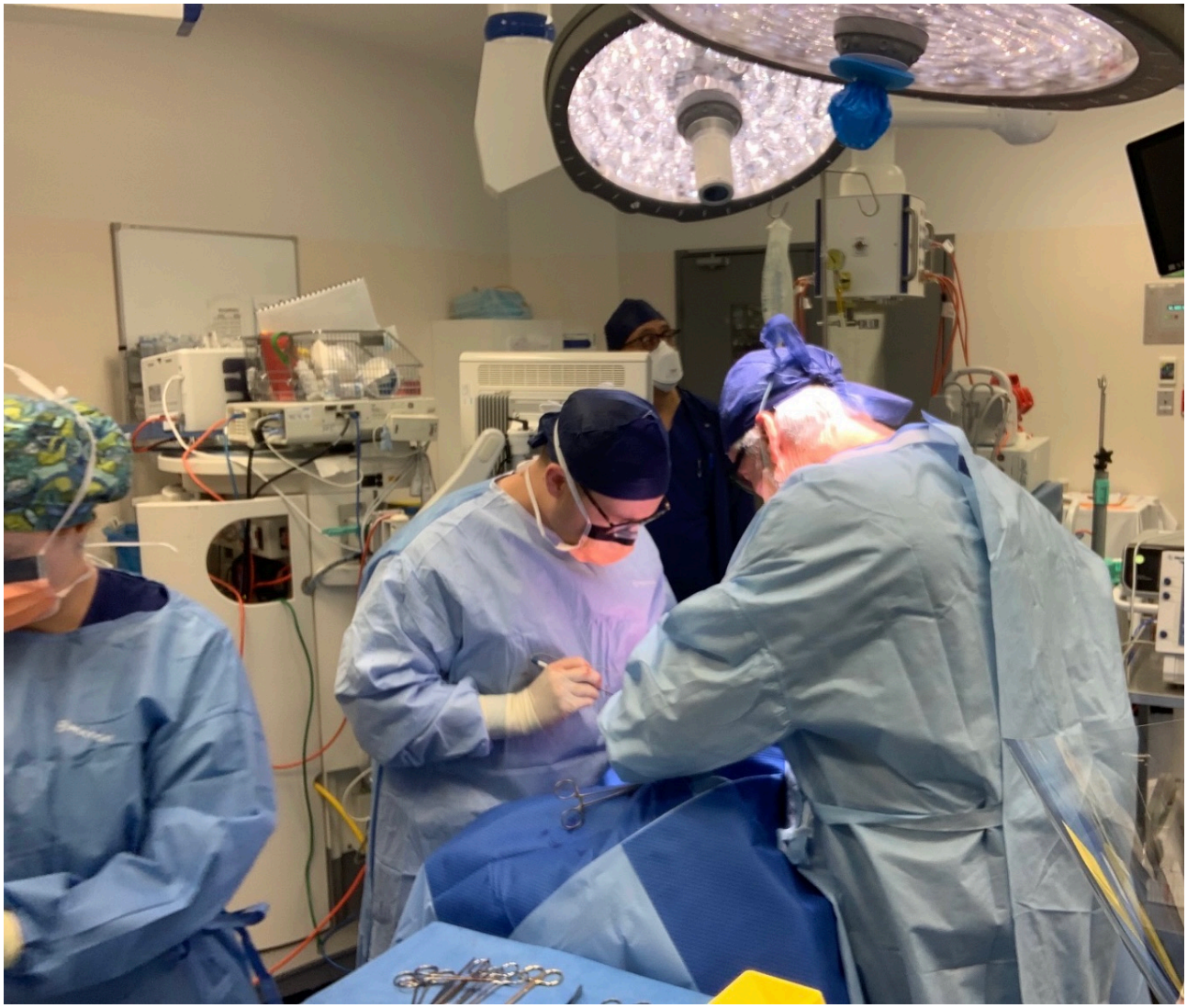
Prince of Wales Otorhinolaryngology, Head & Neck Research Group (POW ORL-HN RG)



Annual Research Report 2021/2022

Foreword

The Prince of Wales Otorhinolaryngology-Head and Neck Research Group was formed in February 2017. We are pleased to report that it continues to expand, and output continues to increase. Comprising a multidisciplinary group of clinicians, it focuses upon participating in, promoting, and presenting research in the field of Otolaryngology-Head and Neck Surgery.

This multidisciplinary group includes:

- Otorhinolaryngology, Head & Neck Surgeons
- Radiation Oncologists
- Medical Oncologists
- Biomedical Engineers
- Radiologists
- Cancer & Vascular Biologists
- Immunologists
- Experimental & Organic Chemists
- Industrial Research Groups
- Senior Nursing Staff
- Surgical Registrar
- Surgical Residents
- Medical Students

Meetings are held monthly in an informal setting aimed at promoting a safe, innovative, and fruitful environment to discuss unanswered research topics and formulate projects in ORL-HN Surgery.

The core group is chaired by A/Prof. Thomas Havas. Key group members being:

Dr. Ian Jacobson FRACS (OHNS)
- Research focus: Head & Neck, laryngology

Associate Professor Catherine Meller FRACS (OHNS)
- Research focus: Facial plastics and rhinology, Head & Neck

Dr. Catherine Banks FRACS (OHNS)
- Research focus: Facial plastics and rhinology

Dr. Sim Choroomi FRACS (OHNS)
- Research focus: Facial plastics and rhinology

Dr. Wenchang Wong FRANZCR
- Research focus: Head & Neck

Dr. Connor O'Meara FRACS (OHNS), Inaugural Post-Doctoral Fellow in Head and Neck Oncology and Translational Medicine in ORL-HN Surgery, POWH 2022
- Research focus: Scientific and translational, Head & Neck, laryngology, facial plastics and rhinology

Dr. Aydin Mohammadi FRACS (OHNS)
- Research focus: Head & Neck

Dr. Alon Taylor, Unaccredited ENT Registrar, POWH 2022
Dr. Anders Sideris
Dr. Jordan Fuzi
Dr. Emma Ho
Dr. Avinesh Chelliah
Dr. Cassie Dow
Dr. Matthew Fadhil
Dr. Daniel Hazan
Dr. George Petrides

Dr. Gideon Budiono
Olivia Lotz
Ben Muston
Will Karantanis
Paula Sankey

The research output from the group in 2021/2022 continues to reflect the high-quality and considerable breadth in ORL-HNS academia which has seen it become one of the most productive research groups within the Prince of Wales Hospital campus.

We are proud to showcase the 2021 and 2022 academic achievements of our group members which include presentations at national and international conferences, publication in high-impact ORL-HNS journals and completion of higher degree theses and UNSW independent learning projects.

We are also excited to introduce our Translational Research Group (TRG), which currently focuses upon wound healing, microbiology, immunology, and Head & Neck Oncology in ORL-HNS. Compromised of Eminent scientists, Industrial Leaders, and Surgeons from different disciplines this group attempts to identify solutions to problematic ORL-HNS issues.

Associate Professor T E Havas

MBBS, MD, FRACS (OHNS), FRCSE (ORL H&N), FACS
Department Head and Conjoint A/ Professor, Otolaryngology Head and Neck Surgery,
Prince of Wales and Sydney Hospitals, University of New South Wales.
Chair POW ORL-HN RG
Chair Head and Neck Cancer Foundation
Founder Benignancy Group

We entered 2021 full of hope and optimism. We thought the Covid pandemic was behind us. How wrong we were!

Just as had been the case during 2020 the activities of the research group were stop start during 2021/2022.

Many research facilities, including the university were closed for lengthy periods of time.

Getting ethics approval amongst other things, presented unprecedented challenges.
We often met via Zoom or had hybrid meetings. Notwithstanding this, we are delighted to present the results of the groups activities.

It is testimony to the dedication and generosity of senior staff members that so many junior and emerging clinicians and researchers continue to be affiliated with the group.

The gravitas of the group was significantly enhanced by the appointment of the inaugural Fellow in Translational Medicine (ORL H&N) and Head and Neck Oncology.

Dr Connor O'Meara is not only a fully trained Otolaryngology Head and Neck Surgeon but is an accomplished and highly published cancer and vascular biologist.
His addition to the group has enabled us to move into sophisticated, ground-breaking translational research projects partnering with not only UNSW, UTS, CSIRO and ANU but also with industry (Baxter, Nanosonics, Storz, Tissium) and several nascent biotech start-ups (Release Therapeutics, Benignancy).

We are short neither of talent, ideas or ambition and our list of projects reflect this.

I am extremely proud of what we have achieved in 5 short years (bearing in mind that three of those years were severely COVID affected) and look forward to an exciting future.

I speak for all my senior colleagues when I say that working with, enthusing, learning from and interacting with this talented group of junior colleagues is one of the high points of our careers.

Dr Connor O'Meara

MBBS, BSc (Hons), PhD, FRACS (ORL-HNS)
Cancer & Vascular Biologist
Inaugural Post-Doctoral Fellow in Head & Neck Oncology and Translational Medicine in ORL, Head & Neck Surgery

The importance of scientific and medical endeavours cannot be understated, for where would we be without antibiotics, vaccine, surgical and anaesthetic discovery?

The challenge we now face is that even the most brilliant discovery can be lost in the complicated process of transferring findings from the bench top into pre-clinical animal studies, through clinical trials to meet evidence-based standards and then into clinical practice. It can be further exacerbated by difference in understanding and specialist language. Trying to understand complex physics described by a Biomedical Physicist is like trying to read and understand a doctors handwriting…

This challenge has led to the advent of Translational Medicine. It has become the new 'buzz word' in medicine, but what does it mean?

It is 'an integrated relationship between the laboratory and the patient, with information and ideas flowing in both directions'.

As Surgeons we are a critical conduit to the recognition of novel therapies and ensuring the safety of therapies for our patients. We can truly represent the nexus between Scientists, Biomedical engineers and Chemists and patients, helping to ensure information and knowledge transfer.

As Surgeon/Scientists we have the capacity to do more- to play a key role in invention, even expediting its transfer to clinical practice. Our patients can only benefit from our active participation in this process.

Within this report we will describe the instrumental role our group is playing in supporting a paradigm shift in translational discovery and personalised medicine, both clinical and within the laboratory environment.

To my part - over the past year this quest for discovery has seen collaboration with CSIRO, Ophthalmology, UNSW, ANU and UTS with success in expedited wound healing potential, potential for sustained release of medications in the sinuses (10-12 days), novel anti-inflammatory therapies and devices for localised delivery of anti-cancer medications and novel immunotherapies.

The future of our group is bright, and we look forward to keeping you abreast of our discovery.

Dr Alon Taylor

MD BE(Mechanical (Biomedical))/ BSc (Adv)
Co-ordinator POW ORL-HN RG
Otolaryngology-Head and Neck Surgery Registrar, Prince of Wales Hospital

The past 12 – 24 months has seen the ongoing growth of the POW ORL-HN RG, despite the logistical and research restrictions imposed upon us by the pandemic. Our group membership continues to grow as does our research output. I, along with the senior members of the group, are proud to showcase the fruits of the hard work, intellectual curiosity, and dedication of our junior members who despite heavy clinical loads, have managed to take their projects through conception to publication.

Our group will continue to support and facilitate Otolaryngology-Head and Neck Surgery research amongst junior doctors, and hopes to be a springboard for the next generation of surgeon-scientists.

Higher Degree Research Candidates

Conferred

Dr. Anders Sideris – Masters of Philosophy (Medicine) – University of New South Wales

Supervised by A/Prof. Thomas Havas FRACS and Prof. Bill Walsh PhD (UNSW School of Clinical Medicine)

This highly innovative and ambitious project was completed and submitted to UNSW in the latter half of 2021, for which Dr. Sideris was successfully awarded a MPhil. Post-tonsillectomy complications are associated with significant morbidity and cost to the health care system. A complex interplay between pain, post-tonsillectomy haemorrhage and wound healing exists and a novel solution to decreasing pain, risk of post-operative bleeding and optimising wound healing would address a massive unmet clinical need. This project developed a novel biodegradable, biocompatible, implantable biopolymeric device that delivers local anaesthetic to the mucosa of the oropharynx in a controlled and sustained manner with a specific focus on management of post tonsillectomy pain. After the appropriate ethics approval was obtained, Dr. Sideris implanted the device into 10 in-vivo porcine models which had undergone tonsillectomy. Analysis determined that the device provided up to 10 days of sustained delivery of local anaesthetic to the tonsillar fossa at safe and non-toxic levels, was biodegradable in-vivo and well tolerated by all animals with no adverse effects. The potential benefits of this device for patients undergoing are extremely broad – ranging from improved postoperative pain, reduced postoperative bleeding rates, reduced analgesia requirements and increased patient satisfaction.

This novel technology forms the intellectual property underpinning the Biomedical Start-up 'Release Therapeutics' which resulted in Dr Sideris being selected to complete a highly competitive Translational Medicine Program at John Hopkins University in the United States. Dr. Sideris is to be congratulated for such a fantastic novel research accomplishment and taking significant steps to realise its role within the clinical environment.

Pending

Dr. Jordan Fuzi – Masters of Philosophy (Medicine) – University of Sydney

Long term remote outcome tracking in facial reanimation surgery – a novel approach

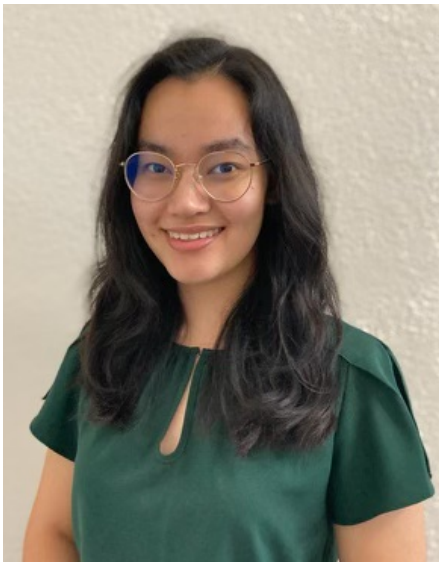
Supervised by Associate Professor Catherine Meller FRACS

This higher degree is aimed at the validation of a novel mobile phone application used for automated long-term assessment of outcomes after facial reanimation surgery. A major barrier to the identification of surgical and non-surgical therapies that reliably restore emotional smile, is the lack of an objective method to quantify spontaneity. This validation study assesses the effectiveness of a new mobile phone application, which incorporates an artificial intelligence based emotional analysis algorithm, in automatically tracking change in facial expression in postoperative facial reanimation patients over time. This will aid clinicians in reliably and durably monitoring outcomes of facial reanimation surgery, providing key insights into the benefits of the various surgical procedures. It has the potential to guide further novel surgical approaches to give the best cosmetic and functional outcomes to patients undergoing surgery for facial palsy. This study is a national and international collaboration with colleagues at the Massachusetts Eye and Ear Infirmary (Boston, USA) and Chris O'Brien Lifehouse (Sydney, Australia).

Dr. Cassie Dow – Masters of Philosophy (Medicine) – University of New South Wales

Creating a normative reference tool for craniofacial measurements useful for the otolaryngologist

Supervised by Dr. Catherine Banks FRACS and A/Prof Thomas Havas FRACS



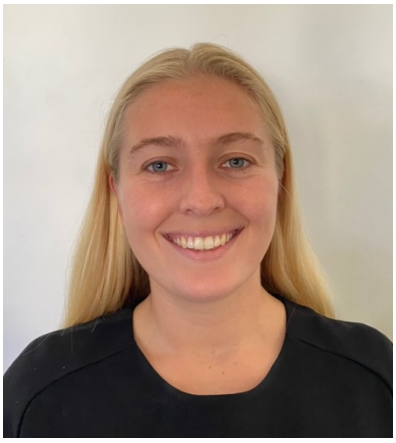
The proper development of craniofacial structures is crucial for the maintenance of normal nasal airflow, which affects children whilst awake and asleep. Maladaptive responses, such as mouth breathing can cause a change in craniofacial growth, particularly of the maxilla, which can result in poor sleep, reduced academic performance and deficits in working memory. Identifying these changes early is imperative as it allows for timely intervention in the growing child. This project aims to create a reference tool using craniofacial skeletal measures on computed tomography imaging and a subsequent low-dose CT head protocol. This will allow clinicians to identify or predict children at risk of maxillary deficiency and allow for early collaboration with orthodontic colleagues and timely intervention where required.

Independent Learning Projects with UNSW

Olivia Lotz – MBBS Candidate, UNSW

The impact of temporomandibular joint disorders on quality of life in patients with facial nerve palsy

Supervised by Dr. Catherine Meller FRACS and A/Prof. Thomas Havas FRACS



Facial nerve palsy and temporomandibular joint dysfunction are clinical entities each with their own significant impact on the quality of life of patients. Whilst data evaluating their individual impact exists, these conditions often occur in tandem in patients, potentially compounding their negative impact on the quality of life. Currently, no data exists examining patients who experience these conditions in tandem. Olivia's ILP is a prospective, cross-sectional study that aims to establish the prevalence of temporomandibular joint disorders in patients with facial nerve palsy and determine its impact on quality of life. Her project is complete and had been submitted to UNSW and will shortly be submitted for review in the surgical peer-reviewed literature.

Scientific or Translational Medicine Studies

Wound Healing, Microbiology, Immunology and Head & Neck Oncology

The Translational Research Group (TRG) brings together a team with a proven track-record of innovation and transfer of laboratory science to the clinical environment, in both drug and medical device domains.

With a combined Journal article count of over 500 papers, publications in Science, Nature, Nature Medicine, Nature Communications and Blood, a nominee for the Nobel Prize in Medicine (CR Parish- Immunology), and with more than 5 medications reaching Clinical Trial in Cancer, Sepsis, Thrombosis and Cardiovascular Medicine in collaboration with some of the most innovative minds in Chemical Engineering and Surgery- the TRG represents a Think Tank for solving ORL-HNS problems.

To expedite these ideas, we have partnered with specialists in Industrial development and talented individuals at multiple universities- in this way we believe the collaborative knowledge and understanding of this team will enable achievable solutions.

Translational Research Group

- Dr C. O'Meara
- Associate Professor T. Havas
- Dr R. Singh
- Professor L. Khachigian
- Associate Professor V. Nguyen
- Professor CR. Parish
- Professor M. Coroneo

Industrial Collaborators

- CSIRO

University Collaborators

- UNSW
- ANU
- UTS

Myringomesh

Investigators:

- Associate Professor T. Havas
- Dr C. O'Meara
- Professor L. Khachigian
- Associate Professor V. Nguyen

Conductive hearing loss (secondary to tympanic membrane perforation), especially within the indigenous population, can lead to poor speech and language acquisition and developmental delay. Treatment is commonly surgical (Myringoplasty), which can be unsuccessful and costly. Techniques to expedite healing, reduce failure and mitigate necessity for surgical intervention would be of significant benefit.

Our laboratory studies have identified a unique synthetic molecule that stimulates 40% faster epithelial cell migration on a novel biodegradable scaffold coated with specialised matrix. We intend to test this novel device in preclinical studies of tympanic membrane perforation over the coming months. There is also potential for this device to be delivered to perforations without surgical intervention.

This device may also benefit wound healing with the potential to expedite skin coverage for burns and skin loss.

Rhinofoam

Investigators:

- Dr C. O'Meara
- Associate Professor T. Havas
- Professor CR Parish
- CSIRO

Management of Chronic Rhinosinusitis (CRS) can be challenging, both from a patient compliance and immunological perspective. Although surgical intervention (Functional Endoscopic Sinus Surgery) can be key in providing a conduit for delivery of medications to the nasal cavity and sinuses. The ability of patients to tolerate sinus washes (potential up to 4-6 times per day) can be poor. Biologics also represent a paradigm shift in management of Allergic Type CRS. Unfortunately, these medications are expensive and require long-term use.

Partnering with a team of organic chemists/engineers, we have potentially overcome issues with delivery of sustained release pharmacology to the nasal cavity and paranasal sinuses (predicted drug release to 12-days).

Development of this delivery system has moved into device development phase (Phase II). It has further potential benefit in the delivery of novel biologic and immunotherapy agents developed by O'Meara & Parish.

Oncomesh

Investigators:

- Dr C. O'Meara
- Associate Professor T. Havas
- Professor CR Parish
- Professor L Khachigian
- Associate Professor V Nguyen
- Professor M Coroneo

This work represents the quest to mitigate functional deficits and systemic toxicity/side effects by delivering anti-cancer therapies directly to the cancer.

Utilising a novel delivery system, we aim to expose cancers to therapies targeting activation of the immune system (up-stream of current immunotherapy agents and thereby producing more effective and robust results) and inhibition of tumour blood supply and metastatic potential. We will also be trialling a novel therapeutic compound developed by Professor Coroneo that has demonstrated efficacy against epithelial dysplasia and squamous cell carcinoma (SCC).

We envision this work to play a key role in Laryngeal and Nasopharyngeal cancer, with potential for benefit in cancers in other areas of the body.

Small Molecule Immunotherapy

Investigators:

- Dr C. O'Meara
- Associate Professor T. Havas
- Professor CR Parish
- Professor L Khachigian
- Associate Professor V Nguyen

Recognising the importance of the immune system in cancer, how cancers hide themselves from the immune system, pressing the right switches to see hidden cancers has been a paradigm shift in treatment strategy, known as immunotherapy.

Unfortunately, while a very small group of patients have even been cured by this treatment, response (if seen) is in less than 20% of patients and usually only for several months before the cancer returns- refractory to further therapy. Realising more effective and durable immunotherapy is key.

We have been working on both small molecule immunotherapies, both novel and repurposed, which target pathways within the cell as opposed to current immunotherapy treatments that act upon receptors on the cell surface. The difficulty is that receptors are 'downstream' and susceptible to change by the cancer- targeting 'upstream' pathways is more effective as the cancer is less capable of changing these pathways.

We intend the utility of these developed immunotherapies to be for targeted and or systemic delivery in cancer therapy. There is also recent evidence that they may also be beneficial in cardiovascular and autoimmune conditions.

Nasopharyngeal Biome/Virome Project

Investigators:

- Dr R. Singh
- Dr C. O'Meara
- Dr G. Crossland
- Professor M. Coroneo
- Associate Professor T. Havas

Recent scientific exploration has defined the key role the gastrointestinal microbiome plays in many human diseases. In contrast, there is a paucity of research focusing upon the microbiome of the nasopharynx, nasolacrimal, ocular and middle ear systems. The role of the virome in these areas is even less known.

This project aims to define the microbiome and virome population of these head and neck subsites, exploring

difference within high-risk populations (ie: Indigenous Australians and CSOM) and whether variance may be associated with atopic disorders of these subsites (ie: Allergic Rhinitis or Allergic Rhinosinsusitis).

We will also specifically explore the role of the nasopharyngeal virome, given new evidence to suggest that the nasopharyngeal virome may play an important role in the development of Nasopharyngeal Carcinoma. This will also allow us to tailor targeted immunotherapy in treatment of NPC.

Topical immunotherapy for nasopharyngeal carcinoma

Investigators:

- Dr G. Budiono
- Dr C. O'Meara
- Associate Professor TE Havas

This project entails a systematic review to examine the literature for topical immunotherapy-based treatments of nasopharyngeal cancer, which may provide a future novel treatment arm for this common head and neck malignancy.

Clinical Investigation

Head & Neck

Clinical research into the diagnosis, treatment, outcomes and care provision of patients with benign and malignant head and neck disease remains the core focus of the POW ORL-HN RG. Through the newly incorporated Head and Neck Rapid Access Clinic (HNRAC) we now have access to an ever expanding clinical and research database of patients with head and neck cancer, which will form the basis of multiple research projects going forward.

Safety & Efficiency in Head & Neck Oncology

Investigators:

- Dr C. O'Meara
- Associate Professor T. Havas

We strive to improve our clinical performance for the benefit of patients and the community. Recognising the importance of constructive critical appraisal- extensive literature review, observation of standard of care units and retrospective data analysis is completed.

This has allowed us to appraise our clinical acumen, recognise paucity and optimise our performance.

This has resulted in:

- A significant reduction in operative time
- A significant reduction in patient length of stay
- A Head & Neck Cancer positive margin rate consistent with the best centres in America
- A significant reduction in post-operative complication

Improving & Expediting Care to Regional Head & Neck Oncology Patients

Investigators:

- Dr C. O'Meara
- Associate Professor AJ Collins
- Associate Professor TE Havas

Exacerbated by COVID, there is access disparity for regional patients, when compared to metropolitan patients, when seeking head and neck oncology care.

Recent research has demonstrated that Head & Neck Cancers grow on average 70% every 4-5 weeks, consequently time is critical to reduce functional deficit, quality of life impact, healthcare financial burden and overall survival rates.

Focusing upon access limitations identified by the Australian Institute of Health and Welfare (AIHW) and in collaborative discussion with regional surgeons and care providers we have streamlined service provision, developing, and instituting the Head & Neck Rapid Access Clinic (HNRAC). HNRAC is an expedited consultant lead service, an initiative jointly supported by NSW Health and the Prince of Wales Hospital.

This has resulted in:

- A significant reduction in Treatment Delay (the period between GP referral and definitive therapy)
- A trend towards early-stage cancer intervention and single modality therapy
- Expedited care delivery to regional patients

Methods of assessment of head and neck lymphedema

Investigators:

- Dr M. Fadhil
- Dr R. Singh
- Dr I. Jacobson
- Associate Professor TE Havas

Head and neck lymphedema (HNL) is an increasingly recognised complication of head and neck cancer and its treatment. However, no consensus exists on the “gold standard” assessment tool for the purposes of diagnosis, classification or monitoring of HNL. This systematic review identified a wide range of assessment methods for the diagnosis of HNL, and identified physical examination, ultrasound, computed tomography and clinician-reported rating scale on laryngoscopy to be the most widely utilised methods. The results of this project were subsequently published in Head and Neck and presented as a poster by Dr. Fadhil at the ASOHNS Annual Scientific Meeting in 2021.

Rate of incidental secondary tumours in PET scans for head and neck malignancies

Investigators:

- Dr A. Mohammadi
- Associate Professor TE Havas

Positron emission tomography (PET) scans are commonly used in the staging, treatment planning and treatment response of head and neck cancers. Uncommonly, secondary areas of uptake are discovered, the significance of which remains controversial. This study was a systematic review and meta-analysis of the literature looking at incidental findings of PET scans for head and neck cancer. The results of this study was published in the Australian Journal of Otolaryngology in 2021 and resulted in the lead author being awarded the prize for ‘best registrar article submitted to the AJO for 2021’.

Emergency management plan for paediatric patients with tracheostomies during the COVID-19 pandemic

Investigators:

- Dr E. Ho
- Dr M. Soma

This project, a collaboration with colleagues at Sydney Children’s Hospital, developed a systematic approach to decrease staff exposure to COVID-19 and optimise care of paediatric patients with tracheostomies. The results of this study were published in the Journal of Laryngology and Otology in 2021.

Laryngology

Our research into benign and malignant disorders of the larynx has been very fruitful in the past 12 – 24 months, resulting in multiple publications in high-impact journals and presentations at national conferences. This is a burgeoning field of research at the POW ORL-HN RG and we will be generating multiple impactful research projects in the coming months.

Optimising Voice outcomes in Unilateral Vocal Fold Palsy

Investigators:

- Dr C. O'Meara
- Associate Professor C. Meller
- Dr I. Jacobson
- Associate Professor TE Havas

Stimulated by an exceptional appraisal of the literature upon the 'Timing of ansa-cervicalis to recurrent laryngeal nerve reinnervation' published in the Journal of Voice, we have commenced a novel clinical study utilising the nerve talents of Associate Professor C. Meller and surgical prowess of Head & Neck Surgeons Dr I. Jacobson & Associate Professor TE. Havas to investigate re-innervation techniques and intra-operative imaging analysis. Utilising this method, we aim to further optimise voice outcomes for patients suffering from unilateral vocal fold palsy.

Timing of ansa-cervicalis-to-recurrent laryngeal nerve reinnervation

Investigators:

- Dr M Fadhil
- Dr R Singh
- Associate Professor TE Havas

Ansa cervicalis-to recurrent laryngeal nerve anastomosis (ARA) is an established technique for the treatment of recurrent laryngeal nerve (RLN) injury after head and neck surgery. However, the optimal timing of ARA remains unclear. This project involved a systematic review of the literature to evaluate the efficacy of ARA performed at different timepoints on postoperative voice outcomes. The review identified that ARA at both delayed and immediate timepoints are effective in the treatment of RLN injury after head and neck surgery, with early delayed repairs likely to associated with better voice outcomes, compared with immediately and late delayed anastomoses. The results of this project were subsequently published in the Journal of Voice and presented as an oral presentation by Dr. Fadhil at the ANZHNCS Annual Scientific Meeting in 2022.

The role of Thyroarytenoid and Optical Coherence tomography in Laryngeal reinnervation

Investigators:

- Dr M. Fadhil
- Dr C. O'Meara
- Associate Professor C. Meller
- Dr I. Jacobson
- Associate Professor TE Havas

Ansa cervicalis will be utilised in conjunction with vocal fold prosthesis to augment vocal fold function in patients with permanent unilateral vocal fold weakness, attenuating vocal fold atrophy. Intraoperative and post-operative optical coherence tomography will be utilised to determine whether vocal fold bulk and therefore voice outcomes are maintained. This may well represent a new standard of care for the professional voice user.

The role of Estrogen Receptor Antagonists in Idiopathic Subglottic Stenosis

Investigators:

- Dr C. O'Meara
- Associate Professor TE Havas

Recent evidence has identified that estrogen receptors are upregulated within the fibrotic tissues causing progressive airway narrowing (beneath the vocal folds) in female patients. This study aims to confirm this finding and repurpose current estrogen receptor antagonists to potential treatment for this challenging pathology.

Assessing current sterilisation standards of nasendoscopes: a sample from a large Sydney-based hospital clinic

Investigators:

- B. Muston
- Dr W. Wong
- Associate Professor TE Havas

This project is currently underway in assessing the degree to which hospital sterilisation of reusable nasendoscopes eliminates potential pathogenic viruses. This is particularly pertinent in otolaryngology given the rising prevalence of HPV as a cause of upper aerodigestive tract malignancies.

Facial Plastics & Rhinology

The POW ORL-HN RG and POWH Department of Otolaryngology-Head and Neck Surgery are privileged to have significant subspecialty expertise in facial plastic surgery and disorders of the nose and olfaction. To this end, the group has already made significant academic contributions in these areas, with multiple exciting projects planned for 2023.

Temporomandibular joint dysfunction – contemporary review of practices and guidelines

Investigators:

- Dr G. Petrides
- Associate C. Meller

Temporomandibular joint dysfunction (TMJD) is a common problem amongst ENT patients, but there is a wide range of ways it is assessd and treated by ENT surgeons. This project aims to perform a contemporary review of the way in which otolaryngologists diagnose and manage TMJD. Subsequently, a structured, evidence-based guideline will be developed, aimed to aid ENTs in the proper assessment and management of this condition.

Intraoperative use of topical adrenaline in sinonasal surgery

Investigators:

- Dr C. Dow
- Dr A. Sideris
- Dr R. Singh
- Dr C. Banks
- Associate Professor C. Meller
- Dr S. Choroomi
- Associate Professor TE Havas

Due to the rich vascular supply of the nasal mucosa and paranasal sinuses, management of intraoperative bleeding during sinonasal surgery is paramount. Topical adrenaline is a popular agent for intraoperative local vasoconstriction, however there is no standard vasoconstrictive procedure amongst ENT surgeons. This single-blinded, prospective, cross-over non-inferiority trial was performed to compare two common preparations of topical adrenaline. The study found that topical 1:1000 adrenaline provides no worse intraoperative hemodynamic stability compared to topical 1:10000 but affords superior visualisation. This practical result was published in the Annals of Otology, Rhinology and Laryngology in 2021

'Bruxometer' - Novel wearable sensory for diagnosis of bruxism

Investigators:

- Associate Professor C. Meller
- Associate Professor TE Havas

Bruxism, or teeth grinding/clenching, is a common problem, the extent of which is difficult to diagnose accurately. This project, planned for 2023, aims to develop a prototype of a novel wearable, intraoral splint device to record real-time force measurements during nocturnal teeth clenching. In parallel we aim to develop a mobile phone app to display the data and assist in the accurate diagnosis and management of bruxism. The

resources required for this project will be aided by a generous donation of $15,000 from the Prince of Wales Hospital Foundation.

Functional MRI (fMRI) for the assessment of cortical representation of nasal obstruction

Investigators:

- Dr D Hazan
- Professor D. Moses
- Associate Professor TE Havas

Little is known regarding the cortical mapping of the sensation of nasal obstruction within the brain. This novel study will utilise functional MRI scan to assess the limbic changes in individuals with and without nasal obstruction using nebulised scents during MRI scanning. This will give key insights into how and where in the brain the sensation of nasal obstruction is perceived.

MRI in the assessment of sinonasal airflow

Investigators:

- Dr D Hazan
- Professor D. Moses
- Associate Professor TE Havas

Studies investigating sinonasal airflow patterns have wide ranging applications in rhinology, however the current gold standard relies on computational fluid dynamics assessment of flow in computer-based models. This exciting project aims to map the pathway of airflow through the nose and sinuses in vivo by performing MRI scans of patients inhaling a nebulised contrast agent. This study will hopefully offer crucial, real world insights into flow patterns in the non-operated and operated sinonasal cavity and inform the design of next generation sinonasal drug delivery devices

Database Initiatives

Facial nerve clinical database

We continue to maintain a robust, prospective database tracking clinical outcomes in patients with facial nerve disorders. This includes postoperative outcomes, patient satisfaction and quality of life scores and the impact of botox injections, which are administered in the POWH Facial Nerve Clinic. The clinic is run by Dr. Catherine Meller and is the only clinic of its kind in the NSW public health system to evaluate, treat and undertake research on patients with facial nerve disorders. We continue to enrol patients, expand the clinic and collect useful data which will form the basis of multiple research projects in the coming years – ranging from simple chart reviews to novel projects appropriate for higher degrees.

Several academic journal articles have arisen from the work with this database and the facial nerve clinic. These includes a narrative review of the diagnosis and management of Idiopathic (Bell's) palsy performed by Dr. Chelliah and Dr. Meller published in Medicine Today in 2022, as well a contemporary management approach to the treatment of Bell's palsy during pregnancy and the post-partum period performed by Dr. Fuzi and Dr. Meller, which was published in the American Journal of Otolaryngology in 2021.

Head & Neck Oncology Database

A prospective AI driven Head & Neck Oncology Database was developed by Dr C. O'Meara and Associate Professor TE Havas. This database allows clinicians to review and appraise performance measures, optimising care delivery and patient outcomes. It is now in the process of being linked to an app that will allow real-time identification of patients at risk of Head & Neck Cancer recurrence to expedite review and therapy. This would represent another improvement in Head & Neck Cancer care provision developed by the HNRAC Team.

Academic Journal Publications

2022

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Conference Presentations

Oral

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Banks C, The role of the rhinologist in cystic fibrosis management; 72nd Australian Society of Otolaryngology-Head and Neck Surgery Annual Scientific Meeting, 10 – 12th June 2022, Adelaide Australia

Fadhil M, Timing of ansa cervicalis-to recurrent laryngeal nerve reinnervation: a systematic review; Australia and New Zealand Head & Neck Cancer Society 23rd Annual Scientific Meeting, 26 – 28th August 2022, Gold Coast Australia

O'Meara C, Immunotherapy in Head & Neck Cancer. Current and Future Directions- a precis. ASOHNS NSW CPD Meeting May 2022

2021

Taylor A, Traumatic paediatric tracheal rupture after blunt force sporting injury: case report and review of the literature; Australia and New Zealand Head & Neck Cancer Society 71st Annual Scientific Meeting, 14 – 19th September 2021, Virtual Conference

O'Meara C, Histones, the dark side of Immunity. Surgical Research Society of the Eastern and Greater Southern Region. September 2021

Poster

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Fadhil M, Timing of ansa cervicalis-to-recurrent laryngeal nerve reinnervation: a systematic review; Australia and New Zealand Head & Neck Cancer Society 72nd Annual Scientific Meeting, 26 – 28th August 2022, Adelaide Australia

Ho E, Emergency management plan for paediatric patients with tracheostomies during the COVID-19 pandemic; Australia and New Zealand Head & Neck Cancer Society 72nd Annual Scientific Meeting, 26 – 28th August 2022, Adelaide Australia

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Fadhil M, Systematic review of head and neck lymphoedema assessment; Australia and New Zealand Head & Neck Cancer Society 71st Annual Scientific Meeting, 14 – 19th September 2021, Virtual Conference

Fuzi J, Bell's Palsy during pregnancy and the post-partum period: a contemporary management approach; Australia and New Zealand Head & Neck Cancer Society 71st Annual Scientific Meeting, 14 – 19th September 2021, Virtual Conference

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