

Annual report 2020

The year, 2020, has become the epitome of the COVID-19 pandemic. Global lockdown and restricted ways of life were the consequences, mixed with anxiety and fear of the disease. Many of us worked at home for long periods, deprived of social contacts and physical collaboration. All national and international conferences was cancelled, and we had to put several posters and oral presentations in the drawer. What a frustration ! However, this was also an opportunity to unfold ones academic sides. The results hereof were impressive. We prepared an application to the region and Aarhus University to obtain status as university clinic for the ENT Department. In September, it was finally announced that the Department was approved as University Clinic for Flavour, Balance, and Sleep for the next five years ! And the appointment as University Clinic was indeed justified by the annual accounts: **28 publications and fundraising 5.648.691 DKK !** In addition, Alexander Fjældstad and Jannik Buus Bertelsen were appointed as associate professors for a five year period. We really wish to thank the entire staff at the Department for our achievements - each and every one of you contribute to the total research outcome. We hope to maintain the attitude that our research is a common cause for the next many years.

What are the perspectives for 2021 ? The mutations of SARS-CoV-2 will influence our activities to a certain degree. But we have learned to take advantage of the most exquisite property of mankind: adaptability. The Department managed to attract several new equipment, e.g. intraoperative fluorescence during thyroid surgery. We have also provided the most advanced model of a Cone Beam CT scanner. The intensions are that Ali Abood initiates a PhD course with focus on intraoperative fluorescence, and Niels Holm has already obtained approval of his PhD protocol, which involves the Cone Beam CT. In June, Laura Danielsen will start her research year at the Department followed by a PhD study about olfaction using olfactometry and EEG. We are also going to welcome Louise Devantier. Besides her clinical activities as trainee, she will work as post doc one day per week with vestibular research. We have also great expectations about boosting the research at our audiological clinic. The audiological team with Hanne Owen and Sophie Mikkelsen works intensively with framing the entire area of tinnitus as well as pediatric audiology.

Hopefully, we can return to normality during the summer and autumn and resume social contact. We will look forward to launch some research workshops and a two days boot camp in 2021. Until then, stay healthy and keep up the courage !

Cordially,

Therese & Anne Louise

On the following pages, we present the members of the research staff; status of ongoing projects; fundraising including a list of applications and grants; and a list of publications. Happy reading !

Research staff

Therese Ovesen, Professor, senior consultant, DMSc.

As head of research at the Department, I strive for being inspiring, motivating, and including - all staff members are welcome in our research environment anytime. I intend to be a good ambassador for the Department when acting with the surroundings and partners. I appreciate freedom of research, transparency, and openness about our ideas, projects, and outcomes. And of course, our research conduct must reflect propriety and honesty.



Infectious diseases and sensory disorders are main themes in my research activities throughout the past 30 years. Especially, infections of the middle ear and the pharynx have been focus areas as well as loss of smell and taste, hearing impairment, and vertigo. As a more novel field, I have engaged myself in sleep related research. Clinical and pre-clinical studies are parts of my research methodologies, but I have also solid experience with animal models and in vitro studies.

Together with my fabulous colleagues, I founded Flavour Institute in 2015 and Flavour Clinic in 2016

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<https://orcid.org/0000-0003-0864-7987>

Alexander Wieck, Associate professor, MD, PhD.

I am a medical doctor and associate professor at Aarhus University. I co-founded the Flavour Clinic in Holstebro and Flavour Institute at Aarhus University. In my research, I work with both clinical and basic research within the fields of taste and smell.



As a result of COVID-19, the year 2020 has been filled with challenges for Flavour research, as many projects have been delayed due to restrictions while many knowledge gaps have emerged in the association between COVID-19 and taste- and smell loss. I was the primary investigator on the first study to confirm that COVID-19 can result in test-verified combined taste and smell loss. Subsequently, I have initiated a follow-up study on the duration of taste and smell loss following COVID-19, where the first paper has been published from the cohort highlighting that many patients suffer from prolonged chemosensory deficits. I am the Danish representative in the international collaboration Global Consortium for Chemosensory Research (<https://gcchemosensr.org>), where several studies on the matter are published and ongoing.

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Jannik Bertelsen, Associate professor, ENT specialist, PhD.

My current scientific activity involves obstructive sleep apnea and surgery methods for benign tonsillar diseases. Obstructive sleep apnea (OSA) is the most common sleep-related breathing disorder and is characterized by recurrent episodes of complete or partial obstruction of the upper airway leading to reduced or absent breathing during sleep. Surgical management of OSA is an alternative if first-line treatment with continuous positive airway pressure (CPAP) is not succeeded.



Drug induced sedation endoscopy (DISE) is a valuable diagnostic tool when deciding the proper surgical management of the upper airways.

The tonsil surgery register covers indications and choices of surgical methods for benign tonsillar diseases in our hospital and the ambition is to spread it to a national register. The results are used in a Nordic

collaboration with Norway and Sweden to compare the results across countries and to compare outcomes of different clinical practice and to create a foundation for research collaborations.

In 2021, we initiate a multicenter study in the ENT departments in Aalborg, Vejle, Esbjerg and Holstebro to investigate the frequency of post-tonsillectomy bleeding in cold steel tonsillectomy versus impedance-dependent-tissue-sealing (BiZact) tonsillectomy in a randomized controlled trial.

<https://pure.au.dk/admin/workspace/personal/overview/>

Kasra Zainali-Gill, ENT specialist, PhD.

In collaboration with Jannik Bertelsen, I am focused on investigation and surgical treatment of obstructive sleep apnea. Prior to introduction of specific surgical modalities at the Department, we conducted a feasibility study and the article was submitted for review in 2020. The study addresses the possibility for novices to become familiar with evaluation of drug induced sleep endoscopy (DISE) by means of DISE videos. In 2020, we were fortunate to see that DISE was implemented in our clinical setup. As of March, the first patient was included in the DISE database, and 75 patients have been included by the end of the year. Furthermore, the first sleep surgeries were performed in 2020. All data is stored in the DISE database and patients will be followed for 12 months. Unfortunately, due to COVID-19 lockdown, courses in sleep surgery was postponed in 2020.



In 2020, I received a grant of 1.000.000Dkr from **Pulje til styrkelse af sundhedsforskning i Region Midt** allocated to investigate sleep surgery for the next two years.

The next step is a systemic review of sleep surgery according to DISE findings. The review will be our guideline how to approach the heterogenous group of patients suffering from obstructive sleep apnea.

Andreas Steenholt Niklassen, MD, PhD-student.

My research interests involve smell, taste and quality of life related to the senses.

Currently, I am investigating if treatment options for olfactory dysfunction can be improved, by improving olfactory training. At the same time, I am investigating the central plasticity in relation to the olfactory system by using structural and functional MRI in health and disease. The quality-of-life changes when losing or regaining the sense of smell, and this is extremely important to be able to measure, to quantify the effect of treatment. In my research I am using modern psychometric methods to develop patient reported outcome measures.

Research skills: Clinical studies, human neuroplasticity, functional and structural magnetic resonance imaging, modern and classical psychometrics, olfaction and gustation.

<http://au.dk/an@clin>



Tina Lildal, MD, PhD-student.

Obstructive sleep apnoea (OSA) is common among children (1-3%), but obtaining accurate diagnostics is challenging. Polysomnography, an extensive sleep study conducted in a sleep lab, is the gold standard for diagnostics, but due to high cost and low accessibility in Denmark, the diagnosis is currently based solely on clinical examination. Home sleep apnea test (HSAT) is a simplified version of polysomnography used for diagnosing OSA in adults.

In my PhD project, we investigate the validity of HSAT for diagnosing OSA in children. Additionally, we evaluate the use of OSA specific questionnaires and urinary biomarkers for assessing severity of morbid conditions associated with childhood OSA. Ultimately, this could lead to better selection of candidates for surgical treatment.

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Niels Holm, MD, pre-PhD student.

I will complete my training as ENT Specialist by May 31th 2021. In 2020, I published a systematic review on acute otitis media and antibiotics in children in Danish Medical Journal. My PhD protocol about Eustachian tube dysfunction has been approved by the Graduate School, Aarhus University, and I will initiate the Ph.D. project June, 2021. The PhD study involves use of the new acquisition: the conebeam-CT. Meanwhile I participate in studies about stapedotomies, and the need for Eustachian tube dilation after myringoplasty.



Dorthe Rasmussen, Laboratory Technician.

Mainly, I participate in Research Year studies and PhD projects at the ENT Department as well as in our laboratory facilities, Department of Clinical Medicine, Aarhus University. My research competences include all kinds of lab techniques, such as cell cultures, biochemical analyzes and immunohistochemistry. I produce the taste drop test, which is developed by Alexander Fjældstad, and conduct all smell and taste tests among both adults and children. Currently, I perform smell and taste tests in children with diabetes. I am also involved in COVID-19-related projects as we test smell and taste in patients referred from the post-COVID-clinics in Skejby and Herning.



Tascha Hovmøller Sørensen, Research Secretary.

I take care of administrative assistance for Therese Ovesen. It means that I provide updates on the research homepage including all ongoing projects, list of publications and funding. Together with Therese Ovesen, I prepare the annual reports. Furthermore, I ensure communication with the Department of Clinical Medicine at Aarhus University; I have knowledge of PURE; the financial management program Indfak; and AURUS (travel settlement at Aarhus University), hereunder travel arrangement for PhD assessors, guests from abroad, and conferences participation. I also assist researchers at the Department with regard to



application formulas, synopsis and protocol schemes. I coordinate the journal clubs and research workshops at the Department, and I link to various partners and colleagues. Finally, I constantly upgrade my qualifications by participation in relevant courses/fora, e.g. at the Department of Clinical Medicine.

Project status

1. Otology/vestibulology (including *Balance*)

Title	First author	Aim	Status
Eustachian tube dysfunction	Niels Holm	PhD thesis: Eustachian tube dysfunction	Start 01.06.2021
Treatment of Meniere's disease	Louise Devantier	Systematic review	Submitted
Treatment of AOE	Niels Holm	Systematic review	Article in preparation
Patients hospitalized with OE	Frida Jacobsen	Original article	Data collection
Bedside test for evaluation of balance in adolescents	Mathias Hald	Original article	Article in preparation
Patients in a balance clinic	Abdirisag Mohamed	Original article	Data collection
Pediatric vertigo	Mathias Hald	Original article	Data collection
Hearing after stapedotomy	Charlotte Wedel	Original article	Article in preparation
Agreement between DW MRI and clinical assessment in detection of cholesteatomas	Mette Ørndrup	Original article	Data collection
Hearing after cholesteatoma surgery	Anne Mette Ryom	Original article	Data collection
Dehiscence of the internal carotid artery	Niels Holm	Original article	Data collection

2. Rhinology (including *Flavour*)

Title	First author	Aim	Status
Taste from tongue to brain	Alexander Fjældstad	Doctoral thesis	Three years left
Smell rehabilitation	Andreas Niklassen	PhD thesis	1 ½ years left
Olfactory impairment associated with naso-sinal surgery	Laura Danielsen	Research year	Protocol completed Starts 1.7.21
Comparative study of the peripheral olfactory system	Laura Danielsen	MD-PhD thesis	Protocol in preparation
Smell and taste among patients with chronic kidney disease	Annegrete Danielsen	Original article	Submitted
Food neophobia	Jelena Stankovics	Original article	Submitted
Isolated taste disorders	Dovile Stankevici	Original article	Submitted
Prognosis of epistaxis	Jacob Galilli	Original article	Submitted
3T MRI of the olfactory bulb	Alexander Fjældstad	Original article	Article in preparation
Retronasal olfaction	Andreas Niklassen	Original article	Article in preparation
The nasal microbiome	Therese Ovesen	Original article	Data collection
Smell and taste in COVID-19	Alexander Fjældstad	Original article	Data collection
Immune deficiencies in chronic rhino-sinusitis	Anita Garcia	Original article	Data collection

3. Head and neck (including *Sleep*)

Title	First author	Aim	Status
OSAS in children	Tina Lildal	PhD thesis	Mid-term evaluation
Tonsil surgery in Denmark	Line Nissen	PhD thesis	Protocol in preparation
Fluorescence during thyroid surgery	Ali Abood	PhD thesis	Protocol in preparation
DISE: learning curves	Jannik Bertelsen/Kasra Zainali-Gill	Original article	Submitted
Parapharyngeal abscesses and pathogens	Anne Louise Bach Christensen	Original article	Submitted

pN-staging metrics in OSCC	Chr. Mirian Larsen	Original article	Submitted
Dysphagia	Nichlas Udholm	Original article	Article in preparation
DISE and sleep surgery	Kasra Zainali-Gill	Systematic review	Article in preparation
DISE in children	Henrik Münch	Systematic review	Article in preparation
Outcome of tonsil and adenoid surgery	Jannik Bertelsen	Original article	Article in preparation
Tonsil surgery in the Nordic countries	Therese Ovesen	Original article	Article reviewed by co-authors
OSAS among patients scheduled for ENT surgery	Charlotte Riis	Original article	Article in preparation
Optimization of home monitoring sleep	Tina Lildal	Original article	Article in preparation
Efficacy of adenoidectomy	Christine Kroer Nielsen	Systematic review	Article collection
Accuracy of UL guided fine needle aspiration	Lars Hansen	Original article	Article in preparation
Outcome of benign head and neck surgery	Jacob Miehe	Original article	Data collection

4. Audiology

Title	First author	Aim	Status
Global hearing screening	Therese Ovesen	Original article	Submitted
OAE screening in general practice	Sophie Mikkelsen	Original article	Article in preparation
Large scale preschool hearing screening	Sophie Mikkelsen	Original article	Protocol draft
Long term growth of vestibular schwannomas	Bartosz Torzynski	Original article	Article in preparation
Validation of Tinnitus Functional Index	Rasmus Dreyer	Original article	Article in preparation
Consequences of vestibular schwannomas	Christian Larsen	Six original articles	Data analysis

Traumatic brain injury and hearing loss	Christian Larsen	National register study	Data collection
Adherence to guidelines and effects of tinnitus treatment	Magnus Madsen	Two original article	Data collection
Bilateral vestibulopathy	Signe Bønlykke	Original article	Data collection
Proprioceptive belt stimulation in bilateral vestibulopathy	Hanne Owen	Multicenter international RCT	Protocol in preparation

Fundraising

Year	Amount applied for (DKK)	Amount granted (DKK)	Granted/Applied (%)	Number of grants/number of applications
2016	11.217.774	4.101.987	37	10/18
2017	15,019,585	2,734,130	18	12/29
2018	14,631,600	3,390,750	23	9/17
2019	7,038,700	1,799,850	26	10/13
2020	15,181,006	5,648,691	37	16/30

List of applications and grants 2020

	Fund	Applied (DKK)	Grant (DKK)	
	Puljen til styrkelse af Sundhedsforsikring i RM	919.000	1.000.000	
	Sygeforsikring Danmark	1.227.000	0	
	Region Midtjyllands Sundhedsvidenskabelige Fond	568.616	0	
	HEV Forskningsfond	400.000	125.000	
	Hans Skoubys Fond	165.000	40.000	
	DSOHH rejsestipendium for YO	10.000	1750	
	Lægeforeningens Forskningsfonde	100.000	100.000	
	AU Graduate School Health	15.000	11.000	
	Wacherhausens Fond	100.000	100.000	
	HEV Forskningsfond	388.571	200.000	
	Hans Skouby Fond	160.000	0	
	Frimodt-Heineke Fonden	114.400	0	
	Speciallæge i ØNH Poul Traun	8.000	0	
	DSOHH Rejselegat	8000	0	
	NIDO	877.882	286.453	
	<i>Speciallæge i ØNH Poul Traun</i>	<i>20.000</i>	<i>0</i>	
	<i>AU</i>	<i>10.000</i>	<i>0</i>	
	RM Forskningsfond	368.088	368.088	
	RM Sundhedsvidenskabelige Forskningsfond	1.240.000	0	
	Hans Skoubys Fond		40.000	
	HEV Forskningsfond	200.999	120.000	
	Velux Fonden	1.961.400	1.961.400	
	<i>RM Forskningsfond</i>	<i>1.961.400</i>	<i>0</i>	
	AUFF	95.000	50.000	
	Spies Fonden	95.000	0	
	Skouby Fonden	95.000	0	
	Tryg Fonden	1.882.650	0	
	Lilian og Dan Finks Fond	95.000	0	
	Covidien AC (medtronic)	745.000	745.000	
	RM Forskningsfond	850.000	0	
	Covidien AC (medtronic)	500.000	500.000	Udstyr
	Total	15.181.006	5.648.691	

Publications

Year	Peer review	Non-peer review	Books/book chapters	Total	Research year thesis + PhD thesis (defended)
2016	5	0	1	6	0
2017	14	2	0	16	0+1
2018	10	1	2	13	1+0
2019	15	0	4	19	1+1
2020	24	1	3	28	

List of publications:

Peer review

- 1.Devantier L et al. PET visualized stimulation of the vestibular organ in Menière's disease, *Frontiers of Neurology*, 2020 doi:10.3389/fneur.2020.00011
- 2.Larsen CM, Ovesen T. The efficacy of corticosteroids in first-line treatment of idiopathic sudden sensorineural hearing loss: a systematic review and meta-analysis of randomized studies. *JAMA Otolaryngol*, 2020; 146: 421-428
- 3.Aalling M, Klud TE, Ovesen T. Head and neck sarcomas: the first report addressing the duration of symptoms and diagnostic work up. *Acta Otolaryngol*, 2020; 140: 521-525
- 4.Fjaeldstad A, Ovesen T, Hummel T. The association between smoking and olfaction in 3.900 patients with olfactory loss. *Laryngoscope*, 2020 doi:10.1002/lary.28552
5. Fjaeldstad A, Stankovic J, Onat M, Stankevica D, Ovesen T. "Patients and experiences from the first Danish Flavour Clinic". *Dan Med J*. 2020;67(4):A09190495.
- 6.Danstrup C, Münch H, Klug TE, Ovesen T. Clinical presentation and microbiology of acute salivary gland infections. *Dan Med J* 2020; 67: A11190659
- 7.Hald MO, Fjaeldstad A, Kjær S, Ovesen T. Positive association between bitter taste threshold and preferences of vegetables among adolescents. *Acta Paediatr* 2020 doi:10.1111/apa.15483
- 8.Haldrup M et al. Anosmia and ageusia as primary symptoms of COVID-19. *Ugeskr Laeger* 2020; 182: V04200205
- 9.Parma V et al. More than smell - COVID-19 is associated with severe impairment of smell, taste, and chemesthesis. *Chem Senses* 2020; doi:10.1093/chemse/bjaa041
- 10.Gerkin RC et al. Recent smell loss is the best predictor of COVID-19: a preregistered, cross-sectional study. *medRxiv* 2020; doi:10.1101/2020.07.22.20157263

11. Fjældstad A. Prolonged complaints of chemosensory loss after COVID-19. *Dan Med J* 2020; 67: A05200340
12. Andersen P, Fjældstad A. Retroøsofageal abscess efter steroidinjektion i sternoklavikulærledet. *Ugeskr Laeger* 2020; 182: V71009
13. Fjældstad A et al. Chemosensory sensitivity after coffee consumption is not static: Short-term effects on gustatory and olfactory Sensitivity. *Foods* 2020; doi:10.3390/foods9040493
14. Riis C et al. Superficial parotidectomy: impact of post-operative drainage. *Ear Nose Throat J* 2020; doi:10.1177/0145561320942380
15. Bertelsen JB et al. The first experiences of implementation of the Swedish tonsil register in Denmark. *Acta Otolaryngol* 2020; 140: 768-772
16. Abood A et al. Pediatric type 1 tympanoplasty: Does age matters ? *J Pediatr Otorhinolaryngol* 2020; 137: 110219
17. Ovesen T. COVID-19 anosmia. Editorial. *Tidsskr Nor Laegeforen* 2020; 140: 20.0302
18. Mikkelsen S, Zainali-Gill K: Unilateral Nasal Obstruction by Respiratory Epithelial Adenomatoid Hamartoma. *Frontiers in Medical Case Reports* 2020; 01: 1-5
19. Holm N, Ovesen T. Acute otitis media and antibiotics. A systematic review. *Dan Med J* 2020; accepted
20. Fjældstad A et al. Patients and experience from the first Danish Flavour Clinic. *Dan Med J* 2020; 67: A09190495
21. Onat M et al. Characterization of patients with idiopathic olfactory dysfunction and plan for clinical follow up. *Dan Med J* 2020; 67(X): A06200421
22. Fjældstad A, Ovesen T. Smell and taste loss in COVID-19. *Ugeskr Laeger* 2020; 182: V06200442
23. Devantier L et al. Using betahistine in the treatment of patients with Menière's disease: a meta-analysis with the current randomized-controlled evidence. *Acta Otolaryngol* 2020; doi: 10.1080/00016489.2020.1777326
24. Stankevic D, Ovesen T. Anosmia as the only symptom of olfactory meningeoma. *Frontiers in Medical Case Reports* 2020; doi.org/10.47746/FMCR.2020.1601

Non-peer

25. Aalling M, Klud TE, Ovesen T. Opgørelse over hoved-halssarkomer i det vestlige Danmark. *Best Practice Nordic*, October, 2020

Books and book chapters

Alexander Fjældstad. **Author:** Chapter 1 and 3. Lærebog i Øre-næse-hals-sygdomme. Munksgaard.

Louise Devantier. **Author** Chapter 1. Lærebog i Øre-næse-hals-sygdomme. Munksgaard.

Therese Ovesen. **Editor and Author:** Lærebog i Øre-næse-hals-sygsomme. Munksgaard.