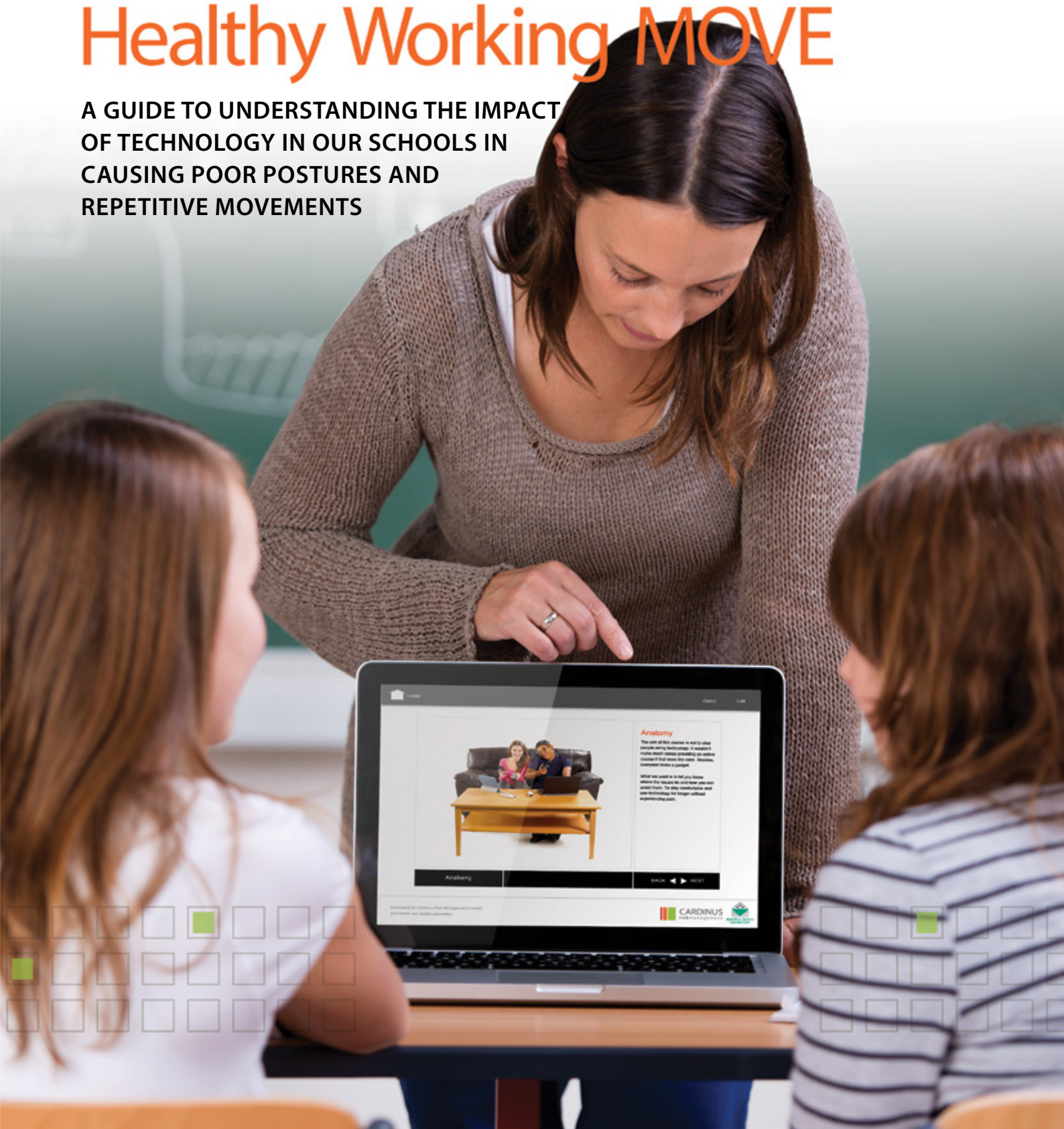


# Healthy Working MOVE

A GUIDE TO UNDERSTANDING THE IMPACT  
OF TECHNOLOGY IN OUR SCHOOLS IN  
CAUSING POOR POSTURES AND  
REPETITIVE MOVEMENTS





## Introduction

Back and neck pain and upper limb disorders have been around for generations. Ailments like tennis elbow, repetitive strain injury and slipped discs have been associated with performance of work activities and use of technology/equipment as risk factors.

Many people are aware of these developments and the concept/principles of ergonomics as a means of reducing the occurrence of such injuries, but most people take action only after they experience discomfort or have become injured.

In recent years, there has been an increased speed of technology change and proliferation in society, including schools. Indeed, desktop PCs have evolved into laptops, tablets, smartphones and smart watches. These technologies are available to all including children and increasingly used in education. This is where our children need to be supported more, while their bodies are still developing and more

prone to injury than the fully developed adult body.

Furthermore, while technology races ahead with ever more exciting, innovative devices that are able to do amazing things, application of the research concerning how to use technology comfortably and safely has not kept up; it remains a challenge for us today.

As one of the world's leading providers of ergonomics solutions, Cardinus Risk Management has partnered with the Health & Safety Laboratory (an agency of the Health and Safety Executive) to provide resources that will help our students to work safely and healthily and to make the most of the opportunities offered by their favourite technologies.

This eBooklet is provided as support material to help you in the use of our e-learning course developed for children and young people.





# Anatomy

## The spine

is the long central bony structure running down the length of the back; it includes vertebrae, discs and the spinal column, and protects nerve tissues running within it. The spine needs to provide firmness to keep us upright, but also flexibility to help us move. These two contradictory functions help explain why it is a vulnerable structure and therefore at an increased risk of injury.

When viewed from the side, the spine normally follows an 'S' shape, with a hollow at the neck and lower back and a gentle convex curve of the thoracic area in between.

## Vertebrae

These are the individual bone segments of the spine, 33 in total, that protect the spinal cord, keep us upright and allow us to move.

## Nerves

The spinal cord runs through the vertebral column. Peripheral nerves run from the spinal cord and activate the muscles of our arms and legs. This helps to explain why pain or pins and needles felt in our arms and legs is often referred from our neck or back e.g. sciatica.

## Discs

These act like shock absorbers between the vertebral bones, and each consist of a jelly-like substance in the middle of the disc with a tougher outer casing (a bit like a marshmallow). They are 80% water, can bulge or slip and compress against nerves causing referred pain e.g. sciatica. Adequate hydration is essential to keep the discs healthy and they are easily damaged by twisting and shearing forces.

## Ligaments

Bones are bound together by ligaments. They are inelastic and limit movement. They are susceptible to cumulative strain and toxin build-up. They have a poor blood supply and if injured they take a long time to heal.

## Tendons

Inelastic tendons join muscle to bone. They can suffer poor blood supply and quickly adapt to shortening, so poor postures can become fixed.



## Muscles

These allow upright posture, stabilize our core, provide movement and help pump blood around the body. They're highly elastic and contractile but are liable to fatigue from overuse and can overload with insufficient recovery and rest time. Muscles are prone to cumulative strain and toxic build-up from static postures, for example sitting incorrectly.

All these soft tissues and structures of the musculoskeletal system allow our bodies to move well and without pain but can easily be damaged if they are not looked after carefully. Healthy movement and good posture are essential for good health.



# Good posture

A good posture refers to the safest and most efficient positions of the joints and limbs of a person's body for movement and function; they are generally associated with minimal tension on joints, muscles and other surrounding soft tissues and optimum circulation and efficient functioning of the body's systems. The human body is at its strongest in a good posture.

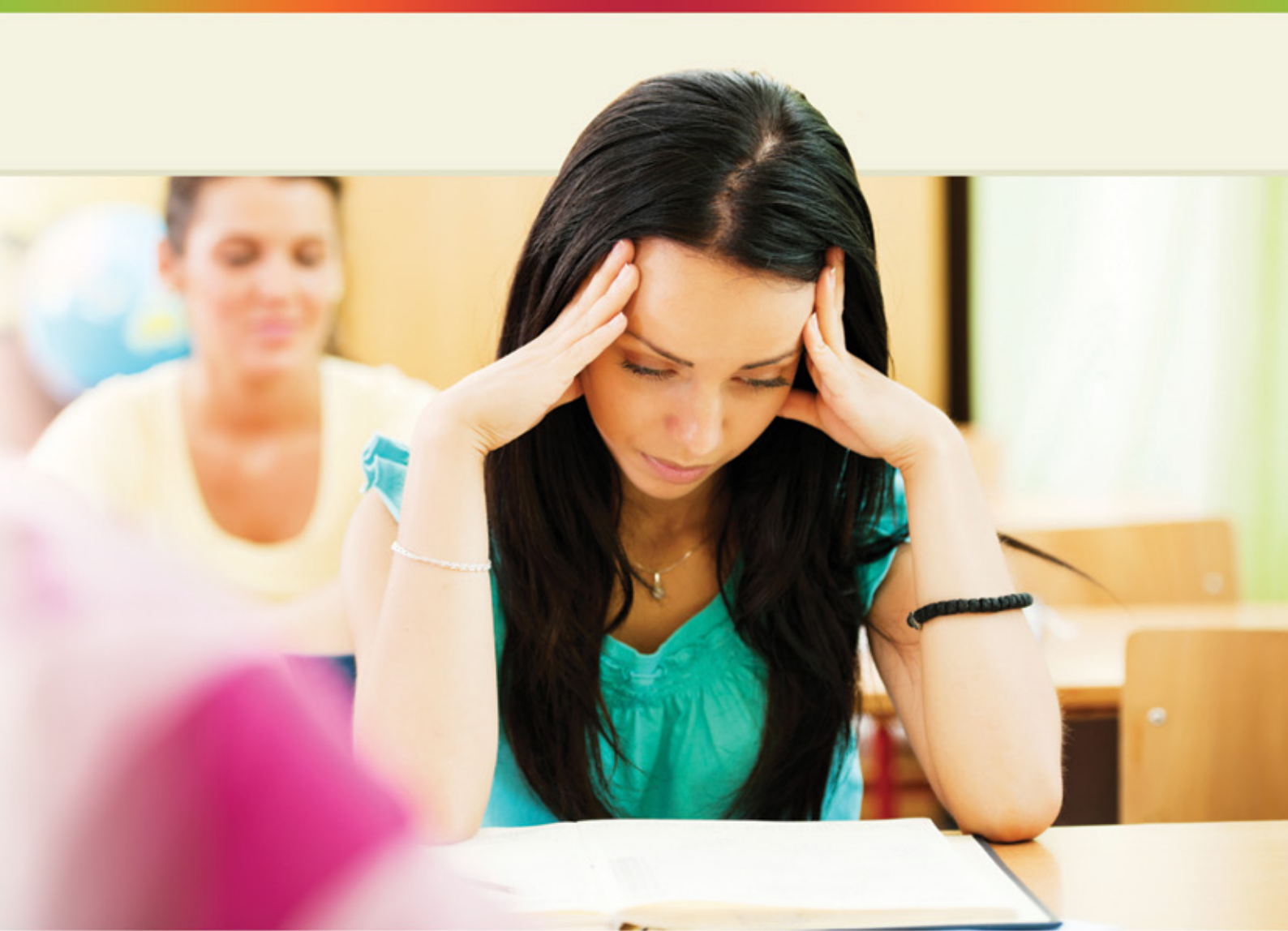
## Good upper body posture is when:

- The three curves of your spine are in natural alignment.
- Your chest is open and your shoulders are back in a relaxed position.
- Your head is naturally balanced, over your shoulders, neither tilting nor twisting.

The opposite of a good posture is an awkward or unhealthy posture. Awkward postures occur when the joints and extremities are at an extreme end of the movement range. Awkward postures include bending, twisting, turning, excess reaching and slouching positions. The body is weaker and at increased risk of injury in an awkward posture compared to a good posture.

Awkward postures also accelerate feelings of fatigue, which, for a child, may affect ability to learn, concentrate and focus.





# Scale of the problem

## Recent research shows:

72% of primary school children suffered back or neck pain in the past year, and more than a third of primary school children have suffered back or neck pain in the last week.

64% of secondary school children have suffered back or neck pain in the past year. A third of secondary school children have suffered back or neck pain in the last week.

Overall, Year 10 children experience more back and neck pain than Year 7 children. Year 7 children experience more problems carrying bags than Year 10. Year 10 students experience more pain sitting at their desks at school.

## Children are experiencing:

- lost school time
- lost sports time
- low self-esteem
- poor concentration

More children than ever before are experiencing back and neck pain. The NHS is treating more children, and more are now taking medication for back and neck pain.

Research indicates that getting less activity as a child may result in a person being less active as an adult and that experience of previous injury such as back pain, is a risk factor for future injury.

Furthermore, children as young as 15 have shown posture-related early arthritic changes on x-rays and it is thought that the problems begin at primary school age from poor posture habits of the children.



# The impacts of poor posture

The following are typical problems that have been associated with poor posture:

- Pain; stiffness; pins and needles; tingling; numbness; and reduced productivity.
- Children are more prone to injury of the spine than adults due to the less developed nature of the body. Problems can occur when a poor posture is adopted, which imposes stress on the spine.

Below, we consider different posture-related injury risk factors.

## The risk factors

### Technology

ICT now plays a huge part of our children's lives both at school and at home. However, very little consideration is given to the postures children frequently adopt, e.g. hunched over handheld mobile devices or laptops.

### Sedentary lifestyle

More children are driven to school and activities because of both safety fears and lifestyle time pressures. Time watching TV and playing on computer games and laptops rather than playing actively outside is taking its toll. Secondary school children spend approximately five hours a day sitting down at school. The Department of Health recommends a minimum of one hour of physical activity per day for school-age children.

### Sitting

Spending too long sitting, on wrong furniture, or at an incorrectly set workstation, using a laptop on the floor or on a bed playing games are examples of situations when poor posture are adopted and, may lead to back and neck pain in young people. Too much slumping and slouching at home and at school is bad for them.

### Lifting and carrying

Repeatedly carrying or lifting objects incorrectly, or carrying things that are simply too heavy, will have a cumulative damaging effect. School bags, which can be incredibly heavy, are continuously hauled about, particularly when lockers are not available at school. Excessive bag weight and inappropriate methods of carrying can lead to poor posture.

### Exercise

Both not enough and too much exercise can cause back and neck problems for young people. Using the wrong techniques and not stretching before and after exercise all constitute bad exercise habits. PE is an essential part of the school curriculum and children should be encouraged to do aerobic exercise every day.

### Diet

High calorie diets can cause weight gain which put additional stress on the body. Children need adequate protein and a healthy diet for good muscle and bone growth and repair.

### Growth

Rapid growth spurts can cause back problems as the spine grows faster than the surrounding muscles.

### Psychological

Stress can affect posture. If a child is under pressure due to exams or increased workload, this can lead to physical problems.

What's happening at home can affect a child's posture too, especially if they are unhappy. They may use a back problem to seek attention or to have the time they crave with a parent. If there is a history of back and neck problems or poor posture in the family, a child may unconsciously copy poor habits or behaviours that are seen as normal.





## How can we make things better?

It's important that we work hard to raise children's awareness of the importance of good posture, at school and at home. The long-term benefits are many and varied; the cost of failing to address musculoskeletal problems in children could be high. This generation of youngsters is having a very different experience of childhood compared to previous generations, which may be attributed to growth and access to technology.

School is a child's place of work and the health and safety considerations that apply to adults in respect of workstation design and physical work activities, such as lifting and carrying, should also apply to school children.

## Practical tips for good musculoskeletal health:

### Remember healthy posture

A sidelong view of a healthy spine looks like a letter 'S' with three curves, rather than a single, potentially damaging 'C' shaped curve. From behind, a healthy spine is straight and upright. It's important to remember this throughout all our daily activities. Encourage children to think 'tall' when sitting, standing and walking.

### Encourage physical activity

To help build up the core muscles that protect it, the spine needs to move to remain healthy. Movement is also needed to increase blood flow to remove the build-up of toxins in the muscles and to nourish the spine. Can children walk/cycle/scooter all or part of the way to school? Ensure school is offering PE sessions and outdoor break times,

rather than keeping children in for extra work. Children who play sport should be encouraged to use good technique, supportive footwear and adequate warm up/cool down periods before and after the activity.



### Support healthy sitting

This does not refer to telling the child to “sit up straight” regularly. Children need a combination of correct spine alignment and environmental influences. These enable them to perform everyday tasks more efficiently whilst minimising the risk of injury to the spine.

Encourage children to arrange their workstations so they are comfortable before they begin. When working at a laptop/computer, children should be sitting at a desk which is level with their forearms (with elbows bent to 90 degrees). Ensure that the top of the screen is level with their eyes and that if using a laptop, they use a separate keyboard. Ensure children’s feet are flat on the floor or well supported. When using a tablet, ensure it has a stand so that it is not used flat on a desk.

Encourage children to tell their teacher if they are uncomfortable at school. School is the workplace of the child, so children should be comfortable and enabled to concentrate on their studies. The likelihood of them adopting extreme awkward postures, particularly of the back or neck (or both) should be minimised. Children should have a clear front view of the board; they should not have to twist around to see it. Suggest they turn their chair around or move position.

The spine does not like prolonged positions, especially sitting. Follow the 30:30 rule: allow a 30-second ‘stand and wriggle’ every 30 minutes. Limit floor sitting for children of primary school age to a maximum of ten minutes at one time where possible. Alternatively, allow them to

move and sit with their legs in front of them or to alternate sides rather than always cross-legged. Encourage physical activity during breaks and movement in class. Movement is essential for children’s comfort.

Touch typing is an advantageous skill for young people to learn to help reduce the repetitive neck movement associated with ‘hunt and peck’ typing.

### Think about nutrition and hydration

The shock-absorbing discs of the spine are 80% water, so regular hydration helps keep them in tip-top condition. A healthy weight/body mass index limits extra stress on the many joints and muscles of the spine.

### Remember safer lifting and carrying

Children should be discouraged from lifting their younger siblings or other smaller children. They should also be taught how to move and carry equipment and furniture safely and correctly, especially if required to do so at school.

Children should be reminded to bend their knees and NOT their backs when picking things up and putting them down. Encourage them to make sure they get close to the object, get a good grip and avoid twisting and stooping as over time, this will make their backs very unhappy. Bending at the knees is the natural way to lift, but children are influenced by their role models and develop bad habits.







### Correct school bag use

A mono/single strap school bag should be worn across the body (not on one shoulder) and children should remember to swap carrying sides regularly. A rucksack should be worn over both shoulders. This will keep the spine symmetrical and upright.

A mono strap bag should be adjusted so that the top of the bag is level with the hip/belt. A rucksack should be worn close to the body and higher up the back (so that the bottom of the bag is level with or above the waist). A chest and waist strap will help if walking long distances. A wheeled trolley bag is also a good option if the child's school has few stairs.

Keep the bag balanced, with heaviest items packed first and closest to the spine. It's important to only carry what is needed, so ensure children repack their bag each evening to keep it as light as possible. School bags should weigh a maximum of 10% of a child's body weight. Studies have shown that children are often carrying over a quarter of their body weight in their school bag which is the equivalent of a 70-kilo (11st) adult carrying over 17.5kilos (2st 10lbs) in weight.

If possible, current school work should be placed in lighter folders or on a memory stick rather than children carrying all their school work.





## Top ten back-care tips for kids

- 1 Physical activity is essential to good back health. Keep active.
- 2 Bend your knees when lifting and putting things down. Don't twist or stoop.
- 3 Re-pack every evening to avoid carrying things you don't need and never carry more than 10% of your body weight.
- 4 Carry your school bag safely and make sure it is correctly adjusted (and remember to swap shoulders regularly if it is a mono strap bag).
- 5 Keep your bag balanced with heaviest items closest to your spine.
- 6 Be aware of your posture every day. Think 'tall' when sitting, standing and walking.
- 7 Tell a teacher or parent if you have back pain and see your doctor if your pain lasts for more than two weeks.
- 8 Remember to get up and move around if you have been sitting for more than 30 minutes.
- 9 Arrange your workstation so you are comfortable before you begin.
- 10 Eat a healthy, balanced diet and stay hydrated.



## Next steps

Bearing all this valuable information in mind you should start to think about how it can be passed on to the children in your care. Identify circumstances and activities where the children are most at risk. Introduce awareness and discussion about staying comfortable and healthy.

Consider dedicated sessions to inform children of the need to consider posture. Explain ergonomics and use examples of how things are designed to be used easily and comfortably; also explain how some technology can be bad for us if we don't use it sensibly.

An exciting new e-learning course has been launched to help you and the young people in your care. It is based on an award-winning training programme called Healthy Working. Healthy Working MOVE is available free of charge for all primary schools, secondary schools and colleges. The e-learning course uses engaging online activities to teach young people about the safe ergonomic use of technology.

There is a version for primary school children, a version for secondary school children and another for students in higher education.

## About Healthy Working MOVE from Cardinus

Healthy Working MOVE has been developed by Cardinus in association with the Health & Safety Laboratory, part of the Health and Safety Executive. The project has been supported by and enjoys contributions from paediatric physiotherapist Lorna Taylor BSc (Hons) Physiotherapy MCSP, HPCP Registered, director of Children First Physiotherapy and Jollyback.com.

Cardinus Risk Management has been developing effective display screen equipment (DSE) and ergonomics programmes since 1995. Its customers include many of the world's leading organisations, central government departments and unions.

The Cardinus approach to effective DSE management is to apply simple programmes that provide a modular, adaptable solution. Healthy Working, the innovative online DSE assessment and e-learning solution, provides award-winning solutions that are fully endorsed by

the International Institute of Risk and Safety Management.

Healthy Working MOVE takes all the expertise that went into Healthy Working and presents it in a format that young people will enjoy and that is available completely free of charge to all schools and colleges.

**For more information telephone 020 7469 0200.**

### Useful resources

- You can find more information from BackCare, the charity for healthier backs at [Backcare.org.uk](http://Backcare.org.uk).
- Also visit [www.Jollyback.com](http://www.Jollyback.com) for research information, advice and a range of back care products for children and schools.
- For touch typing skills for children visit [www.bbc.co.uk/schools/typing](http://www.bbc.co.uk/schools/typing).

### Cardinus Risk Management Limited

■ 4th Floor, 3 East Grinstead House  
Wood Street, East Grinstead  
West Sussex RH19 1UZ

■ 107 Leadenhall Street  
London  
EC3A 4AF

■ Tel: 020 7469 0200 Email: [info@cardinus.com](mailto:info@cardinus.com) Corporate website: [www.cardinus.com](http://www.cardinus.com)  
Healthy Working MOVE website: [www.ergonomics4kids.com](http://www.ergonomics4kids.com)

### Cardinus LLC

■ 325 E. Rolling Oaks Drive  
STE 250  
Thousand Oaks  
CA 91361



## Authors



### Jon Abbott

Jon has been involved in the ergonomics field for over 13 years. During this time Jon's primary focus has been concerned with the corporate workplace and how computer-based technology is affecting worker health and productivity.

Having worked and studied in the UK and US Jon has developed a number of solutions to help organisations comply with national regulations and reduce injuries in an effort to reduce insurance and administrative costs. These solutions are successfully used by many of the world's largest organisations, government departments and unions.

Jon has a passion for education and, through Cardinus, hosts forums and lectures on a wide range of subjects with a special emphasis on musculoskeletal and resilience issues. More recently, through his work with Cardinus, Jon has seen an increase in the number of young people who are entering the workplace with pre-existing ergonomics discomfort and injury. In an effort to address this Jon is a keen sponsor of initiatives that help to encourage positive postural behaviours amongst our youngsters.



### Matt Birtles

Matt has been practising ergonomics for 16 years, with the past 11 years at HSL. His work has spanned various sectors, such as the steel industry, fairground ride safety, food production, train cabin design, manufacturing, construction, ergonomics in health care and office ergonomics.

Matt has authored and delivers training for HSE and the general public on ergonomics. He was recently a member of the ART tool development team.

Matt has particular interest in the prevention of musculoskeletal injury and the design of fit for purpose ergonomic solutions to workplace problems.



### Lorna Taylor

Lorna Taylor BSc (Hons) Physiotherapy has more than 12 years' experience as a physiotherapist and is a member of the Chartered Society of Physiotherapy, specialising in paediatrics, occupational health and ergonomics.

She is a professional member of BackCare – the charity for healthier backs and has worked as a consultant with the Derby City Healthy Schools Team, developing and delivering a new health initiative Adolescent Back Pain Prevention Enhancement.

Known as a sincere active campaigner for improved staff working practices, Lorna has carried out research and has been invited to present the topic of back pain and ergonomics in schools at regional and national conferences. She has written articles for school and health magazines.

As a result of her experiences has created Jolly Back, a company dedicated to back care and ergonomics ideas and solutions for children and educational professionals.