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# The brain doesn't hear

When a child does not listen to instructions, sometimes it could be because he simply does not understand what is being said. Emily Chia investigates the effects of Central Auditory Processing Disorder

WHEN NATIONAL UNIVERSITY HOSPITAL'S HEAD AND NECK surgery otolaryngology consultant Dr Lynne Lim first saw Tom\*, he was serving in the army. He had gone to Dr Lim for a problem with giddiness. As they chatted, he mentioned that he couldn't hear well. Apparently, he had gone for numerous hearing tests over the years and each time the results showed that everything was in order.

Yet, he was getting the foot drills instructions wrong in the army. He told his seniors he could not hear so often that he was accused of malingering and put in the detention barracks. By the time he saw Dr Lim, he had given up saying that he couldn't hear. But more damaging was his increasing loss of confidence. He was starting to doubt himself and wonder if he was psychotic.

Dr Lim remembers how overjoyed Tom was when he was diagnosed with Central Auditory Processing Disorder (CAPD). He finally understood what was happening to him.

Dr Lim, who is also mum to four-and-a-half-year-old Natania, has long since learnt that when someone says they can't hear, it cannot always be taken literally.

"[It could be that] the person can hear but does not understand what he is hearing. Sometimes the brain just can't process what has been heard," she said. This inability is medically known as Central Auditory Processing Disorder or CAPD.



Dr Lynne Lim (left) and Jenny Loo

CAPD is not only an adult condition, says Dr Lim. She finished her adult ear, nose and throat (ENT) specialisation in Singapore before going to the US for two years for paediatric ENT studies. There she learnt that children are prone to CAPD too. Unfortunately, she says, it is a condition that is not widely recognised in Singapore.

Her department started treating CAPD two years ago and has since seen over 200 patients.

"About 20 per cent of these have been diagnosed with CAPD." The diagnosis often brings relief as parents feel they can finally do something productive to help the condition.

## UNDERSTANDING CAPD

According to Dr Lim, CAPD can come about as a result of accidents, brain tumours and infection. But most patients report no such trauma. It is unclear if CAPD has its roots at birth or if it is congenital.

Parents of children with CAPD quickly learn that they understand better in quiet environments and when there are no competing demands for their attention. In a noisy classroom, the teacher may be giving instructions to the class with her back turned to them. She may ask her students to listen and to copy notes at the same time. In such a scenario, the child may find it hard to process the multiple expectations and understand the instructions amidst the noise. The same child may do much better if the teacher speaks directly to the child in a quiet room with few competing distractions. A teacher who is aware of the condition can help by putting the student at the front of the classroom, giving him notes and maintaining a quiet environment, says Dr Lim.

## kidstuff

### ALARM BELLS RING

According to Dr Lim, CAPD is often misdiagnosed as hyperactivity.

She stresses the importance of paying attention to the specifics of each child's experience.

"Some parents say their kids are perpetually distracted by television programmes and do not listen to their instructions at home. Other parents say the children can't hear well in class because it is noisy."

Jenny Loo, a Paediatric Audiologist at the ENT Head and Neck Surgery Clinic of the National University Hospital adds that children with CAPD tend to ask for verbal instructions to be repeated and some may have difficulty following multiple tasks.

"CAPD and dyslexia can coexist. If undiagnosed, CAPD can make dyslexia and other language disorders appear worse than they actually are," Jenny warns.

Jenny also explains that it is important to be aware that speech, language and behavioural problems may stem from hearing loss that is not detected. Parents and teachers can easily miss moderate to severe hearing loss, if no formal hearing test is done. According to her, when one speaks at a normal volume in a room, the speech is loud enough for someone with moderate hearing loss to hear and decipher what is being said, sometimes with help from reading lips, gestures and tone of voice. Someone with severe hearing loss can still hear a telephone ringing.

"For normal speech and learning, a child's hearing needs to be good enough to detect the soft rustling of leaves or the dripping of a tap," she says.

### HELPING HAND

According to Jenny, a multidisciplinary team approach, which includes medical, audiological, psychological and, speech and language assessments, is important in fully understanding the cluster of problems associated with CAPD. However the diagnosis of CAPD can only be made by an audiologist after a comprehensive audiological assessment is conducted. Such an assesment involves obtaining a detailed history of the problem, examining the child's physical hearing ability to rule out hearing loss and several intensive speech and tonal tests.

There are currently no tools, which can accurately test for CAPD in a child under five years old. This is because the child must have developed some language skills before he can take the tests.

For older children, the treatment of CAPD is highly individualised and there is no single approach that is appropriate for all. There are however some common strategies that all such treatments will adopt:

- environmental modifications (eg, reducing background noise)
- training in compensatory strategies
- direct intervention (eg, speech language therapy focusing on specific auditory processing deficits and computerised auditory interventions)

It may come as a surprise to some parents that a few formal training programmes can be bought online, however these rehabilitation programmes must be tailored for the individual by their doctors. "Children with difficulty in differentiating similar sounding speech and poor auditory memory may benefit from the computerised training programmes that consist of different games that target these skills," says Jenny.

However, children with difficulty understanding speech in background noise or recognising different tone pattern of speech may not find much use for the same programmes. Instead, they may need speech therapy that focuses on speech-in-noise training and prosodic training.

Aside from computerised training programmes, there are also informal auditory training activities such as minimal-contrast pair exercises (eg, distinguishing between mouse-mouth, glass-grass) that can be done at home by parents to help enhance their children's listening skills. An audiologist or speech therapist should guide these activities, says Jenny.

Whichever rehab programme a parent ends up using, "the younger you start the re-training, the better it is for the child", says Dr Lim.

NUH is now using diagnostic tools based on the norms developed in the US. Dr Lim is now the lead investigator in a multidisciplinary team of ENT doctors, audiologists and teachers embarking on an extensive study funded by the National Healthcare Group to gather normative data in Singapore.

### CAPD IN A NUTSHELL

CAPD refers to the inability of the brain to process whatever is heard. A child with CAPD may demonstrate one or more of the following signs:

- Difficulty understanding speech in background noise or distorted speech sounds
- Difficulty following direction of sounds
- Difficulty differentiating similar-sounding speech sounds (eg, 'meat' and 'neat')
- Difficulty in recognising different tonal pattern of speech (eg, stresses and intonations)

#### Challenges:

- CAPD cannot be diagnosed from a symptoms checklist as individuals will not experience similar degrees of difficulty.
- The same type of symptoms may be apparent in individuals who do not have CAPD

Source: Jenny Loo, Paediatric Audiologist, ENT Head and Neck Surgery Clinic, National University Hospital

## I'm not stupid

Ten-year-old Justin Chia was diagnosed with CAPD in 2005. His mum, Suzanne Koh, recalls the experience they went through together

Justin Chia is in primary five at Unity Primary School this year. I remembered being concerned about his academic performance as he had difficulty spelling and demonstrated listening difficulties. I noticed he was able to perform better with written instructions and in a quiet environment.

When Justin started primary two in 2003, he refused to go to school and childcare on many days. He was increasingly having problems coping with schoolwork.

He had poor handwriting and difficulty in spelling. He struggled to cope with homework and often threw tantrums. Initially, I suspected that he was being bullied in school. But after some probing, Justin revealed that he did not enjoy going to school because he didn't understand what was happening.

I was troubled by his behaviour and decided to send him to the Student Care Service's Educational Psychology Service division (Yishun Centre) for an assessment of his cognitive and language abilities.

The Wechsler Objective Reading and Language Dimensions and Wechsler Intelligence Scale for Children-III tests were done to assess his abilities. These tests showed that Justin had specific difficulties in learning and will have difficulty coping with the linguistic demands of a mainstream curriculum.

I could not understand what was happening to Justin; but did not think that it was anything serious. I surfed the Internet to gather more information about learning difficulties and methods to help him cope. I was more patient with him and he was able to get through primary two and three over the next two years. I did not think it was necessary for professional help, as I had hoped that he would improve with time.

When he started primary four in 2005, there was still no significant improvement. I also noticed that he often could not understand what I was telling him. He ignored me on many occasions when I gave him verbal instructions and his response would often be a genuinely confused "huh?" and "what?". To add to my anxiety, he was still having difficulty distinguishing between 'b's and 'd's at age nine.

It came to a point when I could no longer tolerate his inattention. I thought he may have problems with his hearing, so we went to have his hearing tested professionally. The results of the test done in February 2005 showed that his hearing was normal.

### WHY WAS IT HAPPENING?

I felt lost and I didn't know how to proceed. Out of desperation, I took him to a Paediatric Neurologist in Mount Elizabeth Hospital who informed me that there was a possibility that Justin has a condition known as Central Auditory Processing Disorder.

The term was new to me and I could not understand why Justin had this disorder. I had heard the term "dyslexia" before and I was worried that Justin may have that. I did not want him to be labelled a dyslexic as there is a social stigma attached to that condition.

The Paediatric Neurologist suggested that I go to a polyclinic for a referral and get professional help through that channel as it would be cheaper. With