late effect of radiotherapy for cancer in the head and neck area is dry mouth. Whether this treatment also causes dry eye has been investigated to a limited extent.

This dissertation investigated possible connections between dry mouth and dry eye, performed clinical examinations of the oral cavity and the ocular surface, and analyzed the composition of saliva and tear fluid. An overview of the questionnaire-based assessments and clinical examinations is shown in **Figure 1**. Additionally, biological samples in the form of saliva and tears were collected for subsequent biochemical analyses of cytokines, using the

Key points:

- Head and neck cancer patients experience late effects related to dry mouth as well as dry eye, negatively affecting the patients’ quality of life.
- There is an association between oral and ocular parameters in young elderly subjects, underlining the importance of interdisciplinary clinical communication and cooperation between various health professions.
- Saliva and tears are promising fluids for diagnostic purposes. Both fluids are complex, and further work is needed. This thesis includes novel findings regarding cytokines, metabolites, and proteins of both saliva and tears.

immunoassay technology multiplex bead array assay, and global metabolomics and proteomics analyses, using high-performance liquid chromatography in combination with high-resolution mass spectrometry.

We found that the cancer patients had not only dry mouth but also dry eye. Dry eye was also common among the 65-year-olds. A previously unproven link between dry mouth and dry eye was also identified in both groups. Mapping possible disease biomarkers in saliva and tears (cytokines, metabolites, and proteins) demonstrated both similarities and differences between patients with head and neck cancer and those with pSS.

Collectively, the findings in this thesis substantiate the rationale for evaluating oral as well as ocular problems in various patient groups and underline the need for cooperation between various disciplines in the clinical follow-up as well as in research. Furthermore, biochemical analyses of saliva and tears can aid in the identification of possible biomarkers of disease, which in turn may lead to simpler diagnostics and novel treatments in the future.

Future directions:

- Examining dry mouth and dry eye diseases in patients with other etiologies, such as side effects from medications.
- Creating a road map for how salivary and ocular glands are affected by a range of conditions in order to identify biomarkers that in turn can contribute to better diagnostics and more targeted treatment.

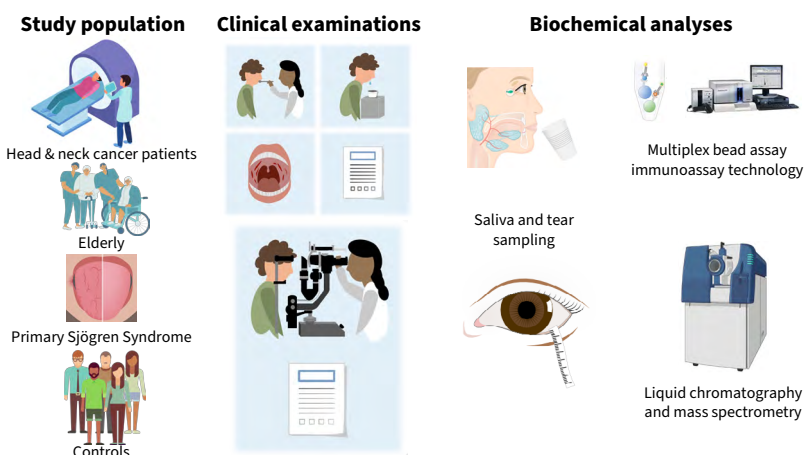


Figure 1. Overview of study design. Illustrations by Sara Nøland & Emily Moschowits

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