

SCIENTIFIC
SECTION

Northcroft Memorial Lecture 2006

The future of specialist training

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The British Orthodontic Society invites outstanding contributors from the field of Orthodontics to give the guest lecture in memory of George Northcroft. In 2006 the guest lecturer was Professor Jonathan Sandy. The paper which follows was presented as the Northcroft Memorial Lecture 2006 at the British Orthodontic Conference, Edinburgh.

Invited paper

The future of specialist training

George Northcroft was born in 1869 and established the British Society for the Study of Orthodontia (BSSO) in December 1907. Traditionally, the Northcroft Memorial lecture is used to develop a theme around an individual's personal research and often marks the culmination of a research career. Indeed, the previous two Northcroft Memorial lecturers have taken exactly this approach – Kevin O'Brien and Nigel Hunt demonstrated, with true erudition, significant contributions in clinical and basic science research.^{1,2}

The BSSO as founded, was interested in the promotion of the study of orthodontia, research and teaching. It is this latter aspect which will be discussed, highlighting the recent advances in specialist training, including the impact on research. A prediction of direction will also be made. The last 12 months have seen a major upheaval in the way orthodontic services are delivered in the United Kingdom and this will have a knock on effect for academics, NHS consultants, specialist practitioners and the public. However, changes have also occurred abroad and thus the impact and consequences of changes in the UK are also likely to have resonance and relevance elsewhere.^{3,4} In many ways the government changes will have significant effects on the way we deliver training of specialist practitioners. This is unfortunate, since the training of specialist practitioners in the United Kingdom is currently at a zenith. The combined efforts of university academics, hospital consultants and specialist practitioners have developed training programmes in orthodontics that are the equal of many programmes elsewhere in the world. The modernization of medical careers introduced in 2006 has caused enormous disruption in the training of physicians and surgeons

in the United Kingdom. Fortunately in dentistry there has been little progress with the modernization of dental careers and in many ways this has been a blessing. The future training of specialists in orthodontics can be divided into three sections. First, where has specialist training come from? Second where is specialist training now and finally, where will specialist training go and what will it comprise?

To begin with, where then has specialist training developed from? Postgraduate orthodontic training received formal recognition when in June 1949, the first Diploma in Dental Orthopaedics was awarded by the Royal Faculty of Physicians and Surgeons of Glasgow (DDO RFPS). In January 1954, the Diploma in orthodontics of the Royal College of Surgeons of England (DOrth RCS) was approved and the first awards were made later that year. These Diplomas required a minimum of one year's specialist orthodontic study and training. This was later increased to two years. The current Membership in Orthodontics and the Intercollegiate Membership in Orthodontics require a three-year training programme. In parallel there were developments in the universities and the first MSc in orthodontics was approved in October 1968 under the auspices of the London University. The first teaching course took place at the Royal Dental Hospital and School and the first award was made in October 1972.⁵

There was a clear need to extend the training period to three years. Case AP was treated 25 years ago and presented as one of three cases at the Diploma in Orthodontics examination at the Royal College of Surgeons of England. The extra-oral photographs show a profile associated with an anterior open bite (Figure 1). This diagnosis is reinforced by looking at the start lateral cephalometric film and tracings. The maxillary mandibular planes angle is increased at 35°

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Figure 1 Anterior and lateral view of patient AP

(Figure 2). The decision was made to treat this case with the extraction of all four first permanent molars. The aims of treatment included levelling and alignment, space closure, reduction of the anterior open bite and maintenance of the normal buccal segment relationship. The case was treated with fixed appliances using the Begg technique. At that time the orthodontic department at the Eastman Dental Hospital had one camera. The photographs show the anterior view of the teeth as well as two buccal segment views. The quality of the photographs is such that it is difficult to discriminate between the anterior and posterior views (Figure 3). At that time only senior staff were allowed to use this camera. The final result is shown in Figure 4. The case was treated in 13 months. It is not intended to show excellence, but instead demonstrates the pressures of a two-year training programme and the limitations of the facilities available 25 years ago.

Postgraduates these days have access to digital cameras; there is no limitation on the number of images they can take of their patients and they have three years to complete orthodontic treatments. The MSc research project has also become a significant and pressurized piece of work, where previously it would typically have comprised retrospective studies usually associated with data sets of models or cephalometric radiographs. There

were also projects which involved biomaterials, animal studies, organ or tissue culture or the latest measuring device such as electromyography. These were difficult to supervise, as there were few academic staff (which is still current) and facilities were limited. Nevertheless for many of the students this was a steep (and valuable) learning curve but not one they necessarily enjoyed at the time.⁶ After completion of the MSc, most at that time went on to Senior Registrar training and then became NHS consultants; a few went into specialist practice and even fewer decided on academic careers.

The extension of the training programme to three years therefore did much, not only for the treatment of patients, but also for the quality and length of time over which MSc dissertations took place. In the early 1990s, the vogue for consultant training slipped away and many graduates from the three-year postgraduate training developed careers in specialist practice. The effect of this move has been seen recently where the number of consultant vacancies has increased significantly over the last five years. This is set to worsen: it is estimated that 20% of the orthodontic consultant body will retire in the next five years.

The few orthodontists who went on to further academic training either combined this with senior registrar training or with total immersion into academic

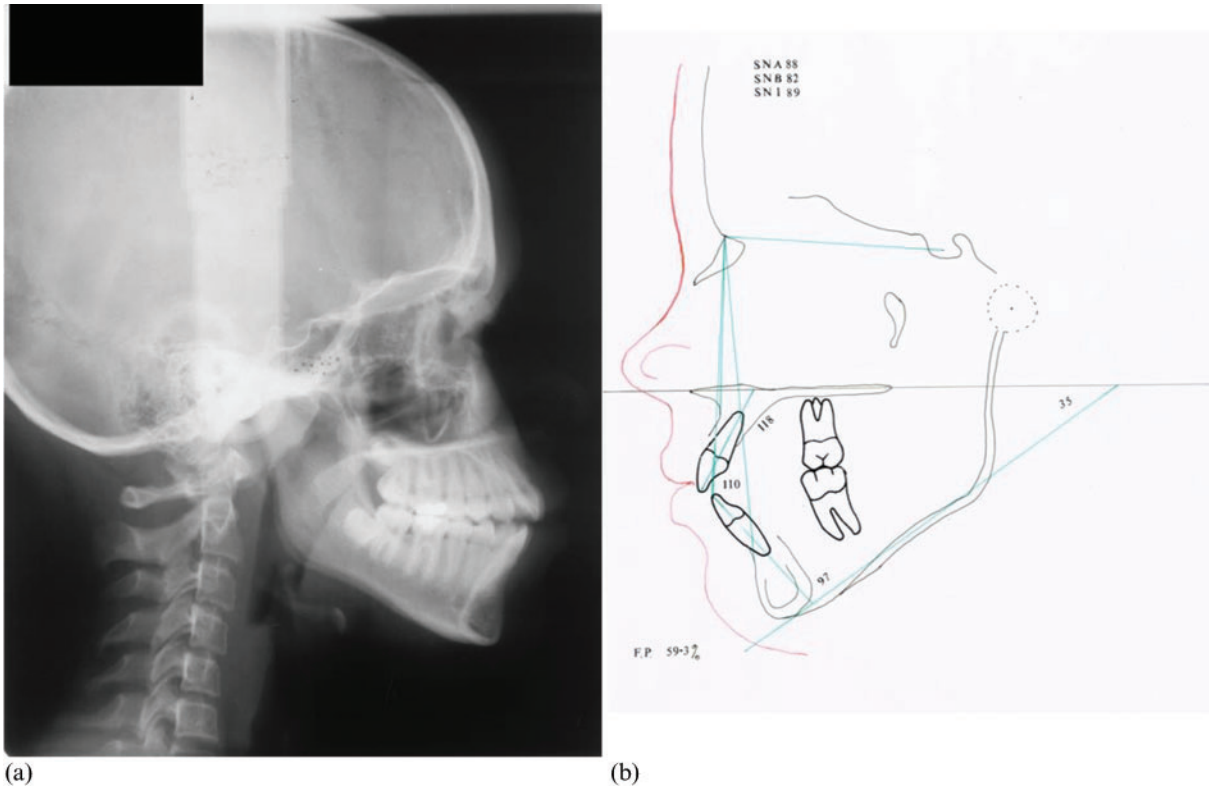


Figure 2 (a) Lateral cephalometric radiograph and (b) tracing of patient AP

training (usually a full-time PhD with few clinical responsibilities), and were helped from the late 1980s to mid 1990s with research training fellowships. More recently these seem to have come to a halt, the competition for research training fellowship applications is intense and although the number of charities providing these opportunities has increased, dentistry as a whole has not done well out of these in recent years. A few of these academics continued with research in postdoctoral positions, while a very small number managed to attract clinician scientist awards and continued in full-time research for a further five years. For a while then, orthodontics appeared to be doing well and to have a sound academic base. Evidence of

this training and the benefits is shown by the number of groups that have developed within dental schools and have produced world-class research. A number of groups have succeeded in both basic research and clinical research. The knock-on effect will be an improvement in the three-year basic postgraduate training in orthodontics.

In recent years, the funding councils have moved away from these models of small research groups. The current view is towards funding much bigger scientific groups and the chance of attracting funding into smaller research groups is diminishing. This means that the position of specialist charities becomes even more vital for research groups working in dental schools. Although



Figure 3 (a-c) In treatment views of patient AP



Figure 4 (a–d) Final result of patient AP

research groups in dental schools should obviously be encouraged to work with bigger groups, many of their innovative ideas cannot be expressed without some form of funding. The importance of the British Orthodontic Society Foundation (BOSF) should be even more obvious to members of the Society than ever before.

Two other major indicators also provide evidence that dentistry will suffer in this new research environment. The first is the Research Assessment Exercise (RAE) which takes place every six to seven years. The next RAE takes place in 2008 and for the first time dentistry has been divorced from medical research. For the purposes of the exercise, dentistry will sit in Panel C as a Unit of Assessment alongside others such as pharmacy, nursing and midwifery as well as allied health professionals.

The other major threat is in the development of the biomedical research centres. This government initiative driven through the Department of Health aims to create five centres in the United Kingdom where best research for best health could be carried out. These five centres have now been chosen, they comprise: Oxford,

Cambridge, King's College, University College and Imperial College London. Only one of these is associated with an undergraduate dental School (King's College, London) and while it may be argued that University College London has an associated Dental Institute, it seems this may not continue to exist. Thus dentistry appears isolated from these major biomedical research centres and it could be argued that geographically and politically this has been a naive move on the part of the government.

How then will academics be trained in the future to contribute to specialist training in orthodontics? The government has introduced a new scheme under the auspices of Walport.⁷ This developed after a report from the Academy of Medical Sciences suggested that academia in medicine and dentistry was under grave threat. In dentistry alone, since 2000 there has been a decrease of 25% of the academic body. To redress this, an initiative driven through the Department of Health, the Academy of Medical Sciences and the UK Clinical Research Collaboration has suggested four levels of entry for aspiring academics. The first is the Academic

Clinical Fellowship which should enable appointees to complete a research training fellowship application in a three year training period. The second point of entry is for those who have already obtained a PhD to apply for an Academic Clinical Lecturer's post enabling them to complete their chosen specialist training and continue with their research momentum. The third level enables a Clinical Senior Lecturer to establish their academic career while the fourth level is for those who have demonstrated an ability to become leaders through a National Clinician Scientist's Award. These initiatives are to be welcomed but there is a feeling of 'too little too late' and there is little doubt that academic recovery will be prolonged and for many, remains an unattractive career choice.

Academics also face other pressures in the clinical environment. The desire to attain high levels of clinical skill is inbuilt in most orthodontists. There is probably no more testing an arena than the Angle Society of Europe. In the United Kingdom, there are now only three full members of this society. The demands on clinical excellence required for entry into this Society are probably unachievable for most academics. Nevertheless this Society and the European Board have endeavoured to influence the development of clinical standards among specialist practitioners including those who train future orthodontists.⁸

Specialist training is now a three-year programme leading to the Certificate of Completion of Specialist Training (CCST) and then entry into specialist practice. For those who wish to become a Consultant there is a fixed term training appointment period (of two years), which is required before attaining a Consultant position. Completion of the three-year training period is marked by the Membership in Orthodontics taken at the Royal Colleges of Surgeons. There is in parallel the University degree of the MSc in Orthodontics; this is a requirement of the Specialist Advisory Committee and it should be completed before gaining access to the Membership in Orthodontics. The Bologna Declaration has done much to harmonize education across Europe. It is argued strongly that for all disciplines such as medicine and dentistry, the final degree should be at the Master's level. It does not make sense then that a three-year full-time training period, after graduation as a dentist, should be marked with a degree at the Master's level. Some universities have recognized this and mark the end of their three-year full-time training period for orthodontists with a professional doctorate. This is likely to become the norm after 2010 when degrees across Europe should be harmonized. Those universities with the perspicacity to award their degrees at this level are likely to be rewarded with stronger applicants particularly from the overseas market.

Teaching orthodontics to postgraduates remains an intensely practical subject. The academic component should be well structured and the research should be of relevance. Seemingly minor progress in research by postgraduates may have significant impact in larger research projects. As an example in the first programme in orthodontics in Bristol which started in 1993, three of the postgraduates worked on projects which related to those patients born with cleft lip and palate. Three of these students developed outcome measures which were later used in a national project to survey the clinical outcomes for children born with a cleft lip and palate.⁹⁻¹⁴ This major audit had an impact on the organization of services within the United Kingdom such that 57 centres were collapsed into 12.¹⁵⁻¹⁸ It is quite reasonably argued that these postgraduates had a significant part to play in this major reorganization. It is intensely rewarding for trainers when postgraduates demonstrate flair and ability within both clinical and academic components of their training. Several examples are evident from the postgraduate programme in Bristol. The first intake published in total (between five postgraduates) 22 peer reviewed papers and a book which is currently in its fourth edition.¹⁹ Some students have emerged with several publications emanating from a significant body of research over a relatively short period of time.²⁰⁻²⁹ If research projects are organized into collaborations between the postgraduate students then productivity is often increased.³⁰⁻³³ Thus a complex randomized controlled trial within a specialist practice was successfully organized by two postgraduates.³⁴⁻³⁶ This project yielded a significant number of publications and demonstrated important findings on the efficacy of orthodontic retainers.

Nevertheless the organization and supervision of these projects requires time and commitment by supervisors. As academic time becomes more pressurized and with fewer staff available, these research dissertations become a source of anxiety for postgraduates and supervisors. As a consequence of all these issues we sought to develop teaching technologies to overcome a number of problems.

The first of these was the European Working Time Directive (EWTD) where travel has to be considered as part of work. Bristol University acts as the academic hub for postgraduate orthodontic trainees in a number of centres (Figure 5) and travel for teaching may involve a two-hundred-mile round trip. If travel time is part of work time then if postgraduates travel to Bristol, the teaching time would have to be reduced. An obvious way forward was to develop distance learning and we took two approaches. The first was obvious, in that video conferencing could clearly overcome some of the



Figure 5 Geographical spread of South West Regional training programme

lecture and tutorial delivery problems, but the second was to develop a platform for a managed learning environment (MLE). These systems are becoming increasingly popular within education; some regard them as being able to deliver higher levels of learning but we took the view that this provided an opportunity to develop an academic filing cabinet with access to a number of re-usable learning objects (RLOs). Thus we were able to create an online system which housed many of the components needed in the delivery of postgraduate education in orthodontics.³⁷ There are some fairly obvious issues around timetabling and announcements which can be instantly updated without having to send out letters or emails announcing the changes. This places the onus on the postgraduates to keep in constant touch with the MLE. Information on other repetitive processes such as records of in training assessments are easily available as electronic documents within the MLE; electronic libraries are also available through this format as well as links with other websites. Trainee feedback can also be collected online and discussion boards can be constructed to enhance learning. The biggest advantage of this system is that the curriculum can be made fully available online and this can then be supported with learning materials.

The curriculum for the postgraduate programme in Bristol was part of the work which went into the assembly of the Royal College Specialist Advisory Committee (SAC) curriculum. The curriculum was broken down into manageable pieces and modules written around this information. In total, 40 modules were written covering all aspects of the curriculum. Initially writing was carried out by academics and consultants in the South West and Wessex Regions. It soon became obvious that we did not have sufficient expertise to cover all aspects and with a grant from the BOSF we were able to collaboratively complete the modules. This has resulted in the National modular

programme to deliver didactic academic teaching for postgraduates in orthodontic training. Within this modular programme are a number of RLOs such as mini-lectures on bone remodelling, communication videos, and a series of video clips dealing with clinical tips such as placement of separators, taking photographs and impressions. It is easy to see how these modules could be further tailored to deal with training issues such as orthodontic nurses, orthodontic therapists and dentists with a special interest in orthodontics. It is not essential that all the modules are used in the same way at all of the teaching institutions. Indeed the diversity with which these modules are used will make them much more powerful learning tools.

Within the MLE are facilities for video conferencing. We found after the initial difficulties with breaking through NHS firewalls and establishing good sound links that this system worked well. Similar observations have been reported in America.³⁸ We also started two postgraduates on the Bristol orthodontic training programme who were taught almost entirely using these learning technologies. These two postgraduates seemed to thrive on this teaching: both passed their Membership in Orthodontics at the first time of asking and both presented for the University Teachers Group research prize at the British Orthodontic Conference in Edinburgh. They were awarded first and third prizes and maintained a long and proud tradition from the Bristol programme of presenting good research from their research dissertations. Other feedback that we collected using the MLE indicated that students were in no way compromised by the fact that they had received their teaching through this medium. Indeed comparison of marks obtained from various tests used throughout the Bristol programme indicated that in some aspects of learning students fared better than through receiving didactic teaching. When we examined national usage of the MLE it became obvious that students use this platform in peaks but there is constant use seven days a week, often late at night.

In the long run, and assuming greater evidence can be obtained for its successful use, not only in Bristol but around the UK, it is possible that this system could be extended to other European countries and even internationally. The online teaching could be extended to include online assessments and this would free up academic time to support research direction for the postgraduate dissertations. Students do not need to be based in the academic hub – indeed it is likely to be more appropriate that their clinical base provides the 1:1 clinical teaching; it may be possible also to provide a research environment, and certainly experience in hospital or practice management is feasible. This significantly

changes thoughts on potential training environments and does require universities and hospitals to look long and hard at how they deliver training. This system also very clearly defines learning and research responsibilities by trainees and provides them with the opportunity to develop and refine their own learning environment.

The current position with contracts from the primary care trusts (PCTs) indicates that the PCTs will want more work for their money. This might indicate that we should train fewer specialists. Furthermore with the advent of the orthodontic therapists we could see a significant change in manpower planning. Salaried services could potentially fill the gaps by working with orthodontic therapists possibly in specialist practice, which could mean that more patients might receive orthodontic treatment from funds delivered from the public purse. This concept is not new, the Specialist Dental Advisory Committee envisaged this in 1991. There is however a significant shift away from public services towards private orthodontic treatment and it is likely that this demand will increase exponentially. Far from being afraid of these changes the orthodontic community needs to grasp these opportunities; a market has been created however unlikely or inadvertent. The British Orthodontic Society has risen to the significant challenges posed to it over the last 12 months, in a manner that George Northcroft would have been proud of and enabling the memorial lecture to celebrate its centenary year in 2008.

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