

A Questionnaire Based Study to Investigate the Variations in the Management of Tooth Wear by UK and Prosthodontists from Other Countries

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Abstract - The aim of this research project was to compare how the management of toothwear differs between specialist prosthodontists in the United Kingdom and other countries' specialist prosthodontists. A questionnaire on the management of toothwear was sent to two groups of 100 specialist prosthodontists randomly selected in the United Kingdom and overseas. The response rate was 64% for UK and 54% for overseas respondents. Similarities existed in the management of bruxism and the prevention of erosion, but there were significant differences between the two groups regarding treatment of palatal erosion, short clinical crowns and wear on the lower incisors. UK prosthodontists more often use resin-based materials and a showed a more conservative approach to treatment of tooth wear compared to their overseas colleagues.

KEY WORDS: Toothwear, specialist prosthodontist brauxism, erosion, tooth surface loss

INTRODUCTION

Tooth Wear is a multifactorial process and is seen as an increasing problem as more people are retaining their natural dentition into later life, thus exposing the teeth to the processes of wear for a longer period of time.¹ Treatment may be either predominantly preventive or operative. Preventive treatment may involve monitoring, splint therapy and dietary control and may be selected for milder cases of tooth wear². Operative treatment is often advised where sensitivity, unfavourable aesthetics, poor function, reduced vertical dimension and progressive wear make future restorative treatment more difficult. The aim of this research project was to compare the approach to management of differing severities of toothwear by prosthodontic specialists from the UK compared with their International Colleagues. The working hypothesis was that UK Specialists adopt a different approach to management of toothwear than their international colleagues.

METHODS

The questionnaire was designed and potential cases selected after convening a working group including postgraduate students and experienced academic staff. The questionnaire was then piloted on other staff at the institution and then posted to 10 local general dental practitioners to validate the questionnaire. Because the questionnaire was going to be sent to overseas dentists whose main language would not be English it was again piloted on 20 randomly chosen participants at an international prosthodontic conference. The feedback and results of these pilots produced changes

to the clarity, selection of cases and to the text. The final questionnaire was designed to target clinical scenarios on Bruxism, management of palatal erosion, Dahl appliances, treatment of lower incisors. The reasons for choosing these particular cases was that in opinion of the research team the clinical cases had sufficient variation to provoke international differences in management. The final questionnaire (Figures 1,3,6,8) was given ethical approval by the Guy's ethics committee 04/Q0704/162 and sent to two groups of 100 randomly selected specialists, those registered in the United Kingdom with the General Dental Council (GDC) and those from the International College of Prosthodontics. Postal questionnaires with a self addressed envelope were used to contact those in the UK, whereas an identical web based version was sent to overseas prosthodontists. Reminders were sent at 4, 8 and 12 weeks. Comparisons of the responses from the two groups were analysed using Chi-squared tests. Demographic data with respect to years since undergraduate and specialist qualification were analysed using the one way ANOVA test using SPSS

RESULTS

Demographic data

There were 64 replies from group 1 (UK) and 54 group 2 (overseas). From the overall sample of UK and overseas specialist Prosthodontists there were 17 female and 101 male respondents. There were no statistical differences between the results from Europe and other countries (40 from USA and Canada, 1 from Australia and 13 from Europe) and so all non-UK respondents were pooled together. The mean number of years since undergraduate qualification for the UK group was 25.4 yrs (range 7-45), and since postgraduate qualification was 17.6 years (range 6-38yrs). None of the overseas respondents indicated their year of undergraduate qualification and only 21% provided

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their year of postgraduate qualification. Within the UK respondents, there was no relationship between years since undergraduate and postgraduate and the treatment options selected. Comparison of the responses between males and females revealed no statistical differences between their answers in either group.

Questionnaire

Case 1 (Figure 1) Bruxism

Please choose one of the following options only

A 46 year old patient presents to you complaining of the appearance of small and worn teeth. He is anxious about possibly losing his teeth if they are not treated. He is medically fit and well. There is clinical evidence to suggest that there is no single aetiological factor but you suspect that bruxism has a major role. The tooth wear appears not to be progressive or at least deteriorating very slowly.



Figure 1.

- Monitor rate of tooth wear by taking study models and/or clinical photographs.
- Restore the shape of the teeth with composite and crown teeth later
- Surgical crown lengthening to increase the clinical crown height and restore with crowns at the existing vertical dimension.
- Place crowns on all teeth at an increased vertical dimension. Michigan splint to protect the restorations.
- Post retained crowns where necessary at the existing vertical dimension Use a Michigan splint to protect the restorations.

The most common answer for both groups to the question regarding the management of bruxism, was to monitor the tooth wear by taking study models and make a full coverage hard acrylic maxillary splint (Figure 2). There were no statistical differences in the proportion of UK respondents (52%) and those from overseas (50%) selecting this option.

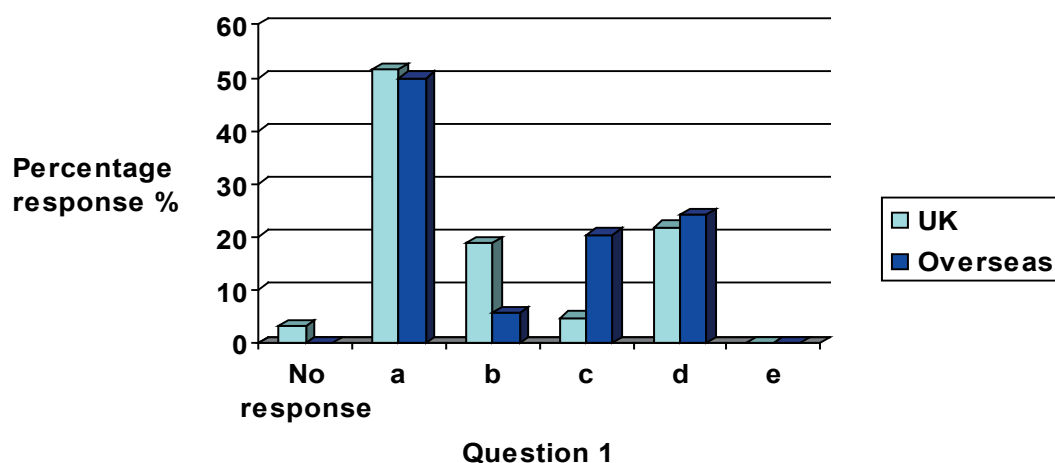


Figure 2. Comparison of responses to Case 1 between group 1 (UK) and group 2 (overseas)

Case 2 (Figure 3) Palatal acid erosion

A 23yr old female patient presents with severe wear affecting the palatal surfaces of the maxillary anterior teeth, her remaining teeth are unaffected. There is no loss of the incisal edge and the buccal surfaces look unaffected. She has sensitivity whilst eating and drinking to cold foods and drinks. After sympathetic and thorough questioning the patient admits to being bulimic and is currently under the care of her psychiatric practitioner. *How would you approach treatment of her case?*

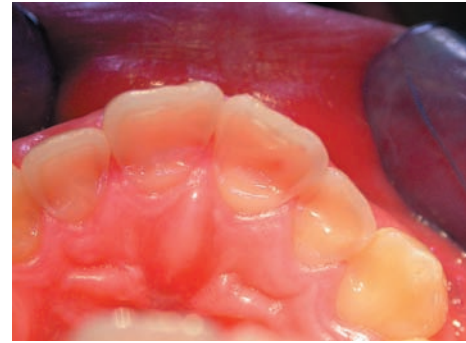


Figure 3.

Section I (Prevention)

- Reassure the patient and monitor
- Prescribe regular use of Fluoride mouthwash
- Cover the worn surfaces with dentine bonding agent (DBA) to reduce sensitivity
- Cover the worn surfaces with DBA and prescribe regular use of Fluoride mouthwash

Section II (Treatment)

- Place direct composites on the palatal surfaces of the affected teeth
- Restore the palatal surfaces of the teeth with gold or metal veneers
- Continue with the prevention and provide no restorations
- Crown the teeth

Both groups, 63% (UK) and 67% (overseas) respectively, chose prevention of palatal acid erosion by covering the worn tooth surfaces with dentine bonding agent and prescribe regular use of fluoride mouthwash (Figures 4 & 5). The most common option selected by UK respondents for restorative management of palatal dental erosion was to place direct composites on the palatal surfaces of the affected teeth (81%) whereas no unified opinion was observed from overseas respondents; (54%) choosing to leave the teeth alone and 37% choosing composites ($p < 0.001$).

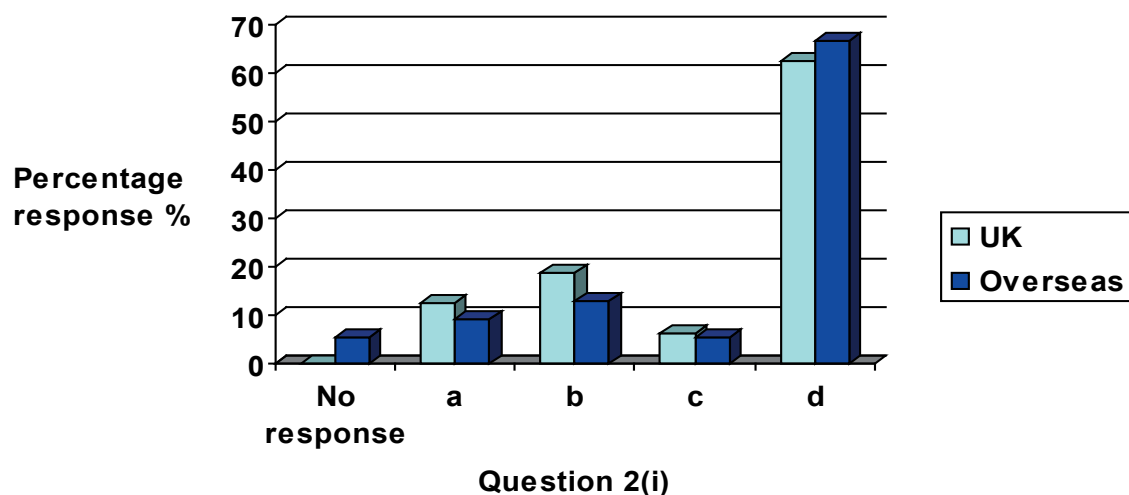


Figure 4. Comparison of responses for prevention Case 2 - section I for group 1 (UK) and group 2 (overseas).

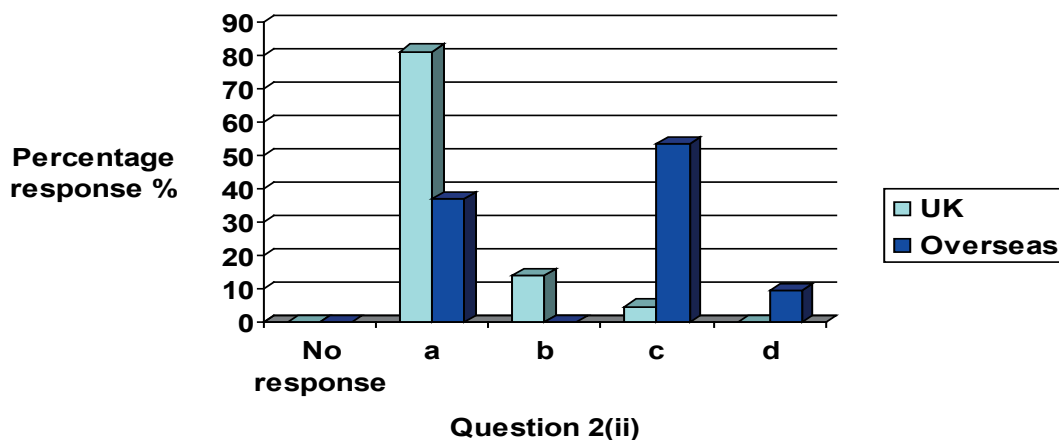


Figure 5 - Comparison of responses for management of palatal erosion for case 2 -section 2 between group 1 (UK) and group 2 (overseas).

Case 3 (Figure 6) Palatal tooth wear involving loss of the incisal edges

Please choose one of the following options only

A 52yr old male patient presents complaining that his upper teeth are not visible when he talks and at rest. He feels unhappy with the appearance of these teeth and requests advice and treatment to remedy the problem. He is not experiencing any discomfort and sensitivity from his teeth and admits to regular regurgitation of gastric juices into his mouth.

How would you manage short clinical crowns?

- Use composites or a Dahl appliance to restore the anterior maxillary teeth at an increased vertical dimension. Allow time for posterior teeth to overerupt and crown at a later stage if necessary
- Surgical crown lengthening of the maxillary anterior teeth, preserving the occlusal vertical dimension followed by definitive crowns.
- Elective endodontic treatment on the anterior maxillary teeth to gain retention for post crowns
- No active treatment and monitor tooth wear



Figure 6a.



Figure 6b.

Figure 7 shows that UK respondents preferred the restoration of short clinical crowns using composites placed at an increased vertical dimension and allow time for posterior teeth to overerupt (Dahl effect), and crown at a later stage if necessary (78%). Overseas respondents had a more mixed response with a reasonably even distribution selecting crown lengthening, elective endodontics or monitoring ($p < 0.001$).

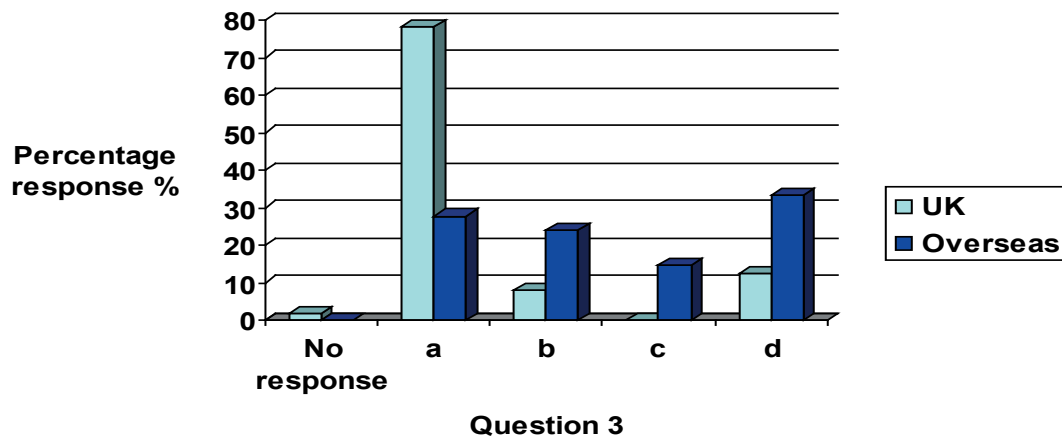


Figure 7. Comparison of responses to case 3 between group 1 (UK) and group 2 (overseas).

Case 4 (Figure 8) Wear on lower incisors

Please choose one of the following options only

A 58 yr old male concerned that his lower teeth are worn. He describes that he has a strong bite. All his posterior teeth are present and are extensively restored.

How would you manage wear on lower incisors?

- Prevent ongoing tooth wear by a Michigan type splint and monitor .
- Restore the lower anterior teeth with direct composites at an increased vertical dimension ensuring even contact and allow posterior teeth to over-erupt (Dahl effect)
- Use overlay dentures to restore the lost tooth tissue in the lower anterior region.
- Electively root treat and provide post retained crowns on the lower incisors. At the same time restore all other extensively restored teeth at a new occlusal vertical dimension.
- Surgically crown lengthen the lower anterior teeth and use crowns to restore their appearance and maintain the existing vertical dimension.



Figure 8.

The answers on management of worn lower incisors were varied for both groups (Figure 9). The most common answer from UK respondents was to restore the lower anterior teeth with direct composites (44%) but no clear choice emerged for the overseas respondents, with monitoring, surgical crown lengthening and elective root treatment chosen all being selected ($p < 0.001$).

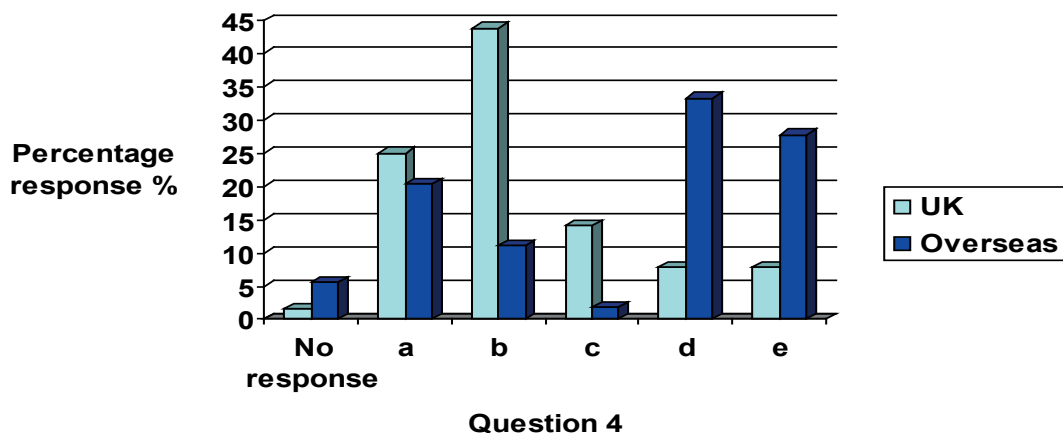


Figure 9. Comparison of responses to Case 4 between group 1 (UK) and group 2 (overseas).

DISCUSSION

The study aimed to investigate whether or not treatment strategies for the management of tooth wear differed between UK and overseas specialists. The outcome suggests that apart from their approach to bruxism and preventing acid erosion, there were significant differences between the groups. There was also a wide variation in opinion on the treatment within the overseas group to all questions, whereas UK prosthodontists showed closer agreement in response to most questions. The reasons for these differences probably reflect distinctive postgraduate education priorities. Overseas respondents were more amorphous originating from a number of countries, each probably with slightly different training protocols, even though the majority practised in North America.

The total response rate was 59%, with 64% responses from the UK and 54% from the overseas prosthodontists. Whilst not ideal, this response rate was not markedly different from other questionnaire based studies in general dental practice^{3,4}. Although 54% of the respondents from overseas replied, the difference in their answers was sufficient to show differences in approach. The questionnaire was designed to be short and simple to complete; consisting of only four targeted questions on tooth wear. Longer and more detailed questionnaires may have targeted more areas of interest but may not have provided any more information because the compliance might have suffered. Arguably, it might have been worthwhile to present the data comparing European to North American replies. The only convenient list of international prosthodontists was held by the International College and because of this there were relatively few European based specialist prosthodontists. Random selection did not provide many more than the 13 who replied possibly because specialisation in Europe is not well developed and only is present within the UK.

Different approaches to the respondents were taken to maximise the response rate. Firstly, an advance warning was given to overseas prosthodontists which carefully explained the role of the questionnaire and through this they were directed to the website. For the UK group, a stamped addressed envelope was sent to each respondent which may have increased the response rate. Similar questionnaire studies have successfully used the same protocol^{5,6}. The reasons for the different approaches were emails were considered more reliable than postal addresses for international colleagues. Whereas the GDC list does not include emails on its website and therefore the postal route was selected.

There was good agreement on prevention of palatal acid erosion with similar proportions from the different groups of specialists selecting reassurance, monitoring and fluoride mouth rinses with or without covering the worn surfaces with a dentine bonding agent. However, operative treatment varied between the groups. It was interesting to note that whilst no one from the UK opted to crown the teeth in case 2, around 10 % of the overseas respondents selected this option as the treatment of choice. UK respondents mostly chose composite resin to restore the eroded palatal tooth surfaces, reflecting the general preference for using composites in the management of tooth wear. Many of the longevity studies on composites have originated from the UK⁷⁻⁹.

Case 3 illustrated where composites could be used as a Dahl appliance. There was a clear majority of UK respondents selecting composites to restore the anterior teeth and allowing time for the posterior teeth to overerupt. The use of Dahl appliances or similar techniques seems to be widely accepted in the UK. Outside the UK this approach is treated with more caution despite the a number of studies reporting success^{7-9,10}. Why this has occurred is difficult to understand. It maybe that in other countries, particularly in North America, the adoption of restorative techniques utilising orthodontic tooth movement is unacceptable.

CONCLUSION

This study illustrates the variability in responses to management of tooth wear comparing UK prosthodontists to those from overseas. Treatment of bruxism showed good agreement, but for most other cases of tooth wear, there were statistically significant differences. Those qualifying in the UK seem to prefer composite restorations and demonstrate a willingness to utilise the Dahl concept.

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