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Science

How Tamsin went on odyssey of discovery for a glue ear device

Dr Tamsin Brown is in the running for a WISE award for the development of her Hear Glue Ear product. MIKE SCIALOM finds out how she developed an original solution for glue ear sufferers.

Tamsin Brown is a community paediatrician at Cambridgeshire Community Services. Based at Brookfields, her specialist area is hearing loss – a professional interest that became a lot more personal when her daughter developed glue ear.

"My fourth child had trouble with glue ear," she explains, "and I already knew a lot about it and how long it took to get a grommet operation. Even though I was working within the system, it took a year before she got the grommet op."

Glue ear is caused by a build-up of mucous which seeps into the middle ear, causing varying levels of hearing impairment for varying amounts of time. It's most common in children aged three to seven, and for nine out of 10 sufferers it clears up within a year. But when you're a young child a lot happens in a year. And while eyesight is regularly tested in young children, hearing slips under the radar, especially among children aged three to seven.

"We wouldn't send kids to school without glasses but that's what we're doing – sending kids to school when they can't hear properly," Dr Brown points out.

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> Dr Tasmin Brown, community paediatrician, Cambridgeshire Community Services

For the one quarter of children with reading difficulties who suffer from glue ear, the solution has been grommets. But waiting for an operation, as Dr Brown knows, can be a long wait in austerity-blitzed Britain. And surgery should always be the last resort...

"I could see she was struggling," Tamsin explains. "I was in a position where I had to do something, and I spoke to a lot of people about it. Then, in Cambridge, I went to a conference and I stood behind a cochlear implant specialist and I just said: 'Why don't we do more to help children?'

"'Write me a protocol', he said, and we disseminated it to the heads of audiology and I tried to get some funding to get going. He was like a fairy godfather – he's still a supporter. I couldn't have started without that conversation.

"I did the research for this in my own time – completely," says Tamsin, whose quest for a new treatment began in 2016. "No one wants to pay for this – there's no money."

The adventure shifted up a gear

when she went shopping.

"I walked into an electronic store and had a conversation with an assistant about how much a bone conduction transducer costs."

These transducers, which have been around since 2011, turn sound into a vibration. The vibration is then restored to an audio signal by the brain, by sending the sound waves directly into your inner ear rather than via the ear canal – useful if you want to keep your ears free to listen to your surroundings but still want to receive messages, which is why the technology is used in the military and in sports including cycling.

"You can put the transducer anywhere on the skull," Tamsin says. "The sound bypasses the glue part and goes straight to the cochlea. The price was £9.99 for the transducer so I thought: 'I'll build one'.

"I tried the headsets out on my poor children first, then took it to a leading audiologist in Cambridge, Josephine Marriage (previous lead for children's hearing services at Addenbrooke's Hospital and currently director of Chear, the Children's Hearing Evaluation and Amplification Resource) and then to Roger Gray (a Cambridge-based ear nose and throat specialist).

"They were both surprised at how good the audio quality was on these headsets. The sound quality on all these audio devices is now so good, I was really surprised. I needed to pair it to a microphone as well, which was difficult to find.

"Eventually we found a motorbike intercom microphone and finally we had something that would work. It connects via Bluetooth so I had to get to grips with that, then I had to get funding to do a research study. Fortunately, with the Cambridge Hearing Trust I got some funding for the first patients."

The initial testing – this was all being accomplished outside of Tamsin's day job duties – took place at Chear's Shepreth base.

Things have happened pretty quickly since those early experiments. The pilot study of 20 children yielded positive results.

A conference in Australia last summer, which Tamsin attended with her family, proved that Hear Glue Ear is a unique product with a viable future. Having struggled on her own in the early days, the medical establishment is now involved, the funding is coming along, and the product should be on sale soon, priced at around £150.

Tamsin Brown has invented a new treatment for Glue-Ear after her daughter, Lilac Brown, 7, suffered with the condition

Picture: Richard Marsham

A Hear Glue Ear app recently went on sale, offering advice and information. And the WISE (Women in Science and Engineering) nomination has perked Tamsin up too – she is one of three finalists in the WISE Innovation category.

"I get grilled this week to see if I'm wise enough," she says, "and there's a black tie event with the Princess Royal in London on November 15."

Her work also comes at a time when the NHS has realised how much talent it has in its ranks, and how much innovation from within those ranks could offset the cuts that have afflicted the service.

"Innovation in the NHS probably needs to be more innovative itself – and have more women in it," Tamsin says.

Interestingly, despite the fact that she did all the work outside of her regular hours, the NHS is now very much on board.

Matthew Winn, chief executive of Cambridgeshire Community Services NHS Trust, commended her commitment, saying: "Tamsin is a fantastic advocate for ensuring the best outcomes for children. Her personal commitment to developing these innovative headphones has been inspirational and she will rightly benefit from the product when it appears in the market to buy, in line with our trust's policy which supports innovation in the NHS.

"We're proud to be part of bringing this initiative to the market which has the potential to help many children avoid negative impacts on language development while appropriate 'watchful waiting' takes place."

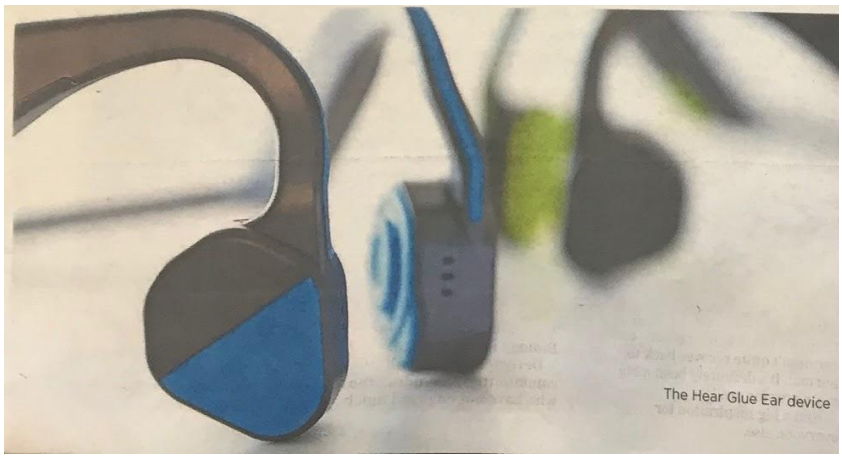
It's all looking good – and a manufacturer has been lined up for the production of the headsets – except for one thing: Hear Glue Ear needs certification before it can go on sale, and a CE Mark is currently taking a long time to process. There's a reason for the delays.

"The number of notified bodies has gone down to two," says Tamsin. "It didn't previously take six to 12 months to get approval if all the documentation was done. Everybody is lamenting how long it takes now. They won't take anything new, so we're a year behind. It won't go on sale this winter but if it's not on sale next summer I shall need anti-depressants."

And how is Lilac, her daughter, who is now seven?

"She's got a minimal amount of hearing loss left over in one ear from her hearing infections – one ear didn't quite recover back to normal. It's definitely been a big motivator for me."

And a big inspiration for everyone else.



The Hear Glue Ear device

Tamsin Brown with her daughter Lilac, 7
Pictures: Richard Marsham