Pediatric Dental Patients' Attitudes to Rubber Dam

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Objectives: *To explore young patients' experiences of rubber dam (RD) and determine how personal and clinical factors may influence opinions.* ***Study design:*** *A self-completed questionnaire was developed to capture pediatric patients' experiences of treatment under RD in a hospital setting. Patients' acceptance of RD and perceptions of how well it was explained to them were recorded on a 10cm Visual Analogue Scale (VAS), where zero represented the most negative score. The following clinical variables were also recorded: type of RD; procedure undertaken; use of local anaesthetic and procedure duration.* ***Results:*** *One hundred children (52 male, 48 female) with a mean age of 11.8 years (SD=2.29; range 7-17 years) participated. Overall, acceptance of RD was satisfactory (mean VAS=5.0). Patients were happy with the explanation of why RD was used (mean VAS=7.7). The type of RD, use of local anaesthetic, procedure undertaken and duration of the procedure did not significantly influence acceptance levels. However, RD was significantly less acceptable to patients who underwent radiographic examination whilst wearing the RD (P< 0.05, t-test). Nearly five times as many patients expressed concern at being seen wearing RD when taken to the radiography department (39.2%, n=20/51), compared to those who were reportedly self-conscious about RD when treated only on the paediatric dentistry clinic (8.2%, n=4/49).* ***Conclusions:*** *The use of RD appears acceptable physically and psychologically to most pediatric patients, however, visibility of the RD to others was a potential concern to some children.*

Keywords: *Rubber dam, children, acceptance*

INTRODUCTION

The concept of isolating teeth from the rest of the oral cavity using rubber dam (RD) was first conceived by Sanford C Barnum almost 150 years ago.[1] The original technique has altered relatively little in comparison to other dental technologies (Figure 1). The use of RD confers numerous benefits (Table 1) ranging from isolation of the tooth from salivary contaminants through to protection of the patient's airway and oral soft tissues. The European Society of Endodontics advises that root canal treatment (RCT) should only be carried out when the tooth is isolated with RD.[2]

The use of RD in pediatric dentistry has been described in the literature as far back as the 1950s.[5] It is particularly beneficial in this group of patients, as it not only ensures isolation where cooperation may be limited, but also acts as a psychological as well as physical barrier for the patient which can make them feel more secure. Furthermore pediatric dental patients have been shown to find RD acceptable, with a reported acceptance rate of 79%.[6] A recent study[7] found considerable variability in the use of RD amongst UK based pediatric dental specialists, with many citing limited co-operation or a perceived lack of necessity for certain treatments as reasons for not using RD. These findings seem to contradict recommendations for the use of RD made by the British Society of Paediatric Dentistry and the American Academy of Pediatric Dentistry in a number of clinical guidelines.[8-10]

To date, scant attention has been paid to young dental patients' perceptions of the application and use of RD to aid in the provision of dental treatment.

The aim of this service evaluation was to explore pediatric dental patients' attitudes to RD in a hospital setting.

MATERIALS AND METHOD

A self-completion questionnaire was developed in order to facilitate data capture. The questionnaire was divided into two sections, the first allowed the clinician to indicate the nature of the treatment, whether local anaesthetic was used, how long the rubber dam was *in situ* for, the type of RD used, how it was secured, and whether the patient required a radiograph to be taken whilst the rubber dam was still on. The second part, completed by the patient, utilised simple closed questionning as well as a series of 10cm visual analogue scales (VAS) to ascertain the patients' opinion relating to their acceptance of RD and perceptions of how well the need for RD was explained to them. A score of zero indicated the most negative evaluation and 10 the most positive evaluation. The questionnaires were checked for readability and both sections were piloted prior

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Figure 1. Pediatric dental patient receiving treatment under non-latex rubber dam

to data collection. The service evaluation was registered with the local National Health Service Trust's clinical effectiveness unit and approved for implementation.

Data were collected for a convenience sample of 100 patients attending for treatment that required the use of RD in the pediatric dental department at the Charles Clifford Dental Hospital, Sheffield, UK.

The data were analysed using SPSS software for simple descriptive statistics and a t-test used to determine statistically significant differences in VAS scores ($P<0.05$).

RESULTS

One hundred children (52 male, 48 female) participated with a mean age of 11.8 years (SD=2.29; range 7-17 years). About three quarters of the children (n=73/100) had experience of RD prior to their inclusion in this study. In the majority (79%) of cases, the RD was used to facilitate RCT, with 12% placed for restorations and the remaining split between microabrasion (6%) and internal bleaching (3%).

Exactly 75% of treatment episodes did not require the administration of local anaesthetic (LA). The vast majority (89%) of RDs applied were of the DryDam (Directa, Upplands Väsby, Sweden) variety, with 47% secured with Wedjets (Hygenic Corporation, Akron, Ohio), 38% of RDs did not require securing and the remainder (10%) utilised a RD clamp. Just over half (51%) of patients had a dental radiograph whilst the RD was in-situ.

Overall acceptance of RD was found to be satisfactory (mean VAS=5.0/10). Patients were happy with the dentist's explanation of why RD was used (mean VAS=7.7/10). The type of RD, use of LA, type of procedure or duration of the procedure did not significantly influence patient acceptance levels. However, RD was significantly less acceptable to patients who underwent radiographic examination whist wearing the RD ($P< 0.05$, t-test). In total 24% (n=24/100) of patients expressed concern at being seen wearing RD. Those patients attending the radiography department were 4.8 times more likely to feel bothered about being seen wearing RD that those patients who remained in the pediatric dentistry clinic *(Figure 2)*. A third (n=17/51) of patients who attended for radiographs were also self-conscious about being seen wearing RD on the clinic. This resulted in a high level of agreement (Kappa=0.87) between patients who were concerned about being seen wearing RD on clinic and those who felt the same whilst attending radiography.

Table 1. Advantages of rubber dam use

• Isolation of the tooth/teeth from salivary contaminants, thus providing an aseptic operating field[3]
• Prevention of aspiration/inhalation of dental instruments/ materials
• Improved cross infection control by reduction of aerosol-borne infective agents[4]
• Safe use of materials potentially harmful to the oral soft tissues
• Creation and maintenance of a dry operating field, essential for moisture sensitive techniques
• Provision of gingival retraction
• Facilitate treatment of patients with significant gag reflexes

Patients displayed good insight into why RD was required with 78% of patients stating that the dentist used RD to help both patient and dentist, with 9% and 13% thinking the RD was to help the patient or dentist respectively.

DISCUSSION

This report differs from the only previous study[6] to consider childrens attitudes to having treatment under RD in that it not only assessed patients' acceptance of the technique, but also aimed to determine if wearing RD had an impact on the patients' level of self-consciousness. A dentist must be able to recognize when a patient is under undue stress or anxiety. In doing so clinicians are able to either avoid or mitigate anxiety-provoking procedures and minimise the affect this has on their patient.[11,12]

Compared to a similar study, looking at RD in pediatric dental patients, the acceptance rate in the present study was lower[6], however, the means of recording this and the questions asked were different and therefore not easily comparable. In the present study children used a VAS to express what it was like wearing the rubber dam. The mean response was 5.0 at the median point between "really horrible" and "really nice", the two extremes of the scale. Based upon the findings, it would seem unlikely that the acceptance level is lower due to a lack of explanation for the use of RD. One possible reason for the lower acceptance rate could be the open plan nature of the department. As a result of this children are often within full view of the other parents or siblings seated at adjacent dental units. Despite this, only 8.2% (n=4/49) of patients treated exclusively on the clinic expressed that they were bothered that other people on the clinic could see them wearing RD.

Leaving the department appeared to have a negative impact on how children felt being seen wearing RD. If during the course of treatment with RD a radiograph is required, the patient attends the radiography department which is situated in the main entrance to the hospital, populated by patients of all ages waiting for radiographs. In those patients who had to leave the clinic for radiographs 39.2% (n=20) were bothered about being seen by other people with the RD *in situ*. Anecdotally, the authors have observed that patients who have to have a dental radiograph with the RD *in situ* display a heightened degree of self-awareness once they have left the confines of the clinic. Frequently patients who are given paper towels to dry around their mouth use this to cover the lower half of their face.

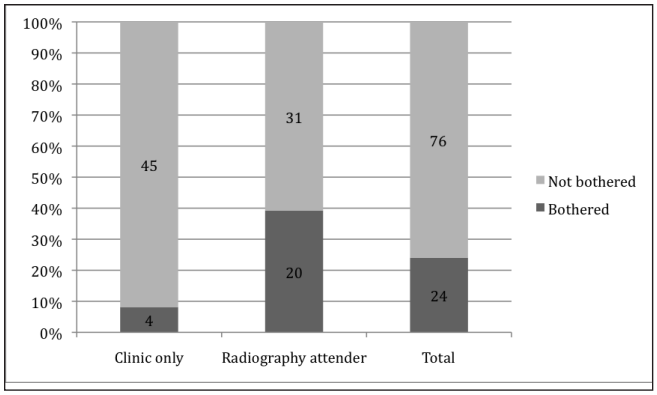

Figure 2. Childrens' response to how they felt being seen wearing RD in different clinical locations

In addition to the apparent heightened self-consciousness there is concern that the paper towels frequently become saliva soaked and present a cross infection control hazard. Although this study reveals that patients are concerned about being seen wearing a RD on and off the clinic, further work needs to be done to determine the root causes of this. There was strong agreement (Kappa=0.87) between patients who were bothered about being seen wearing RD on the clinic and those who felt the same whilst attending radiography. Of those patients who felt bothered about being seen wearing RD on the clinic 80.9% (n=17/21) attended the radiography department, 100% of these patients subsequently also felt self-conscious in this department. As all answers were received at the end of treatment it is not possible to determine whether attending radiography conferred a negative feeling to wearing RD on clinic or if this close correlation was coincidental. Only 3 out of 20 patients (15%) were made additionaly self-conscious by attending radiography whilst wearing RD.

One positive finding was that patients felt that the dentist provided a good explanation of why it was necessary to use RD (mean VAS=7.7). In providing the patient with sufficient information the patient should feel less anxious about receiving treatment with RD, this follows the principles outlined by Buchanan and Niven.[11]

The finding that the majority (79%) of patients had RD placed for RCT and that 89% of these were of the DryDam type indicates that most treatment under RD in these cases took place on anterior teeth. In the sphere of pediatric dentistry this is indicative of the frequent management of the complications of dental trauma and also improving the esthetics of anterior teeth with enamel defects utilising microabrasion or direct composite placement.

This report presents the findings from a local service evaluation into pediatric patient perception of RD. The findings add to the paucity of data that considers children's attitudes towards RD. The methodology was largely original and as such the validity of the questionnaire is a potential weakness in the study design. We suggest that similar studies in the future should aim to optimise the validity of their results by drawing upon and adapting existing patient questionnaires that have been used successfully to record child acceptance of other aspects of dental treatment such as preformed metal crowns.[13] Further studies are required to better appreciate and understand the psychological impact of dental treatment upon children and its acceptability to optimise the outcomes of pediatric dental treatment for patients.

CONCLUSION

This survey contributes to existing understanding of children's attitudes to RD but also highlights the extent to which they feel self-conscious about being seen by others whilst wearing RD. As such it is important to bear this in mind prior to treating younger patients with RD who may be better treated out of sight of other children/people where facilities exist.

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