A multicentre audit of GDPs knowledge of orthodontic retention

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IN BRIEF

- Presents the findings of a national audit on GDP knowledge of orthodontic retention.
- Looks at the potential barriers for the provision of replacement retainers in primary care.
- Highlights the need for improved communication between the orthodontist and GDP.

GENERAL

Objective To determine GDP knowledge and willingness to supervise orthodontic retention and provide replacements retainers. **Design** An audit sampling GDPs from six centres within England (Bradford, Cambridge, Burton-Upon-Trent, Croyden, Norwich and Plymouth). A gold standard of 100% of GDPs should be aware of commonly used retainers and be able to provide replacements was selected. **Method** Overall, 1,053 postal questionnaires were sent to local GDPs. The questions covered knowledge and provision of various retainers, practitioner background and education. GDP satisfaction with the information provided by the orthodontist at discharge was also explored. **Results** Five hundred and two questionnaires were received (response rate of 48%). The majority of GDPs (64%) were trained in the UK. Awareness of vacuum-formed, Hawley and fixed retainers was generally high. A significantly smaller number of GDPs were willing to prescribe, fit or review the retainers. The most common reasons for reluctance in provision were insufficient knowledge, financial and time constraints. Over two thirds (72%) of GDPs would like further training on retention. **Conclusion** This audit highlights a need for increased training at undergraduate and postgraduate levels to update practitioners about contemporary retention practice. Better communication is required from orthodontists to GDPs to ensure that on discharge the dentist is aware of the retainer type and retention regime.

INTRODUCTION

Retention is the phase of orthodontics that aims to maintain teeth in their post-treatment position by preventing their inherent tendency to relapse. The aetiology of relapse is not fully understood but is multifactorial with possible contributions from periodontal, occlusal and soft tissue pressures and continued growth.[1,2]

Retention can be achieved with removable or fixed retainers. Removable retainers include vacuum-formed retainers (Fig. 1), Hawley (Fig. 2) and Begg (Fig. 3) designs. Bonded retainers (Fig. 4) are often used in conjunction with removable retainers in cases that are more prone to relapse. These include patients with periodontal disease, teeth with severe rotations or displacements, following closure of a midline diastema and other spaces and for cases in which the lower incisors have been significantly proclined.[3] Vacuum-formed retainers are the most commonly prescribed retainers in the UK.[4] Studies have shown

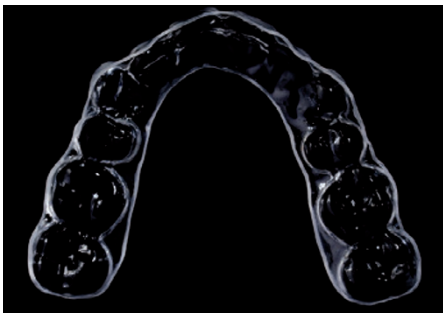

Fig. 1 Vacuum-formed retainer

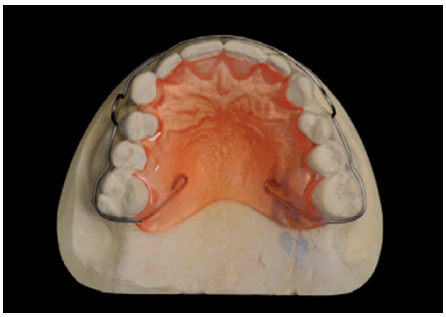

Fig. 3 Begg retainer

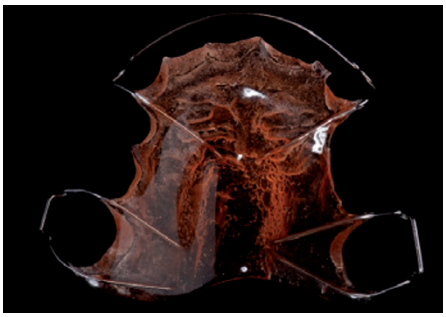

Fig. 2 Hawley retainer

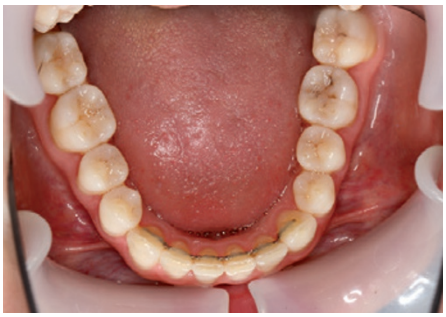

Fig. 4 Bonded retainer

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that they are more effective at maintaining labial segment alignment than Hawley retainers.[5] They are also more cost-effective and preferred by patients.[6] Hawley retainers are also used across the UK and have been shown to allow better occlusal settling post-treatment.[7]

There is wide variation in the retention regime used by orthodontists, ranging from immediate night-only wear to full-time wear for a period of six months before reducing to night-only wear. Studies comparing the effectiveness of full-time and part-time retainer wear have demonstrated no statistically significant differences with regards to labial segment irregularity and concluded that it was acceptable for patients to wear their retainers at night only.[8,9]

Although there is no consensus on the duration of retention, it has been demonstrated that it takes a minimum of 232 days for periodontal fibres to remodel around the teeth in their new position[10] and most orthodontists will carry out supervised retention one year following active treatment before referring the patient back to the GDP. Studies have, however, demonstrated that relapse can occur beyond this and orthodontists often prefer to retain long-term.[11] Due to significant individual variation in post-treatment stability, contemporary orthodontic advice is to continue with retention indefinitely to ensure stability.[1,12]

In primary care, payment for orthodontic treatment generally includes one year of supervised retention. In secondary care, although the retention of some complex multidisciplinary cases may continue beyond 12 months, there is increasing pressure to reduce the number of review visits and discharge patients to primary care for long-term monitoring. This naturally leads to the question of whether GDPs feel they have the necessary contemporary knowledge and skills to provide orthodontic patients with this service.

A pilot audit to investigate if GDPs had sufficient knowledge regarding orthodontic retention to supervise patients following discharge from orthodontic treatment was conducted in North Staffordshire.[13] Seventy-two GDPs were sampled with a response rate of 83%. Overall, GDPs were aware of the commonly used retainers but fewer respondents were willing to fit and adjust appliances. Reasons highlighted for this reluctance were:

- Insufficient knowledge and training in the use of the various retainers
- The belief that repair and replacement of retainers was the responsibility of the orthodontist
- Financial limitations
- Time constraints.

Table 1 GPDs' awareness of retainers and willingness to prescribe, fit and review them

Retainer type	% of GDPs aware	% of GDPs happy to prescribe	% of GDPs happy to fit	% of GDPs happy to review
Vacuum-formed	92	64	72	72
Hawley	78	35	45	51
Begg	31	7	12	17
Bonded	94	39	41	58

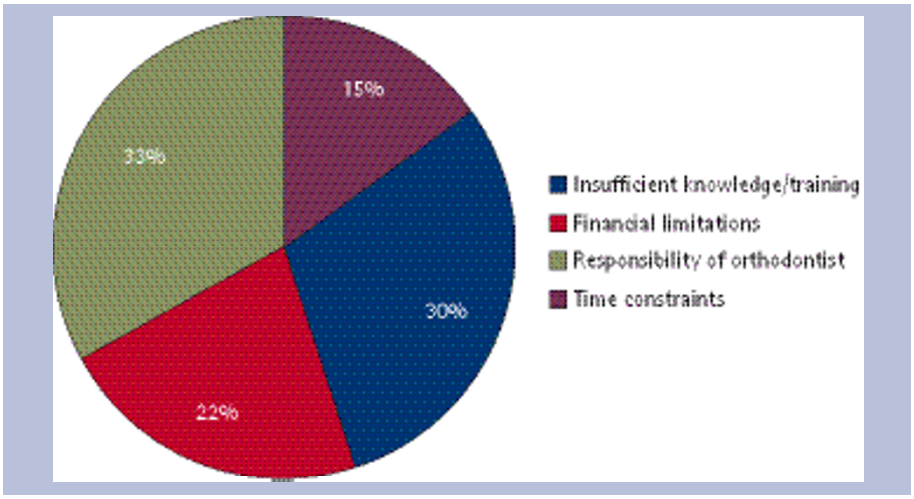

Fig. 5 Reported reasons for not prescribing, fitting and reviewing retainers

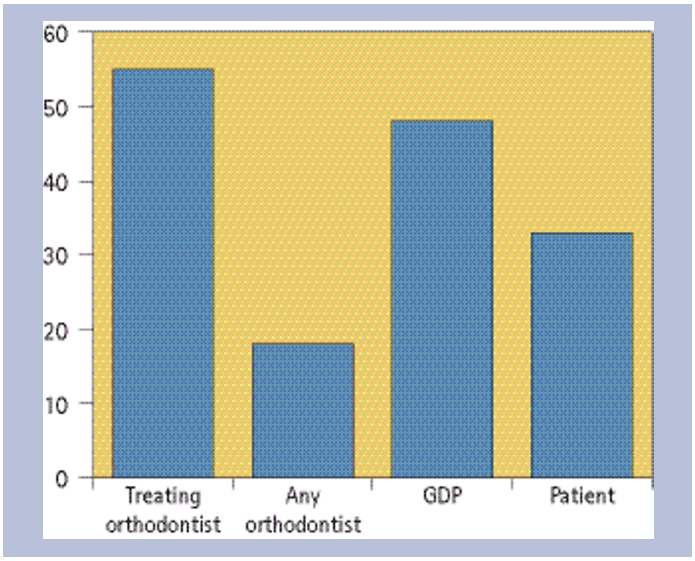

Fig. 6 GDPs' opinions on where responsibility lies for monitoring orthodontic retention following patient discharge from treating orthodontist

The aim of this audit was to extend the pilot audit over a wider geographic area to investigate the level of GDP knowledge regarding the retention phase of orthodontics in England. The audit aimed to assess GDP awareness and experience of different orthodontic retainers and to determine the perceived ability of GDPs to monitor patients in the retention phase and provide replacement retainers.

A gold standard was set that 100% of GDPs should be aware of commonly used retainers, be able to supervise wear as directed by the orthodontist and provide replacements as necessary.

METHOD

A cross-sectional survey of GDPs referring to the following orthodontic departments was undertaken:

- Queen's Hospital, Burton-on-Trent
- Norfolk and Norwich University Hospital, Norwich
- Addenbrooke's Hospital, Cambridge
- St Luke's Hospital, Bradford
- Croydon University Hospital, London
- Derriford Hospital, Plymouth.

In total, 1,053 GDPs were identified and sent an anonymous postal questionnaire with a stamped addressed envelope for its return. Questions included GDP demographics,

GDPs knowledge of retainer types, retainers currently provided either on an NHS or private basis by the GDPs and their views on responsibility for monitoring long-term retention. GDP satisfaction with the information provided by the orthodontist at the time of patient discharge was also explored. An online version of the questionnaire was also made available. Non-responders were sent a second questionnaire with a follow-up letter and if this failed then a further follow-up telephone call was made. Each author administered the questionnaire and follow ups for their region following the same protocol.

RESULTS

A 48% response rate was achieved with 502 questionnaires returned. Fifty-eight percent of respondents were male and 42% female. Two thirds of responding GDPs (64%) had undertaken their primary dental training in the UK and 21% had trained in another European Union (EU) country. The remainder (15%) had trained outside of the EU. Thirty-eight percent of participants had an additional postgraduate qualification, of which less than 1% was related to orthodontics.

The majority of GDPs were aware of vacuum-formed and Hawley retainers (Table 1). A significant proportion of the sample (94%), were aware of bonded retainers.

Half of all GDPs (53%) were willing to remove bonded retainers but only 26% were happy to replace them, compared to 55% who were happy to provide replacement removable retainers.

One third of this sample of GDPs was not willing to prescribe, fit and review retainers because they felt this treatment was the responsibility of the orthodontist (Fig. 5). Less than half of GDPs (48%) felt that it was their responsibility to monitor a patient's retention following discharge from the treating orthodontist (Fig. 6). Some GDPs selected more than one option, indicated by the sum of the numbers being greater than 100%, which would suggest that some would prefer shared responsibility.

Only 5% of participating GDPs had an orthodontic contract whilst 18% of GDPs provide some orthodontic treatment. This ranged from 10–60 cases per year.

One fifth of GDPs provided replacement removable retainers for patients under the age of 18 on the NHS and one fifth offer them privately. Some GDPs (40%) offered removable retainers for patients over the age of 18, 36% on a private basis and 6% on the NHS. The majority charged between £50–75 for a single replacement removable retainer (Fig. 7).

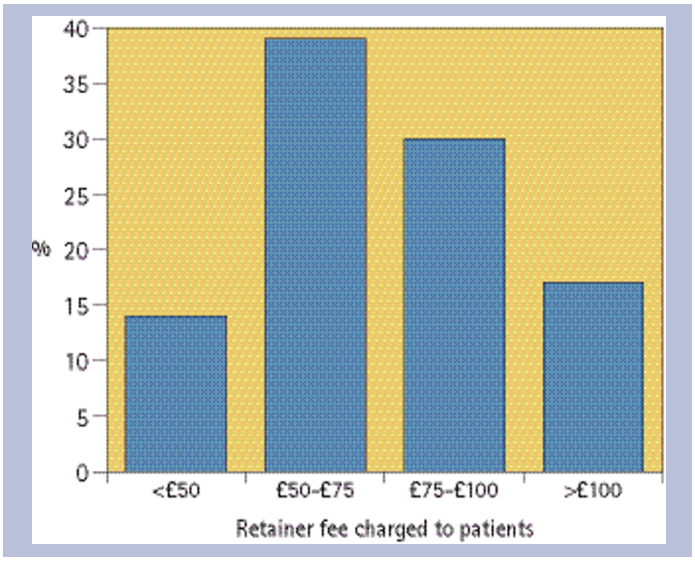

Fig. 7 Patient charges for a private single replacement removable retainer

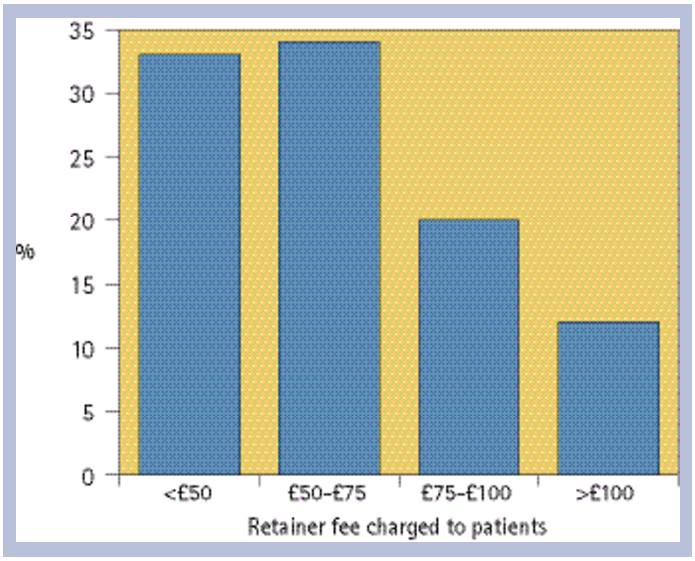

Fig. 8 Patient charges for a private single replacement bonded retainer

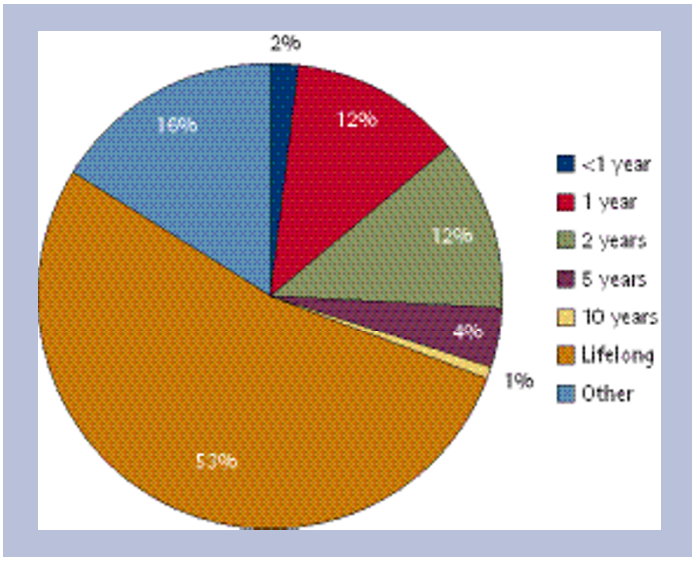

Fig. 9 GDP views on required duration for orthodontic retention

Fewer (17%) provided replacement bonded retainers for patients under the age of 18 (9% private and 8% NHS). A greater proportion (25%) provided them for patients over the age of 18 years. For those GDPs providing private bonded retainers, the most common fee was £50–75 (Fig. 8). Over half (53%) of all GDPs were aware that retention should be lifelong (Fig. 9).

Although 70% of GDPs reported receiving a discharge letter from the orthodontist only 42% of letters detailed the required retention

Table 2 Selection of comments from respondents

Education	Communication	Responsibility for retention
'I have not been trained to prescribe or fit removable or bonded retainers. I would be happy to attend a course regarding retainers'	*I would be happy to review retainers but want a letter with clear instructions from the treating orthodontist.'*	*'The current contact arrangements for NHS do not allow for non-orthodontists to be remunerated so it is a pointless undertaking'*
'Orthodontics is a bit of a mystery to me and I am not really up to speed regarding retainers, I think a course on this subject would be beneficial.'	*'Patients are poorly informed of duration of wear of retainers.'*	*'Orthodontists should offer to provide new retainers where needed. Patients should phone and pay for this privately.'*
'Lack of knowledge and no teaching at university/VT.'	*'More regular updates and general communications from the treating orthodontist would be very helpful.'*	*'Orthodontists should monitor their own patients after treatment.'*
'We need clear guidelines - I have a lack of training.'	*'Better communication on both sides - GDP and Orthodontist is needed. Orthodontists should provide better discharge letters with details on the retention duration and type.'*	*'GDPs should not be encumbered with additional work that is the responsibility of the orthodontic department/specialists, particularly with those lacking suitable training.'*
'We received only basic orthodontic undergraduate teaching.'	*'Patients inform me of varying retention times that they have been advised. I am unsure what the guidelines are now. Is it lifelong?'*	*'I would love to learn more.'*
		'I am happy to review them and repair if possible but any active intervention I leave to the orthodontist.'

regime. Less than one third (31%) of letters outlined the retainer type. Almost two thirds (68%) of GDPs would like the discharge letter to include a copy of the laboratory prescription for the retainer and 73% highlighted that they would welcome further training on retention.

DISCUSSION

Response rate

Despite the authors best efforts in making the audit as accessible and easy to complete as possible,[14] a poor response rate was achieved (48%). Questions were kept limited in number and were sent in handwritten envelopes with stamped addressed envelopes provided; an online version was made available to complete and practices were contacted again if they failed to respond. The subject area of this audit affects a large volume of patients and the low response rate suggests a lack of engagement amongst GDPs. Some authors have had the opportunity to present these data to local groups. Feedback suggests that GDPs feel bombarded by multiple requests for audit responses in addition to the required NHS paperwork. The authors appreciate that pressures on GDPs may have contributed to the lower response rate than anticipated; however, this feedback may be biased as it was obtained from GDPs attending orthodontic educational forums. There was a range of positive and negative views expressed by the cohort that returned the questionnaires (Table 2), indicating this is obviously an area for wider debate. This data may overestimate the knowledge of retention as often those participants returning questionnaires have greatest engagement with the subject, however due to the risk of response bias it is not possible to generalise the results.

Retention knowledge and education

The gold standard set for this audit has not been met; highlighting gaps in knowledge that need addressing both at undergraduate and postgraduate level. There has been a gradual shift away from orthodontic appliance design training in dental undergraduate degrees, with a reduction in overall orthodontic course hours and content.[15] The focus is often on diagnosis, referral criteria and timing for treatment with the current undergraduate curriculum not clearly indicating the need to understand and monitor orthodontic retention[16].

As 73% of respondents would welcome further training in orthodontic retention it is important for specialist orthodontists to take part in local and national education in these areas. This could include establishing readily available online platforms for learning about retention and updates through the local professional networks. In Staffordshire, where the pilot audit was carried out this has already been provided through a section 63 course run by the local orthodontic consultants. The course was well attended by local members of the profession but fell short of the numbers who had suggested they would like to attend. Positive feedback was received from those members attending.

Responsibility for ongoing retention

It is apparent from both comments and responses that more than half of the dentists who replied feel that the responsibility lies with the orthodontist. Under a private contract for treatment this would seem reasonable to assume, although some may be discharged after a defined item of treatment. However, under an NHS contract when there are often lengthy waiting lists for treatment, using clinical time to offer continued reviews past one year in all cases would severely affect contracted new to follow-up ratios and reduce the pool of funds to treat patients waiting to start their care. It is therefore more sensible and better use of limited NHS resources for patients in retention to be monitored in primary care.

This system is already used in other areas of dentistry such as periodontal health where specialists or interested providers achieve a steady state in controlling a disease, which is then reviewed and maintained by the GDP.

With the recent controversies about short-term orthodontics[17] and concern from specialist bodies about instability of these treatments, never has it been more important to have a good working knowledge of retainers and retention. The fact that only 53% of respondents recognise that modern orthodontic advice is for lifelong retention and only two thirds of respondents could prescribe or fit the most common retainers used in the UK, is an issue that the profession needs to address with training.

This audit has made it clear that funding for retention can be problematic and perhaps confusing if a dentist does not hold an orthodontic contract. Clearly the dentist should not be expected to provide this service free of charge, but the current NHS remuneration system does not allow such treatment. A typical lab bill for a single vacuum-formed retainer is between £10–20 and requires a simple well extended alginate impression. GDPs should be able to provide this service privately at an affordable rate. However if the dentist is unaware treatment has been completed, has no knowledge of the relapse potential or type of retainer used, then how can the GDP take over? Orthodontists have a responsibility to communicate this information to their referring colleagues and this study shows that this is not happening routinely in the areas surveyed, with only 40% of dentists reporting receipt of this information. This needs to change to facilitate and ensure best practice is achieved. The results of this audit have been presented locally and nationally to encourage members of the British Orthodontic Society to address these concerns.

CONCLUSIONS

This audit shows that we did not reach the gold standard when assessing GDPs' knowledge and willingness to fit and monitor contemporary orthodontic retainers.

GDPs' knowledge of and willingness to fit and monitor contemporary orthodontic retainers is subject to a number of factors, which could cause a barrier to continued care. These include an insufficient knowledge base, ambiguity regarding responsibility and financial constraints.

More teaching and training is required both to update practitioners about contemporary retention practice and give the GDPs confidence to prescribe and fit simple retainers.

Better communication is needed from orthodontic practitioners to GDPs to ensure that on discharge the dentist is aware of the retention regime and likelihood of relapse. It is also important for the orthodontist to discuss with patients how this access may be achieved once discharged from their own care.

The team would like to thank all the dentists who took time to complete the audit questionnaires. A copy of the questionnaire is available on request from the corresponding author.

1. Littlewood S J, Millett D T, Doubleday B, Bearn D R, Worthington H V. Orthodontic retention: a systematic review. *Br J Orthod* 2006; **33:** 205–212.
2. Melrose C, Millett D T. Toward a perspective on orthodontic retention? *Am J Orthod Dentofacial Orthop* 1998; **113:** 507–514.
3. Shah A A, Sandler P J, Murray A M. How to place a lower bonded retainer. *Br J Orthod* 2005; **32:** 206–210.
4. Singh P, Grammati S, Kirschen R. Orthodontic retention patterns in the United Kingdom. *J Orthod* 2009; **36:** 115–121.
5. Rowland H, Hichens L, Williams A et al. The effectiveness of Hawley and vacuum formed retainers: A single-center randomised controlled trial. *Am J Orthod Dentofacial Orthop* 2007; **132:** 730–7.
6. Hichens L, Rowland H, Williams A et al. Cost-effectiveness and patient satisfaction: Hawley and vacuum-formed retainers. *Eur J Orthod* 2007; **29:** 372–378.
7. Sauget E, Covell D A, Boera R P. Comparison of occlusal contacts with use of Hawley and clear overlay retainers. *Angle Orthod* 1997; **67:** 223–230.
8. Shawesh M, Bhatti B, Usmani T, Mandall N. Hawley retainers fullor part-time? A randomised clinical trial. *Eur J Orthod* 2010; **32:** 165–170.
9. Thickett E, Power S. A randomised clinical trial of thermoplastic retainer wear. *Eur J Orthod* 2010; **32:** 1–5.
10. Reitan K. Clinical and histologic observations on tooth movement during and after orthodontic treatment. Am *J Orthod* 1967; **53:** 721–745.
11. Little R M, Reidal R A, Artun J. An evaluation of changes in mandibular anterior alignment from 10 to 20 years postretention. *Am J Orthod Dentofacial Orthop* 1988; **93:** 423–428.
12. Patel A, Sandler J. First aid for orthodontic retainers. *Dent Update* 2010; **37:** 627–630.
13. Storey M, Scholey J. An audit of general dental practitioners' (GDP) knowledge of and willingness to monitor retention. The British Orthodontic Society Clinical Effectiveness Bulletin 2012; **28:** 3–4.
14. Edwards P, Roberts I, Clarke M J *et al.* Increasing response rates to postal questionnaires: systematic review. *BMJ* 2002; **324:** 1183.
15. Derringer K A. Undergraduate orthodontic teaching in UK dental schools. *Br Dent J* 2005; **199:** 224–232.
16. General Dental Council. Preparing for practice - dental team learning outcomes for registration. 2009. Online information available at http://www.gdc-uk.org/dentalprofessionals/education/pages/dental-team-learning-outcomes.aspx (accessed May 2015).
17. Chate R A C. Truth or consequences: the potential implications of short-term cosmetic orthodontics for general dental practitioners. *Br Dent J* 2013; **215:** 551–553.