

Eirini P Fragouli, Xenos M Petridis, Maria K Georgopoulou

Rubber dam acceptance by patients treated by undergraduate and postgraduate students

Key words *future preference, patients' current experience, rubber dam*

Aim: The aims of the present survey were to record the views of patients on their experience of rubber dam (RD) use in an objective manner and evaluate the influence of several personal and clinical factors on patient opinion.

Methodology: A simple questionnaire was distributed to 116 patients receiving root canal treatment in the Dental School of Athens University. The sample was divided into two groups; adult patients receiving treatment under RD from (a) final-year students and (b) postgraduate students. Data were analysed using: a) exact tests and b) univariate and multivariate ordinal logistic models.

Results: Overall, patients' current experience and preference for future RD use were positive. Although slight differences were detected between the two groups of patients, concerning their experience and future preference, no clear trend was found. A positive association between current experience and future RD use was demonstrated among all participants ($P < 0.001$). The probability of a less favorable outcome regarding patients' current experience and their preference for future RD use were higher as the placement time was increasing ($P < 0.001$ and $P = 0.009$, respectively). The probability of a less favorable outcome regarding patients' current experience was higher as usage duration was increasing and the effect was more pronounced amongst patients treated by postgraduate students.

Conclusions: Evidence suggesting positive patient attitudes to RD use is presented. Overall, patient opinion concerning current experience of RD use and future preference did not differ significantly in relation to the experience of the clinicians. Patients' current experience exerted significant leverage on their future preference.



Eirini P Fragouli

National and Kapodistrian
University of Athens, Dental
School, Department of
Endodontics, Athens, Greece

Xenos M Petridis

National and Kapodistrian
University of Athens, Dental
School, Department of
Endodontics, Athens, Greece

Maria K Georgopoulou

National and Kapodistrian
University of Athens, Dental
School, Department of
Endodontics, Athens, Greece

Correspondence to:

Eirini P Fragouli
Xenias 32, Athens 157 71,
Greece.
Tel: +306942053014
Email: eirinifragouli1@
hotmail.com

■ Introduction

Rubber dam is a useful adjunct to certain operative and endodontic treatments. First described in 1864^{1,2}, it offers several benefits during dental treatment, mainly related to safety and quality issues. These include:

- maintenance of an aseptic field during treatments such as cavity preparation or root canal preparation or filling³;
- improvement of infection control procedures and reduction of potential aerosol contamination⁴;
- prevention of inhalation or aspiration of instruments or dental materials used during dental procedures such as endodontic files, burs etc. This is not only a medicolegal concern, but it also has deleterious consequences on the patient's health⁵;
- protection of gingival and other oral tissues from contact with deleterious materials, particularly liquids used during dental treatments, such as sodium hypochlorite or phosphoric acids^{6,7};

- How old are you? _____ ☐ Female ☐ Male
- Have you had rubber dam used for dental treatment before? ☐ Yes ☐ No
- If yes, who has used it?
 - ☐ same dentist as today/ ☐ different dentist/ ☐ student
- Compared to the first time you had rubber dam used, did you find today's experience
 - ☐ Better ☐ Worse ☐ About the same
- Did the dentist explain why the rubber dam was used? ☐ Yes ☐ No
- Was the explanation clear to you? ☐ Yes ☐ No
- Did you feel that it was being used
 - ☐ for your benefit ☐ the dentist's benefit ☐ or both
- Did you find wearing the rubber dam was
 - ☐ pleasant ☐ uncomfortable ☐ painful
- Would you prefer the rubber dam to be used next time?
 - ☐ Yes ☐ No preference ☐ No

Please add any comments you have, for or against, regarding your experience of rubber dam: _____

Procedure

- Time taken to apply rubber dam: _____ minutes
- Duration of rubber dam use:: _____ minutes

Fig 1 Questionnaire used to gather information.

- retraction of the soft tissues, including gingivae, during certain operative procedures⁸, improving therefore visibility and access to the operating field.

These advantages have led to the use of rubber dam being accepted as a standard of care by professional organisations⁹⁻¹². In addition, the use of rubber dam is taught and required in most dental schools^{13,14}, including both dental schools in Greece.

However, despite these many advantages, rubber dam is not routinely used in general dentistry and has created debate within the dental profession, more so than any other dental device or technique¹⁵⁻¹⁷. The possible reasons for the underuse of rubber dam are not entirely clear. The most commonly reported reasons include lack of patient acceptance, time required for application, insufficient training, difficulty in use, cost of equipment and materials and low treatment fees¹⁷⁻¹⁹.

No relevant data is available concerning the acceptance of rubber dam or other related factors amongst Greek patients. The aims of the present survey were:

- To record patients' views of their experience of rubber dam (RD) use in an objective manner.

- To evaluate the influence of several personal and clinical factors on patients' opinion.

Materials and methods

A simple confidential questionnaire containing 11 questions was designed. The questionnaire drew on work by previous investigators²⁰⁻²² and was also designed to gain information that is considered pertinent by the authors (Fig 1). The questions enquired into:

- Personal details of age and gender.
- The patient's previous experience of rubber dam use.
- Their current experience.
- Their understanding of the benefits of rubber dam use.
- Their preference for future rubber dam use.

Also, additional information concerning:

- the category of the tooth to be treated (anterior/posterior);
- the time taken to apply the rubber dam;
- the approximate duration of its use;

were filled in by the supervising clinician at the dental school (MG).

The questionnaire was distributed to patients receiving root canal treatment in the Dental School of Athens University, Greece. It was decided the survey would be undertaken by two groups of patients; adult patients who were receiving treatment under rubber dam from (a) final-year students and (b) postgraduate students. The intention was to enable an assessment to be made concerning the influence of the operator's experience on the patients' views regarding rubber dam. At the beginning of the appointment, the patient was informed by the student what rubber dam is, how it is used and its benefits. At the end of the appointment, patients were asked to complete the questionnaire, only one form each. This was undertaken in the waiting area and returned to the student afterwards. The information concerning procedure, application time and duration were entered by the supervising clinician at the Dental School (MG). Patients were assured that the forms were anonymous and confidential.

The survey was continued until 116 questionnaires had been collected and correctly completed from both groups.

Categorical data are presented through one-way or two-way tables as frequencies and percentage proportions. Continuous data are summarised through their mean and standard deviation (SD), when the underlying distribution was approximately normal and through their median and interquartile range (IQR) in other cases. Between group differences in the distribution of categorical variables have been tested through exact tests and when relevant a *P*-value for trends is also reported. In cases of significant trends, Kendall's tau is also reported as a measure of the strength of the association.

The effects of potentially prognostic factors on the distribution of patients' current experience and preference regarding use of rubber dam in subsequent visits have been tested and evaluated through univariate and multivariate ordinal logistic models. In such cases, Odds Ratios refer to the probabilities of a less favourable outcome (i.e. "Painful" vs "Uncomfortable" / "Comfortable" or equivalently "Painful" / "Uncomfortable" vs "Comfortable"). When modelling patients' preference regarding the use of rubber dam in subsequent visits, Odds Ratios refer to the probabilities of a more positive preference (i.e. "Yes" vs "No particular preference" / "No" or equivalently "Yes" / "No particular preference" vs "No"). The level of significance was *P* = 0.05.

■ Results

Overall, 71 female patients and 45 male patients participated in the survey, aged between 18 to 85 years old. The descriptive characteristics of the study sample are presented in Table 1.

Overall, patients' attitude toward the rubber dam was considered comfortable in 77.6% of the patients whilst only 7.8% would not like to use it in the future (Table 2). The patients' current experience as well as the patients' preference regarding use of rubber dam in subsequent visits between the undergraduate and postgraduate clinic showed slight differences but no clear trend (Tables 3 and 4). There was, however, a significant trend toward a more positive preference

in the future when the current experience was more comfortable (*P* < 0.001, Table 5).

By dividing the sample in three different age groups (18-35, 36-60, 61-85), no age effect was detected in both outcomes, current experience and preference in the future. Tooth category (anterior/posterior) also demonstrated no effect on patients' opinion. Previous experience of rubber dam had no effect on current patient experiences, however experienced patients reported a higher preference for future rubber dam use (Table 6).

Non-significant differences were noticed between postgraduate and undergraduate students in the time taken to apply the rubber dam. However, the higher the time to apply the rubber dam the worse current experience became (Table 7) and there was less positive preference for subsequent use of the rubber dam (Table 8). The effect was similar amongst both postgraduate and undergraduate students but with a non-significant interaction.

The total usage duration showed a non-significant difference between the undergraduate and postgraduate students (*P* > 0.05). However, the usage's duration of the rubber dam demonstrated more variation among undergraduate students [undergraduates median (IQR): 90.0(60.0, 120.0) and postgraduates median (IQR): 90.0 (70.0, 90.0)]. The higher time resulted often in worse current experience (Table 9). In addition, this effect was more pronounced in postgraduates students and showed a significant difference (Table 10). Moreover, different average times were reported amongst those who replied "No", "No preference" and "Yes" for subsequent use but with no clear trend (Table 11). This result was the same for both undergraduate and postgraduate clinics.

Factors associated with patients' current experience were independently tested using multivariate analysis and the results showed (Table 12):

- One minute longer placement resulted in a 29.2% increase in the probability of a less comfortable experience.
- Ten minutes longer usage duration in the undergraduate students resulted in a 22.9% increase in the probability of a less comfortable experience.
- Ten minutes longer usage duration in the postgraduate students resulted in a 139.9% increase in the probability of a less comfortable experience.

Table 1 Descriptive characteristics of the study sample.

	Clinic			Overall <i>P</i> -value
	Undergraduate N (%)	Postgraduate N (%)	N (%)	
Gender				0.703
Female	41 (63.1)	30 (58.8)	71 (61.2)	
Male	24 (36.9)	21 (41.2)	45 (38.8)	
Age (years)				0.376
15-35	11 (16.9)	13 (25.5)	24 (20.7)	
36-60	40 (61.5)	31 (60.8)	71 (61.2)	
61-85	14 (21.5)	7 (13.7)	21 (18.1)	
Previous experience				0.460
No	34 (52.3)	23 (45.1)	57 (49.1)	
Yes	31 (47.7)	28 (54.9)	59 (50.9)	
Previous user				< 0.001
Postgraduate student	0 (0.0)	6 (11.8)	6 (5.2)	
Private practitioner	0 (0.0)	14 (27.5)	14 (12.1)	
Undergraduate student	31 (47.7)	8 (15.7)	39 (33.6)	
NA	34 (52.3)	23 (45.1)	57 (49.1)	
Comparative experience				0.038
Same	21 (32.3)	10 (19.6)	31 (26.7)	
Better	10 (15.4)	18 (35.3)	28 (24.1)	
NA	34 (52.3)	23 (45.1)	57 (49.1)	
Teeth category (1)				0.016
Incisor	18 (27.7)	9 (17.6)	27 (23.3)	
Canine	14 (21.5)	3 (5.9)	17 (14.7)	
Premolar	15 (23.1)	13 (25.5)	28 (24.1)	
Molar	18 (27.7)	26 (51.0)	44 (37.9)	
Teeth category (2)				0.007
Anterior	32 (49.2)	12 (23.5)	44 (37.9)	
Posterior	33 (50.8)	39 (76.5)	72 (62.1)	
	Mean (SD)	Mean (SD)	Mean (SD)	<i>P</i>-value
Age (years)	49.9 (14.2)	43.6 (14.4)	47.2 (14.6)	0.020
Total	65 (100.0)	51 (100.0)	116 (100.0)	

NA: patients with no previous experience

Table 2 Overall patients' current experience and preference regarding use of rubber dam in subsequent visits.

	N (%)
Current placement experience	
Comfortable	90 (77.6)
Uncomfortable	21 (18.1)
Painful	5 (4.3)
Patient's preference regarding use of rubber dam in subsequent visits	
No	9 (7.8)
No particular preference	24 (20.7)
Yes	83 (71.6)
Total	116 (100.0)

Table 3 Patients' current experience and differences between undergraduate and postgraduate students.

	Clinic		Overall	P-value
	Undergraduate	Postgraduate		
	N (%)	N (%)	N (%)	
Current placement experience				0.089
Comfortable	47 (72.3)	43 (84.3)	90 (77.6)	
Uncomfortable	16 (24.6)	5 (9.8)	21 (18.1)	
Painful	2 (3.1)	3 (5.9)	5 (4.3)	
Total	65 (100.0)	51 (100.0)	116 (100.0)	

P-value for trend = 0.169

Table 4 Patients' preference regarding use of rubber dam in subsequent visits. Differences between undergraduate and postgraduate students.

	Clinic		Overall	P-value
	Undergraduate	Postgraduate		
	N (%)	N (%)	N (%)	
Patients' preference regarding use of rubber dam in subsequent visits				0.072
No	7 (10.8)	2 (3.9)	9 (7.8)	
No particular preference	9 (13.8)	15 (29.4)	24 (20.7)	
Yes	49 (75.4)	34 (66.7)	83 (71.6)	
Total	65 (100.0)	51 (100.0)	116 (100.0)	

P-value for trend = 0.479

Table 5 Association between patients' preference regarding use of rubber dam in subsequent visits and current experience.

	Current placement experience			Overall	P-value
	Comfortable	Uncomfortable	Painful		
	N (%)	N (%)	N (%)	N (%)	
Patients' preference regarding use of rubber dam in subsequent visit					< 0.001
No	1 (1.1)	5 (23.8)	3 (60.0)	9 (7.8)	
No particular preference	17 (18.9)	6 (28.6)	1 (20.0)	24 (20.7)	
Yes	72 (80.0)	10 (47.6)	1 (20.0)	83 (71.6)	
Total	90 (100.0)	21 (100.0)	5 (100.0)	116 (100.0)	

P-value for trend < 0.001; Kendall's tau = 0.392

Table 6 Effect of previous experience on patients' preference regarding use of rubber dam in subsequent visits; results from a univariate ordinal logistic model.

Covariate	Odds Ratio	95% CI	P-value
Previous experience			
No*	1		
Yes	2.277	(0.999, 5.187)	0.050

* Baseline category

Table 7 Effect of placement duration on patients' current experience (overall); results from a univariate ordinal logistic model.

Covariate	Odds Ratio	95% CI	P-value
Placement duration (min)			
per 1 minute	1.275	(1.114, 1.460)	< 0.001

Table 8 Effect of placement duration on patient preference (overall); results from a univariate ordinal logistic model.

Covariate	Odds Ratio	95% CI	P-value
Placement duration (min)			
per 1 minute	0.854	(0.758, 0.962)	0.009

Table 9 Effect of usage duration on patients' current experience (overall); results from a univariate ordinal logistic model.

Covariate	Odds Ratio	95% CI	P-value
Usage duration (min)			
per 10 min	1.316	(1.169, 1.483)	< 0.001

Table 10 Effect of usage duration and type of user (postgraduate vs undergraduate) on patients' current experience; results from a multivariate ordinal logistic model with interaction.

Covariate	Odds Ratio	95% CI	P-value
Clinic			
Undergraduate*	1.000		
Postgraduate	0.004	(0.000, 1.136)	0.055
Usage duration (min)			
per 10 min	1.254	(1.099, 1.432)	0.001
Clinic and usage duration (min) interaction			
Postgraduate × usage duration time	1.775	(1.024, 3.077)	0.041

*Baseline category; Significant interaction; Undergraduate OR = 1.254 (95% CI: 1.099, 1.432); Postgraduate OR = 2.226 (95% CI: 1.303, 3.805).

Table 11 Effect of usage duration on patients' preference (overall); results from a univariate ordinal logistic model.

Covariate	Odds Ratio	95% CI	P-value
Usage duration (min)			
per 10 min	1.007	(0.912, 1.111)	0.895

Table 12 Results from a multivariate ordinal logistic model for patients' current experience.

Covariate	Odds Ratio	95% CI	P-value
Placement duration (min)			
per min	1.292	(1.101, 1.515)	0.002
Clinic			
Undergraduate*	1.000		
Postgraduate	0.472	(0.120, 1.853)	0.282
Usage duration			
per 10 min	1.229	(1.075, 1.406)	0.003
Clinic and usage duration interaction			
Postgraduate × usage duration	1.952	(1.101, 3.460)	0.022

*Baseline category; OR for 10 min increase in usage duration; Undergraduates: 1.229 (95% CI: 1.075, 1.406); Postgraduates: 2.399 (95% CI: 1.371, 4.198); Given usage duration of 90 min (average duration) clinic effect was not significant.

Table 13 Results from a multivariate ordinal logistic model for patients' preference regarding use of rubber dam in subsequent visits.

Covariate	Odds Ratio	95% CI	P-value
Current placement experience			
Comfortable*	1.000		
Uncomfortable	0.081	(0.024, 0.279)	< 0.001
Painful	0.008	(0.001, 0.084)	< 0.001
Usage duration (min)			
per 10 min	1.193	(1.042, 1.366)	0.011

*Baseline category

- Given the placement duration and usage duration of 65 to 130 min, the "clinic" (undergraduate/postgraduate) effect was not significant ($P > 0.05$). The outcomes were better for postgraduates when usage duration was shorter than 65 min and the opposite when longer than 130 min.
- Given the aforementioned factors, all other recorded factors did not have any significant effect ($P > 0.05$).
- Multivariate analysis was also applied for factors affecting patients' preference regarding the use of rubber dam in subsequent visits (Table 13).
- Patients' preference for the next visit was dominated by his/her current experience. The less comfortable the experience the less positive the preference.
- Adjusting for current experience, longer usage duration was associated with higher probabilities of a more positive outcome (this result is mainly driven by patients with a comfortable experience: those that said that they would like to use it again had longer usage durations).

Discussion

Despite being the gold standard, a number of studies have shown that rubber dam use tends to decrease dramatically after graduation^{19, 22-29}. A recent clinical survey by Anabtawi et al³⁰ has shown that only 44% of general practitioners use rubber dam for every tooth scheduled for endodontic treatment. One of the reasons often reported is lack of patient acceptance. However, the present study clearly showed a positive patient attitude towards the use of rubber dam: 77.6% considered rubber dam to

be comfortable with a significant trend for a more positive preference in the future when the current experience was more comfortable ($P < 0.001$). Only 7.8% would not like to use it in the future. In addition, patients with previous experience reported a higher preference for future rubber dam use, indicating probably the conscious belief that the rubber dam is used for their benefit, while being an actual comfortable experience at the same time.

The present results are in accordance with those of the study by Stewardson and McHugh²², which was carried out amongst patients treated by final year dental students and four general dental practitioners. The majority of the patients said they would prefer rubber dam to be used at their next appointment and most had a positive opinion of the experience, with a statistically significant association between preference for rubber dam use next time and current positive experience of rubber dam, for both groups ($P < 0.001$).

Other practitioners^{20,21,31} have also suggested that there is no problem with patient acceptance. Reuter³¹ offered anecdotal evidence that, based on extensive personal experience, his patients preferred the use of rubber dam for restorative procedures. Gergely²¹ interviewed 72 of his patients and found that approximately 72% expressed a preference for treatment with rubber dam, 8% preferred treatment without and 19% had no preference. Jones and Reid²⁰ surveyed 100 patients attending a child dental health unit for treatment and concluded that 79% of their patients demonstrated sufficient acceptance of rubber dam.

In addition, in the study by Filipović et al³², the majority of patients treated either by undergraduate students or specialists also reported a positive current experience and would like to use the rub-

ber dam in the future (63% in the undergraduate students group and 76% in the specialists group). Moreover, Gördüysus³³ conducted a similar survey to the present one and found similar results. In particular, in his study, 47.2% of patients treated by undergraduate students and 67.4% treated by postgraduate students considered the rubber dam to be a positive experience (in the present study 72.3% and 84.3%, respectively). When asked about their future preference, 46.2% of patients in the undergraduate clinic and 77.2% in the postgraduate clinic replied positively (75.4% and 66.7%, respectively, in the present results).

Patients' age, sex and tooth type had no effect on patient opinion and these results are also in agreement with the results reported by Stewardson and McHugh²². On the contrary, longer time taken to apply the rubber dam and longer total usage duration resulted in worse current experience and the time to apply the rubber also negatively affected the future preference. The same was reported by Stewardson and McHugh²², as prolonged rubber dam use showed some association with negative opinions regarding the experience of rubber dam. It must be pointed out, however, that in the present study there was no statistically significant difference between the undergraduate and postgraduate students for both application time and duration, in contrast to the two groups in their study; compared with the clinicians, students took longer to apply the rubber dam and it was in place for longer. As a result, fewer student patients preferred rubber dam use next time, and were less positive about its use than the patients of the clinicians, indicating that the operator experience improves patient compliance. It can be assumed that the main reason why a difference in the usage duration time amongst groups did not become apparent (affecting indirectly the factor operator's experience) in the present study is perhaps because the time scheduled for appointments each day is the same for both undergraduate and postgraduate students in our clinic: a total of 4 h divided into two appointments by the majority of students. Perhaps the questionnaire should be given to the patients at the end of the endodontic therapy, where the appointments and total usage duration would be less for the postgraduate students.

The majority of patients are not averse to rubber dam application and perhaps, given the limited use of rubber dam by dental professionals, the opinion that patients do not like it may not be valid, possibly being based on the clinicians' view rather than on patients' true opinions. Since the operator's positive attitude and enhanced experience play a major role in increasing the level of rubber dam acceptance, clinicians should use it frequently and therefore become proficient; efficiency comes with experience, which, in turn, comes with regular use³⁴.

■ Conclusions

Evidence suggestive of positive patient attitudes to rubber dam use is presented. Overall, patient opinion concerning current experience of rubber dam use and future preference did not differ significantly in relation to the experience of the clinicians. Patients' current experience exerted significant leverage on their future preference. Longer time to apply rubber dam and total usage duration generally yielded less favourable outcomes with regard to patient opinion to rubber dam.

■ References

1. Barnum SC. History of the discovery of the dam. *Can J Dent Sci* 1877;4:88–89.
2. Ireland L. The rubber dam: its advantages and application. *Texas Dent J* 1962;80:6–15.
3. Cochran MA, Miller CH, Sheldrake MA. The efficacy of the rubber dam as a barrier to the spread of microorganisms during dental treatment. *J Am Dent Assoc* 1989;119:141–144.
4. Forrest W, Perez RS. The rubber dam as a surgical drape; protection against AIDS and hepatitis. *Gen Dent* 1989;37:236–237.
5. Cohen S, Schwartz SF. Endodontic complications and the law. *J Endod* 1987;13:191–197.
6. Carrotte PV. Current practice in endodontics: 4. A review of techniques for canal preparation. *Dent Update* 2000;27:488–493.
7. Lynch CD, McConnell RJ. The use of microabrasion to remove discolored enamel: a clinical report. *J Prosthet Dent* 2003;90:417–419.
8. Reid JS, Callis PD, Patterson CJW. *Rubber in clinical practice*. London: Quintessence Publishing Co, 1991.
9. European Society of Endodontology. Undergraduate curriculum guidelines for endodontology. *Int Endod J* 1992;25:169–172.
10. European Society of Endodontology. Quality guidelines for endodontic treatment: consensus report of the European Society of Endodontology. *Int Endod J* 2006;39:921–930.
11. American Association of Endodontists: *Guide to Clinical endodontics*, ed 4. Chicago: American Association of Endodontists, 2004.

12. American Academy of Pediatric Dentistry. Guideline on pulp therapy for primary and young permanent teeth. *Pediatr Dent* 2008;30(7 Suppl):170-174.
13. Smith GE, Richeson JS. Teaching of rubber dam technique in North America. *Oper Dent* 1981;6:124-127.
14. Petersson K, Olsson H, Soderstrom C, Fouilloux I, Jegat N, Levy G. Undergraduate education in endodontology at two European dental schools. A comparison between the Faculty of Odontology, Malmö University, Malmö, Sweden and Faculty of Odontology, Paris 5 University (René Descartes), France. *Eur J Dent Educ* 2002;6:176-181.
15. Going RE, Sawinski VJ. Parameters related to the use of the rubber dam. *J Am Dent Assoc* 1968;77:598-601.
16. Joynt RB, Davis EL, Schreier PJ. Rubber dam usage among practicing dentists. *Oper Dent* 1989;14:176-181.
17. Marshall K, Page J. The use of rubber dam in the UK. *Br Dent J* 1990;169:286-291.
18. McColl E, Smith M, Whitworth J, Seccombe G, Steele J. Barriers to improving endodontic care: the views of NHS practitioners. *Br Dent J* 1999;186:564-568.
19. Lynch CD, McConnell RJ. Attitudes and use of rubber dam by Irish general dental practitioners. *Int Endod J* 2007;40:427-432.
20. Jones CM, Reid JS. Patient and operator attitudes toward rubber dam. *ASDC J Dent Child* 1988;55:452-454.
21. Gergely EJ. Desmond Walker award. Rubber dam acceptance. *Br Dent J* 1989;167:249-252.
22. Stewardson DA, McHugh ES. Patients' attitudes to rubber dam. *Int Endod J* 2002;35:812-819.
23. Mala S, Lynch CD, Burke FM, Dummer PM. Attitudes of final year students to the use of rubber dam. *Int Endod J* 2009;42:632-638.
24. Ahmed MF, Elseed AI, Ibrahim YE. Root canal treatment in general practice in Sudan. *Int Endod J* 2000;33:316-319.
25. Stewardson DA. Endodontic standards in general dental practice – a survey in Birmingham, Part 1. *Eur J Prosthodont Restor Dent* 2001;9:107-112.
26. Slaus G, Bottenberg P. A survey of endodontic practice amongst Flemish dentists. *Int Endod J* 2002;35:759-767.
27. Hommez GM, Braem M, De Moor RJ. Root canal treatment performed by Flemish dentists. Part 1. Cleaning and shaping. *Int Endod J* 2003;36:166-173.
28. Peciuliene V, Rimkuvienė J, Aleksejuniene J, Haapasalo M, Drukteinis S, Maneliene R. Technical aspects of endodontic treatment procedures among Lithuanian general dental practitioners. *Stomatologija* 2010;12:42-50.
29. Ahmed HM, Cohen S, Levy G, Steier L, Bukiet F. Rubber dam application in endodontic practice: an update on critical educational and ethical dilemmas. *Aust Dent J* 2014;59:457-463.
30. Anabtawi MF, Gilbert GH, Bauer MR, et al. Rubber dam use during root canal treatment: findings from The Dental Practice-Based Research Network. *J Am Dent Assoc* 2013;144:179-186.
31. Reuter JE. The isolation of teeth and the protection of the patient during endodontic treatment. *Int Endod J* 1983;16:173-181.
32. Filipović J, Jukić S, Miletić I, Pavelić B, Malčić A, Anić I. Patients attitude to rubber dam use. *Acta Stomatol Croat* 2004;38:319-322.
33. Gördüysus M. An Evaluation of Rubber-Dam Acceptability by the Patients [in Turkish]. *Hacettepe Dishekimligi Fakültesi Dergisi* 2006;30:8-12.
34. Ahmad IA. Rubber dam usage for endodontic treatment: a review. *Int Endod J* 2009;42:963-972.

Calendar of events

25–27 August 2016

SkandEndo 2016

Danish Endodontic Society
Scandic Hotel
Copenhagen, Denmark

24 September 2016

8th Annual Congress of CES

Czech Endodontic Society
Czech Republic

21–22 October 2016

Congress of the BAET Celebrating the 15th anniversary of the BAET

Belgian Association for Endodontology and Traumatology (BAET)
Radisson Blu Balmoral Hotel
Spa, Belgium

10–12 November 2016

SIE international congress 2016

Saving teeth: the endo challenge

Italian Endodontic Society (SIE)
Auditorium del Massimo Via Massimiliano Massimo
Rome, Italy

11–12 November 2016

Pan Dental Conference and Exhibition 2016

Pan Dental 3D

British Endodontic Society
International Conference Centre
Birmingham, United Kingdom

17–19 November 2016

Annual Meeting

German Society of Endodontology and Traumatology (DGET)
Frankfurt, Germany

1–3 December 2016

4th International Endodontic Congress in Vienna

Austrian Society for Endodontology (OEGEndo)
Palais Ferstel
Vienna, Austria

Please send details of any relevant meetings to
imran@quintpub.co.uk