



2727 Camino del Rio South, Ste. 1, San Diego, CA 92108 619-294-9863

General Ergonomic Solutions

ERGOhealthy assists employers and people in evaluating workplace safety and risk exposures. Assessments and related services may not reveal every hazard and/or exposure.

***Note:** The information contained in this report and contained in the materials provided are for educational purposes only. It may not reflect the opinion of your health care provider. For personal health care advice, consult a qualified health care professional. Treatment should always be carried out under the care of a trained health care provider.*

Contents

General Ergonomics Solutions

1. Sedentary lifestyle
2. Stretching and exercise
3. Opportunities to improve posture
4. Opportunities to improve "rotation"
5. Opportunities to improve workstation
6. Opportunities to improve general fitness
7. Possible benefits of vitamin B-6
8. Ongoing research
9. Wrist splints
10. Conclusion

GENERAL ERGONOMIC SOLUTIONS

1. Sedentary lifestyle.

Incorporate a rest period of at least four 5-minute breaks (spaced throughout the day) in addition to two 15-minute rest breaks. The past 50 years have brought technology, desk jobs, and sedentary lifestyles – resulting in more people remaining in static, seated positions for prolonged periods of time. Low back, neck, shoulder, elbow, and wrist complaints are frequently reported among sedentary people.

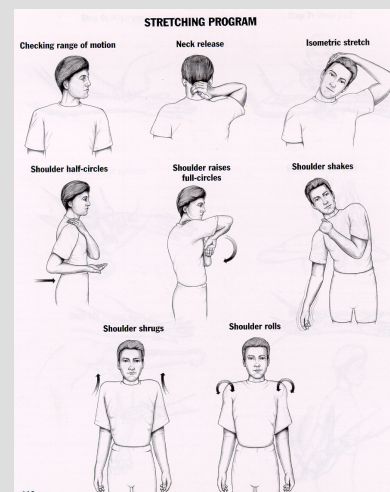
A recent National Institute for Occupational Safety and Health (NIOSH) study found that workers that added four 5-minute rest breaks (spaced throughout the day) to their two 15-minute rest breaks, consistently reported less eye soreness, visual blurring, and upper-body discomfort. Quantity and quality (numbers of keystrokes and accuracy) of work were not impaired by the additional breaks. The study found that short, strategically spaced rest breaks for sedentary people can reduce eyestrain and musculoskeletal discomforts without decreasing productivity. In summary, this means taking a break at least every hour. These 5-minute “breaks” are opportunities to not do keyboard/mouse work – not official work breaks. Incorporate the same breaks at home.

2. Stretching and exercise.

Before beginning work, and throughout the day (whether at home or on-the-job), it may be beneficial to incorporate some warm-up/stretching/exercise routines. According to Kate Montgomery, author and ergonomics specialist, breathing correctly can increase lung volume, and help get more oxygen to muscles and other body tissues. She recommends learning to “breathe from the diaphragm” (versus the chest).

And according to Clement Martin, MD, he states: “When you sit down you should first inhale and then exhale as you begin to lower yourself toward the chair/seat. While standing, take a good full breath. (This also causes someone to stand more erect.) Again, then as you seat yourself, begin to exhale.”

Importance of exercising and stretching... perhaps 3-10 minutes each hour at the job, and each waking hour at home, etc. Feel free to discuss this information with your health care provider (or other fitness professional) as to the best approach of incorporating regular exercise and stretching every day. Also whether traveling, at home, or in the office, it's critical to regularly incorporate some form of stretching and exercise.



3. Opportunities to improve posture.

Utilize a headset, speakerphone, or correct use of handset. Many everyday habits or activities can contribute to neck and upper extremity pain. Sitting in an awkward position, sitting with shoulders forward, neck bent forward or back, slumping over a desk, squeezing a telephone between the ear and shoulder, or straining to see over a steering wheel all may cause muscle fatigue or strains. Neck pain and poor posture can also cause a reduction in the normal range of motion in the neck, as well as pain in the face, shoulder, arm, wrist, hand and fingers. If a headset is used, consider rotating the speaker between the left and right ear every 30 days.

Sit comfortably and incorporate effective postures. According to Deborah Quilter, author and fitness professional, proper posture is crucial to preventing a myriad of ailments, including neck, back, shoulder, elbow, and wrist injury. NIOSH also states that postural factors may be associated to upper extremity disorders. We encourage people to participate in the exercises provided (or those recommended by their health care practitioner), and follow the guidelines provided to help improve seated postures. Most sedentary workers have adapted to years of seated work (beginning in childhood). This, and in addition to a sedentary lifestyle can lead to weak abdominal muscles, rounded shoulders, and drooping heads - resulting in the potential for musculoskeletal injury and illness.

To obtain an ideal posture (whether at home or on-the-job) while doing seated work (writing, 10-key, keyboard, mouse):

- Continue to make seat adjustments (height, backrest, angles, etc.) in accordance with ergonomic guidelines and in-line with current ergonomic literature. While in a seated position, make every effort to place feet flat on the floor. Perhaps take the perspective that the feet and legs set the “tone” for all other postures related to seated work.
- Position elbows comfortably beside the body, forearms approximately parallel to the floor (elbows are at about 90 degrees), with wrists in a neutral position.
- Head should be at a neutral position (chin tucked in so that the ear is in line with the shoulder).
- Getting up and moving around is better on the body than sitting in the same position for long periods of time – it’s probably healthier on the body if you re-position yourself, “fidget,” and stand periodically throughout the day.
- It’s also important to **“hang the arms”** down at your side (natural position of function) when not using them (try this for 60 seconds every hour or so).

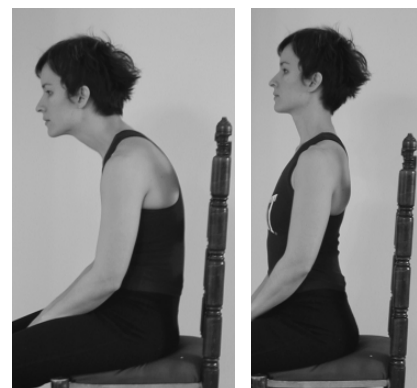
Check your posture while seated in a car (or while watching television, reading a book, texting or using a smart phone, during air travel, etc.) by checking your head placement. According to Joanne Griffin, senior physical therapist, keeping your head in an awkward position (such as pushed forward with your ears in front of your shoulders – for a long time) can make your neck hurt.

Keep your chin in alignment. Griffin recommends keeping your head level but pulling your chin in as if you were making a double chin. Also avoid having your head lowered all the time when working at a desk or reading – this will prevent stressing the muscles in the back of the neck.

For maximum improvement for posture in neck and back.

Implement the exercises found in *Treat Your Own Neck and Treat Your Own Back* (Optp) by Robin McKenzie. These books are readily available through Amazon.com, other online stores and major bookstores. They are by far the best written books on the subject of improving posture, healing injuries, and eliminating problems because bad posture. Feel free to discuss with your physician, physical therapist, and others. Books include a step-by-step system of education, exercise, and prevention. At right are photos showing

incorrect (Example 1) and correct posture (Example 2). Example 2 is the eventual posture to obtain while working in a seated position (with or without back support).



Example 1

Example 2

Demonstration photos of Krista Scott-Dixon

Incorporate function fitness exercises to help maintain good posture: Consider incorporating exercises from Anthony Carey's book, *Pain Free Program* (Wiley) or similar exercises to help maintain good posture, including the strengthening of your back, shoulders, and neck.

Incorporate specific exercises to help prevent wrist and upper extremity problems. Incorporate exercises from such programs as Kate Montgomery's *End Your Carpal Tunnel Pain Without Surgery* (Sports Touch Publishing) to help prevent wrist and upper extremity problems.

Before driving, adjust the mirror to a position conducive to healthy posture. Adjust your car's mirror when you are sitting up tall and straight (Photos A & B below). Do this so that you'll be able to "check your posture" each time you drive. (Make every effort to not re-adjust the mirror to adapt to poor posture - like at the end of the day, or after a long weekend). And check to see that you are "centered" in the car seat by checking the position of your head (Photo B).

Many modern vehicles have contoured driver and passenger seats. This can present to the driver a "crunched" (pushes the shoulders forward) feeling. To minimize the potential problems associated with sedentary tasks - like driving and contoured seats (found in automobiles) incorporate frequent stops, breaks, and periodic stretching.

Photo A



Photo B



4. Opportunities to improve "rotation."

Alternate tasks between the right and left hands. We use our upper extremities in all aspects of life: eating, combing hair, shaving, brushing teeth, driving, sports, doing dishes, talking on the phone, working on cars, doing laundry, computer data entry, getting the mail, writing, etc. Tony Andre, Ph.D. suggests that "ergonomic injury" is not caused by any one event – that it takes years of accumulated activity [or inactivity] to bring on symptoms. Maintaining a proper balance of nutrition and physical & mental fitness is crucial to minimizing the potential for musculoskeletal injury.

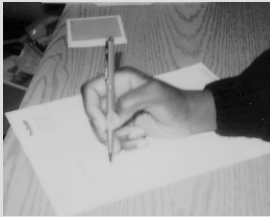
Alternate phone location between right and left side of desk. If you spend time on the phone at work, rather than always relying on one hand/arm/shoulder to utilize the phone, switch the phone location to the opposite side (perhaps each month). Make the same adjustments at home. (Also see Headset information)

When using a computer mouse, alternate mouse use between right and left hands (at home and at work). People will get accustomed rotating their mouse fairly quickly -- usually within 3 days. All computers and laptops allow you to change the mouse settings. And as it relates to mouse use, set the mouse speed (slower or faster) to suit your needs. A simple oval 2-button scroll mouse works best for mouse rotation.

Use job-station props (copy stand/document holder, adjustable chair, etc.) effectively. If people find themselves working from multiple documents, books, and materials, (while doing computer work), regularly incorporate the use of a document holder / stand / inline document holder to minimize neck strain. The document holder should be placed; if possible, at about the same height as the computer monitor, and in a place that prevents the head from leaning too far forward. The document holder can be alternated periodically (placed to the right or left of the monitor).

A combination - pencil/pen grip techniques can be incorporated when writing (to minimize fatigue). Using felt tip or liquid gel pens also minimizes pinch grip fatigue. For those people that write extensively, it may be advantageous to alternate (perhaps every hour) between grips A and B.

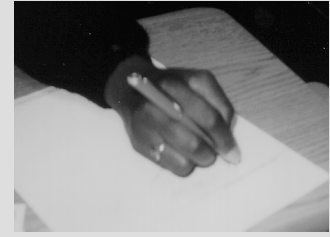
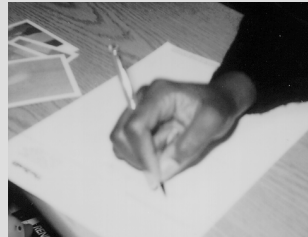
Grip A



Most people use this standard grip (A): pencil/pen rests on middle finger and is supported by the thumb and index finger

Grip B

Modified grip (B): pencil/pen rests between middle and index fingers and is supported by the thumb.



5. Opportunities to improve workstation.

Set up desk, keyboard and workstation to create neutral postures. Neutral postures (for example) for the:

1. Head and neck are in the middle of the range of movement.
2. Upper arm – is simply **hanging by your side**.
3. Forearm – approximately horizontal
4. Feet – resting comfortably, and flat on the floor (or foot rest if necessary)

In addition, and in general:

Maintain appropriate monitor height to minimize awkward neck and body posture.

Remove all wrist jewelry and watches while keying or using a mouse.

Minimize glare on documents, computer work/monitor. If the screen or work has annoying reflections from lights or windows, move the screen and minimize the glare source if possible. Sometimes placing a monitor at a slight angle can help minimize glare. Some people also prefer to add local lighting (like a small lamp).

6. Opportunities to improve general fitness.

Although people are responsible for a number of general activities involving the home (which requires physical activity), it's important that all aspects of life fitness be considered: strengthening, stretching, and endurance. Stretching, toning, and strengthening the muscles and tendons in the upper and lower extremities can be most rewarding in building the tolerance of local tissues for the demands associated with sedentary activities.

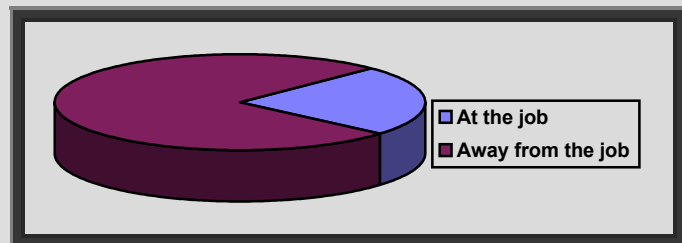
As we discussed throughout this evaluation process, it may seem strange to consider the issue of physical conditioning in a conversation encompassing the treatment of musculoskeletal disorders; however, it is an important factor in the prevention and treatment of such conditions. It probably is no surprise that persons with sedentary lives are prominent among those who develop the disorder.

More than 2,000 studies on musculoskeletal disorders have been conducted by the Centers for Disease Control (CDC) and NIOSH. In addition to making environmental (physical items) changes (at home & on the job), the findings indicate that exercising, stretching and physical balance are critical components to minimizing the potential for musculoskeletal injury.

It's important to note that NIOSH and the CDC have also identified individual factors associated with work-related musculoskeletal disorders (MSD). It's important to note that the relationship of these factors (individual) and the resulting risk of injury to an individual are complex and not yet fully understood. Among these factors are:

- **Gender** - some studies have found a higher prevalence of some MSDs in women
- **Cigarette Smoking** - some studies have found smoking related to pain in the extremities, including the neck and back. One hypothesis is that there is nicotine-induced diminished blood flow to vulnerable tissues
- **Physical Activity** - a lack (or overexertion) of physical activity may increase susceptibility to injury
- **Strength** - the risk for musculoskeletal injuries (in some studies) was three times greater in weaker subjects
- **Anthropometry** - weight, height, body mass index (BMI) (a ratio of weight to height squared), and obesity all can play a role in MSD potential, especially carpal tunnel syndrome (CTS) and lumbar disc herniation.

Occupational work comprises about 24% of a persons' time in a given week (40 hours of work, divided by 168 total hours). This shows the importance of continuing to examine away from work "ergonomic/fitness activities."



7. Possible benefits of vitamin B-6.

Feel free to discuss with your health care provider the possible benefits of vitamin B-6. The Mayo Clinic indicates that supplements of vitamin B-6 may be helpful for relieving the symptoms of carpal tunnel syndrome. However, there are other medical opinions on the efficacy of B-6 and how it affects CTS and other MSDs.

It has been reported by Dr. Richard C. Keniston of the Portland Hand Surgery and Rehabilitation Center in Portland, Oregon, that a low vitamin B-6 level was consistent with greater symptoms of CTS. In addition, Dr. John Ellis has also conducted a number of studies on the use of B6 therapy for certain musculoskeletal disorders.

Be sure to discuss with your health care provider any supplements or medications you are taking, or might plan on taking.

8. Ongoing research.

Clinical trials and National Academy of Sciences. There are 38 clinical trials in various stages relating to musculoskeletal disorders. A recent study, "Musculoskeletal Disorders and the Workplace," conducted by the National Academy of Sciences, found that "none of the common musculoskeletal disorders is uniquely caused by work exposures." The report went on to say; "however, the connection between the workplace and these disorders is complex, partly because of the individual characteristics of workers -- such as age, gender, and lifestyle."

There are numerous causative factors leading to musculoskeletal conditions. NIOSH conducted a review of epidemiologic evidence of more than 2000 case studies. In addition to some workplace factors, a sedentary lifestyle, psychological components, smoking, obesity, poor posture, and a long list of personal and environmental factors all play a part in the development of musculoskeletal disorders.

One of the most important aspects of treatment and recovery from musculoskeletal injury is education. Understanding the various factors – and how to correct them – will ultimately reduce the risks for progression of injury, or for developing the disorder at all.

Findings of the Office Ergonomics Research Committee (OERC). According to OERC, some medical experts contend that many musculoskeletal injury cases never receive a final diagnosis but are put in inappropriate catch-all categories such as occupational overuse syndrome, cumulative trauma disorder, repetitive strain injury, etc. The committee states: "For diagnosed disorders such as tendinitis, tenosynovitis, epicondylitis, etc., treatment protocols exist and non-surgical treatments can be effective in most cases. Personal factors such as general physical condition, and predisposing medical factors such as diabetes, thyroid conditions, arthritis, use of birth control pills, and pregnancy also play an important role."

9. Wrist splints.

In 2005, the University of Michigan conducted research on the possible benefits of night-time wrist splinting for people with hand and wrist discomfort. From this and other research, some people suffering with wrist pain are recommended wrist splints to wear at night.

10. Conclusion.

Based on the research and our findings, it is of great benefit for people having sedentary jobs and leading sedentary lifestyles to incorporate regular fitness activities.

Most occupational and away-from-work ergonomic changes can be resolved with minimal effort, some **simple adjustments**, and **changes in activities**.

Ergonomic changes alone will have minimal impact on the final outcome of your health. Work-station activities at work constitute about 24% of your life activities (*see previous pages*) so ***your best success will come from continuing to incorporate personal exercise, stretch activities, and functional posture at home and at work.***

Additional questions can be addressed to Steve Thompson at 619/294-9863, or email sthompson@ergohealthy.com.

Note: The information contained in this report and contained in the materials provided are for educational purposes only. It may not reflect the opinion of your health care provider. For personal health care advice, consult a qualified health care professional. Treatment should always be carried out under the care of a trained health care provider.