

Institution: Sheffield Hallam University		
Unit of Assessment: UOA04 - Psychology, Psychiatry and Neuroscience		
Title of case study: Transforming the Care of Children with Dental Anxiety		
Period when the underpinning research was undertaken: 2012 - 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s): Dr Jenny Porritt	Role(s) (e.g. job title): Senior Lecturer	Period(s) employed by submitting HEI: 2012 - present
Period when the claimed impact occurred: 2015 - 2020		
Is this case study continued from a case study submitted in 2014? No		

1. Summary of the impact

Children with dental anxiety are more likely to avoid dental appointments and have worse oral health and health-related quality of life than those without it. The management of dental anxiety is also one of the main causes of occupational stress for dental professionals. The 'Your Teeth - You Are In Control' intervention, based on Sheffield Hallam research and endorsed by the British Society of Paediatric Dentistry, has been used to transform the way dental professionals manage children with anxiety across UK dental services. Approximately 1000 dental health professionals across 24 UK dental services have been trained in the use of the intervention, which has increased practitioner knowledge and capability in effective dental anxiety management. The intervention has been found to successfully reduce children's dental anxiety in 95% of cases. Dental services have made significant financial savings from both reduced 'no show' appointments and fewer referrals for treatment under general anaesthetic.

2. Underpinning research

The Problem of Dental Anxiety

Dental anxiety (DA) is a fear of dental treatment and/or visiting the dentist. Children with DA are more likely to miss or delay appointments until they experience pain/infections, and thus have worse oral health and oral health-related quality of life than children without DA. Dental professionals report a lack of training and resources in anxiety management, which prevents them from being able to effectively reduce DA, contributing to high levels of occupational stress. Many children who have dental anxiety are therefore referred for pharmacological interventions (sedation, general anaesthetic). Referrals for pharmacological treatments can result in anxious children having to wait longer and travel further for dental treatment, creating additional potential barriers to dental care. This can then contribute to increased healthcare inequalities, given that children who are referred to specialist services for dental anxiety/behaviour management are more likely to be from lower socioeconomic backgrounds. Children who receive dental treatment under general anaesthetic (GA) continue to be at high risk for poor oral health and dental anxiety in later life. Referring children with DA for pharmacological treatments also places a financial burden on NHS dental services. DA is one of the most common reasons why dental treatment (e.g. extractions) can't be performed in primary dental care, and in England there are 60,000 admissions to hospital for dental extractions in children per year, which cost approximately £50 million.

Impact case study (REF3)

Cognitive Behavioural Therapy (CBT) can be used to reduce children's dental anxiety. However, the demand for CBT services outstrips availability and therefore to improve access to this effective therapy, self-help interventions that are based on CBT can be used to effectively manage/reduce children's anxiety.

Porritt, a registered Health Psychologist, applied her past clinical experiences of treating people with a range of anxiety disorders using CBT-based self-help interventions, and her experience of undertaking health service evaluation and care pathway development in the field of dental anxiety management, to the specific challenges of managing children's DA. Porritt's identification of the potential for a CBT-based self-help approach to be used in the management of children's dental anxiety, and her specific expertise in anxiety management (**R1**), was fundamental to the design of the intervention. Porritt also led the development and validation of the 'Children's Experiences of Dental Anxiety Measure' (CEDAM) (**R2**). The CEDAM is currently the only child-centred measure of children's dental anxiety that has been developed with children and is based on a theoretical framework of dental anxiety (CBT). As such, the measure was fundamental for evidencing the changes in children's dental anxiety as a result of the CBT intervention.

Development of an Evidence-Based Intervention for Children's Dental Anxiety

The research was funded by NIHR (total grant £230,000) and conducted in collaboration with colleagues at the University of Sheffield, University of Glasgow, King's College London and University of Reading.

The resulting intervention was developed by Porritt and colleagues in 2015 and comprises a paper-based self-help guide for children called 'Your Teeth - You Are In Control' (**R3**, **R4**). Supporting resources were developed for parents/carers and dental team members. Children and parents/carers are provided with the self-help guide (and supporting resource for parents) prior to their treatment appointment and then complete the self-help guide activities with the dental professional during their appointment.

The CBT self-help guide includes:

- Information about DA to help the child, parent/carer and dental professional to understand the factors that influence this type of anxiety in children (**R5**), and procedural information designed to enhance children's understanding of what treatment involves, reducing uncertainty and increasing self-efficacy and confidence;
- CBT activities which promote shared decision making and goal setting;
- CBT activities/techniques which promote children's sense of control and encourage their use of effective coping strategies during their appointment or treatment (e.g. stop signal, ask questions, listen to music, use relaxation exercises)

This low intensity self-help CBT intervention for children's dental anxiety is the first feasible, effective and acceptable management approach for children's dental anxiety.

3. References to the research

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- R1.** Porritt, J., Marshman, Z., & Rodd, H. (2012). Understanding Children's Dental Anxiety and Psychological Approaches to its Reduction. *International Journal of Paediatric Dentistry*, 22 (6), 397-405. <http://doi.org/10.1111/j.1365-263X.2011.01208.x>
- R2.** Porritt, J., Morgan, A., Rodd, H., Gupta, E., Gilchrist, F., Baker, S., ... Marshman, Z. (2018). Development and Evaluation of the Children's Experiences of Dental Anxiety Measure. *International Journal of Paediatric Dentistry*, 28 (2), 140-51. <http://doi.org/10.1111/ipd.12315>

Impact case study (REF3)

- R3.** Marshman, Z., Morgan, A., **Porritt, J.**, Gupta, E., Baker, S., Creswell, C., ... Rodd, H. (2016). Protocol for a Feasibility Study of a Self-help Cognitive Behavioural Therapy Resource for the Reduction of Dental Anxiety in Young People. *Pilot and Feasibility Studies*, 2, 13. <http://doi.org/10.1186/s40814-016-0054-2>
- R4.** **Porritt, J.**, Rodd, H., Morgan, A., Williams, C., Gupta, E., Kirby, J., ... Marshman, Z. (2017). Development and Testing of a Cognitive Behavioural Therapy Resource for Children's Dental Anxiety. *JDR Clinical and Translational Research*, 2 (1), 23-37. <http://doi.org/10.1177/2380084416673798>
- R5.** Morgan, A.G., Rodd, H.D., **Porritt, J.**, Baker, S., Creswell, C., Newton, T., ... Marshman, Z. (2016). Children's Experiences of Dental Anxiety. *International Journal of Paediatric Dentistry*, 27 (2), 87-97. <http://doi.org/10.1111/ipd.12238>

All articles were rigorously peer-reviewed prior to publication in leading journals in the field.

4. Details of the impact

The research findings gained significant interest from clinicians, policy makers and the media (seven news outlets). Almost 10,000 copies of the self-help guides and supporting resources have been purchased (**E1**), while the project website has had several thousand unique views. The guides have been translated into 11 languages and have attracted interest from dental professionals around the world, including being recommended for inclusion in Norwegian national guidelines (**E10**).

Transforming the Care of Children with Dental Anxiety in UK Dental Services

As the first ever child-centred intervention for dental anxiety management, the CBT self-help guide and supporting resources have transformed the delivery of care for children with DA. By 2020 the intervention had been adopted/used in the following UK dental services:

- NHS England Central Midlands - incorporated into dental pathway in 2017;
- More than a quarter of UK community dental services (18 of 70) - Aberdeen, Liverpool, Derbyshire, Doncaster, Kent, Sheffield, Northern Ireland, Manchester, North Cumbria, South Cumbria, Newcastle, Glasgow, Harrogate, Rotherham, London Community Health, North Central London, Leeds and Gloucestershire (**E6**, **E10**);
- Dental hospitals in Liverpool, Sheffield, Leeds, London (the Eastman), Aberdeen, Dundee, Manchester, Leeds, Newcastle, Birmingham and Glasgow (**E6**, **E10**);
- The dental corporate body 'Centre for Dentistry' (in partnership with Anxiety UK) has introduced the resources into two large UK practices in 2018 and recommended the intervention in its factsheet for dental anxiety (**E2**);
- Two-fifths of UK dental schools (8 of 19) have included teaching of the low-intensity CBT intervention for children with dental anxiety into their undergraduate and postgraduate training. By 2020, over 380 students had received teaching in this intervention (**E3**).

An online survey distributed in February 2020 was completed by 71 dental professionals who currently use the intervention. The data revealed that, within the practices the dental professionals worked in, up to 28 additional dental staff members also used the intervention (average=6). A total of 70% (n=40) of staff felt the resources benefitted dental services including through: improving attendance, efficient use of clinic time, reduced need for GA and sedation, reduced need for referrals to secondary care, and improved patient experiences and outcomes (**E10**).

Impact case study (REF3)

A service evaluation conducted within the Sheffield paediatric dentistry clinic (Sheffield Teaching Hospitals) revealed that during the 4-week service evaluation period when the intervention was used (13/1/20 - 7/2/20), 15.5% (n=53) of children were not brought (WNB) to their appointments for their treatment. During the same 4-week period in the previous year (14/2/19 - 8/2/19), prior to the implementation of the intervention, there was a higher WNB rate of 19.6% (n=52). A 4.1% reduction in WNB rates translates to a significant economic benefit (140 'extra' new patients seen and an income of £22,000 for the hospital). There was also reduction in GA uptake following delivery of the intervention - 80% of the patients were referred for a GA, but only 15% subsequently required it; each reduction saving the service on average at least £800 per patient (**E4**).

The British Society of Paediatric Dentistry (BSPD) have endorsed the resource:

'the Executive Committee would like to thank the team for the resource. To have the tool available for use in clinical dental practice is empowering - for our patients and their families, and the clinical team' (E5).

The impact of the intervention on service delivery/improvement has also been recognised by the following dental/medical organisations (**E2**):

- BSPD Outstanding Innovation Award: 2nd place (2017);
- British Dental Association Community Dental Service group conference: 1st prize for service improvement (2016);
- British Medical Association Patient Information Award: highly commended and shortlisted for children award (2017);
- Yorkshire & Humber Academic Health Science Network: best patient-driven innovation award (2018).

Increased Practitioner Understanding, Knowledge and Capability in the Effective Management of Dental Anxiety

The resources are backed by the delivery of an extensive support programme, which increases practitioners' understanding/knowledge of dental anxiety and trains practitioners in the delivery of effective anxiety management. In the UK, a total of 972 dental practitioners across 24 UK dental services have received face-to-face training in the implementation of the intervention from Porritt and colleagues. 100% of participants felt the intervention could benefit children with dental anxiety and 99% felt using the intervention could also help dental teams provide care for children with dental anxiety. Practitioners reported that the training increased their understanding and anxiety management skills, and over 90% across the different services intended to change their clinical practice because of the training (**E6**).

A follow-up online survey was distributed in February 2020 and was completed by 71 practitioners. A total of 86% (n=49) respondents felt that using the intervention directly benefited them. Benefits included: improved communication, higher confidence, improved job satisfaction, and increased anxiety management capacity/options. Over a quarter also felt that using the resources had reduced occupational stress (28%, n=16) (**E10**).

Reductions in Children's Dental Anxiety

The initial testing of intervention undertaken by Porritt et al. involved 48 patients from a dental hospital and a community dental clinic in 2015. The intervention resulted in a significant reduction in dental anxiety in 95% of the children who engaged with the CBT resources (large effect size), and children, parents and dental professionals provided positive feedback about the usefulness of the resources (**R4**).

Impact case study (REF3)

Further evaluations of the CBT self-help guide in a general dental practice, two dental hospitals and two community dental services, found that there was a large (statistically significant) reduction in children's dental anxiety following the intervention (n=140 child patients) (**E7**, **E8**, **E9**) and 91% of children still reported lower levels of DA 12-18 months after the intervention, demonstrating the long-term impact of the intervention on children's DA (**E8**). The self-help guide and supporting resources were co-designed with children, parents and dental professionals, and the equity and inclusivity of the intervention was prioritised throughout. The intervention has been found to reduce DA in children living in areas of high deprivation (**E4**, **E8**). This is important because children from lower socioeconomic status groups are more likely to be referred to specialist services for DA/behaviour management, and thus face additional barriers to accessing timely dental treatment. Translated versions of the guide have been developed to ensure that children with DA whose first language is not English can also engage with, and benefit from, the intervention, and access timely and patient-centred dental care. The resources have been translated into 11 languages - Welsh, Urdu, Arabic, Persian, Malaysian, Mandarin, Dutch, Spanish, German, Turkish and Norwegian.

The British Society of Paediatric Dentistry (BSPD) executive committee acknowledged the impact of the intervention has on children's anxiety and ability to engage with dental treatment, noting they were:

"astounded by the positive change using the resource has had on a young person's ability to accept treatment. The name says it all - 'you are in control'" (**E5**).

5. Sources to corroborate the impact

- E1.** Purchase history of resources and engagement with webpage
- E2.** Certificates of awards and factsheet produced by Anxiety UK and the Centre for Dentistry
- E3.** Letter from chair/secretary of national BSPD teachers' branch
- E4.** Sheffield Teaching Hospital Paediatric Dental Clinic Service Evaluation
- E5.** Approval of resource by the British Society of Paediatric Dentistry (BPSD) including testimonial of endorsement from the president of the BPSD
- E6.** List of training events for dental professionals and feedback summary
- E7.** Rodd, H., Kirby, J., Duffy, E., Porritt, J., Annie, M., Suneeta, P., ... Marshman, Z. (2018). Children's Experiences Following a CBT Intervention to Reduce Dental Anxiety: One Year On. *British Dental Journal*, 225 (3), 247-51.
- E8.** Bux, S., Porritt, J., & Marshman, Z. (2019). Evaluation of Self-Help Cognitive Behavioural Therapy for Children's Dental Anxiety in General Dental Practice. *Dentistry Journal*, 7 (2), e36.
- E9.** Rodd, H., Timms, L., Noble, F., Bux, S., Porritt, J., & Marshman, Z. (2019). 'Message to dentist': Facilitating Communication with Dentally Anxious Children. *Dentistry Journal*, 7 (3), e69.
- E10.** Results of online Qualtrics survey of dental professionals in the UK and worldwide