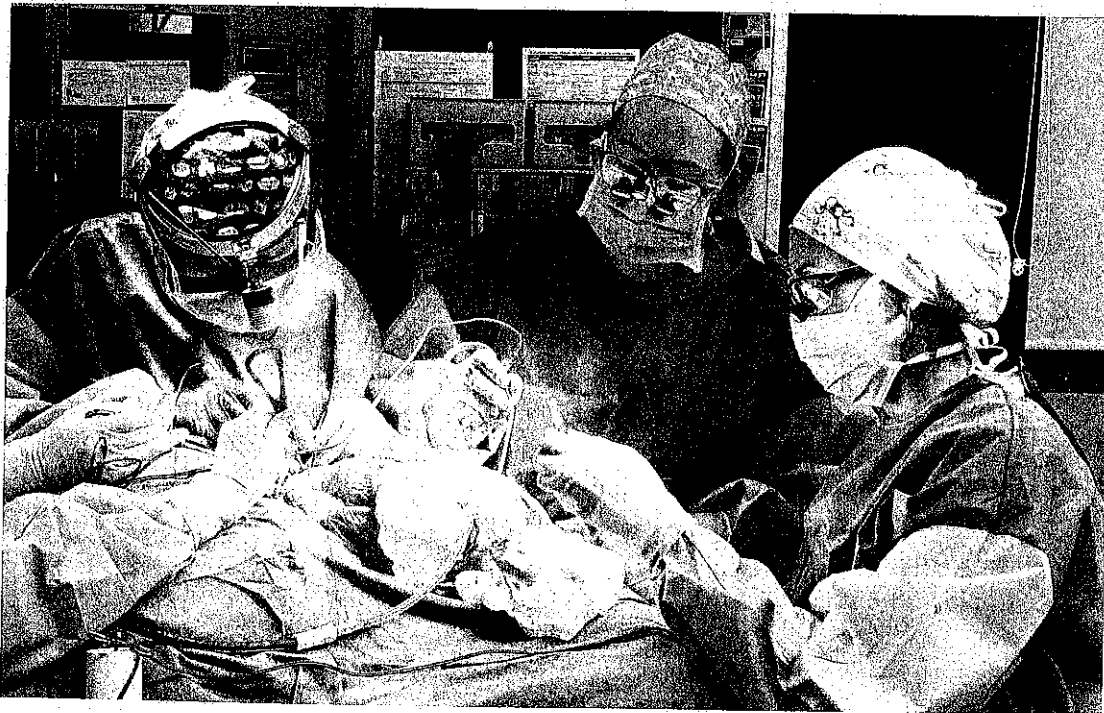


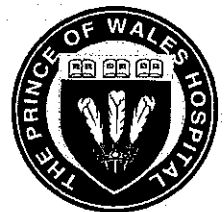
Prince of Wales Otolaryngology Head and Neck Research Group

Annual Report 2020

Prince of Wales ORL Head and Neck Research Group



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Prince of Wales Otolaryngology Head and Neck Research Group

2020 Annual Introduction to Report

Professor Thomas Havas (Chair) Prince of Wales ORL Head and Neck Research Group

2020 has been a difficult year for all of us. The COVID pandemic certainly brought universities and hospitals to a complete stop.

Notwithstanding that I am extremely proud of the group, who stayed together through this difficult period, mutually supportive, constantly communicating by way of Skype, Zoom, or teleconferencing and moved forward with research as best we could in a large number of areas.

Will Karantanis, our ILP student had his clinical project totally disrupted but we came up with an excellent alternative project, which could be done without clinical contact and which in fact has set a new yardstick in international communication and corporation with regards to head and neck surgeons on 4 continents.

The proposed PhD project with the University of New South Wales involving artificial learning and interpreting laryngeal imagery, conjointly with Prof. Arcot Sowmya from the School of Computer Science and Engineering and Prof. Eric Majoring from the School of Biomedical Imaging Computing, Computer Science Engineering and the Graduate school of biomedical engineering at the University of New South Wales, had to be abandoned.

We are optimistic about resurrecting this project, COVID climate permitting in 2021.

In 2021, the Research Fellow, whose job has been to coordinate the Prince of Wales, ORL Head and Neck Research group, will no longer be funded by the Head and Neck Cancer Foundation.

A new position has been created on campus, using research funding that I have transferred from Sydney Hospital, to pay the salary of a second unaccredited registrar and it is envisaged that the successful candidate for this job will take over the role hitherto performed by POWORL Head and Neck Research Fellow.

The group will be entering its fourth year in 2021 and this, is like the previous report attests to the amazing interest, quality of work, ecumenical participation and enthusiasm that we have managed to generate on campus and with the university.



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We have emerged from the difficulties posed by 2020, stronger than ever and we hope to pick up the pace with novel, patient centric research moving forward.

A new foundation, John Fordham Foundation will be launched early December 2020.

One of the major aims of this foundation is to raise between \$10 and \$15 million for the establishment of a John Fordham School of translational medicine in the area of Otolaryngology, head and neck surgery.

We are enthusiastically supporting this and feel that a world first unit of excellence integrating research, product development, and commercialization could be developed in our academic hub.

I am very pleased to report that the biomedical polymeric drug delivery device for use in Head and Neck surgery in which Dr Anders Sideris (research fellow 2019) is currently completing his Ph.D., has been awarded a major Prince of Wales Hospital foundation grant to support the study through its second stage animal experimentation.

I take this opportunity to congratulate and thank everyone associated with the group, and look forward to your ongoing engagement in 2021 and beyond.

Introduction

The Prince of Wales ORL Head and Neck Research Group was formed in February 2017 and comprises a heterogenous group interested in participating, promoting and partaking in research in the area of Otolaryngology and Head and Neck Surgery.

The group comprises of otolaryngologists, radiotherapists, nurses, speech therapists, registrars, residents and medical students.

Meetings are held monthly in an informal setting aimed at promoting a helpful and safe environment in which to discuss ideas pertaining to research in the area of Otolaryngology and Head and Neck Surgery.

The group is chaired by Professor Tom Havas, and key group members are;

- Dr I Jacobson.
- Dr W Wong
- Dr C Meller
- Dr S Choroomi.
- Dr R Singh
- Dr T Holmes
- Dr J Fuzi
- Dr A Taylor
- Dr C Dow
- W Karantanis
- B Mustin
- M Fadhil
- R Robinson and M Barnhart from the Department of Speech Therapy.
- P Gunner, the Clinical Nurse Consultant in Otolaryngology Head and Neck Surgery

A number of projects have been undertaken in this year as both new projects and continuation of long term projects. These have been both basic science in nature and clinical reviews. The breadth and quality of projects is demonstrated by several studies being accepted at ASOHNs 2020 Conference.

This year the group has had another medical student complete their thesis (ILP project). While the initial project was going to be a world first in Microbiome assessment of allergic rhinitis, the COVID pandemic prevented this from occurring. However, it did create another unique opportunity have develop an international survey asking the different techniques for pharyngolaryngectomy reconstruction. This is the largest, survey conducted asking the widest community from seven different countries with over 100 reconstructive



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surgeons taking part. The survey was successfully completed and will be submitted to JAMA Head and Neck Surgery for consideration of publication.

Accepted for publication

Sideris A, Rao A, Maher N, Parker A, Crawford J, Smee R, Jacobson I, Gallagher R, Acinic Cell Carcinoma of the Salivary Gland: A Survival Analysis, Australia New Zealand Journal of Surgery.

Dow C, Sideris A, Singh R, Giles M, Banks C, Meller C, Choroomi S, Havas T, A non-inferiority trial: Safety and efficacy of 1:1000 vs. 1:10,000 topical adrenaline in sino-nasal surgery, Annals of Otolaryngology, Rhinology and Laryngology, September 2020.

Sideris A, Fuzi J, Wong W, Jacobson I, Havas T, Desmoid Tumours of the Head and Neck: A Survival Analysis in the Adult and Paediatric Population, Australian Journal of Otolaryngology.

Taylor A, Fuzi J, Sideris A, Banks C, Havas T, Non-steroid, non-antibiotic antibiofilm therapy for the treatment of chronic rhinosinusitis", Journal of Laryngology and Otolaryngology, Accepted September 2020.

Fuzi J, Taylor A, Sideris A, Meller C, A Systematic Review of the Effect of Botox Therapy on Quality of Life in Facial Palsy, Aesthetic Plastic Surgery

Singh R, Karantanis W, Fadhil M, Dow C, Fuzi F, Robinson R, Jacobson I. Meta-Analysis on the rate of pharyngocutaneous fistula in early oral feeding in laryngectomy patients. American Journal of Otolaryngology

Singh R, Karantanis W, Fadhil M, Fuzi J, Crawford J: A review of Tracheobronchial Adenoid Cystic Carcinoma: Treatment Methods and Outcomes. International Journal of Medical Research.

Singh R, Karantanis W, Fadhil M, Kumar S, Crawford J, Jacobson I. A Systematic Review of Laryngocele and Pyolaryngocele Management in the Age of Robotic Surgery. Journal of International Medical Research.

Fuzi J, Budiono G, Meller C, Jacobson I. Tranexamic acid in otorhinolaryngology – A contemporary review, World Journal of Otorhinolaryngology - Head and Neck Surgery, 2020,

Active Research

Long-term outcomes of Percutaneous versus Surgical Tracheostomy: a retrospective analysis

Sterilization of Flexible Naso-endoscopy procedures and HPV contamination

Management of facial palsy in the peripartum period

Cost Analysis of TMJ Systematic Review

FDI Botox Prince of Wales Hospital Facial Nerve Clinic Retrospective Review

Spindle Cell Carcinoma of the Head and Neck: A retrospective survival analysis

Funding implications of coding inaccuracies in complex major head and neck surgery

Histological and Biomechanical Investigation of Cartilage Autografts in Nasal Reconstructive Surgery

Systematic review and meta-analysis on Head and Neck Lymphoedema- emperors cloak?



Research Fellow Report:

The research fellow position for the Head and Neck Research Group was formally established in 2018 as a position that coordinates and undertakes research with key members of the group. The purpose of this position was to encourage young ENT inclined doctors a pathway to undertake research but also maintain a clinical conjoint. The clinical conjoint has enabled junior ENT inclined doctors a supervised and safe way to transition into on-call.

2020 has been a challenging year, however, despite the difficulties it has given many opportunities. Due to the reduction in clinical services and lockdown we have been fortunate to be able to pursue high quality research and have one of the most productive years to date. Furthermore, we have been fortunate to have a strong representation at the virtual ASOHNS 2020 conference this year with numerous members of our group presenting posters and oral presentations. The research fellow presented seminal work on 3D printing and mandible reconstruction. Furthermore, the research fellow was fortunate to be accepted as a masters candidate, looking to develop a novel use of light to assess lesion within the throat of awake patients.

In 2020 the Research Fellow undertook numerous research projects and supervised the junior members of the group. Specifically, the fellow this year has been involved in supervising the ILP students honors projects and establishing a long term research in the area of microbiome. The Research fellow was either first author or involved in publishing numerous publications this year listed below:

Singh R, Karantanis W, Fadhil M, Dow C, Fuzi F, Robinson R, Jacobson I. Meta-Analysis on the rate of pharyngocutaneous fistula in early oral feeding in laryngectomy patients. American Journal of Otolaryngology

Singh R, Karantanis W, Fadhil M, Fuzi J, Crawford J. A review of Tracheobronchial Adenoid Cystic Carcinoma: Treatment Methods and Outcomes. International Journal of Medical Research.

Singh R, Karantanis W, Fadhil M, Kumar S, Crawford J, Jacobson I. A Systematic Review of Laryngocele and Pyolaryngocele Management in the Age of Robotic Surgery. Journal of International Medical Research

Dow C, Sideris A, Singh R, Giles M, Banks C, Meller C, Chooroomi S, Havas T, A non-inferiority trial: Safety and efficacy of 1:1000 vs. 1:10,000 topical adrenaline in sino-nasal surgery, Annals of Otolaryngology, Rhinology and Laryngology, September 2020.



Future Direction

Since the creation of the research group we have been fortunate to see it grow into a phenomenal research hub. The integration with numerous different departments within the university has enabled the group to explore numerous unique research opportunities. Particularly, the integration with Biomedical Engineering has enabled the creation of a more accurate anatomical model of the temporal bone.

The integration of numerous biomedical engineering projects has encouraged the development of an important evolution of the group. Going forward the group looks to nurture an important arm of commercialization. This has been one of the fundamental goals of the group, to develop and teach medical professionals the process from research to commercialization. As the research group continues to mature we hope that this will become a regular teaching method for motivated ENT surgeons. The establishment of a this will help create a world first otolaryngology translation medicine hub associated with a major university.

We have been fortunate enough to have affiliation with the Head and Neck Cancer Foundation. The foundation has kindly given offered to fund the position of the research fellow and help support the research group. The ongoing financial support will help encourage ongoing lab based research, as well as purchasing of equipment for the group.

Integration with biomedical engineering is key to developing a collaborative modern approach to medicine . The research group will look to build upon the great achievements this year, despite the difficulties, and foster these key relationships. In the year to come we have had another honors student join the group to pursue the burgeoning area of microbiome. We have also been fortunate to have another masters student join the group.

Higher Degrees for 2021

Ravjit Singh – Masters of Philosophy (Biomedical Engineering)- *Optical Coherence Tomography (OCT) in assessment of laryngeal pathology*

The 2020 Head and Neck Research registrar commenced a masters regarding the novel use of OCT in the identification of laryngeal pathology and vocal cord movement. The project has been conducted through UNSW Biomedical Engineering with industry collaboration utilising OCT to assess motion and depth of invasion of lesion within the larynx of awake patients. This will increase diagnostic accuracy potentially alleviating many patients necessity to undergo procedures.

Cassie Dow – Masters of Philosophy (Medicine) – *Seasonal variation of microbiome within the nasal cavity*

Dr Dow, will commence a masters with the research group in 2021, looking at the seasonal variation. This will be a novel Australian based research, which has far reaching treatment and diagnostic consequences. At this stage specific factors for why allergic rhinitis occurs in some and not others? Similarly, why hay fever affects some and not others? A proposed mechanism is the alteration of microbiome within the nasal cavity which varies based on seasonal factors. Classification of this change has never been done within the Australian population.

Anders Sideris – PhD – *Development of a biopolymeric drug delivery device for use in otolaryngology/Head and Neck Surgery*

The project has taken leaps and bounds since 2019 and its commencement by Dr Sideris. It has progressed significantly and been considered to be a PhD. The initial test results in animal models have demonstrated fantastic results and showed improved biocompatibility, adhesion, safety and degradation characteristics. The significant implication for this technology are widespread within the

Jordan Fuzi – Masters of Philosophy (Medicine)- *Long term remote outcome tracking in facial reanimation surgery a novel approach*

This masters is aimed at the creation and validation of a novel mobile phone application to be used for long term monitoring of outcomes after facial reanimation surgery. The application uses a machine learning algorithm to interpret the facial expressions of users and will allow clinicians to track the change in facial expression of patients over time. This will hopefully result in an objective and sustainable means of monitoring outcomes of facial reanimation surgery and provide clinicians with a key understanding of the expected benefits of this surgery.

Biomedical and translation streams

3D printing implantable jaw allografts for insertion in patients undergoing mandibulotomy

This project was commenced in 2019 and successfully completed this year, with several prototypes developed with great success. Each of these prototypes were successfully modelled off real patient cases, and customized to ensure attachment of dental implants and brachytherapy catheters. This work was successfully accepted and presented at the 2020 ASOHNS conference.

3D printing of temporal bone and lateral base of skull models as a surgical training model

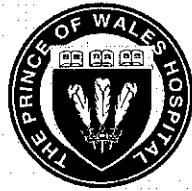
The second in collaborative projects with UNSW Biomedical Engineering, developing a representable, affordable model to allow trainees to practice drilling temporal bones. The project is about to produce a working prototype

Artificial Intelligence in decision making in Head and Neck Cancer Surgery

This is a collaborative project between UNSW and the research group. The aim of which is to develop a database of micro-laryngoscopy images of different pathology, from this a new machine learning algorithm will be created to help streamline diagnosis. This will help swift screening of patients within the wider community and identify early cases of laryngeal malignancy.

Development of a biopolymeric drug delivery device for use in otolaryngology/Head and Neck Surgery

Optical Coherence Tomography (OCT) in assessment of laryngeal pathology



International Collaborations

Pharyngolaryngectomy Reconstruction: An international perspective on reconstruction

The ILP student this year, William Karantanis, was challenged with the COVID19 pandemic. However, this enabled the creation of a new novel project assessing the perspective of pharyngolaryngectomy reconstruction. This was the largest project conducted of this kind within the Head and Neck community. It was conducted with major reconstructive institutes in India, Nepal, Bangladesh, USA and UK. The paper has been submitted to JAMA for review and possible acceptance.

Through this collaboration key relationships have developed, specifically with TaTa Memorial Hospital (Mumbai, India), Massachusetts Eye and Ear (Boston, USA) and Harvard University. These relationships have resulted in some centres offering to the group observership with potential fellowship positions in the future.

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

Dr Fuzi, as part of his masters attended Massachusetts Eye and Ear Infirmary to collaborate with acquisition of their facial nerve database. His masters is a novel project attempting to track facial nerve reanimation surgery. The relationships developed with this have enabled the research group to have an ongoing North American connection. This has created the opportunity for observerships within this world renowned department.



Head and Neck Cancer Foundation

It is with great sadness that the patron and founding member of the Head and Neck Cancer Foundation passed away in 2019. John Fordham was a colossus of a man, generous with his time, knowledge and expertise. The Head and Neck Cancer Foundation was the brainchild of John and it was his motivation, vision that saw it develop into what it is today. While we miss John, the foundation has found new purpose to help expand the area of head and neck cancer research. The trials of this year have made this even more so relevant.

The foundation graciously awarded the 2020 research registrar grant to Dr Ravjit Singh. Dr Singh, has coordinated the Prince of Wales Research Group this year and mentored junior trainees in expand their research career. Furthermore, the grant has been instrumental in developing his research project: *Optical Coherence Tomography (OCT) in assessment of laryngeal pathology*.

The foundation has survived a challenging year and while saddened by the loss of its patron looks forward to the opportunities that 2021 hold.



Final Remarks

2021 promises to be an exciting year.

The group will be supervising, an ILP student, 2 master student, and at least one Ph.D. student.

We are involved on the Medical Advisory Board of a novel device for the diagnosis of concussion which has recently obtained USA FDA approval.

We are optimistic about resurrecting our artificial intelligence programme together with Professors Sowmya and Maojiring from the University of New South Wales.

The Head and Neck Cancer Rapid Access Clinic which has the support of the Ministry of Health and has now received the support of the area will hopefully be established and will provide a novel approach to facilitate early diagnosis and treatment of a wide range of head and neck cancers.

The major professorial/research program for 2021 will be the development of Laser printed three dimensional modeling of tumors in the head and neck based on high resolution imaging modalities.

The aim of this is to facilitate production of a biodegradable polymeric mesh impregnated with high dose time release nano particles of appropriate chemotherapeutic agents as a novel way of treating advanced cancers in the head and neck.

I have received a personal grant of \$15,000 via the Prince of Wales Foundation for the development of novel diagnostic technology in the area of myofascial pain/clenching/TMJ dysfunction. This initiative is the "Bruxometer" project and will commence in 2021.

I again take this opportunity to thank all of the participants in this group and all of our supporters for their sterling efforts in 2020 and look forward to an exciting 2021.