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Review

Academic Training in Oral and Maxillofacial Surgery – when and how to enter the pathway

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Abstract

Entering into surgical academia can seem a daunting prospect for an oral and maxillofacial surgery (OMFS) trainee. However, the streamlining of academic training by the NIHR to create the integrated academic training (IAT) pathway has simplified academic training and more clearly defined academic positions and entry points for trainees. In this article we review the current NIHR IAT pathway and the various grades and entry points available to OMF surgeons, both pre- and post-doctoral. We highlight the unique challenges facing OMF trainees and provide advice and insight from both junior and senior OMFS academics. Finally, we focus on the planning and application for a doctoral research fellowship – discussing funding streams available to OMF surgeons.

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Introduction

The purpose of this article is to provide an update[1] and a reference framework for Oral and Maxillofacial Surgery (OMFS) early researchers or trainees who are considering an academic career. Conducting research alongside clinical work is a challenging but rewarding endeavour, however academic and clinical responsibilities must be balanced carefully, allowing neither one to dominate or become neglected. Whilst it is possible, maintaining research interests without protected and acknowledged time set aside regularly as part of a prospective contract or learning agreement risks burnout. This is perhaps even more relevant in those OMFS subspecialities with longer operating times and requirements for additional fellowship training. Furthermore, without structured research training and academic networks, individuals with an interest in research may end up without access to the resources required to perform at the highest level as research leaders. In this paper we will outline the current structure of clinical integrated academic training (IAT), provide advice on entry points for OMFS trainees and discuss what you will need to start a research project, with particular focus on doctoral training fellowships to undertake a PhD.

NIHR Integrated Academic Training

Following the 2005 *Modernising Medical Careers* report, clinical IAT was brought under the umbrella of the NIHR.[2] Academic posts were aligned with the medical training pathway, with recruitment and commissioning moved to a central model with input from local units. IAT is broadly split into 4 stages – academic foundation, academic clinical fellowship (ACF), doctoral fellowship and academic clinical lecturer (ACL), with various configurations of post-training consultant academic positions following these (Fig. 1). The intention is that these posts, with ringfenced academic time, allow research to progress without necessarily increasing training time (specific points are listed in Box 1). Of note, how you choose to structure your academic time in ACF and ACL posts is individual preference with input from your clinical and academic supervisors (for example a single academic block, rotating blocks or weekly session splits). Clearly the demands of the project may dictate the need to be more flexible, for example laboratory-based versus clinical trials research. In addition, alternative pathways such as those aligned with the military, industry-funded or international posts are available (Box 2).

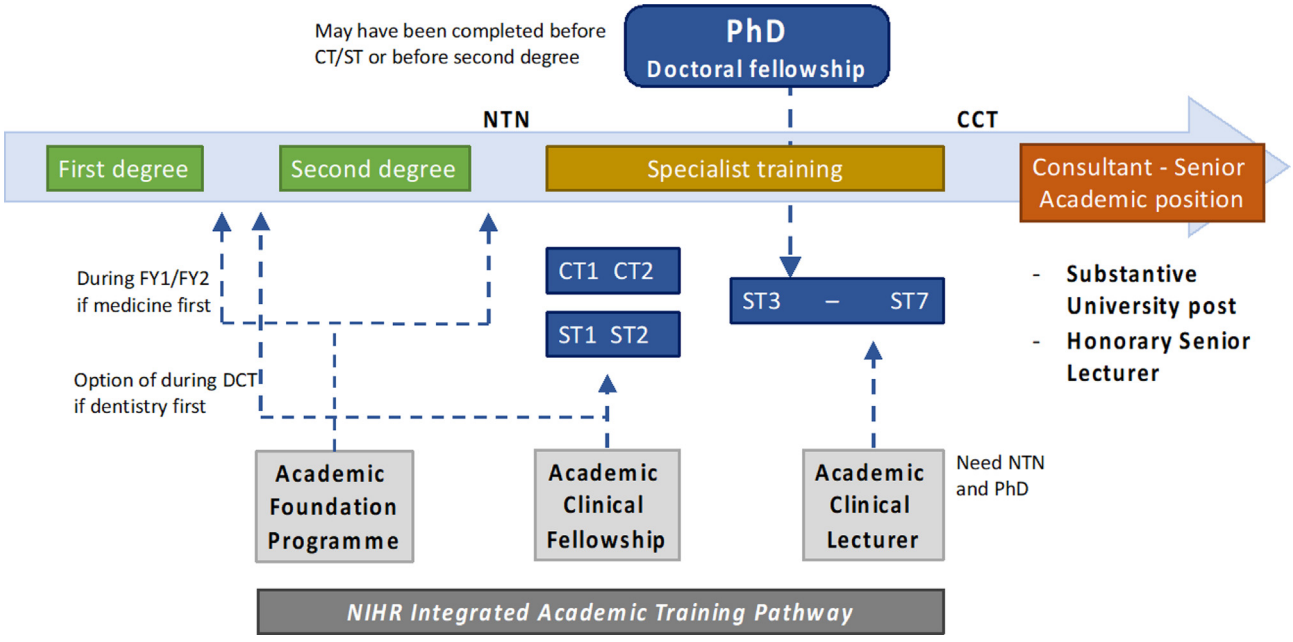

Fig. 1. **NIHR integrated academic training pathway adapted for OMFS training.** (NTN = national training number, CCT = certificate of completion of training, FY = foundation years, CT = core training, ST = specialist training). Note how the pathway is designed to be a progression from one stage to the next, however there is flexibility and trainees may join at various points and leave (and return) if desired.

Beyond completion of training and balancing academia

Consultant Academic positions - Combining Consultant clinical practice with academia can be extremely rewarding, especially with the ability to see direct clinical benefits to patients and the wider impact upon communities and populations from research. Consultants with an active research

Box 1: Detailed description of academic positions in the integrated academic training pathway.

Academic foundation

- Now termed specialised foundation programme posts (which includes applications for research, teaching and leadership foundation routes).
- Applicants apply centrally (through the Oriel system) and nominate up to 2 local units as preferences, who will rank scores and interview locally.
- One 4-month rotation out of 6 is dedicated to 100% academia (i.e. 16.6% full-time research).

Academic Clinical Fellowships

- For candidates in specialist training and can commence at ST1/CST1/DCT1 level or ST3.
- Dedicated ringfenced academic time increases to 25% with funding for up to 3 years and candidates are encouraged to achieve a masters level qualification during the ACF (but not mandatory).
- Applications are central and candidates rank all available units. Once benchmarked as meeting the defined standard, candidates are interviewed locally for specific posts.
- Available local ACF positions may be grouped into specialty specific posts, so prospective OMFS candidates should discuss opportunities locally.
- Trainees have the option to convert into an ACF part way through specialist training if wishing to pursue academia.

Academic Clinical Lectureship

- Funding is for a maximum of 4-years, with 50% full-time dedicated to research. Applicants must hold a national training number and PhD.
- The application process differs from above and local units will often ask for expressions of interests from potential candidates well ahead of jobs being advertised, to attempt to align ACL posts to suitable candidates
- Crucial for OMFS trainees to be integrated into the local set-up in your deanery for allocating/recruiting to these posts.
- Similar to ACFs, several specialties will be grouped into themed posts to which applicants can apply. Of note, candidates must have submitted their thesis prior to being interviewed and have completed their PhD before commencing the post.

Box 2: Alternative pathways into academia in OMFS.

Military academia

- Generally follows a separate but analogous pathway to civilian surgical academia. It is funded and co-ordinated through the Academic Department of Military Surgery and Trauma, which is led by the Defence Professor of Surgery, a competitively selected chair within the RCS (England).
- OMFS military personnel wishing to do a PhD the require support from the academic institution to which they intend to undertake their research and are then competitively selected and civilian benchmarked through the military higher degree board, as are substantive senior academic military positions.
- Current preferred institutions for surgical research are Imperial College London and Defence science and technology laboratory (Dstl) Porton Down, but trainees can still apply for other nationally funded schemes through other institutions as long as clear military relevance for the research is demonstrated.

Industry sponsored programmes

- Grants are available directly from industry (such as osteosynthesis manufacturing companies) or the research-education organisations which they sponsor (for example SORG or AO) for trainees and also consultants.
- Funding from the manufacturers directly may be part of a formal government-led scheme, such as the Knowledge Economy and Skills Scholarships - contributing to the funding that spans several years of entire research programmes (MD/MPhil or PhD).
- Research collaboration with industry can provide valuable and unique opportunities and resources - such as experience working in technical design/manufacturing and cost-effective or even free access to raw materials (and industry personnel) required to conduct research projects.

International research

- International grants are available from the UK government via agencies such as the NIHR, UKRI or Newton fund. These grants work on bilateral partnerships that have been set up to promote research between the UK and overseas partners which tend to be Universities although not exclusively.
- Partners may include government institutions, non-government organisations (NGOs) or industry. These funds are mostly directed to low- and middle-income countries and the research has to be impactful and relevant to the country in question. The applicant needs to be affiliated to a UK university to apply, with a track record of high-quality research and financial governance set up that is approved by the grant awarding bodies.
- Of note, transporting data and samples across borders can be time consuming with bureaucratic obstacles, so facilities in those countries to undertake data analysis or laboratory work should be sought at the project design stage.

or teaching profile can apply directly for honorary academic positions at Universities that are aligned to their NHS trust. Substantive academic clinician roles are available to support ongoing research in the post-training career, at a level of Senior Lecturer (Associate Professor) and above. These roles are usually highly targeted to specific subspecialties and awarded to clinicians with an established portfolio of research and in receipt of national grant funding. Such contracts are bespoke for the individual with regard to the split between clinical and academic time (generally 50:50 with an accommodation for the demands of surgical practice) and if awarded by the University the Consultant will be an honorary NHS employee. National funding for a substantive Consultant academic clinical position can be achieved via advanced or clinician scientist fellowships, for example from the NIHR, MRC or CRUK, among others. Increasingly, NHS trusts recognise the contribution of research active clinicians and as such their Research and Development Departments will have the resources to support/fund consultant PAs (Programmed Activity) or sessions with the intention that the individual will seek funding to support those PAs through their own grant awards over time.

Honorary teaching academic positions – Teaching is an invaluable skill for OMF surgeons, and we have a key role to play in contributing to both undergraduate medical and dental education. For trainees of all levels - formal and informal routes are available, both within and outside of the IAT pathway. Informal routes may include ad hoc teaching of students on placement and volunteering for unpaid roles facilitating training days and/or clinical examinations. Formal commitments range from Clinical Teaching Fellowship roles during training and Academy Tutor positions as a senior year's registrar or consultant, taking responsibility for a 'firm' of students. These may contribute to honorary Lecturer titles and Consultants can apply for Honorary Senior Clinical Lecturer status in affiliated universities, who may choose to 'buy out' PAs for both medical and dental undergraduate education. Ultimately, this may lead on to stronger academic commitments and positions of leadership and responsibility within higher education institutions e.g. Head of School. All of the above strengthens the reputation and awareness of our speciality in undergraduate education.

Balancing academia with other responsibilities - Surgical academic training often coincides with significant life events – both good and bad. For those entering the field of surgical academia whilst balancing caring responsibilities, the path is now well trodden - but nonetheless the challenges remain the same. Negotiating a PhD with children is a common challenge and good childcare is the foundation for any solid parent-academic alliance. Support can be found on various platforms such as the BMA Academics Forum and Facebook groups such as Academic Clinical Trainees, PhD and Early Career Researcher Parents and PhD Mamas. Several academic institutions have Athena Swan grants that promote gender equality in research - providing extra financial resources for academic parents. Perhaps the best source of support of how to negotiate the competing demands of home, training, and academia is to find someone to talk to who has successfully done so and be honest about the challenges with supervisors. More formal mentoring programmes are accessible through the Academy of Medical Sciences SUSTAIN (women-specific) and PILLAR schemes, wherein a recurrent theme is the importance of mental well-bring, recognising burn-out and the maintenance of hobbies and interests.

When to enter the academic training pathway

OMFS training is a protracted and challenging pathway, with trainees leaving the recognised pathway to undertake a second degree and then returning to specialist training (ST). Because of this there is no right or wrong point to join the academic pathway. In this review we present options for entry points for trainees considering a more formal research position. However, the best way to gain insight is to talk to current academic OMFS trainees or surgeons. The decisions will invariably be unique to the individual and there is frequently more than one option.

Undertaking doctoral research (PhD/MD) is the benchmark entry point for an academic career and an entry requirement for subsequent lecturer and advanced fellowship positions. Both PhD and MD routes provide periods of dedicated academia - developing independent thinking and a research skillset. There is no reason why a trainee cannot undertake an academic foundation or ACF post without the initial intention to complete a PhD/MD - these posts serve as 'tasters' into academia. An ACF can be completed before or after the second degree depending on the trainees individual pathway. Gaining a more in-depth understanding of clinical research methods is valuable for all surgeons, particularly at further job applications. Furthermore, there is no pre-requisite to have undertaken an academic foundation or ACF post prior to considering a PhD. However, they do have several benefits: developing a research skillset, 'plugging you in' to the local academic setup, developing supervisor/collaborator relationships, and crucially generating pilot or feasibility data on which to base a formal PhD research fellowship application. For an OMFS trainee the thought of further time spent in training and when to consider the 'jump' can be a daunting prospect. For medicine first trainees, who have completed foundation and/or core training prior to dental school, early academic posts perhaps won't have been undertaken before the 2nd degree – however, an ACF post can still be considered at ST3 level. For dentistry first trainees, options are increased as the progression between foundation, core, and ST is continuous and more streamlined.

If you have made the decision to undertake doctoral research then most candidates will do this during ST, however you may have completed a PhD before ST. Considering when to start, you will need to balance acquiring clinical capabilities as an established registrar versus being too close to the FRCS exit exam and loosing focus. However, timing may be dictated by project/funding availability and/or personal circumstances. As will be highlighted, we strongly recommend starting to plan early – thus, realistically you will need to be having discussions with your potential supervisors and TPD as soon as possible, this way they can support your specific needs as an academic trainee. The majority of trainees will apply for a period of full time 'out of programme research' (OOPR). There has been precedent for undertaking part-time doctoral research, with or without weekly ring-fenced academic time however this carries additional risks, particularly in achieving a successful (and sustainable) balance between clinical, academic, and personal commitments. Any such arrangement is postgraduate deanery specific. Many supervisors would strongly counsel against a lab-based project attempted part-time during continued clinical work.

What you need to do a PhD

While the points highlighted below are specific to PhDs and doctoral fellowships, the same rationale applies to research projects of any size or undertaking. If you have made the decision to do a PhD then you need the '4 P's': project, person (supervisor), place (academic institution) and pounds (funding).

Location and supervisor - Aligning with a well-established OMFS academic group within your deanery makes a lot of sense, especially if you are settled in the area and they have a proven pathway for academic training. However, you may have an idea for a project or a particular passion for a topic that requires looking outside your deanery for expert supervision – or indeed outside of OMFS as a specialty and finding local experts from other specialties/disciplines. Also, be aware that certain institutions may have expertise or reputation in a particular research area that may be worth considering. While your supervisor may be a surgical academic, having supervisors from allied specialties or scientific backgrounds is critically important. This brings together fresh opinions and viewpoints, but also differing skillsets to ensure you succeed. Options for multi-site supervision should also be considered, in particular given the increased availability of technology for remote meeting and supervision.

Project – An in-depth discussion of research project design and options is outside the scope of this article; however, you should have an idea of key questions to consider even at an early stage of planning, in particular:

- What is your research question? Specifically, can you answer it with your proposed project?
- Is your research in an area of unmet clinical need in a defined patient group?
- Is the project idea novel with potential for significant impact?
- Do you have well-defined study endpoints/outcomes to help you reach your conclusion?
- Have you considered safety nets or additional side-studies to ensure you can deliver a result/outcome at the end of the project?
- Have you involved patients in the design process?
- Can you develop a 'skill' or practice that you can take into your post-training career?

Ideas of research 'impact' and 'patient and public involvement' (PPI) are likely to be new concepts to early researchers. However, they are critical parts of all funding applications, in particular fellowship applications to large funders. Being familiar with these concepts (i.e. attending courses and workshops) is essential when you start writing grant applications. In brief, impact relates to the benefit and effect your research output will have on both academic *and* non-academic parties at a local/national and international level, for example patients, healthcare institutions, policy, etc. It needs to be specific to your research area with a well thought out statement avoiding often heard clichés. PPI is the involvement of patients/public/consumers in your research from the very beginning, to tailor study design and ensure patient benefit is at the core of your project (e.g. presenting your research proposal and getting feedback from a patient support group or undertaking focus groups).

More than likely your local research group or OMFS academic will have a niche interest and/or idea for PhD projects already lined up - but they will undoubtedly be receptive to ideas from a keen and motivated trainee. Getting help early and from multiple sources is invaluable to design and refine a competitive fundable project. One critical message to appreciate from this article is that all of these processes take time. As a rough guide, from inception of an idea to starting your PhD may take 2 years or more, especially if you consider that funding cycles tend to come around once or twice a year only.

Research funding - To undertake doctoral research or time out of training to conduct a research project you will require consumables funding/bench fees and, not insignificant, personal salary costs. For the purposes of this paper we focus our discussion on research fellowships i.e. those including salary funding, with mention of specific smaller research grants. Key points and examples of available funders are outlined in Box 3.

Box 3: Examples of one-year and doctoral fellowships available to cover salary costs, and smaller research grants for research costs. Key points for each group are listed.

One-year research fellowships

Examples: RCS England (around 20 per/year, applicant needs NTN and MRCS), FDS England (applicant needs MFDS or ad eundem), RCS Edinburgh (need to be member of the college), University institute one-year research fellowships (specific to local academic institution).

- Excellent entry point to start research and secure some salary funding to generate preliminary data. Separated into local and nationally funded fellowships.
- Application process usually much simpler than doctoral fellowship - consisting of an application form of a few thousand words and an interview after shortlisting.
- Can be undertaken as pre-doctoral 'entry fellowship' or as 1st year of PhD. May be joined together to enable completion of PhD.
- Need to check if 1-year fellowship comes with specifically allocated research consumables funding, otherwise will need further research costs funding.

Clinical doctoral fellowships

Examples: CRUK clinical research training and Wellcome PhD fellowships (nationally funded, coordinated locally through CRUK centres/institutions), NIHR and MRC doctoral fellowships (nationally funded with national multi-stage application process).

- Either centrally or locally recruited – offering funding for 3-4 years including research costs.
- Application process and deadlines are well publicised, with transparent scoring guidelines and criteria published online.
- Local institutions may advertise these fellowships as open to applications of any project specialty/topic or they may be pre-assigned to specific projects.

Research grants

Examples: BAOMS (<£10K internal review, >£10K requires external peer review), BAHNO (£3-6K size), Oracle Charity (head and neck cancer specific), AO ('mini' or 'large' trauma research grants), local charities/hospital charities (often very receptive to clinical academics, University pump-priming grants (discuss with local research team), industry grants (ad-hoc and topic/implant specific).

- Covers cost of research- including consumables, facility/equipment costs, subscriptions to services, etc. 1-year fellowships will often come with a small pot of funding (i.e. <£5K). Doctoral fellowships will seek to cover all research costs.
- Research grants divided into small (<£10K), medium (< £50K) and large categories – with the size and complexity of the application form increasing at each level (table 1). Smaller research grants, often from local charities or national surgical associations, are an excellent way to get funding for pre-doctoral fellowships (academic foundation/ACF), or early PhD research.

How to be successful in a research/doctoral fellowship funding application

When applying for a research grant or fellowship you are asking the funder to allocate a significant amount of money towards your project on the basis of a proposed idea and your trajectory towards being a future academic leader. To do this, the review panel will assess various factors that will contribute to your success, i.e. the risk of failure. Aside from the perceived quality of the project, discriminating factors that may sway their decision will include your academic track record, that of your supervisor and institution, and critically any preliminary data to show 'proof-of-concept'.

Your track record – Aside from the obvious portfolio contents, you need to demonstrate an aptitude to undertake a sustained period of research and a willingness to learn and develop. Ideally you should have published in your chosen field, at the very least a review paper but ideally original research to highlight your track record. Of note, it is not necessarily the quantity of previous work but the quality and whether you have maximised your opportunities that will indicate a favourable trajectory. Consider research courses and workshops that you can go on (these will often be available locally) and also formal 'learning needs assessments' to demonstrate you have considered what areas are lacking in your portfolio or knowledge base.

Preliminary data – Particularly for larger doctoral fellowship applications you need to show the reviewer that while your research is novel, it isn't based on hypothetical methodology that carries significant risk (and therefore likely isn't going to get funded). But how do you get preliminary data if you haven't started your PhD yet? Aside from gaining exposure to research and developing a skillset, one of the primary purposes of pre-doctoral fellowships (i.e. an ACF) is to generate preliminary data and explore a research idea for future doctoral applications. If you have not been able to undertake one of these posts then you need to work hard to fill this gap in any potential application. Building on a previous project, or using preliminary data from your supervisor is ideal. The difficulty comes if you are starting a project from scratch with a totally novel idea. Herein lies the purpose of the many 1-year research fellowships available – as starter or 'pump-priming' grants to explore ideas and launch your academic career. Thus, we come back to our key message of plan ahead – there is no reason why you cannot be contacting a supervisor early and using core and/or ST to generate preliminary data ahead of a fellowship application.

Ask for help - While the IAT pathway has become more prescriptive, this is certainly not a 'one-size-fits-all' approach and individual needs will be different between trainees. However, successful OMFS academic trainees will all state how it was invaluable getting help and advice from various sources. One such example is the Research Design Service (RDS) who can provide valuable insights and constructive advice on improving your research proposal. All the authors on this paper, from various academic institutions/OMFS units, are willing to be contacted directly and offer advice. It cannot be overemphasised that the process of developing an idea into a well-designed project and writing associated funding applications is akin to learning to speak a new language. The learning curve is steep, requiring you to rapidly develop your academic skillset and vocabulary. Take the initiative to ask supervisors or mentors if you can read their successful applications. Your local university academic training unit will run educational events, such as grant writing courses or Impact/PPI workshops, and there will certainly be local research groups to join. If you are successful in being offered an interview, take the initiative to set up mock interviews made up of academics from varied backgrounds, previous successful applicants and RDS advisors. Aside from your supervisor, a mentor often plays a crucial role in providing guidance and help from an impartial viewpoint.

Summary

In summary, we have presented an update on the current structure of UK IAT, with focus on entry points for OMFS. Potential academic trainees should be aware of options for research funding and salary fellowships. At whatever level, developing a fundable project takes time, requiring input from several parties. The key message is to start early, plan ahead and ask for help - utilising assistance from local and national associations, in particular trainee and research groups within our parent association BAOMS.[3]

Ethics statement/confirmation of patient permission

Not applicable.

Conflict of interest

None of the authors have any conflicts of interest to declare.

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