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Why technology puts young spines at risk

Chiropractors and osteopaths are reporting a huge increase in the number of children complaining of chronic neck, shoulder and back pain. And they say the long hours spent on laptops, tablets and smartphones are changing the shape of children's spines, which are more malleable than those of adults and so more prone to distortion.

"The spine has a beautifully elongated S-bend when you view it from the side, but with kids sitting scrunched up all day they are developing a two-curve 'C' spine, which is building up a whole heap of trouble for them in later life," says Sarah Key, a physiotherapist and also Prince Charles's back specialist, who has treated children as young as 5 for backache.

Simone Ross, an osteopath who specialises in treating children, says that stress is also a factor. "There is definitely a relationship between stress and musculo-skeletal pain," she says. "Some teenagers at very high-achieving schools are spending six hours a day hunched over computers. Many are under immense stress and pressure, working very hard."

With good posture, the ear, shoulder, hip, knee and ankle should line up when standing, but when children hunch over a screen, the natural curve in the lower back is flattened and their head and neck are pushed forward, which strains the neck muscles.

"The head represents about 8 per cent of body weight but as soon as you carry it forward, that weight will become more significant — just as a kettle feels heavier if you hold it in outstretched arms," Tim Allardyce, a member of the British Osteopathic Association, says. "I am now seeing kids with 6cm of forward head posture when standing, which is double the acceptable limit of 0-3cm. That creates a lot more fatigue of the neck muscles."

The effect is compounded by the profound lack of fitness in today's children when compared with previous generations; exercise strengthens the muscles, making them better able to withstand the effects of prolonged sitting, which places ten times more load on the immature spine than standing. "The big trouble is sitting: it's a curse on the body," Allardyce says. "Yet they sit still at school, come home and sit down to do their homework, text their friends and use laptops with their neck bent forwards and their head dropped, and then they play computer games slouching on the sofa. Their backs are rounded all day, and they don't have the muscle strength to cope with it. Kids' spines are more mobile than adults' but that is a double-edged sword, as they have the potential to become adapted to a poor position."

Along with other back-pain specialists, he is seeing an increase in patient numbers in two age groups: 11 to 12-year-olds (about half of all British children have experienced some kind of back pain by the age of 11, according to the British Chiropractic Association), and 16 to 18-year-olds. "The older teenagers pack my clinics, especially at this time of the year, complaining of really high levels of neck pain because they are studying hard for exams," Allardyce says.

Karen Jacobs, professor in the department of occupational therapy at Boston University, says children aged 11 and 12 are at particular risk because they are beginning to use screens more intensively (a study published last month showed that a quarter of 12 to 13-year-olds regularly use laptops on their bed, and a fifth on the floor), and they are also carrying heavier bags once they're at secondary school. Some of these bags weigh up to 12kg, she says, and anything more than 15 per cent of a person's body weight can cause damage. Jacobs rates laptops as the most ergonomically disastrous devices of the technology world: the screen is too low, forcing the user's neck forward, and their portability means they are often used away from desks and in contorted positions on laps and sofas.

In her study, which followed the children for more than three years, she discovered that giving them external keyboards and a mouse for their laptops, and teaching them how to use a computer in a healthier way by raising the screen height, significantly reduced their neck, back and shoulder pain and headaches.

Some believe that tablets are worse than laptops because they require even more craning of the neck if laid on a flat surface. Then there's the problem of typing on a tablet or phone, which can strain the wrist and hand.

Simone Ross believes that steps could be taken to minimise the effect of laptops and tablets on children who, she says, are spending hours every day in front of a laptop or iPad, either slumped on their beds or on a poor-quality chair.

"Adults will spend hundreds on a proper ergonomic chair for themselves but they'll buy a £30 chair for their child. I meet a lot of teenagers who are in significant pain and have been for a long time but no one has taken them seriously," she says.

Rachel Carlyle

What parents can do

Encourage more exercise

A German study suggested a minimum of 30 minutes' daily movement was needed by 12 to 14-year-olds to offset computer use. Help them plan half an hour of daily sport or non-screen activity.

Make children use a desktop

If you don't have a desktop PC at home, buy a separate keyboard and mouse for their laptop and use it at a desk, on a laptop stand. Get them a proper laptop rucksack with built-in lumbar support and try to stop them carrying a rucksack over one shoulder or, worse, holding a heavy school bag over the crook of one arm.

Teach kids to sit correctly

"They should sit back so their bottom is at the back of the chair," osteopath **Simone Ross** says, "with feet flat on the floor." Arms should be close to the body while typing, and the height of the chair should be such that the forearm is horizontal when laid on the desk. The top of the screen should be level with the eyebrows and the seat should be tilted slightly so that the knees are lower than the hips.

Instigate regular breaks

Children should get up and walk around, squat — to decompress the spine — and bend to touch their toes at least every two hours. Professor Karen Jacobs of Boston University has devised a free app called *Stretch Break for Kids*, which pops up on the screen every half an hour and suggests one of 32 stretches (see blogs.bu.edu/kjacobs/).

Buy your child a good chair

An ergonomically designed chair is best, but, failing that, buy a seat wedge, an angled cushion that restores the S-shape of the lower back.

Teach simple stretches

Stretch shoulders by doing shrugs and holding each one for a few seconds; stretch the neck by drawing your chin back as far as you can. The British Chiropractic Association has published a three-minute exercise programme for children to strengthen the spine: chiropractic-uk.co.uk/straightenup

Look for telltale signs

If children are reporting neck and back pain more than three times a week, seek help from a specialist. Parents should look for telltale signs: a child's head may be too far forward, one shoulder higher than the other, or there may be a flattening of the natural curve in the lower back. There may also be a tightening of the hamstring muscles so that they can no longer lie down on their back and lift one leg up at 90 degrees to the other.