STAND UP FOR GOOD HEALTH

How to Minimize the Risks of Sitting in the Workplace

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INTRODUCTION

Many patients come to our office with complaints that can be traced back to the significant amount of time they spend sitting doing deskwork. To prevent this, I have instructed patients and corporations on correct ergonomics in the work environment. This is to tailor your workstation to your specific needs, to lower the risk of injury from cumulative trauma. This is still an important approach but only within the context of overall workplace wellness. In other words it is less important **how well you sit** than **how long you sit! You must move!**

SEVEN CHARACTERISTICS DIFFERENTIATE THE LIVING FROM THE NON- LIVING

1. Breathing 2. Metabolizing 3. Growing 4. Reproducing 5. Excreting 6. Responding to Stimuli 7. Movement 8. Organized Structure 9. Cell Differentiation 10. Digestion

Source - funtrivia.com/newflash/trivia.cfm?qid=240042

Chiropractic adjustments improve joint function enabling people to move better, which is a fundamental ingredient to life and full health. The life sustaining benefits of movement are so critical that I remind my patient's that chiropractic care doesn't heal them but instead removes the barriers to the body healing itself through motion.

Experts have advised us for years that there is a baseline level of physical activity needed daily for fitness. Today's recommendations are for 20 minutes of activity a day or a total of 150 minutes / week. The purpose of this baseline activity dosage is to provide us with benefits to our overall health such that we lower our risk to diseases from heart disease to cancer. What is not as well understood is how critical your level of activity is for the remainder of the day. In fact, research confirms the risks of a lifestyle of inactivity cannot be mitigated by a daily dose of exercise.

EXPERTS SAY... PEOPLE NEED

OF PHYSICAL ACTIVITY

Common sense would suggest that it is not a surprise that brief periods of exercise won't protect you from the risks of being sedentary the rest of the day, just like when you exercise it doesn't remove the risk to your health from smoking, consuming excess alcohol or eating trans-fats.

For this reason, **sitting needs to be considered as an independent risk factor to your health.** It is a risk that is dose dependent. In other words it matters how long you sit at a time, how many days of the week and cumulatively how long you sit over the years.

The first step is to find ways to limit the total time you sit. Follow this by strategies to break up this total time into as little prolonged sitting as possible. Then consider the mechanics of how you are sitting and incorporate specific exercise recommendations to counter the imbalances that occur to the soft tissues with sitting.

SITTING ADVICE

1. Sit if you must **otherwise do not sit!**
2. If that is not possible **limit sitting time**
3. **Move often**
4. Exercise will counter the negative effects of prolonged sitting **but not negate them**

CONSEQUENCES OF PROLONGED SITTING

To be inactive is to be sedentary from the latin word “sedre” to sit and involves low levels of energy expenditure. The unit of measurement for energy expenditure is the MET (metabolic equivalent of task). The following lists the MET of different activities.

0.9 MET SLEEPING
1.0-3.0 MET LIGHT ACTIVITIES STANDING
3.0 - 6.0 MET WALKING, HIKING ETC
>6.0 MET VIGOROUS WORK OR EXERCISE ACTIVITY

Changing from sitting to standing raises the MET and positively changes metabolism, which in turn lowers the risk of metabolic disease (diabetes, Cardiovascular)

The consequences of too much sitting or sedentary behavior can be divided into three categories

1 MUSCULOSKELETAL

- Back/Neck pain
- Headaches
- Carpal tunnel
- Upper crossed syndrome
- Lower crossed syndrome

2 METABOLIC

- Obesity
- Type 2 Diabetes
- Cancer

3 PERFORMANCE LIMITATION

- Fatigue
- Loss of concentration
- You are more creative when you move

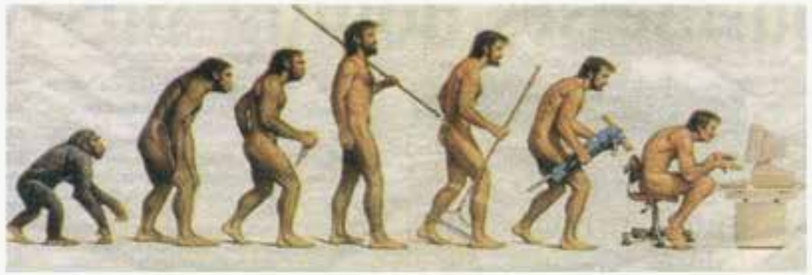
UPPER CROSSED SYNDROME

POSTURAL CHANGES

- Forward head shift with rounding of the upper back
- Increased neck curve (cervical lordosis) or sometimes a straightening of the neck
- Shoulders elevate and round forward

MUSCLE & MOVEMENT CHANGES

- Shortening and tightening of the upper back muscles at the base of the skull (trapezius, levator scapula and suboccipital) and also muscles of the chest (pectoralis major and minor).
- Weakness of the deep cervical flexors in the front of the neck is paired with weakness of the mid back (rhomboid, middle and lower trapezius)
- This pattern of imbalance creates joint dysfunction, in the neck, upper back and C5 segment, cervicothoracic joint, glenohumeral joint (shoulder)



Somewhere, something went horribly wrong

LOWER CROSSED SYNDROME

POSTURAL CHANGES

- Forward tipping of the pelvis which increases low back curve (lordosis).
- External rotation of the leg
- Knee hyperextension

MUSCLE & MOVEMENT CHANGES

- Shortening and tightening of the extensor muscles in the low thoracic spine (erector spinae) and the flexors of the hip (iliopsoas and rectus femoris).
- Weakness of the deep abdominal muscles in the front is paired with buttock weakness (gluteus maximus and medius).
- This pattern of imbalance creates joint dysfunction, particularly in the lower back at the L4-L5 and L5-S1 segments, SI joint, and hip joint.[1]

TRY TO AVOID SITTING IN THESE POSITIONS

RESEARCH

Studies find that it's not just physical activity that can affect your risk of death, it's how much time you spend sitting. The impact of sitting is even worse when combined with a lack of physical activity. Women and men who sat more and were less physically active were **94%** and **48%** more likely to die compared with those who sat the least and were the most physically active.

1 The obesity epidemic is attributed in part to reduced physical activity. Evidence supports that reducing time spent sitting, regardless of activity, may improve the metabolic consequences of obesity. Analyses were conducted in a large prospective study of US adults, enrolled by the American Cancer Society to examine leisure time spent sitting and physical activity in relation to mortality. Time spent sitting and physical activity were queried by questionnaire on 53,440 men and 69,776 women who were disease free at enrollment. The authors identified 11,307 deaths in men and 7,923 deaths in women during the 14-year follow-up (1993- 2006). **After adjustment for smoking, body mass index, and other factors, time spent sitting (≥6 vs. <3 hours/day) was associated with mortality in both women and men.**

> “Women and men who sat more and were less physically active were 94% and 48% more likely to die compared with those who sat the least and were the most physically active”

The relative risk for women with > six hours/day sitting was 40% greater risk to die than women sitting less than three hours/day. For men the risk was 20% greater mortality for sitting more than six hours/ day compared to those sitting less than three hours/ day. Lead researcher Alpa Patel said there could be several factors to explain the correlation. **"Prolonged time spent sitting, independent of physical activity, has been shown to have important metabolic consequences, and may influence things like triglycerides, high density lipoprotein, cholesterol, fasting plasma glucose, resting blood pressure, and leptin, which are biomarkers of obesity and cardiovascular and other chronic diseases,"** he said in a release Associations were strongest for cardiovascular disease mortality. The time spent sitting was independently associated with total mortality, regardless of physical activity level. Public health messages should include both being physically active and reducing time spent sitting.[2]

2 This research has been done by Australian researchers and published online in the March 26 issue of the Journal Archives of Internal Medicine. Researchers were already of the opinion that sitting for a long time can damage health. Now researchers have worked on the independent relationship of total sitting time with all-cause mortality. It has been found that on average 90% of adults spend their leisure time sitting down whereas World Health Organization (WHO) has recommended that 150 minutes of at least moderate-intensity of physical activity must be done each week. Researchers worked on 222,497 individuals, who were 45 years of age and older. **They found that more than 11 hours of total daily sitting is very much linked to mortality and the mortality risks are 15% higher in people who have total daily sitting between 8-11 hours as compared to those people who sit fewer than 4 hours daily.** “The evidence on the detrimental health effects of prolonged sitting has been building over the last few years,” said study author Hidde van der Ploeg, a senior research fellow at the University of Sydney.

> “It has been found that on average 90% of adults spend their leisure time sitting down whereas World Health Organization (WHO) has recommended that 150 minutes of at least moderate-intensity of physical activity must be done each week.”

“The study stands out because of its large number of participants and the fact that it was one of the first that was able to look at total sitting time. Most of the evidence to date had been on the health risks of prolonged television viewing. **“Yes, you have to work, but when you go home it’s so important you don’t go back to sitting in front of the computer or television,”** Dr. Suzanne Steinbaum, director of Women and Heart Disease at Lenox Hill Hospital in New York City and a spokesperson for the American Heart Association said. **“After the 8-hour mark, the risks go up exponentially. It’s really about what you’re doing in your leisure time and making the decision to move”.**[3]

3 In the May issue of journal Medicine and Science in Sports and Exercise, researchers found a greater risk of mortality linked with higher amounts of time spent sitting in more than 17 000 Canadian men and women. **The link held after taking into account physical activity levels outside of work, body mass index, age, sex, smoking and drinking alcohol.** "I don't think it's a very rosy future," said the study's lead author, Claude Bouchard, a retired professor from Quebec City who is now executive director at the Pennington Biomedical Research Center in Baton Rouge, La. "If we combine that [time spent sitting at work] with the growing prevalence of obesity, it's going to mean that just about every developed society is going to be faced with a health care cost bill that has the potential to bankrupt the finances of all of these developed countries. "*In the study, the researchers concluded the results support public health calls to limit sedentary time.* ***"The findings of the study also support that physicians should counsel patients to not only increase their level of physical activity and maintain a normal body weight but to reduce the amount of time they spend being sedentary in general and sitting in particular”.*** Participants who were classified as active (getting at least 30 minutes of moderate-intensity physical activity such as brisk walking five days a week) had a lower overall risk of mortality over the 12 years of follow up, the team found. Only five per cent of Canadian adults compensate for the time they sit at work through exercise. Even among this group, the risk of premature death escalated depending on the amount of sedentary time in their day. The mortality risk was 1.54 times higher among those who spent almost all of the day sitting compared with those who spent almost no time sitting, the researchers found. During the 12 years of follow-up, 1 832 deaths were recorded, including 759 from cardiovascular disease, 547 from cancer and 526 from other causes.The link between time spent sitting and higher risk of mortality applied only in the case of the cardiovascular deaths and deaths overall but not those from cancer.

Laboratory studies suggest that time spent sitting is associated with major disturbances sitting effects how the body metabolizes fuels such as glucose and lipids, Bouchard noted. Taking breaks from sitting helps to normalize this physiology, he added.

4 While laying flat on your back the intra-discal pressure is 24 PSI while standing intradiscal pressure is 100 PSI. Sitting upright with a normal lumbar lordosis (lower back curve) maintains the intra-discal pressure at 100 PSI while shifting forward into a flexed or slouched posture will result in increased measurements of 190 PSI.[4]

ERGONOMICS

Ergonomics is the study of relationships between the worker and the work environment. The most basic principle is to tailor the working environment to meet the needs of the individual worker. Make the work environment fit the individual and not the individual fit the environment.

When making an ergonomic assessment look at the entire system: This includes

1. The physical environment Eg. Temperature, lighting, noise, equipment, and furniture
2. Work organization and tasks
3. Psychosocial environment Eg. Job demands, interpersonal relations, and labor relations

ERGONOMICS
Derived from the Greek language "Ergo"- meaning work "Nomis"- meaning natural law of.

Ergonomic principles have been drawn from information provided by a number of scientific approaches:

A) Anthropometrics: Anthropometry involves the measurement of a population's body dimensions and based upon the information **it can be** determined which dimensions are necessary to accommodate a given proportion of **the population**. Typically when designing chairs and furniture attempts are made to meet the requirements of the middle 90 percent of all workers.

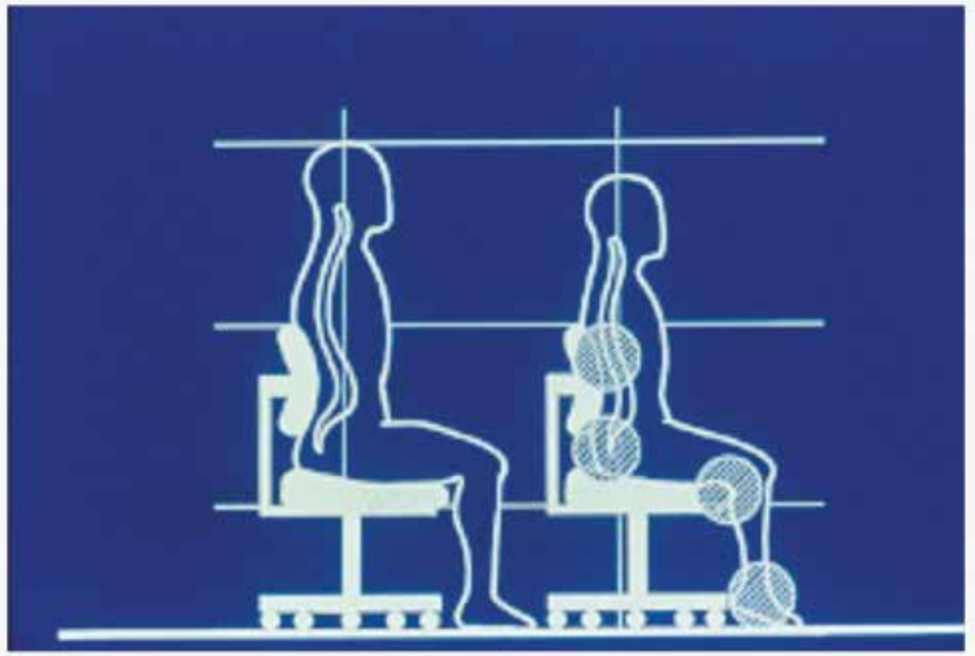
B) Biomechanics: This involves the application of engineering principles to **calculated forces** on human subjects to determine the stress on muscles, tendons, **and joints**. When looking at work station set up you want these basic principles to be considered for the worker:

i. Use large muscles for holding things fixed in position.
ii. Use small muscles for manipulative and repetitive tasks.
iii. Muscles are strongest at their mid-point of contraction.
iv. Keep joints in neutral positions.

C) Physiology: This would provide information about the visual system response to visual tasks and lighting, the ears response to noise, the body to heat and the hormonal nervous system response to stress. Another important physiological factor is understanding fatigue, how it is minimized and the risk it creates.

D) Psychology: This considers the comfort and individual preferences. Discomfort and irritation are very subjective but psychological distress will exacerbate and complicate other problems.

E) Common sense: This would cover issues such as safety Eg. A chair should not tip easily and there should not be sharp edges or pinch points.



BIOMECHANICAL PRINCIPLES

There is an optimum position for your body, the trunk and limbs to minimize stress and maximize comfort. Understanding this will help you look at ways to approximate the ideal position at your work station.

When applying these principles, pretend it is you first day at work and carefully review your workstation and your tasks for where your body is positioned. You should strive to maintain a neutral and symmetrical position of the body or body part alignment.

1 Head and Neck

- Maintain a neutral and symmetrical position of the body or body part alignment.
- The optimum position for the head and neck is 0 to 15 degrees forward and 0 to 10 degrees backwards.
- 0 degrees of head rotation is optimal while greater than 20 degrees is very stressful.
- 0 degrees of lateral flexion (ears toward the shoulder) is optimal, while anything over 5 degrees is very stressful.

2 **Shoulder Position:** The shoulder, elbow, and wrist are all joints that work together to position your hands for work. Your shoulder positions the whole arm and controls the majority of the large movements or placements of the hands. Always try to keep your shoulders by your side:

A) Flexion: Movement out to the front. Avoid shoulder reaching. Take your chair out of the rear tilt position during hand tasks and move your chair close keeping elbows at the side.

B) Abduction: Moving your arms away from your side.
The optimal position is between 0 to 10 degrees.

3 **Elbow Position:** The elbow contributes to two basic motions.

A) Flexion and extension: This is the up and down motion. The optimum position to work in is mid range at about 70 to 90 degrees.

B) Pronation (palm down or supination (palm up) - the optimum position for the elbow is neutral with the thumb pointed up. The most fatiguing position is with the palm up.

4 **Wrist position**
The wrist allows up and down and circular motions for specific placement of the hand.

A) **Flexion:** Placing your hands out in front of you thumbs together and palms down and bending towards the floor. The optimum position is 0 degrees but anything over 15 degrees is very stressful to the forearm.

B) **Extension:** the palms again are down but the hand is lifted upwards. Optimum position is again 0 degrees. The shape of the wrist bones limits extension more than flexion.

C) **Adduction:** This is holding palms up and moving towards your body. Optimum is 0 degrees and anything over 10 degrees is stressful

D) **Abduction:** Again the palms are up but this time you bend the wrist away from your body towards the thumb. Optimum again is 0 degrees but because of the shape of the wrist bones anything greater than 5 degrees is a stressful position

CONSIDERATIONS IN PURCHASE OF A CHAIR

THE BIOMECHANICAL DIFFERENCE OF SITTING FROM A STANDING POSTURE

- The pelvis, hips, and thighs bear the weight of the upper body so there is greater supporting surface when sitting.
  With unsupported sitting:
- Abdominal muscles relax when sitting
- The spinal muscles fatigue
- The spine forms a ‘C’ contour (kyphosis)
- The lumbar lordosis is reduced an average of 38 degrees from standing to a sitting posture. 28 degrees of this change came from pelvic rotation (the pelvis rotates back) and 20 degrees of this change came from the lumbar spine becoming more rounded or kyphotic.
- With flexion of the spine the outer covering (annulus) of the intervertebral disc is compressed at the front and stretched the back. The soft inner material (nucleus pulposis) of the disc is displaced backwards. Therefore, this pressure is greatest in the lower spine when flexed forward over work and least when sitting in a relaxed position.

PROPER SITTING FOR COMPUTER WORK

- When sitting aim for the area between the back of the chair and the seat pan. Slide back on seat pan and utilize the back support.
- This tilts the pelvis forward helping to maintain the lumbar curve as well as places the low back against support. The lumbar support rotates the pelvis forward. This helps to maintain the curve as well as takes some weight off of the low back. Both muscle activity and disc pressure decrease when the back is supported. The adjustability required to support the lumbar curve from the fifth through the 95 percentile, of the general population would be about six inches.

PROPER SITTING FOR TASK FOCUSED WORK

- Sliding forward and dropping our thighs to arch our back. Open the trunk hip angle to 130 degrees
- Another way to tilt the pelvis forward and open the hips to maintain lumbar lordosis is to wedge the back of the seat up 30 degrees.
- Lean forward and carry some of our body weight down into our feet and on our arms.

EXERCISE

1 **Micro Breaks**
A moment to a minute in length. It is a quick break where you shift your sitting position or change the focus of your eyes. Remember the shape of the lens of the eye is under muscular control and not changing focus will fatigue these muscles.

2 **Mini Breaks**
A couple of minutes during the natural breaks that occur as we change tasks. We can stretch back against our chair, do some deep breathing or isometric muscle contractions or stand and stretch for a minute. If we are using a work station which transitions to standing we can shift to working in a standing posture for some tasks.

3 **Macro Breaks**
Longer breaks in the schedule such as coffee time. This is an ideal time to get up and walk around, go outside or close your office door to get on the floor and stretch or complete a progressive relaxation session.

4 **Lunch Breaks**
This is a time to do your more vigorous activity outdoors or at a convenient exercise facility. With some creative thinking the necessary lunch meetings and social obligations at work can be replaced or incorporated into these sessions.

CONSIDERATIONS IN PURCHASE OF A CHAIR

1. **Fabric Upholstery**
Prevents sliding forward on the seat pan

2. **Cushioning**
If you can depress the cushion, with your hand, more than one inch, it is too soft to give proper support.

3. **Adjustability**
A back adjustment allowing for at least 6” of up and down excursion from the bottom of the seat back to seat pan

4. **Back Support**
This should be adjustable to support the forward contour of the low back, so that the weight of the upper body is supported

5. **Seat Pan Tilt**
Should be able to tilt 15 degrees forward from the horizontal for tasks that require concentration in bent forward position. Also, 5 degrees tilt back from the horizontal allows one to sit upright and take advantage of the back support when sitting at a computer.

6. **Back Extension**
Allows one to stretch backwards on a micro stretch break

7. **Wide, Five Pronged Base**
Chairs with five castors are more stable and safer than those with four castors

8. **Castors**
Allows one to roll toward a work area, preventing overreaching, when you need to retrieve something

9. **Armrests**
Adjustable in height to support the arms

PREVENTION! IDEAS TO MINIMIZE THE TIME YOU SIT EACH DAY

There are two properties of tissues in our body that we want to be aware of, first is elasticity which is the ability of your tissue to return to its original length, and the second is plasticity which is the putty like characteristic of the soft tissue that molds it into the shape which you hold it. Being active and moving regularly will help you maximize your tissue elasticity and minimize the plasticity.

Get up from your chair. An immediate bonus: Double your MET rate. Just moving to standing without any additional activity burns about 2 calories per minute, compared with 1 calorie for sitting and doing nothing.

Set a timer or a post it reminder. Remind yourself to stretch or step away from your desk for one or two minutes each 20 - 30 minutes. Fill your water bottle or walk around the perimeter of the office.

Minimize e-mail and instant messages. Instead of e-mailing, walk to a co-worker's desk to discuss a project face to face. Or ask co-workers to join you for a walking meeting.

Change your work environment. There are many good options for creating a flexible work station. Check out these stand up desk options.

Exercise in place. Use your cubicle wall for simple stretches, leg lifts and other movements.

Stand up when you answer the phone. It's good if you're able to pace while handling phone calls. A headset, especially the wireless kind, will make it easier to do so.

Find excuses to walk. Keep snacks and coffee out of your work cubicle so you have to walk to get them. Stock only a few office supplies in your work area. At home, get rid of the remote controls.

"Active" TV watching. Stand while watching your favorite shows. Household chores such as ironing, cooking, washing dishes or polishing your shoes can be done while watching. Certainly stretching, riding the exercise bike or walking on the treadmill can also be done while you are watching television.

Standing Chair Examples - ergotron.com/StandingDesk/tabid/803/language/en-US/Default.aspx

TREATMENT

Prevention is obviously the most important first approach. Employ the ergonomic and exercise suggestions consistently. Another important component of prevention is to be assessed for postural imbalances and muscle weakness that predisposes you to injury and pain. Awareness of how your body is being impacted by your sitting posture gives you an opportunity to implement change. **Sit by sit, improve a little at a time.**
If you are unfortunate and experience injury and pain the best approach would include the following;

- History
- Postural examination
- Assessment of movement patterns
- Assessment of joint movement
- Assessment for muscle imbalance
- Review of the workstation checklist

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