

Nerves - the telephone system of our body

In order to understand disability which involves damage to a child's brain, we need to understand how the brain and nerves work.

The telephone system of our body

The brain and nerves work like a telephone system in our body. Nerves allow messages to be passed around our body.

Our brain sends messages via nerves to our body telling it to do things. For example, when I want to pick something up, my brain sends a message through my nerves to the muscles in my arm and hand making them move and pick something up. When I'm sitting in a chair my brain is constantly sending little messages to the muscles in my back telling them to keep my back straight so that I don't fall off the chair – sometimes you don't even know when your brain is sending messages to your body.



Our brain also receives messages from our body. For example, if I'm walking and I step on a piece of glass, nerves from my foot carry this message of pain back to my brain, which then tells the muscles in my leg to lift my foot up and get it away from the pain!

Messages travel through nerves from your skin to tell your brain if you are hot or cold.

Messages travel through nerves from your stomach to tell you if you're hungry!

Messages travel through nerves from your bladder to tell you if you need to use the bathroom!

Damage to nerves or to the brain...

Many disabilities that happen before or when a baby is born cause damage to the brain and nerves. This is like damage to the telephone wires and can mean that messages don't get through at all, or that messages go to the wrong place, or that messages are unclear.

Messages don't get through at all.

Imagine if you pick up your telephone to make a call, but when you dial the number your phone cannot connect to the number you want to dial.

This is like your brain telling your hand to pick something up, but because of damage to your brain or nerves, the message doesn't get through to the muscles in your hand at all.

This happens for some children with cerebral palsy or brain damage – they cannot get the message through to parts of their body to move at all – this is called “paralysis”. The damage is not in the arm or leg, but in the brain and the nerves.

How can I help when the messages don't get through at all?

By finding different ways of doing things – if the messages aren't getting through to your child's hand muscles to make them pick things up, then maybe you can teach your child to do things with just one hand. You need to be careful to help the child stretch their hand out every day so that it doesn't close up and so that the muscles don't get shorter (see fact sheet “stretching my child's muscles”).

You can help by using special equipment that helps your child – if the messages don't get through to one leg, then find ways to encourage your child to move around using mostly one leg.

Messages going to the wrong places.

Imagine if you pick up the phone and dial your cousin in Vava'u, but instead you are put through to a different person in Ha'apai. This is like your child's brain telling his body to sit up, but instead the message goes to the wrong place, and he ends up arching his back and straightening his legs. Your child is not doing this on purpose, it just happens and he can't help it.



Messages going at the wrong time.

Imagine if your telephone automatically dials the number for your cousin in Vava'u, even when you don't pick up the phone and dial the number yourself! Sometimes, your child's brain will automatically send messages to the wrong places, even when he doesn't ask it to. Your child might just be lying on the ground and a message will go from his brain to his muscles to move around or to move his arm out to the side. Your child may not want this to happen, but

because of the damage to the brain and nerves, it happens anyway. Sometimes it happens all the time, many times every day.

How do I help when the messages are going to the wrong places at the wrong times?

By putting your child in a position that prevents the incorrect movements. So, if your child always arches their back or straightens their legs and crosses them over, then place your child in a position that is the opposite of this, with their legs bent and open, to prevent this from happening.

Unclear messages

Imagine if you call your cousin in Vava'u and try to talk to them on the phone, but it's hard to hear them and you have to yell into the phone for them to hear you.

This is the same as your child's brain telling his hand to reach for something, but he has to concentrate really, really hard – his brain has to yell down the nerve telephone line – for this to happen. Sometimes your child's brain might try really hard to tell the muscles in the arms or legs to do something, but only a little bit of the message gets through, and the arm or leg will start to move in the right direction, but won't quite do what your child wants it to do. This is not because of damage to the arm or leg, but damage to the brain and nerves.



How do I help when the messages are unclear?

By practicing movements with your child, and giving them lots and lots of encouragement to reach for things, pick up things, or any movements that they are unable to do.

Will the brain and nerves ever be “fixed”?

Not completely, but there are many things you can do to help your child's brain to prevent incorrect messages and to encourage correct messages.

In particular, you can prevent the wrong muscles from getting stronger and stronger because they get incorrect messages all the time by stretching the muscles and putting the child into good positions. See the “preventing muscle shortening” fact sheet”.