

Preparing children for operations

"On edge, suspicious, afraid, like a journey into the unknown, no explanation was given to me as to what to expect. That day I ran away from my own surgery. My mother found me by our car in the parking lot...we went home without having any surgery done." So remembers Gunilla Lööf, now a Paediatric Nurse Anaesthetist at Karolinska Institute University Hospital, Sweden, thinking back to her first experience of surgery at age 5 years. Today, Lööf works on ways to prepare children for operations.

Many millions of children undergo anaesthesia and surgery globally every year. More than 60% of children have reported anxiety during anaesthetic induction, and up to 25% of young children have had to be forcefully held during induction. Additionally, pre-operative anxiety in children is linked to several other clinical outcomes. "Anxiety before surgery is associated with many negative postoperative outcomes, including increased pain and analgesic requirements, higher incidence of emergence delirium and higher rates of postoperative sleep and behaviour disturbance compared with children who are less anxious before surgery", explained Michelle Fortier, Associate Professor, Sue & Bill Gross School of Nursing, University of California Irvine (USA).

A vast amount of research has reported maladaptive behavioural changes 2 weeks after surgery, as Professor Zeev Kain, Child Study Center, Yale University School of Medicine, New Haven (USA) told *The Lancet Child & Adolescent Health*. "Factors such as new onset of anxiety, bed wetting, not eating are all closely correlated to the amount of stress they had before surgery." And outcomes are poorer in those children who have had to be restrained during induction, also known as brutane anaesthesia.

"Hospitals and the operating theatre are a strange and different environment, and children are with unfamiliar people", says Eric Nicholls, a member of the Council of the Royal College of Surgeons of England, adding that the children are hungry because they have been fasting.

The issue is so important because it is modifiable, says Fortier. Research shows that interventions to reduce anxiety in children before surgery do have positive outcomes. Interventions such as play therapy in younger children, distraction to reduce anxiety, and teaching children what to expect can make a difference, according to Fortier. There is evidence that online initiatives can be effective too. "Children of today have the unique experience of being surrounded by digital media from a very young age. My research shows that children themselves declare the internet as their primary source of information ahead of contact with health-care and treatment", says Lööf. However, with the proliferation of technology and numerous websites, which are largely unregulated, Lööf thinks it is essential that "interventions should be evidence-based and rigorously evaluated and that families are provided with references on high-quality web-based sources of information".

Lööf has been part of the development of an online intervention, Anaesthesia Web, a comprehensive, age-specific, multimedia, web-based preparation programme to prepare and educate children and parents before peri-operative procedures. First launched in 2006, and available in 32 different languages, the programme aims to inform children via cartoons, frequently asked questions, games, blogs, podcasts, and interviews with children of different ages. The site has been developed by a multidisciplinary team of around 150 people, and "all content is based on scientific and

clinical evidence...including medicine, pedagogy, cognitive developmental science, and web-based technology", says Lööf. In her view, "Children have the right to, and need for, understandable information and preparation prior to peri-operative procedures and preparation must be performed and ranked in equality to other perioperative preparations."

Children who are prepared for and informed about what will happen during a procedure tend to have a better experience, says Professor Imelda Coyne, School of Nursing and Midwifery, Trinity College, Dublin. She believes it is important that practitioners take the time to find out what children already know, consider their age, and "scaffold the information in bits so the child is not overwhelmed". Regarding trying to understand children's existing knowledge, Coyne advises asking "What is it that you'd like to know?" and she often teaches nurses to say "What do you think is going to happen?" As she relates, children offer replies like "They're going to take out my kidneys, then I won't be able to wee again", adding that then "You can correct that misconception." Lööf echoes this approach of giving



For more on the **children having anaesthesia and surgery each year** see *Paediatr Anaesth* 2015; 25: 27-35

On **children's anxiety in anaesthetic induction** see *Int J Nurs Sci* 2014; 1: 89-92

For **Anaesthesia Web** see <https://www.anaesthesiaweb.org/en/>



For early research on the WebTIPS phone app reducing anxiety in children see *Anesth Analg* 2015; 120: 915–22

For the research into using virtual reality before surgery to reduce children's anxiety and pain see *Eur J Anaesthesiol* 2019; 36: 728–37

For the meta-analysis on virtual reality and pre-operative anxiety see *J Clin Med* 2020; 29: 3151

For more on clown interventions reducing pre-operative anxiety see *J Health Psychol* 2014; 19: 369–80

information in steps, saying that it is important to consider how children interpret and understand the information they are given. “Children need time to process the information provided in order to learn, understand and be prepared”, she explains.

Kain believes that customised interventions can have a big impact, and has been involved in creating a phone app, WebTIPS that aims to provide a tailored approach for children: “first we ask them questions about their personality, their likes and dislikes, and we provide [customised] training based on that”. Early research has suggested the app can reduce anxiety levels in children on the day of surgery, and Kain is now finishing a large National Institutes of Health randomised control study of the app.

Kain also believes that using virtual reality applications would be “wonderful”, although it is currently too expensive for clinical use. Research groups are starting to evaluate using virtual reality to address children’s anxiety before operations, with some initial positive outcomes. One group from The Netherlands assessed its use in 200 children (age 4–12 years) undergoing elective day surgery. The children were exposed to a realistic, child-friendly, immersive virtual version of the operating theatre, allowing them to get used to the environment and general anaesthetic procedure. The researchers reported that there was no benefit for postoperative anxiety, emergence delirium, or pain, but that in children who had more painful surgery there was a significantly reduced need for rescue analgesia. A meta-analysis in 2020 found that virtual reality reduced pre-operative anxiety, particularly in paediatric patients.

Distraction is another key strategy. Alberto Dionigi, Psychologist and Cognitive Behavioural Psychotherapist, National Federation of Clown Doctors, Cesena, Italy has been studying the benefits of using humour and clowning in health care for 15 years. Dionigi has also been a practising clown in hospitals

since 2008. He has found that hospital clowns can reduce pre-operative anxiety in both children and parents and they are rated as supportive by health-care staff. Dionigi described to *The Lancet Child & Adolescent Health* how research suggests several positive effects of hospital clowning. One is the cognitive effect, involving distraction from the medical procedure; another is the physiological effect, meaning the release of endorphins that stimulate the immune system, lower heart rate and blood pressure, and reduce pain; and yet another is the emotional effect of inducing positive emotions or reducing anxiety.

Although much attention is directed towards how young children cope with operations, Coyne points out that adolescents must not be forgotten. Coyne related her experience with teenagers with chronic conditions, such as congenital heart defects, who have had to have numerous operations. “This can be very stressful for them, especially if they have had a bad experience when they were little. They don’t forget those experiences and they come back to them when they are readmitted to the hospital”, Coyne says, adding that “even though they’re older and they may have a coping mechanism, they can still feel quite stressed”.

Another important factor is the children’s parents and their own anxiety. Coyne suggests that the most vulnerable age group is those aged 2–5 years, because their cognitive development means they don’t really understand what is happening. Parents’ anxiety can affect these children through a process known as transference of anxiety. “Some children react to their [parents’] anxiety by becoming very quiet, very withdrawn, and not interacting much. And sometimes professionals make an assumption that the child is okay because the child is not crying or acting out”, explained Coyne.

Lööf agrees that it is important to consider parents, noting that

parental anxiety is associated with children’s pre-operative anxiety and postoperative negative behaviours. “Parents constitute an important link between the child and the health-care providers and have a major role in children’s preparation. To be able to support their child, it is important they feel well informed and secure about the situation”, says Lööf.

Considering the long-term impact of childhood operations, however, Kain explains that this is difficult to study. Although he has received anecdotal stories and case studies from colleagues around the world who have needed psychological help long after surgery, he also questions how far-reaching this type of long-term impact might be and what happens when paediatric patients become adults.

Even though not every hospital has the resources to make time for preparing children and parents before surgery, experts believe that there is a shift in recognition of its importance. Kain relates how when he started this line of research in 1993, other people didn’t think it was an issue, but that much more is being done now. “There is more attention to it, but it does depend on the institution”, says Kain, adding that “children’s hospitals provide better care than the community hospitals simply because it’s a child friendly environment; they are more attuned to it”.

The landscape of preparing children for operations looks very different today than it did decades ago. Research has shown that children’s anxiety around operations has a substantial impact on both their psychological and clinical outcomes after surgery. But research in the field is still developing, awareness is increasing, and more evidence-based strategies are being used in children to reduce anxiety before their surgical operations.

Nayanah Siva