



SCHOLARSHIP REPORT

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SECTION 1 PERSONAL AND AWARD DETAILS			
Title	Miss	PID	128233
Surname	Foster	Forename(s)	Emma Catherine
Scholarship/award awarded	College Travelling Scholarship	Amount awarded	£2000

SECTION 2 PROJECT/VISIT DETAILS	
Name/Title	Visit to the UF Health Jacksonville.
Location	Jacksonville, Florida
Aims and objectives	<ol style="list-style-type: none">To establish formal connections with the University of Florida Proton Therapy Institute (UFHPTI) and gain further insight into its advanced programme.To gain an understanding of the oral strategies used within this unit.
Summary <i>Include methodology, results and conclusions if applicable</i>	<p>There are now 77 centres across the world providing Proton Beam Therapy (PBT). The Christie Hospital in Manchester recently opened the first NHS PBT centre in the UK and to begin with will treat select head and neck cancers (HNCs). A second UK centre based at the University College London Hospital is due to open in 2020. In the UK, the consultant in restorative dentistry and oral rehabilitation is a core member of the HNC MDT. The UK has multiple standards which provide recommendations on the dental management of HNC patients pre, during and after conventional radiotherapy (Butterworth, McCaul & Barclay, 2016) (BAHNO, 2014) (RCSEng, 2012) (BAHNO, 2009). However, little has been published on the oral screening and rehabilitation protocols for patients treated with PBT. The primary aim of this out of programme experience (OOPE) to the University of Florida Proton Therapy Institute (UFHPTI) was to establish formal connections with an established unit that has been treating HNC patients with PBT for 12 years. The HNC Rehabilitation service in Manchester felt that it was imperative to gain an input from experienced clinicians to ensure that our oral screening and rehabilitation protocols are maximised to achieve the best outcomes for patients treated with PBT.</p> <p>This four-week trip involved visiting the UFHPTI, shadowing prestigious OMFS surgeons and prosthodontists, and visiting the University of Florida College of Dentistry. Our team was successful in answering the following specific questions:</p> <ol style="list-style-type: none">What specific HNCs are being treated with PBT at UFHPTI?How many HNC patients on average are treated annually with PBT?Protocols used for the dental pre-assessments prior to photon and proton treatment?What are the protocols currently in place for the rehabilitation of HNC photon and proton patients?Does the rehabilitation potential vary dependent on the treatment modality used in their care?Do dental location devices have a role in HNC proton treatment?

7. What are the potential consequences / side effects in children given proton treatment for HNC?
8. Are patient reported outcome measures being collected? If so, what approach?

The UFHPTI officially opened in 2006 and now treats 12 types of cancers, specifically: bone, breast, brain, eye, gastrointestinal, head and neck, lung, pancreatic, prostate, sarcomas, hodgkin's lymphoma and paediatric cancers. The Radiation Oncologists are treating a very diverse patient population with both photon and proton treatment. At maximum capacity this unit can treat up to 100 patients with PBT and 50-70 patients with photons per day. The \$39 million expansion currently underway will allow for a 25% increase in the centres ability to treat cancer patients with proton therapy.

Of relevance to The Christie Hospital, the UFHPTI treats sinonasal cancers of diverse histologies (as long as carcinomas), for example, SCCs, Adenoid Cystic, SNUCs, Small Cell and Olfactory Neuroblastomas up to 76Gy. Dr Roi Dagan, a Radiation Oncologist at UFHPTI, has seen a large difference in local control (LC) in sinonasal cancers treated with protons compared to photons. The latest published data supports this, showing 90% 3-year LC rate with gross total resection and PBT for sinonasal cancers (without metastases) in a population of 69% T4 and 96% T3-T4 (Dagan et al., 2016a). With PBT, a key factor to consider is the air-water interface and dose distribution. This is the reason that the oral cancer (OC) is a challenging site for PBT. For this reason, the UFHPTI is not treating OC with protons if the tumour is in the midline or not well lateralised. In unilateral OCs, the benefits of PT can be really maximised due to eliminating contralateral damage.

Despite advances in head and neck radiotherapy, oral mucositis remains a frequent adverse effect. Simulation in IMRT and IMPT requires optimal reproducible oral immobilisation. An effective method of reducing radiation-induced toxicity is to construct customised oral stents / tissue displacement devices which physically displace tissues away from the tumour (Wilke et al., 2017). Frequently reported negatives with any customised oral stent / displacement devices are the chairside time, maintenance, cost and tolerance. At UFHPTI the team have designed a relatively simple, inexpensive tissue displacement device. These tissue displacement devices have proved particularly useful in the following tumours: sinonasal, maxillary/alveolar ridge/hard palate, FOM and tongue cancers. Although this device has proved successful and effective in minimising mucosal radiation, it does not securely attach into the facemask and if modifications during the course of treatment were required, it would be a challenge to do whilst maintaining accuracy. The Manchester HNC Rehabilitation team hope to design and utilise a novel method to quickly construct reproducible oral tissue displacement devices which aim to be well tolerated, easily modifiable and effective in minimising mucosal radiation during PBT.

Dr Daniel Indelicato, an Associate Professor of Radiation Oncology, directs the UFHPTI Paediatric Radiotherapy programme. Paediatric patients from the UK started being referred to the UFHPTI approximately 7 years ago. This unit has treated an array of different paediatric HNCs, for example, Rhabdomyosarcomas, Ewing Sarcomas and Nasopharyngeal Carcinomas. The UFHPTI is collaborating with the Máxima Medisch Centrum (Academic Medical Center) in the Netherlands on an ongoing project. The aim of this project is to compare adverse effects in HN Sarcoma patients between multiple treatment modalities. Due to important organs being in close proximity during HANC treatment, long-term adverse effects including craniofacial growth deformities and functional impairments have been noted. Additionally, quality of life and facial experience (FACE-Q) questionnaires will be offered. This trip has opened up the possibility of collaborating with the UFHPTI. Specifically, the opportunity to collaborate on the retrospective data collection of adverse effects experienced in UK paediatric patients treated at UFHPTI with PBT.

With regards to acute adverse effects with PBT, the UFHPTI has data on the parotid tumour cohort. In a previous retrospective evaluation most patients who received PBT for parotid cancers experienced no or minimal toxicity throughout therapy (Dagan et al., 2016b). PBT for proton tumours can almost eliminate the dose to tooth bearing areas, thus limiting the risk of short and long-term radiation effects i.e. ORN. Therefore, in these cases it can be proposed that a restorative dentist can be less radical with pre-extractions. Unfortunately, at present the UFHPTI is not able to quantify if the incidence or severity of ORN differs between proton and photon treatment of HANCs. A possible explanation for this is due to the difficulties with follow up at this unit, as many patients are referred from out of state.

	<p>During this trip, I was able to attend a two-day clerkship in Oral Oncology and Oral Medicine at the University of Florida College of Dentistry. Dr Pamela Sandow, the Director of Oral Medicine and Dean of Admissions at the UF College of Dentistry, has over 30 years' experience working with HNC patients. Dr Sandow aims to be less radical with pre-extractions when proton treatment is planned. The local protocol states that a minimum of 14-21 days is required between extractions and radiotherapy. Experience in this department is that there is a lower incidence of trismus, xerostomia and radiation caries in HNC treated with protons versus photons. The UF College of Dentistry also recommends and constructs custom fluoride 'carriers'. A difference in their local protocol compared to that of UDHM local protocol is that they are only recommending their patients to wear the fluoride trays for 5-10 minutes daily. On reflection, the Oral Oncology department regrets not collecting long term data prospectively on HNC patients treated with both photon and proton treatment. Our team hopes to learn from Dr Parker, the recently appointed associate dean for research at UF Health Jacksonville, in establishing a databank, specifically for HNC patients treated with PBT.</p> <p>The UFHPTI offers numerous patient support programmes, for example a weekly patient engagement session, support groups and social activities. The patient engagement sessions have been running weekly by volunteers and faculty staff for over 12 years. Attending these sessions during my trip allowed me to see first-hand the value that patients placed on these patient support sessions. Of particular relevance to our team, the 'Support for People with Oral and Head and Neck Cancer' (SPOHNC) organisation holds support sessions at UFHPTI. This patient-directed self-help organisation was founded in 1991 by an oral cancer survivor. SPOHNC offers information, support and encouragement to newly diagnosed patients, survivors, family members and friends.</p> <p>Overall, this trip allowed our team to gain invaluable knowledge and connections with the UFHPTI.</p> <hr/> <p>References.</p> <p>BAHNO. (2009). BAHNO Standards. Retrieved from: www.bahno.org.uk</p> <p>BAHNO. (2014). National Head and Neck Cancer Audit. Retrieved from: www.bahno.org.uk</p> <p>Butterworth, C., McCaul, L. & Barclay, C. (2016). Restorative dentistry and oral rehabilitation: United Kingdom National Multidisciplinary Guidelines. <i>J Laryngol Otol</i>, 130(S2), S41-44.</p> <p>Dagan R., Bryant C., Li Z., Yeung D., Justice J., Dzieglewski P., Werning J., Fernandes R., Pirgousis P., Lanza D.C., Morris C.G., Mendenhall W.M. (2016a). Outcomes of Sinonasal Cancer Treated with Proton Therapy. <i>International Journal of Radiation Oncology</i>, 95: 377-385.</p> <p>Dagan R., Bryant C.M., Bradley J.A., Indelicato D.J., Rutenberg, M., Rotondo, R., Morris, C.G. & Mendenhall, W.M. (2016b) A Prospective Evaluation of Acute Toxicity from Proton Therapy for Targets of the Parotid Region. <i>International Journal of Particle Therapy (IJOPT)</i>. Vol. 3, No. 2, pp. 285-290. https://doi.org/10.14338/IJPT-16-00010.2.</p> <p>RCSEng. (2012). The Oral Management of Oncology Patients Requiring Radiotherapy, Chemotherapy and / or Bone Marrow Transplantations, Clinical Guidelines.</p> <p>Wilke C.T., Zaid M., Chung C., Fuller C.D., Mohamed A.S.R., Skinner H., Phan J., Gunn G.B., Morrison W.H., Garden A.S., Frank S.J., Rosenthal D.I., Chambers, M.S. & Koay E.J. (2017). Design and fabrication of a 3D-printed oral stent for head and neck radiotherapy from routine diagnostic imaging. <i>3D Printing in Medicine</i>, 3:12.</p>
<p>Learning outcomes</p> <p><i>Detail here how the aims and objectives were met</i></p>	<p>This four-week trip involved visiting the UFHPTI, shadowing prestigious OMFS surgeons and prosthodontists, and visiting the University of Florida College of Dentistry.</p> <p>Attended a two-day clerkship at the UF College of Dentistry – allowed me to see first-hand the preassessment and review protocols for HANC proton and photon patients in this region.</p> <p>Shadowed two experience private prosthodontics who rehabilitate HNC patients – Dr Gielincki and Dr Rawal.</p> <p>Formed formal connections with the OMFS and HN Radiation Oncology team at UFHPTI.</p>

Evaluation

How has this scholarship/award impacted on your clinical/NHS practice or equivalent?

As a result of this trip, our team has been given the opportunity to collaborate with the UFHPTI in future research and projects. As the PBT Centre at the Christie Hospital has not yet treated a HANC patient with PBT, our team has the opportunity to establish data collection tools and plan PRO for both adult and paediatric patients, which will allow long term data to be analysed.

Following on from this trip, the Manchester HNC Rehabilitation team hope to design and utilise a novel method to quickly construct reproducible oral tissue displacement devices which aim to be well tolerated, easily modifiable and effective in minimising mucosal radiation during PBT.

Additionally, our team aim to establish local and national protocols for the dental management of HNC patients treated with PBT.

SECTION 3 | IMAGES

Image 1: External view of the University of Florida Proton Therapy Institute (UFHPTI)



Image 2: Merchandise sold at the patient support session to help raise money for the Paediatric Proton Therapy programme.



Image 3: Beam line at UFHPTI



Table 1: Day schedule of four-week trip

1	Monday 14 th January 2019	UoF College of Medicine Introduction to team & OR
2	Tuesday 15 th January 2019	AM OMFS Clinics PM Tumour board & OR
3	Wednesday 16 th January 2019	AM Follow up clinic PM Tour of Proton Beam Institute
4	Thursday 17 th January 2019	PM Theatre and talk with OMFS Research Coordinator
5	Friday 18 th January 2019	AM & PM Oral Surgery Outpatient – GA/IVS
6	Monday 21 st January 2019	National holiday in the USA – Martin Luther King Jr. Day AM Brainlab course
7	Tuesday 22 nd January 2019	AM OMFS Clinics PM Tumour Board & OR
8	Wednesday 23 rd January 2019	AM OR PM UFHPTI Patient engagement session
9	Thursday 24 th January 2019	AM OR & Meeting at UFHPTI PM OR
10	Friday 25 th January 2019	AM & PM OR
11	Monday 28 th January 2019	AM & PM OR
12	Tuesday 29 th January 2019	AM Clinics PM Tumour Board
13	Wednesday 30 th January 2019	Observed Dr S Rawal at Florida Prosthodontics, Merritt Island
14	Thursday 31 st January 2019	AM Outpatient clinic PM OR
15	Friday 1 st February 2019	AM Outpatient clinic PM OR and PFR Lecture
16	Monday 4 th February 2019	AM North UF Hospital PM UFHPTI patient orientation tour. Met with Dr Indelicato
17	Tuesday 5 th February 2019	AM Outpatient clinic PM S.P.O.H.N.C. Support group at UFHPTI. Tumour board.
18	Wednesday 6 th February 2019	AM UFHPTI PM Visited Dr Gielinski
19	Thursday 7 th February 2019	Oral Oncology/Oral Medicine Clerkship UF College of Dentistry
20	Friday 8 th February 2019	Oral Oncology/Oral Medicine Clerkship UF College of Dentistry



SECTION 4 | EXPENDITURE

Breakdown of expenditures

Please demonstrate how the scholarship/award funding was used to support your project/visit

This College Travelling Scholarship has funded the travelling expenses (flights) for four members of our team:

Dr Emma Foster

Dr Carly Taylor (Consultant in Restorative Dentistry)

Professor Craig Barclay (Consultant in Restorative Dentistry / Honorary Professor in Maxillofacial Rehabilitation)

Mr Massimo Maranzano (Consultant Oral and Maxillofacial Surgeon)

SECTION 5 | PUBLICATION

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