



## Common Symptoms in the Office Environment and Proper Adjustments

## Shoulder Stress

Improper postures of the shoulders and neck, such as shrugging (hunching shoulders up toward the ears), abduction (holding upper arms away from the body), and craning your neck forward, can lead to shoulder muscle fatigue or pain.<sup>1</sup> Proper positioning of your chair armrests and desktop monitor can help mitigate shoulder stresses. While working, your shoulders should be relaxed, your neck should be straight, and your arms should be close to your body. Adjust armrests to a proper height and width to support the forearms while allowing for relaxed shoulder postures. A monitor arm may also help to position computer screens properly, promoting neutral postures of the neck and shoulders during typing.

## Wrist and Hand Discomfort

Awkward postures of the wrists experienced in the office environment can contribute to discomfort in the wrists and hands. Such wrist postures are often experienced during typing tasks (Figure 1). Additionally, contact stresses are encountered when wrists are resting on edges of worksurfaces (Figure 2). Together, awkward wrist postures, contact stresses, and forceful finger exertions experienced during typing tasks can lead to tendon inflammation and restricted blood flow, and may eventually result in pain in the wrists or numbness of the fingers?

To maintain healthy wrists, it is important to promote neutral wrist postures (wrists aligned with forearms) and to avoid contact stresses. In your workplace, adjust armrests to allow forearms and hands to remain straight and inline during typing and mousing. If there is a mismatch between the proper height of your keyboard (as dictated by both proper seat height and armrest height) and the actual height of your worksurface, additional tools may be required.

A height-adjustable table is one option to allow individualization of work height. Alternatively, a keyboard tray can be used to bring your keyboard and mouse to the proper height for your body and chair height. A third option may be to adjust your seat height to allow the height of your arms to coordinate with your worksurface and add a footrest to properly support the legs and feet.

Figure 1



Awkward postures of the wrists are commonly experienced during typing tasks.

Figure 2



Resting wrists on the edge of worksurfaces is an example of contact stresses, and should be avoided.

## Eye Strain

Eye strain is the most frequent complaint of computer users.<sup>3</sup> The absence of proper lighting may lead to eyestrain.<sup>4</sup> Because the proper amount of illumination depends both on your vision and on the tasks being performed, overhead lighting may be inappropriate as a sole illumination source. Consider adding task lighting to individualize lighting schemes to accommodate your visual acuity and your work.

Additionally, improper monitor positioning and glare on your monitor may also be contributing to eye strain. The addition of a monitor arm will allow you to properly adjust the height, depth, and tilt of your monitor to suit your needs. Monitors and laptop screens should allow for neutral postures of the neck (head facing straight forward with no turn or tilt of the neck), a slight downward gaze of the eyes, and should be approximately an arm's length away, depending on visual acuity.

A good rule of thumb to follow is to align the top of your monitor with your eye level, so that your eyes are relaxed and slightly lowered to view the majority of the screen. The proper distance of your monitor depends on your visual acuity and on your personal preference. Typically, your screen should be about an arm's length away, but may need to be brought closer if you have difficulty viewing.

## Neck Strain

Improper postures of the neck and shoulders can lead to neck strain or pain.<sup>5</sup> During work, your shoulders should be supported in a relaxed position, your head should be facing forward and not turned or tilted, and your neck should be in line with your spine. If you find yourself tilting your head or craning your neck, consider using a monitor arm to adjust your computer screen to a proper height, position, and tilt for your vision and posture. If using a laptop, a laptop tray can offer the same benefits. To promote relaxed shoulder muscles, adjust your armrests to a position that allows your forearms to be supported while also allowing shoulders to be down and arms to be kept close to the body.

## Back Discomfort

It has been reported that approximately 80% of the U.S. population will experience back pain at some point in their lives, and often the specific cause of back pain is unknown.<sup>6</sup> While you cannot always completely prevent back pain, there are important steps you can take to maintain a healthy spine while at the office. Ensure the curvature of the spine is supported by sitting in a chair that provides lumbar support as you sit and move throughout your workday. There are two general categories of lumbar support in task seating: manual and passive. While the back material of chairs with manual lumbar adjustments help to offer support of the lumbar curve, additional manipulation of adjustments can help to more properly support the spine. If manual adjustment is needed, adjust the lumbar to a point below the belt level.<sup>7</sup> Alternatively, seating with passive lumbar support requires no action from the user – the chair automatically conforms and supports the spine properly.

Lumbar support is not the only thing to consider if you are experiencing back pain. Adjust your chair seat depth to a position that allows you to sit all the way back in your chair and fully utilize the backrest. Additionally, movement of your spine is important to nourish the vertebral discs (the soft structures between the bony vertebra in the spine). Check that the recline tension of your chair is at a level that is high enough to support your back while still allowing for a comfortable recline motion. In some chairs, tension recline is manually adjusted, and in other chair designs, the tension adjustment is engineered into the recline mechanism, meaning no adjustment is needed to obtain the proper recline tension for your body. This automatic recline tension adjustment is accomplished with a weight-activated control. Reclining occasionally is one way to introduce some movement during the workday (Figure 3).

Figure 3



Figure 4



Height-adjustable tables are one way to promote movement and posture changes.

Sit-to-stand workstations are also an excellent option to promote changes in posture throughout the workday. Sit-to-stand workstations can be achieved through height-adjustable tables (Figure 4), with sit-to-stand keyboard trays and monitor arms, or at a standing-height desk with an ergonomic task stool. Taking short breaks to stretch or walk throughout the day can also help maintain a healthy back. Additionally, many workplaces today promote collaborative work, rather than solely individual workstations.<sup>8</sup> Collaborative meeting areas (in addition to promoting creativity, problem-solving, and team building) can also promote movement. Employees can step away from their normal workstations and move and work together in collaborative meeting areas, thereby promoting movement and posture changes throughout the day (Figure 5).

Figure 5

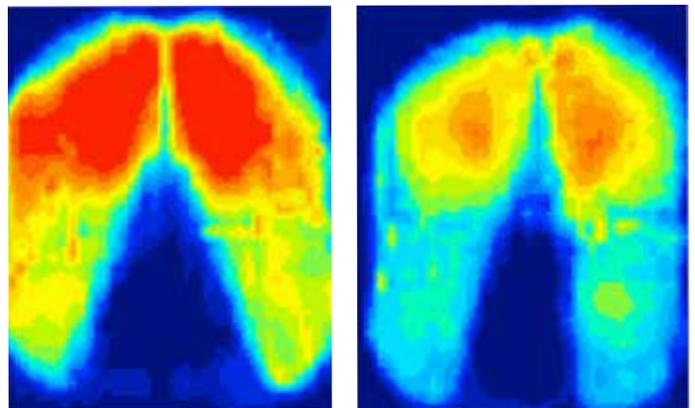


Collaborative meeting areas can encourage workers to leave individual workstations and change their postures.

## Leg Discomfort

Sitting for long periods of time in improper postures or without the proper support can lead to discomfort in the thighs and buttocks. To avoid unnecessary pressure on the legs, ensure that your chair seat height and depth are adjusted properly. Seat depth should be adjusted to allow for 2–3 inches of clearance between the back of the knees and the front edge of the seat. This will prevent impingement of the popliteal fossa (the area of the back of the knees where the vein providing a majority blood supply for the lower leg travels) and allow for easy movement of the legs. The height of the seat should allow feet to be supported firmly on the floor and for the hips to be at or slightly above knee level. A footrest may be needed if legs cannot reach the floor when the chair height is adjusted to coordinate with the worksurface. Adjusting your seat to the proper height will ensure that the pressures on the seat are well distributed and shear stresses are avoided (Figure 6). Additionally, taking short breaks to stretch or walk throughout the day can promote healthy blood flow to the legs.

Figure 6



Task seating should be designed to eliminate areas of high pressure, as shown in the bright red areas on the pressure map on the left. The pressure map on the right illustrates a seat that minimizes pressure points (demonstrated by less red) and distributes pressure more evenly throughout the legs.

## Proper Adjustments

### Proper Positioning of Monitors

Monitors and laptop screens should allow for neutral postures of the neck (head facing straight forward with no turn or tilt of the neck), a slight downward gaze of the eyes, and should be approximately an arm's length away, depending on visual acuity. A good rule of thumb to follow is to align the top of your monitor with your eye level, so that your eyes are relaxed and slightly lowered to view the majority of the screen. The proper distance of your monitor depends on your visual acuity and on your personal preference. Typically, your screen should be about an arm's length away, but may need to be brought closer if you have difficulty viewing.

### Proper Positioning of Chair Armrests

Armrests should be adjusted to a height and width that allow for shoulders to be relaxed (not hunched), upper arms to stay as close as possible to the body, and for forearms to be well supported. If you prefer to sit close to your workstation, look for chairs that allow you to adjust the depth of the armrests. Adjusting the depth of the armrests (pushing them in a rearward position) will allow you to bring your chair closer to the worksurface.

### Lumbar Support

Your chair should support the curvature of your lumbar (low spine). Adjustments may require manual correction of physical lumbar supports or lumbar supports may be passive. The back materials used in passive lumbar chairs have been engineered to support and cradle your back automatically and require no manual adjustments to achieve the proper support. If manual adjustment is needed, adjust the lumbar to a point below the belt line.

### Proper Chair Seat Height and Depth

Seat height should be adjusted to a height that allows for feet to be flat on the ground or a footrest, and hips to be at or slightly above knee level. Seat depth should be adjusted for 2–3 inches of clearance between the front edge of the seat and the back of the knees.

### Proper Keyboard Position

Your keyboard should be at a height that allows for neutral wrist postures. If there is mismatch between the height of your keyboard (as dictated by the worksurface height) and the proper height of your armrests (as dictated by your body dimensions), additional tools may be required. A height-adjustable table is one option to allow individualization of the height of your keyboard.

Alternatively, a keyboard tray can be used to bring your keyboard and mouse to the proper height for your body and armrest height. A third option for shorter-statured individuals may be to elevate your seat height to allow the height of your armrests to coordinate with your worksurface and add a footrest to properly support the legs and feet.

The angle of your keyboard may also be forcing your wrists into awkward postures. Avoid using built-in pop-out supports on the back side of the keyboard, which may cause you to extend your wrists (elevate your fingers compared to your forearms). Additionally, keyboard trays can be used to adjust the tilt of your keyboard and promote neutral wrist postures.

### Look at the Big Picture

When considering ergonomics in your office, it is important to consider the entire environment. Avoid focusing on each element independently of the others. All the elements of your workspace need to work in harmony to support you and your work.



## References

1. A Field Comparison of Neck and Shoulder Postures in Symptomatic and Asymptomatic Office Workers. G. Szeto, L. Straker, and S. Raine. *Applied Ergonomics*. 33(1), 75-84 (2002).
2. *Work Design Occupational Ergonomics*. S. Konz and S. Johnson. Sixth Edition. Holcomb Hathaway Publishers. Scottsdale, AZ (2004).
3. Eyestrain: The Number One Complaint of Computer Users. R. Atencio. *Computers in Libraries*, 16(8), 40-43 (1996).
4. Eye Discomfort in the Office. Canadian Centre for Occupational Health and Safety. [www.ccohs.ca](http://www.ccohs.ca).
5. Individual and Work-Related Risk Factors for Neck Pain Among Office Workers: A Cross-Sectional Study. B. Cagnie, L. Danneels, D. Van Tiggelen, V. De Loose, and D. Cambier. *European Spine Journal*. 16(5), 679-686 (2007).
6. Epidemiology and Risk Factors for Spine Pain. D. I. Rubin. *Neurologic Clinics* 25(2), 353-371 (2007).
7. *Occupational Ergonomics*. A. Bhattacharya and J. McGlothlin. Marcel Dekker Inc., New York, NY (1996).
8. Just Because You Built it Doesn't Mean They Will Come. J. Johnson and S. Hargis. Allsteel white paper.

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Dr. Lauren Gant, AEP, Ph.D., heads the Ergonomics Group at Allsteel. Lauren's background in biomedical engineering allows her to apply human factors and ergonomics principles to the design of office furniture, and to research emerging trends in the office environment. Lauren has taught engineering and ergonomics courses at the university level, has conducted extensive research in the field of ergonomics, and holds a doctoral degree in biomedical engineering from the University of Iowa. She is a member of the Human Factors and Ergonomics Society, and is an Associate Ergonomics Professional, granted by the Board of Certification in Professional Ergonomics.

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