To sit or not to sit – is that the question?

By Kieran Slevin, MFHT

Has humankind evolved to cope with the stresses and strains imposed by our current lifestyles or has evolution still got some way to go? We started in the annals of time as hunter gatherers spending our time committed to basic survival in the search for food or pursuing prey. Today the extent of our hunter gathering experience is limited in its simplest form to a digital device allowing us to order on line food deliveries. Realistically the human body is not designed to sit on our bottoms days after day from early morning through bedtime and worse still staring fixedly at television or computer screens or sitting in cars watching the kilometres pass by. Apart from the obvious physical manifestations, posture can also be impacted by one’s mental state. For example and especially pertinent in Ireland over the past seven years, financial
stresses caused by the property bubble, possible inability to change jobs, long commuting times to work and high child care costs are just a few of the contributory factors that would influence a person’s slumped posture and rounded shoulders.

A basic postural assessment by a practicing medical professional will note a marked increase in clients presenting with rounded shoulders and rotated wrists, thanks to the humble computer mouse ... increasingly becoming known as “mouse arm”! The proliferation of digital devices is also having a marked and profound impact on the younger generation; texting has helped this new generation to become impressively dextrous by typing with their thumbs. Should we be concerned and will we adapt our physiques to cope with a differentiated way of living in today’s digital age?

Almost two decades ago I was involved in a rear end collision road traffic accident. I was stationery in traffic, when I saw in my rear view mirror a car driving at speed, hitting me from behind and shunting me into the car in front and “totalling” my wife’s brand new car! The car was repaired in the space of two months, but four months on from the accident I was still suffering and even today I am still experiencing back pain issues due in part to the whiplash and soft tissue damage sustained in the crash. One of the medical professionals, treating me at the time, commented that “man was not designed optimally as there are a lot of pressures on the spinal column as it is constantly challenged to support the array of bones, muscles and organs residing in the thoracic and abdominal cavities”.

The research studies into back pain and back care are numerous, however in this article I want to highlight two studies in particular. The first published by the Back Care Charity for the Get Britain Standing movement and the second by the British Chiropractor Association. All of the other studies are of course very relevant, but in this article I will primarily reference these two studies as they also highlight the issues we are facing in today’s digital age; key extracts are also included below. In particular they highlight the challenges we face when sitting.
In previous centuries hard manual labour was the order of the day, but physical labour has evolved and is rapidly being superseded by office based work, or by automated / computerised processes. This evolution now means workers are spending more and more time desk bound!

Current studies are focusing on “why sitting is bad” and a recent article in the Back Care Charity magazine for the Get Britain Standing movement painted the following stark concerns

• Heart – prolonged sitting has been linked to high blood pressure and elevated cholesterol.

• Cancer – a 2014 study assessing 70,000 cancer cases among four million individuals revealed that for every two hours of sitting (above four hours) the risk of bowel, womb and lung cancer grow between 8 and 10 per cent.

• Obesity – after 90 minutes of sitting, your metabolism shuts down and the body’s cells become less responsive to insulin and muscles release lower levels of the enzyme which burn cholesterol (lipoprotein lipase).

• Diabetes – cells in idle muscles don’t respond as readily to insulin, so the pancreas produces more and more which can lead to other diseases.

• Muscle degeneration – when you stand, you use your abdominal muscles to keep you upright. However, excessive sitting leads to tight back muscles and soft abdominals which lead to bad posture which can exaggerate the spine’s natural arch.

• High blood pressure, back and neck pain, depression and even dementia have all been linked to physical inactivity and excessive sitting.

Concluding, that prolonged sitting can contribute to major health issues regardless of how physically active you are, the www.getbritainstanding.org movement’s focus is to reduce our sitting time – especially at work. Like five a day you should be sitting no more than 4 to 5 hours per day – sit stand desks will be the order of the day in the future! It is worth noting that
“throughout Scandinavia, more than 80% of office workers have sit-stand desks, in the UK it is less than one percent.”

The second study by the British Chiropractor Association (BCA) showed 50% of the UK population suffer from back pain mainly attributed to Posture & Pregnancy. The BCA research shows that bad posture was one of the biggest triggers for back pain in Europe; 67% in Germany, 63% in Italy and 52% in the UK. Similar studies in Europe and North America confirmed the UK statistics.

Back pain, apart from affecting one’s emotional and physical well-being, has a significant economic impact. The last comprehensive research study occurred in the UK in 1998. This study found the estimated direct health care costs due to back pain were £1.6 billion of which £565 million was non NHS. The cost of back pain due to lost production was substantially larger and was assessed at £9.1 billion. Today, it is estimated, the “hurt” to the UK economy is closer to £20 billion due to back pain!

So the above two studies found that

i. sitting for too long can contribute to major health issues

ii. bad posture is one of the major contributors to back pain

What, if anything, should we do to minimise or mitigate the impact of sitting? Practically speaking is it possible to realistically reduce the amount of time we sit and whether anything can be done to minimise the physical, mental and indeed financial strain associated with sitting. Unless there is a radical change in the way we approach desk based work ... you could argue the answer is no!

We should heed the warnings around sedentary sitting and ensure we have correct ergonomic desk set up, take regular breaks from sitting and pro-actively interrupt the need to be a slave to your desk. Apart from these active interventions we also need to address our posture and this
is something relatively easy to correct, but will require discipline, once we know what is correct seated posture.

Posture contributes greatly to an individual’s shape. Each organ has its natural position and place in the body that is to a large degree maintained by posture. Physiological and organ function depend greatly on a natural posture. The tension and efficiency of the diaphragms movement is a good indication of overall posture. While in a neutral position, the diaphragm is able to move optimally compressing the abdominal content during inspiration and recoiling during expiration. When the diaphragm is moving efficiently and the spine is neutral, the internal organs are in their optimal location allowing their proper functioning. When posture is out of balance it creates distortions of the spine, which can change the position of the internal organs, cramping the lungs, stomach and intestines, which can lead to shallow breathing, faulty digestion, poor elimination and constipation!

The second part of this article will be published in a subsequent publication and will focus on what bio mechanical posture devices should include to help correct posture. Until then remember there are constant forces at work on your spine, adopting poor posture and not adopting correct ergonomic seating set up will contribute to the pain you experience in your neck, shoulders and lower back.

To sit or not to sit – is that the question? Part II

Part I of this article discussed the challenges we face with our posture and the detrimental physical and mental effects it has on the body. This second part of the article will focus on the actual way we sit and the various devices available to help improve our posture

Before we get into the specifics, it is first necessary to understand the forces at play when we are sitting. These include:
• Down Force – the gravitational pull and the pressures exerted by the body’s own weight on the seat surface. 65% of a person’s body weight is supported by 8% of the seat area under the Ischia i.e. your bottom bones. The remaining 35% is borne by footrests (18%), armrests (12%) and backrest 5% at a 105 degree seat back angle.

• Compression – the degree of “give” offered by the seat surface – this is dependent on the actual surface material of the chair and the degree of padding built into the seat. Different surfaces will cause the body to react in different ways.

• Passive Resistance – is the degree of friction created by the surface material of the seat against the type of clothing worn by the individual.

• Active Resistance – any resistance applied to prevent or restrict the body moving forward on the seat.

Most research into the area of sitting is focused on identifying the optimum sitting angles and the impact of the pressures exerted against the contact surfaces. Gravitational pull rotates the pelvis, which results in the person sliding forward (slouching) in the seat.

So what is correct posture and how should we sit correctly? The human body has evolved in the most efficient way to be able to achieve certain tasks and purposes. So when our body is properly aligned we can say this is the natural or neutral position where the body’s bones, muscles and joints are working with the least amount of effort. This is equally true when we are in active or passive poses. So if the body is working when it is not properly aligned it can result in pain which could lead to an injury. Accordingly the spine is in its most neutral position when a person is standing normally. In this instance, by neutral, I mean the pressures or load on the spine are not impacted for example by the person leaning forward, reclining or stooping to pick something up.

Although there is not total agreement amongst the various medical studies, the ideal standing postural position shows an imaginary line drawn through the centre of the ear and runs down
through the central points at the proximal and also distal points of the femur and ultimately through the mid-point of the distal aspect of the fibula.

However compared to the actual averages of the measured human alignment, the imaginary line bisects the distal part of the foot and this results in anterior head translation and anterior pelvic translation (Ref: Journal of Manipulative and Physiological Therapeutics – Sitting Biomechanics Part I Harrison et al).

Despite the lack of aligned consensus on standing posture, seated posture is more straightforward, as the imaginary line would still be drawn from the centre of the ear through the mid-point of the proximal aspect of the femur. Thus any product that purports to help seated posture will need to include design features that will satisfy a multitude of differing criteria including,

- Needing to solve a real issue and balance the amazingly complex networks of muscles, bones, joints and nerves. The 206 skeletal bones hold us up, joints are linked to these bones, muscles are used to move the bones around approximately 230 moveable and semi moveable joints and the nerves facilitate control of the whole interaction. So the key to ensuring a correct posture is to ensure there is correct joint alignment. However muscle activity, balance and nerves also play an important role
- Educating correct Posture. Good posture allows the optimum distribution of force through the body so the musculoskeletal system can function properly and protect against injury and deterioration. If the spine is not held straight, the internal organs are crowded into less space, which can reduce their effectiveness e.g. patients with kyphosis leads to reduced lung capacity. Sitting in a bad position at your office computer, could result in stress headaches, tensed shoulders and lower back pain
- Not necessarily redesigning chairs (although there are several new seat / chair designs on the market) nor providing a cure for back ache. Biomechanical devices will however provide an instructional aide to educate and train correct seating
- Designed from a material that is light weight, easily portable and above all can be cleaned at high temperatures. If made from silicone, it can be washed at temperatures up to 300 degrees centigrade without compromising the integrity of the product.

- Comfort: any product should be comfortable to use; especially if in mat format, the mat should be comfortable to sit on and incorporate appropriate grooves / channels to facilitate free air flow and create as much space as possible between the mat surface and the seated subject.

So what types of devices currently exist and are offered for postural correction / enhancements. The following are just a sample of some of the devices available:

- The smarter posture company developed a seat mat to help achieve a near perfect seated postural profile. Specifically the mat addresses two fundamental issues – i.e. how to prevent slouching and how to teach / instruct correct seated posture? This mat does what it actually says – the persons own body weight is used to hold the person in place, through the use of ergonomically designed angled papillae emanating in concentric rows from a defined focus area, and thereby prevents slouching. The second and probably most important element is the aptly described spine riser – this forces the body to move the spinal column into its typically natural “S” shaped curve. An added benefit is the impact on the abdominal muscles. The user’s core muscles are engaged as the user is forced to sit in an upright position.

- Posture Now offers a strap that attaches from one arm (attached to the biceps), runs behind the back and attaches to the other arm. This device effectively locks the shoulders in place by restricting the forward movement of the upper arms.

- Freedman have totally redesigned the traditional chair, by designing the chair such that there are individual seat pads, that create an inbuilt instability, of just a few degrees of movement, which allows the trunk of the sitter to gently ‘wobble’ and ‘flex’, thereby aiding the circulation of blood and the healthy function of the whole of the body.
So whatever device you decide to use, remember a key reason for needing to use it, is simply down to the fact that we have neither evolved nor adapted our postural lifestyles to cope with the stresses and strains imposed by our current lifestyles!

About the Author

On the subject of “Back Pain and Posture”, Kieran is a relatively new comer to the FHT having spent 24 years travelling and working internationally within finance, across 6 countries and three continents. His “interest” in back pain was sparked after finding that a consistent contributor to his own back pain was the poor posture he adopted while a slave to his desk and computer.

He embarked on his research journey back in 2011, reading reams of research papers and texts into back pain and associated ailments. He noted that all of the research work tended to focus on the medical and physical causes of back pain and seeking to get to the root cause of that pain. Additionally any of the biomechanical devices brought to the market were developed to force fit the body to adopt a certain posture, poise or to aim to alleviate stresses on certain contact points on the seating or lying surfaces.

To help with his research, he completed an ITEC diploma in Anatomy & Physiology and Massage in 2013. This diploma provided the theoretical anatomical overview of the body structures – bones, muscles and joints whilst the massage helped him witness first-hand the typical back and neck complaints afflicting his clients. He also trained in Advanced Deep Tissue, Myofascial Release, Manual Lymphatic Drainage, Hot & Cold Stone and Temple Style Hawaiian Lomi lomi techniques. Understanding this range of different techniques, is helping further his research into back pain and associated neck and shoulder pain attributable to posture.

Based on the research data he invented, designed and developed a seating mat, which he is currently bringing to market, that would address two fundamental issues with sitting i). bad posture and ii). incorrect spine alignment. His goal was not necessarily to provide a cure for back pain but
rather to help avoid back pain attributable to poor posture. Approximately 50% of the entire population are, or will be afflicted with back pain at some stage during their life and poor posture is identified as one of the key contributors.

The mat has three components

i. Papillae or teeth like angled structures that grip a person to the mat and prevent them from slouching in their chair, irrespective of the type of clothing they are wearing. There were a lot of light hearted moments when different people tried to slouch but were thwarted by the papillae.

ii. The second element is a spine riser which forces the spine into its natural shape, by creating a 95 degree hip knee angle. The spine has the least amount of forces at play when a person is standing upright.

iii. The third element is a strip along the riser, the purpose of which is to create auto neural messaging for the muscles when the person is using the mat

This is the start of his journey into finding solutions to back pain attributable to poor posture, but is certainly a very exciting journey and the feedback received from initial pioneer users of the mat is a resounding confirmation that the mat does work.

Here is a link to the smarter posture mat website and instruction video for using the mat. Please do feel free to “like” the mat on his Facebook page.

**Web Site:** www.smarterposture.com

**Facebook Page:** www.facebook.com/SmarterPosture

**Instruction Video:** http://youtu.be/cyDjScS5BkY
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