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The twenty-first century ORTHODONTIC workforce

T. Hodge[1] and **N. Parkin**[2] highlight the changes that have taken place in the orthodontic workforce over the past decade and review the roles of various members of the orthodontic team.

Orthodontic workforce planning

Historically, orthodontic workforce planning has proved difficult. In 1985 Stephens *et al.*[1] predicted an oversupply of orthodontists and yet only 13 years later the Task Group for Orthodontics identified a shortfall and recommended a target of 480 general dental service specialist practitioners for the UK. This wide ranging and perspicacious report took into account training mechanisms, European directives and wider drivers from the Chief Medical and Dental Officers. At that time they were mindful of two other unknowns in planning the workforce, the influence of 'grandfathering' onto specialist lists and the potential impact of 'orthodontic auxiliaries' as they were then known.[2]

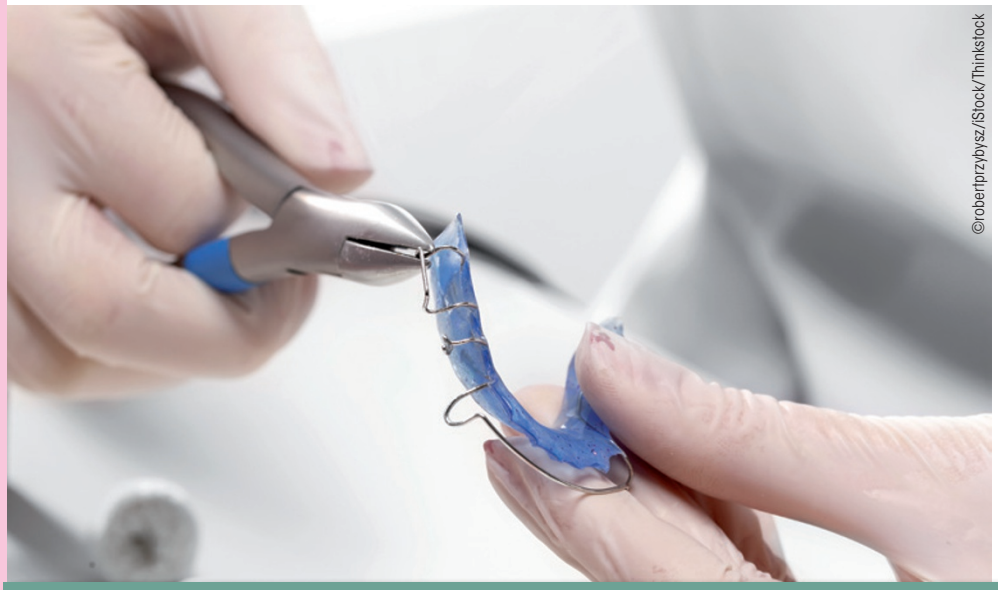
The first complete survey of the orthodontic workforce in the UK was carried out during 2003 and 2004.[3] This survey was commissioned by the Department of Health and carried out by the University of Sheffield. The aim was to assess the existing orthodontic workforce in relation to current and future population needs. It was questionnaire-based and investigated the location of workforce and the ratio of 12-year-olds per whole time equivalent orthodontic provider in each Strategic Health Authority. Type of provider, case mix and productivity (assessed as number of cases treated per year) were also investigated. An orthodontic provider was considered to be a specialist or non-specialist who treated more than 30 cases per year.

Of the 1,660 UK orthodontic providers identified, 919 were General Dental Council (GDC) registered specialist providers. In the hospital setting, 243 NHS consultants and 68 university teachers were identified. Fifty-five worked in a community setting and 221 were in training. The specialist practitioner group was the largest group (548) and the practitioner group (non-specialist providers) represented 26% of the workforce (432). At this time, orthodontic therapists did not exist and attempts were not made to measure their potential impact on workforce need. Several scenarios were presented with the problem of addressing the shortfall in orthodontists and it was emphasised that the demand for increased numbers of providers could be lessened if those patients falling

[1] *Consultant Orthodontist, Leeds Dental Institute;* [2] *Consultant Orthodontist, Charles Clifford Dental Hospital, Sheffield*

into low index of treatment need categories of treatment were not offered orthodontic correction. Following this survey, and the introduction of contracting, for those patients with a dental health component (DHC) score of three and below orthodontic treatment is no longer available on the NHS. An exception to this rule is those who fall in the DHC category three where the aesthetic component scores six or higher. It was also highlighted in the report that there was considerable variation in geographic distribution of providers, similar in fact to the variation shown in the study by O'Brien and colleagues.[4]

In recent years, probably the most significant change to the orthodontic workforce has been the introduction of orthodontic therapists. There is anecdotal evidence that this has already impacted on the employment of some dentists and specialist orthodontists in the workforce and continues to impact on the employment of newly qualified specialists and clinical assistant dentists. Future workforce issues will need to be reassessed by the Centre for Workforce Intelligence, with input from the British Orthodontic Society (BOS). Consideration should be given as to whether potentially smaller numbers of specialists will be needed to be trained in the future or whether there needs to be a reduction in the number of orthodontic therapist training providers. In many ways this latter problem should have been circumvented. The original pilot study to establish training of orthodontic therapists, and conducted in Bristol, made it very clear that a very small number of centres should be involved. It was recognised that it was important to fully evaluate the appropriateness of the training and skills acquired from the initial courses over time before further proliferation of programmes around the UK. At the end of the Bristol pilot it was suggested that there should initially be an establishment of one or two auxiliary training courses in the UK to ensure the development of a national standard, and that further courses would then be seeded from these programme leading to GDC registration.



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'IN RECENT YEARS, PROBABLY THE MOST SIGNIFICANT CHANGE TO THE WORKFORCE HAS BEEN THE INTRODUCTION OF ORTHODONTIC THERAPISTS.'

THE CURRENT WORKFORCE

Orthodontic nurses

In 2000, a survey was undertaken to investigate the delegation of orthodontic tasks and the training of chairside support staff in Europe.[6] At this stage in the UK the role of the orthodontic therapist had not been developed. From the nine tasks investigated, the only one which was permitted to be undertaken by a dental nurse in the UK was the taking of radiographs. This survey highlighted that UK dental nurses were allowed to work without qualifications or formal training. However, currently all dental nurses have to be registered with the GDC. Those employed, but not yet qualified, need to be enrolled within two years of commencing employment or waiting to start on a recognised training

In addition, the clinical duties dental and orthodontic nurses are permitted to undertake have increased. Many nurses not only take radiographs but routinely give oral hygiene instruction, take impressions and clinical photographs. These roles, as with all dental registrants in the team, are laid out in the GDC *Scope of practice* documentation.[7]

Finally, as well as the Certificate in Dental Nursing, the National Examining Board for Dental Nurses (NEBDN) also run additional post-qualification courses leading to certification that many orthodontic nurses undertake in assisting them perform their additional clinical roles competently including the:

- Certificate in Orthodontic Nursing[8]
- Certificate in Oral Health Education[9]
- Certificate in Dental Radiography.[10]

Orthodontic therapists

Orthodontic therapists are a grade of dental care professional (DCP) introduced in 2007. The recommendations for the training and deployment of orthodontic auxiliaries in the UK were based on the experiences of the Bristol pilot study,[5] which provided a foundation for the current training models being used in Bristol and Leeds. These were the first two training centres to qualify orthodontic therapists.[11] It was also the basis for those institutions that subsequently established programmes (Swansea, Edinburgh, King's, Manchester, Preston and Warwick).

Working under appropriate supervision[12] and following a prescription, orthodontic therapists are permitted to undertake numerous reversible orthodontic procedures. In reality this includes most orthodontic procedures, such as bonding brackets, changing archwires, fitting functional appliances and retainers and debonding appliances.

The exact details of the scope of practice for orthodontic therapists as laid out by the GDC[7] are shown in Table 1 and the specific capabilities of orthodontic therapists can be found in the GDC *Preparing for practice: Dental team learning outcomes for registration* document.[13]

Since the first orthodontic therapists qualified in 2008, 364 of these personnel are now registered with the GDC (as of May 2014). This has significantly increased the orthodontic workforce and in many areas has led to an increase in access to a specialist led orthodontic service. It is expected that therapists will have had a beneficial effect in reducing geographical inequality of specialist

Table 1 Scope of practice of the orthodontic therapist

Orthodontic therapists can:	Orthodontic therapists cannot:
Clean and prepare tooth surfaces ready for orthodontic treatment	Remove sub-gingival deposits
Identify, select, use and maintain appropriate instruments	Give local analgesia
Insert passive removable orthodontic Appliances Insert removable appliances activated or adjusted by a dentist	Re-cement crowns
Remove fixed appliances, orthodontic adhesives and cement	Place temporary dressings
Identify, select, prepare and place auxiliaries	Place active medications
Take impressions Pour, cast and trim study models	They do not carry out laboratory work other than previously listed as that is reserved to dental technicians and clinical technicians
Make a patients's orthodontic appliance safe in the absence of a dentist	Diagnose disease, treatment plan or activate orthodontic wires - only dentists can do this
Fit orthodontic headgear Fit orthodontic facebows which have been adjusted by a dentist Take occlusal records including orthognathic facebow readings Take intra and extra-oral photographs	Additional skills which orthodontic therapists could develop during their career include:
Place brackets and bands prepare, insert, adjust and remove arch wire previously prescribed or, where necessary, activated by a dentist	Applying fluoride varnish to the prescription of a dentist
Give advice on appliance care and oral health instruction	Repairing the acrylic component part of orthodontic appliances
Fit tooth separators	Measuring and recording plaque indices and gingival indices
Fit bonded retainers	Removing sutures after the wound has been checked by a dentist
Carry out Index of Orthodontic Treatment Need (IOTN) screening either under the direction of a dentist or direct to patients	
Make appropriate referrals to other healthcare professionals	
Keep full, accurate and contemporaneous patient records	
Give appropriate patient advice	

Table 2 GDC learning outcomes for dentists – management of the developing and developed dentition

1.13.1 Identify normal and abnormal facial growth, physical, mental and dental development and explain their significance
1.13.2 Undertake orthodontic assessment, including an indication of treatment need
1.13.3 Identify and explain development or acquired occlusal abnormalities
1.13.4 Identify and explain the principles of interceptive treatment, including timely interception and interceptiv orthodontics, and refer when and where appropriate
1.13.5 Identify and explain when and how to refer patients for specialist treatment and apply practice
1.13.6 Recognise and explain to patients the range of contemporary orthodontic treatment options, their impact, outcomes, limitations and risks
1.13.7 Undertake limited orthodontic appliance emergency procedures

care, although this has still to be confirmed in the latest BOS survey expected to be published in the near future.

There have been possible concerns raised about the quality of supervision of this grade of dental registrant.[14] At the outset many, including a number of educational providers, were keen that while DCPs could work independently from a dentist once they had a treatment plan, due to the nature of orthodontics where progress and mechanics were constantly being re-evaluated, an appropriate reassessment schedule would be required every visit. Therefore an orthodontic therapist should never be left unsupervised.[15] Others felt this view was over prescriptive and perhaps such guidelines would be a disincentive to employing therapists.[16] As a result, a working party from all the groups of the BOS convened leading to a set of guidelines being published on the supervision of qualified orthodontic therapists by both the BOS and the Orthodontic National Group (ONG).[12]

Orthodontic technicians

Orthodontic technicians are registered dental professionals who construct custom-made orthodontic appliances to a prescription from a dentist or orthodontist. If they are trained, competent and indemnified they can:

- Review cases that come in to the laboratory to decide how they should progress
- Work with the dentist/orthodontist on treatment planning and appliance design
- Modify orthodontic appliances according to a prescription[7]
- Give appropriate patient advice and carry out shade taking. This may be especially useful mid-treatment when constructing temporary pontics to replace missing units.[17]

With additional training, working alongside an orthodontist, technicians may also assist in the treatment of patients by taking impressions, recording facebows and occlusal registrations, tracing cephalograms and taking photographs. The skill of an orthodontic technician in the orthodontic workforce is probably nowhere more central than in delivering an orthognathic service where accuracy, skill and good communication are crucial for success in treatment outcomes.

General dental practitioners and dentists with enhanced skills

General dental practitioners (GDPs) perform a key role in the orthodontic workforce acting as diagnostic gatekeepers. The GDC *Preparing for practice* documentation[13] it lists the learning outcomes for dentists to be registered with the GDC (Table 2).

Although orthodontics is a very specific area of expertise, and only those registered on the specialist list with the GDC can call themselves a specialist orthodontist, any registered dentist can carry out orthodontics as long as they are competent to do so. Historically, a significant proportion of orthodontic treatment has been carried out by GDPs in the UK. The 2005 report revealed that 17% of orthodontic providers had no orthodontic qualification. The report also highlighted that in some regions, Shropshire, Staffordshire, Trent, North and East Yorkshire and Lincolnshire, the majority of orthodontic provision was carried out by non-specialists. Since 2006 the speciality has seen the end of fee-for-item payments and the introduction of the new individualised contracts. While the majority of these contracts have been made with specialist orthodontic practitioners, contracting has occurred among a group of existing NHS primary care general dentists. Initially known as dentists with a special interest in orthodontics,[18] these clinicians are now known as dentists with enhanced skills (DES). While not being eligible for specialist list registration with the GDC these providers will have gained additional experience and training in orthodontics and can be formally recognised by the commissioners of orthodontic care (known as area teams since April 2013). A DES is expected to treat patients within their competence and refer complex cases to a specialist orthodontist or local hospital service as part of a local clinical network. If this clinical network works efficiently and effectively, the likelihood of population need being met and high quality of care being maintained will be increased. Training of DES often used to take place on two-year orthodontic clinical assistantship schemes but now few, if any, of these remain. Instead, there has been a recent increase in longitudinal general professional training (GPT) schemes for foundation dentists with placements in orthodontic specialist practice or in hospital departments.

Recently, GDPs have increased their presence in the orthodontic workforce by offering short-term orthodontics to adult patients wanting an improvement in their anterior smile aesthetics. While this has caused debate[19] a move away from anterior alignment using a handpiece to reshape teeth together with ceramic restorations has to be welcomed.[20] It should, however, be appreciated by those practitioners offering short-term orthodontics that it provides a relatively limited range of outcomes and frequently a specialist referral for correction of a patient's wider malocclusion may be indicated.

Specialist practitioners

Specialist practitioners work in primary care and are registered as specialists with the GDC. At the time of the introduction of the specialist lists in the late nineties a number of people gained entry to this group via 'grandfathering'. However, entry should now only be on receipt of orthodontic training in other EU member states or in the UK by securing an orthodontic speciality training registrar post. Entry to these salaried posts by UK/EU applicants is competitive with essential criteria for application including the possession of a dental degree, registration with the GDC and completion of a period of dental foundation/vocational training or GPT demonstrating experience in a range of dental specialties. Interestingly, the GDC are currently completing research, including patient and public, stakeholders' and registrants' views on regulation of the specialties and are asking these three questions to gather evidence on the way forward:[21]

- Does regulation of the specialties bring any benefits (potential and/or actual) in terms of patient and public protection?
- Is regulation of the specialties proportionate to the risks to patients in relation to more complex treatments?
- Are the specialist lists the appropriate mechanism for helping patients to make more informed choices about care not seen as falling within the remit of the general dental practitioner?

Many consider that the reason specialist lists are useful is because specialist training and defined standards of practice help to deliver better treatment and improve clinical outcomes for patients who receive specialist dental care. In orthodontics the likelihood that a treatment will benefit a patient is increased if appliance therapy is planned and carried out by an experienced orthodontist.[22]

Orthodontists also spend less time on treatment and achieve better quality outcomes than cases treated by general dentists who have not undergone a specialisation course in orthodontics.[23]

The training programme leading to specialisation in orthodontics in the UK is three years full-time (or part-time pro rata)[24] and involves undertaking a university postgraduate degree at the Masters (MSc, MClinDent, MPhil) or Doctorate (DClinDent, DDS) level and upon successful completion of the programme, eligibility to sit the Membership in Orthodontics examination of the Royal College of Surgeons. The training programmes are currently monitored by the Postgraduate Deaneries and the Specialist Advisory Committee but with national developments through Health Education England these arrangements are likely to change. The workload undertaken by specialist orthodontic practitioners reflects the comprehensive learning outcomes of the specialist training programmes which include being able to diagnose anomalies of the developing dentition and facial growth, carrying out a wide range of simple and complex treatments both interceptive and comprehensive in nature including multi-disciplinary management of a variety of treatments and understanding psychological aspects relevant to orthodontics.

Community orthodontists

The community orthodontic service is a long-established part of NHS provision. In a changing climate of dental provision over recent years, providing orthodontic support for Trust-based 'Personal Dental Services' schemes, under the umbrella of the salaried primary dental care services, has become increasingly important. Community orthodontists are specialist-trained providers who undertake orthodontic treatment for a range of special care patients who have limited access to other, appropriate specialist treatment.

The majority of such patients who are able to receive orthodontic treatment often require close liaison with other health care professionals for a holistic approach to management and not infrequently this service provides a 'safety net' in those areas of the country not well served by specialist practice or hospital orthodontic providers.

Orthodontic consultants

Consultant orthodontists are those specialists that have undergone an additional two years of full-time training (or part-time pro rata), in many cases sub-specialising for example, cleft lip and palate work, who collectively can provide any orthodontic service which the commissioners might require. In addition eligibility for application to these posts is subject to satisfactory completion of the Intercollegiate Speciality Fellowship

Examination Exam in Orthodontics, FDS (Orth), although foundation trusts are in a position to write their own requirements for appointment to a consultant post. While this role can be varied, clinical activity is focused upon the following:

- Working in conjunction with consultant oral and maxillofacial surgeons, plastic surgeons or paediatric surgeons to correct severe skeletal problems by means of combined orthodontic and surgical treatment approaches
- Liaise with other key specialties to provide coordinated care for patients with cleft lip and palate, and other congenital dentofacial anomalies. There is also increasing collaboration with ENT consultants and respiratory medicine to manage patients with obstructive sleep apnoea
- Provide clinical training for undergraduate dental students, career junior staff, future specialists and trainee academics and participate in continuing professional programmes for all trained providers of orthodontic care
- Undertake personal research, innovation and service evaluation including audit
- Working with colleagues in primary care and dental public health as part of a professional network to manage orthodontic services locally.

In summary, the role of the consultant orthodontist is varied but centres on clinical consultation, the treatment of severe and multidisciplinary cases, service coordination, training and research.

DISCUSSION

This article highlights the many varied personnel involved in the delivery of orthodontic treatment in the UK and illustrates how the workforce has evolved in recent years. From the extension of the role of the orthodontic nurse, the introduction of the orthodontic therapist into the team, the mandatory registration of all DCPs and the increase in uptake of short-term orthodontic treatments being offered in general dental practice, much has changed over the past decade.

While we may be clearer now as to who does what in the orthodontic workforce, perhaps the next workforce issue that will arise as a result of these changes is how many of these varied personnel will be needed to deliver care and their appropriate training.

The Centre for Workforce Intelligence published a strategic review in 2013 analysing the future 'supply and demand' of the dental workforce in England between 2012 and 2040[25] which revealed that there is likely to be a surplus supply of dentists by as many as 4,000 by 2040. The mechanisms for the derivation of these figures is far from clear and likely to be as hopeless as the information which led to expansion of undergraduate numbers in 2006. It is hoped that the report of the current Workforce Survey Task and Finish Group of the BOS will form the backbone of negotiations with the Centre for Workforce Intelligence, Health Education England and the Department of Health and will be instrumental in shaping the future training of the workforce and delivery of orthodontic services in England and Wales.

'THE IMPACT OF THE CHANGE IN COMPOSITION OF THE WORKFORCE MUST BE TAKEN INTO ACCOUNT WHEN PLANNING FUTURE NEEDS.'

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CONCLUSION

There has been considerable change in the composition of the orthodontic workforce over the last decade. It is hoped that the extension of roles performed by the various members of the orthodontic team will lead to increased accessibility of specialist care.

The impact of the change in composition of the orthodontic workforce, in particular the addition of orthodontic therapists, must be taken into account when planning future manpower needs.

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PROFILE - ORTHODONTIC NURSE

***Ruth Mackenzie**, 34, is a dental nurse at Giffnock Orthodontic Centre in Glasgow. Ruth worked at a specialist orthodontic practice from 2002-2006, at a private general dental practice from 2006-2010, and has been at her current workplace since 2010. As well as her dental nurse qualification, Ruth has a certificate in dental radiography, and enjoys snowboarding, running and travelling.*

What first attracted you to dentistry?

I have always been interested in how braces can make people's teeth move. I had upper and lower fixed appliances myself in the past. I was attracted to working in orthodontics after noticing how much more people would smile after having braces fitted. My interest in orthodontics began when I read a magazine article about clear braces.

I first started working in an orthodontic dental practice in 2002. The general practice that I worked in later on was far quieter. The staff at the orthodontic practice were more involved in the treatment of patients, which I found very appealing.

We treat a broad mixture of child and adult patients. It is very satisfying when patients complete their orthodontic treatment and are happy with the outcome - especially with the patients that were very self-conscious with their smile before treatment.

Have you undertaken a Certificate in Orthodontic Nursing?

No but it is something I am interested in doing and feel I would benefit from greatly.

Would you recommend working in an orthodontic practice to other dental nurses?

Yes, there are many opportunities within orthodontics and it is very satisfying to see patients happy with their smile after treatment.

Do you have any career plans you would like to share with us?

I would like to volunteer in a work placement in a third world country.

PROFILE - ORTHODONTIC THERAPIST

***Fiona Carter**, 53, is an orthodontic therapist at Colchester Orthodontic Centre. Fiona qualified as a dental nurse in 1981 and completed a Certificate in Oral Health Education in 1993, a Certificate in Orthodontic Nursing in 2008, a Diploma in Orthodontic Therapy in 2009, and was PAR calibrated in 2014 (Peer Assessment Rating index). Ruth is a member of the Orthodontic National Group (ONG) and enjoys running, cycling, yoga and vintage shopping!*

What first attracted you to dentistry?

Nursing was my chosen career but when I left school I was too young to begin the SRN (state registered nurse) training. I saw an advertisement for an orthodontic dental nurse so applied, not realising what it entailed, and was successful. That was way back in 1978 and by chance I had found a profession I really enjoyed.

In 1978 there was no recognised qualification for orthodontic nursing so my orthodontist enrolled me on a local NEBDN course. I gained experience in general dental nursing by spending half a day a week working in various local general dental practices to successfully gain the National Certificate. This confirmed that orthodontics was the branch of dentistry that I wanted to continue in.

Fixed appliances were still being made with stainless steel tape so welding and soldering attachments was part of the orthodontic nurse role as was acrylic and wire repairs to removable appliances, preforming arch wires and making EOT face bows which involved learning how to bend wires, a great skill to have as an orthodontic therapist (OT). This was together with all the other duties of running a busy specialist orthodontic practice.

Following a short break after the birth of my two sons I returned to work on a part time basis in a multi-disciplinary dental practice working for an orthodontic specialist. Gaining my Certificate in Oral Health Education in 1993 was a great advantage having a varied patient base and the help and guidance of GDPs.

As my children got older and more independent I had the opportunity to work with the orthodontist I began my career with in 1978 within the local Primary Care Trust, treating a variety of complex orthodontic cases and also dental nursing in a special care dental department. There was a specific managerial element to this position as it involved setting up an orthodontic practice within the community dental department, staff recruitment, department management and carrying out audit, producing the department COSHH manual, Dental Nurse Policy and Protocol, following Trust guidelines and liaising with multidisciplinary departments.

When did you decide to become an orthodontic therapist?

OTs were being discussed as early as 1978 when I started my career. When the orthodontic therapy course was introduced in 2007 I knew that this was what I wanted to do and that this may be my opportunity! I applied for an orthodontic nurse position and I was lucky in finding an orthodontic specialist who had the confidence in me to support my application and training and was prepared to be my training provider. I studied for the RCS Eng Diploma in Orthodontic Therapy at South Wales Orthodontic Therapy course, based at Cardiff Dental School. It was hard work but also very exciting with excellent course tutors.

Was it difficult to get a place?

I considered myself fortunate to be selected for interview and I was so pleased to be successful at my first interview. My employer/orthodontist also had to be interviewed as a 'training provider'.

Was it straightforward finding employment as an orthodontic therapist?

Yes because you are trained by the orthodontic specialist that you work with. S/he is your 'trainer' and after such a big investment in time, energy and emotion (not forgetting financial investment), successful OTs tend to stay with their trainers/training providers.

The transition from orthodontic nurse to orthodontic therapist was very exciting; however, it was a change for the whole practice. Having a very supportive team made it easier. Patients had to adjust too but they were all very understanding and encouraging. I am confident working within my clinical capabilities and I am aware of my limitations. CPD is an essential and important part of keeping up to date.

> ***'THE MOST SATISFYING PART OF MY JOB IS SEEING HOW DELIGHTED PATIENTS ARE WHEN TREATMENT IS COMPLETED.'***

I treat a mixture of both adults and children but a higher percentage of children. I work within the limits of the OT GDC scope of practice and following BOS guidelines.

At Colchester Orthodontic Centre we are a small but very happy team of ten: Gareth Davies, the orthodontic specialist practitioner; two orthodontic therapists; four orthodontic nurses; a practice manager; and two administrative staff.

The most satisfying part of my job is seeing how delighted the patients are when treatment is completed and the self-confidence that this gives them. Not only because they have a fantastic smile but because they realise that have they achieved this through their own hard work. Adult patients may have missed the opportunity to undertake orthodontic treatment as a child and it is rewarding to see the confidence they gain.

What is the future for OTs?

I think OTs are an asset to an orthodontic practice and coming from a dental nursing background OTs are empathetic to the patient and parents. I think it is an excellent career path for an orthodontic dental nurse considering career progression.

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