

Institution: University of Sheffield		
Unit of Assessment: A-03 Allied Health Professions, Dentistry, Nursing and Pharmacy		
Title of case study: Transforming dental services to improve the care of children with dental anxiety		
Period when the underpinning research was undertaken: 2012-July 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Zoe Marshman	Professor of Dental Public Health	2009-present
Helen Rodd	Professor of Paediatric Dentistry	2006-present
Sarah R Baker	Professor of Psychology in relation to Dentistry	2009-present
Period when the claimed impact occurred: 2015-2020		
Is this case study continued from a case study submitted in 2014? N		
<p>1. Summary of the impact (indicative maximum 100 words)</p> <p>Fear of the dentist is common, affecting 30% of children in the UK and worldwide. Traditional approaches such as admission to hospital for general anaesthesia (GA) or sedation do not reduce child dental anxiety and are costly to the NHS. In response to this challenge, our research has transformed dental services provided for children with dental anxiety by developing a new low-intensity psychological intervention. This intervention has been adopted widely throughout the UK with benefits for dental services (improved attendance, reduced use of GA/sedation) plus improved outcomes for children and parents of reduced dental anxiety and better communication.</p>		
<p>2. Underpinning research (indicative maximum 500 words)</p> <p>Fear of the dentist is common, affecting 30% of children in the UK and worldwide. Children with dental anxiety experience unpleasant thoughts, feelings and symptoms and have more decayed and extracted teeth with worse quality of life than children without dental anxiety. The impacts of child dental anxiety are far reaching, causing upset for families, stress to dental professionals, and NHS costs. NHS costs include the cost of traditional approaches to managing child dental anxiety such as admission to hospital for general anaesthetics (GA) or sedation (approximately £700 per patient) plus the cost of missed appointments (approximately £157 per lost appointment) due to avoidance. In addition, these traditional approaches do nothing to reduce child dental anxiety in the short- or long-term resulting in dental anxiety being maintained into adulthood.</p> <p>In 2012 Marshman and Baker from the University of Sheffield found a lack of psychological support available for dentally anxious patients and revealed that dental professionals struggle to manage them with limited resources and training available [R1]. Rodd and Marshman established that psychological interventions such as cognitive behavioural therapy (CBT) should be used to reduce dental anxiety in children [R2]. The review identified barriers to psychological interventions including the lack of psychologist-led services for children with dental anxiety and dental professionals reluctance to undergo lengthy training to deliver psychological interventions [R2]. CBT is a talking therapy which requires patients and professionals to work together to</p>		

tackle the patient's problems. Differing intensities of CBT have been developed from low-intensity 'self-help' approaches to higher intensity psychologist-led therapies.

The research team in Sheffield developed the first ever low-intensity CBT intervention for dental professionals to use with children and their parents [R3]. In 2014, the initial stage involved child patients and their parents to explore their experiences of dental anxiety [R4] and provided unique insights not previously described. From these insights the intervention 'Your teeth you are in control' was developed in 2015 using a 'person-based' approach (involving children, parents, professionals, and Patient/Public Involvement (PPI) representatives) based on the Five Areas model of CBT. The intervention involved children and dental professionals working through a series of CBT-based activities together to change children's unhelpful thoughts (e.g. 'something will go wrong'), behaviours (e.g. cancelling appointments), physical symptoms (e.g. sweating), feelings (e.g. embarrassment, anger) and situational factors (e.g. poor patient-dentist communication) that maintain dental anxiety. One activity children suggested which was incorporated into the intervention was a 'message to dentist' children write to communicate with the dental professional.

In 2016 we evaluated the use of the intervention with 48 patients from two dental settings (one dental hospital and one community dental clinic) and found 86% engaged with the intervention which reduced child dental anxiety in 95% of patients, with a significant, large reduction in dental anxiety and improvement in quality of life. The intervention was acceptable to children, parents, and dental professionals (n=25) [R4]. Based on the findings, resources were developed by the research team for parents and dental professionals including an online training package.

The research was principally funded by the National Institute for Health Research.

3. References to the research (indicative maximum of six references)

Sheffield researchers in bold.

- R1.** Porritt, J, **Baker, S, & Marshman, Z** (2012). A service evaluation of patient pathways and care experiences of dentally anxious adult patients. *Community Dental Health Journal*, 29(3):198-202. https://doi.org/10.1922/CDH_2761Porritt05
- R2.** 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. <https://doi.org/10.1111/j.1365-263X.2011.01208.x>
- R3.** Porritt, J., **Rodd, H.**, Morgan, A., Williams, C., Gupta, E., Kirby, J., Creswell, C., Newton, T., Stevens, K., Baker, S., Prasad, S., & **Marshman, Z.** (2016). Development and Testing of a Cognitive Behavioral Therapy Resource for Children's Dental Anxiety. *JDR Clinical & Translational Research*, 2(1), 23–37. <https://doi.org/10.1177/2380084416673798>
- R4.** Morgan, A. G., **Rodd, H. D.**, Porritt, J. M., **Baker, S. R.**, Creswell, C., Newton, T., Williams, C., & **Marshman, Z.** (2016). Children's experiences of dental anxiety. *International Journal of Paediatric Dentistry*, 27(2), 87–97. <https://doi.org/10.1111/ipd.12238>

Funding

National Institute for Health Research (NIHR). 'Development of a guided self-help Cognitive Behavioural Therapy resource for the reduction of dental anxiety in young people'. Research for

Patient Benefit (RfPB) Programme. Grant Reference Number PB-PG-1111-26029. 2013-2015
£230,578 Principal Investigator: Marshman.

4. Details of the impact (indicative maximum 750 words)

The Sheffield research has resulted in changes to the way **dental services across the UK** treat child patients with dental anxiety. This research led to the creation of a low intensity CBT intervention, 'Your teeth you are in control', resulting in improvements in children's health and wellbeing including reduced dental anxiety in the short- and long-term following use of the intervention. These impacts have been realised through the adoption of this intervention by community dental services, dental hospitals and dental practices and has transformed the way they provide dental care for children with dental anxiety.

Benefits for dental services and dental professionals

The benefits to dental services are patient-related and financial, including improved attendance rates, reduced demand for GA and sedation services, reduced need for referrals to secondary care and improved patient experiences and outcomes [S1]. A service evaluation found improved attendance when the full intervention was delivered. There was a reduction in the number of children not being taken to their follow-up appointments (the 'was not brought' (WNB) rate) of 10% with the intervention compared to 26% without the intervention. When a brief version of the intervention was delivered to all new patients the WNB rate for new patient appointments fell by 4% [S2]. Each patient assessment appointment missed costs the NHS £157. There was also a reduction in GA uptake (80% of the patients were referred for a GA, but only 15% required it). This is important as a GA brings with it risks of morbidity, mortality, distress for the child and their family plus they do not reduce dental anxiety long-term and are costly to the NHS [S2].

Benefits of the intervention for dental professionals include improved communication with patients, understanding of children's dental anxiety and job satisfaction [S1] as illustrated by this quote, *"much better communication with the anxious child. It develops a better sense of trust between patients and the dental team which is rewarding."*

Feedback from dental students using the intervention found it improved their patient management skills and reduced their anticipatory anxiety at treating children [S2].

Service delivery and intervention implementation

Since 2016, the team from the University of Sheffield have delivered 28 training events in the use of the intervention, mainly in the UK (by community dental services, branches of the British Society of Paediatric Dentistry (BSPD) and British Dental Association (BDA)) reaching over 1,000 dental professionals [S3]. Feedback found 90% of dental professionals who attended the training felt they would alter their clinical practice.

The contribution of this intervention to transforming the dental care for children with dental anxiety has been recognised by two endorsements. The BSPD endorsed and approved the intervention, the past President said *"To have the tool available for use in clinical dental practice is empowering - for our patients and their families, and the clinical team... The name says it all - they 'are in control'"* [S4]. The charity Anxiety UK has also recommended the intervention [S5].

Internationally, the team have responded to requests from paediatric dentists to collaborate to translate the intervention into nine languages [S1] for use in ten countries.

Impact case study (REF3)

The intervention has been incorporated into the Dental Anxiety Management Pathway of NHS England Central Midlands and the number of services using it is increasing rapidly. It is being used in 18 of the 70 community dental services and 9 of the 19 dental hospitals across the UK so far. The intervention is also being incorporated into the national guidelines for health services for children and young people in Norway [S1, S6].

In addition, eight dental schools have revised their curricula to include teaching of the intervention to undergraduate and postgraduate dental students [S7]. Feedback from students using this intervention: improves their confidence in talking to children; improves their ability to assess their patient's level of dental anxiety; provides practical tips for ways to support children and helps them anticipate problems that may occur during treatment [S7].

The intervention includes resources for children, parents, and dental professionals. These resources are available in two formats: paper-based and online. The paper-based resources are available to purchase at cost from the School of Clinical Dentistry online shop. There is no charge for online access.

Dental professionals, practices and services have purchased [S8]:

- 2,465 guides for children
- 5,140 message to dentist proformas
- 1,835 resources for parents
- 444 resources for dental professionals

The resources can be accessed via two websites. The first website is the dental section of the [Living Life To The Full](#) website hosted by our collaborators [S8] who are internationally recognized for their work publishing low-intensity CBT interventions. Between January 2017 and October 2020 there have been 373 registrations to this website. Subsequently, [a second website](#), hosted by the University of Sheffield, was published providing information on research, links to the online training and direct access to the resources.

The intervention has been recognised by the following awards:

- BDA Community Dental Service group - 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 [S9]

In October 2020, Professor Helen Rodd was awarded Member of the Order of the British Empire in the Queen's belated birthday honours in recognition of her work to help children with dental anxiety in dental services throughout the UK.

Benefit to patients, parents, and the public

The main benefits for children include decreased levels of dental anxiety which were sustained following the use of the intervention. In 2017 a subsequent follow-up of 22 children after 12-18 months found 91% felt better about visiting the dentist showing the longer-term benefits [S10].

Service evaluations have been conducted in one general dental practice, two dental hospitals and three community dental services to date involving 240 child patients. The general dental

practice, which is in a very deprived area of London, used the intervention with 84 children and found a statistically significant reduction in child dental anxiety [S10].

Feedback from parents as part of the service evaluations [S2] was positive with 58% reporting the brief intervention had a positive effect on their child prior to their appointment. One parent said “from start to finish the whole process of coming to the dental hospital and using the *Your Teeth You Are In Control* approach with my daughter has been amazing and has changed our lives”.

5. Sources to corroborate the impact (indicative maximum of 10 references)

- S1. Results of an online survey of dental professionals in the UK and worldwide who are using the resources with details of use of translated versions.
- S2. Service evaluation report from Sheffield Teaching Hospital NHS Foundation Trust.
- S3. List of national and international training events with results of feedback.
- S4. Letter from the president of BSPD and press release issued when the intervention was endorsed.
- S5. Factsheet produced by Anxiety UK and the Centre for Dentistry recommending the resources.
- S6. Tannhelsetjemester tu barn o gunge – national guidelines for health services for children and young people in Norway recommending ‘Dine Tenner Du Har Kontroll’, the Norwegian version of ‘Your Teeth You Are in Control’.
- S7. Letter from the Teachers branch of British Society of Paediatric Dentistry (BSPD) recognising the contribution of the intervention to improving undergraduate and postgraduate teaching.
- S8. Purchase history and access to the intervention online - details of resources purchased and activity data on registrations and log-ins to the <https://dental.lltf.com/> website and Second Website (<https://bit.ly/3suNZ7C>).
- S9. Combined: Intervention Awards Certificates - BDA Community Dental Service group - 1st prize for service improvement 2016; British Medical Association Patient Information Award – highly commended and shortlisted for children award 2017 and Yorkshire & Humber Academic Health Science Network – Best Patient Driven innovation award 2018.
- S10. Published service evaluations:
 - Rodd, H. et. al. (2018). Children’s experiences following a CBT intervention to reduce dental anxiety: one year on. *British Dental Journal*, 225(3), 247–251. <https://doi.org/10.1038/sj.bdj.2018.540>
 - 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), 36. <https://doi.org/10.3390/dj7020036>
 - 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), 69. <https://doi.org/10.3390/dj7030069>