Welcome

Basic Office Ergonomic Set Up

Presenter:

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About Grant Judah

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• Over 10 years experience performing onsite office ergonomic assessments
Think back to when you started your most recent job and you were shown the location where you would be working. Were there things about the location that you immediately liked such as the size of the room, the window, or maybe the location in the building? Possibly you were fond to the modern desk set up or the size of the monitors?

When you look back at that time did you ever think about the chair that was in the room and if it was comfortable enough for you to sit in? Or is there adequate leg room under the desk for me to sit comfortably? Do I like this style of keyboard?

Odds are that for most of us, ergonomics were not on our minds, at least not right away, and some times not until work becomes uncomfortable or even painful, hopefully neither of the latter.

A benefit to todays instruction is that you will be able to make simple changes to your own and other employees work stations to promote comfortable and injury free work environments.

In order to recommend and make simple ergonomic changes to a work station you must first understand the rationale behind making those changes. Today's instruction will help you understand basic office ergonomic principles and ergonomic risk factors in order make simple and basic changes to office workstations.
Ergonomics can be defined as fitting the job to the worker.

Office ergonomics aims at designing and improving the workplace, work station and procedures of work in order to limit fatigue, discomfort and injuries. This improves employee morale, reduces absenteeism, improves safety and ultimately saves everyone money.

Office ergonomics allows the individual to customize their own individual workstation so it fits them.
Office Ergonomic Risk Factors

• Repetition – Keyboarding, Mousing
• Sustained Static and Awkward Postures
  – Looking at down at laptop screen for 30 minutes
  – Slouching in chair

Although the office is not thought of in a traditional sense of being a very physically demanding work environment, that does not mean it is void of injury or injury risk factors.

The main risk factors in an office setting include the following:

• **Repetition** – Examples; Keyboarding, mousing.

• **Sustained Static and Awkward postures** – Examples; looking down at your laptop monitor for 30 minutes. Slouching in your chair for an extended period of time.

Eventually, some employees produce enough muscular strain and fatigue that it causes pain and even injury.
Ergonomic Risk Factors

Slouched Seated Posture
There is biomechanical disadvantage with the slouched posture pictured above that makes your postural muscles work harder to maintain this position. The low back, mid back and neck muscles are placed in a stretched position and if this position is sustained it can lead to pain or injury.

This posture will also make your arms and shoulder to work harder to type and make your neck muscles work harder to view your computer monitor.
The average weight of the human head is 8-12 lbs.

The upright seated posture pictured on the right places the weight of the head on top of the body’s spine. When the head is on top of the spine the muscles of the spinal column are required to produce much less force to maintain this position compared to the slouched position. This upright postural position is often referred to as spinal neutral.

The spinal neutral position will be your reference to guide towards good ergonomic seating.
The human spine has three distinctive curves at the cervical (neck), thoracic (mid-back) and lumbar regions.

It is important to remember that everyone will have a slightly different spinal neutral posture. The low back is a good example where often it is visibly easy to see a person's back that seems to curve inward quite a bit where as someone else has a low back that looks visibly flat.
Finding your lumbar neutral while seated.

Sit in your chair and scoot your buttocks back as far as you can in the chair

Next round or arch your low back up as far as you can (make yourself taller)

Then back off this arch by 50%.

This will be very close to your spinal neutral position while seated and it will be very similar to what your neutral spine position is when you stand.

Quick Tip:
Place your hand behind your low back once you have found your spinal neutral while seated.

If there is a gap between your hand and the backrest of the chair this is the area where the lumbar support of the chair or cushion should be placed.

Support at the lumbar gap will help maintain posture while sitting.
The most accepted ergonomic posture while seated at your workstation includes the neutral spine position in addition to the following positions of the rest of the body.

- Hips, Knees and Elbows are between 90-110 degrees.
- Wrists and forearms are straight for typing and mouse operation.
- Head and neck remain looking straight ahead for comfortable viewing of the monitor at eye level.
- Feet are flat on floor or footrest

**Keep in mind that most people will not want to posture themselves at complete right angles/90 degrees. A more comfortable position is usually at somewhat greater angle between 100-110 degrees.**

- For purposes of training a good tip is to think? 90-90-90
- 90 90 90
  Hips – Elbows - Knees
Top View:

• Your chair and most of your work should be straight in front of you.

• Monitors should be at least one arm length away for a single monitor and usually greater for a dual or triple monitor set up.

• Keyboard and mouse should be directly under your hands when yours upper arms are relaxed at your side and elbows at 90 degrees.

• Phones, adding machines, document holders should be as close as possible without interfering with your typing, using your mouse and viewing the monitor. (above)
The office chair is the most important part of your seated work station. A well fitted office chair can hold you in your ergonomic neutral position.

- Office chairs may contain as little adjustable features such as height adjustment only or they may have multiple features for adjusting to your chair to preference.

- A Multifunction Office Chair is a chair that offers several adjustable features.

- As a general rule the more adjustable features a chair contains the better fit you will be able to obtain.

**Multifunction Chair features:**
- Seat pan height
- Seat pan slide
- Seat pan tilt
- Backrest angle
- Backrest height
- Adjustable armrests
Seat height adjustment is usually a standard feature in every office chair.

Seat height ranges vary on every chair.

Knowing the seat height range of your chair is critical to adjusting your workspace.

Standard seat heights range from 16 - 22 inches

Measuring your Seat Height Range:

• Lowering your chair to the lowest height position and measure from floor to mid seat cushion and record this measurement.

• Raise your chair to the highest height position and record this measurement.

• Low, High = Seat Height Range.
Standard desk surface heights range between 28-30 inches from floor to work surface.

Standard work surface depths range from 24-36 inches.

- Work surface depths of 30-36 inches are most well suited for dual and triple monitor set ups because they provide more depth to view monitors comfortably.

- Work surface lengths will vary depending on design of the desk, however a length of 5-6 feet will generally provide adequate work space length.

- Working entirely off the work surface has advantages in that all your work tools are on the same level.
One of the most common problems you will face in adjusting a office workspace will be a Chair Desk problem. The Chair Desk problem is a matter of height discrepancy.

**The Chair Desk problem #1**

**Low chair and high desk**

- The desk is a high fixed height.
- The chair will not go high enough to get the employee in correct ergonomic working position.

**Result:**
- The employee has to reach upward with their arms to use the computer.
- Arms are held away from the body places stress at shoulders and neck.
- Contact pressure is placed at the wrist/forearm.
- Wrist and forearm typing position is not straight.
- Head and neck will be looking up with an incorrect monitor set up.

**The Chair Desk problem in this situation presents itself most often when:**
1. Desk height is not adjustable and is fixed at 30 inches or above
2. The chair does not raise to at least 22 inches
Continued...

To fix this problem you have the following options:

- Replace the chair with one that will raise to 22 inches or slightly higher and/or add a footrest for the employee.

- Modify the desk to lower the desk surface.

- Purchase a new desk with desired height or adjustable height surface.

- Install a under desk keyboard tray.
The Chair Desk Problem #1

Solution:
Modify or Purchase a Chair that will Raise higher
+
Add a Footrest

• Some, but not many chairs come standard with a 23 inch max seat pan height.

• Some chair manufacturers offer chair stem extensions that add an extra 1-2 inches to the current chair seat pan height.

• A Footrest will take place of the floor so the feet will not dangle.

• Footrests can be ordered in adjustable height/angles or be custom made.

• Footrest should not be too tall or it will raise employee’s thighs off the seat pan.
The Chair Desk Problem #1

Solution:
Lower the work surface

• Some desk systems and cubicle that have track systems that can be adjusted to raise and lower the work surface.

• Lowering the desk from 30 inches to 28 inches will resolve the chair desk problem for the majority of people as long as they have a chair that will raise to at least 22 inches.

• Some users may need their work surface between 26-28 inches however in almost all of these situations the employee is 5 feet tall or below.
The Chair Desk Problem #1

Solution:
Install an Under desk Keyboard and Mouse Tray

• Will lower the keyboard and mouse so the user can place feet on ground.

• Work surface will not need to be modified.

• Keyboard trays come in fixed height slide outs or multi-positional trays where features such as keyboard tilt, height adjustment, and keyboard slide are often part of the function.

Frequently observed problems:

• Tray will not be wide enough for both keyboard and mouse and user will mouse at a separate surface

• Tray will not be sturdy, and will start to tilt or lean towards the users mouse hand.
The Chair Desk Problem #1

Not enough room for mouse on keyboard tray.

- If the under desk keyboard tray is not wide enough the user will often place the mouse on the desk surface to operate.

- Operating the mouse like this contributes to the originally listed ergonomic risk factors but on the mouse hand only.

Solution:

- Check current keyboard size, mouse, and mouse pad size prior to ordering a tray.

- Order a keyboard tray that will be wide and deep enough for the user.
The Chair Desk Problem #2

Low desk and tall employee

- The desk is at a low fixed height.
- The employee is tall and unable to raise the chair to a comfortable working position.
- A pencil drawer may be present under the employees thighs.

Result:
- The employees thighs hit the desk or drawer when they raise their chair.
- Wrists are not straight and arms are away from body.
- Employee may be looking down at monitor.

The Chair Desk problem in this situation presents itself most often when:

1. Desk height is not adjustable and is fixed at 28 inches
2. There is an under desk drawer that prevents raising the chair because of contact with the thighs
The Chair Desk Problem #2

Continued...

Trial Solution:

Lowering the chair for a tall employee in this situation typically will not resolve the situation because:

• Thighs will not comfortably take up the entire seat pan evenly and the buttocks will now take on most of the seated pressure.

• Typing position at the wrists and upper arms will get worse.

• Contact pressure will occur at wrist and forearms.

• Shoulders may hike to accommodate this typing position.
The Chair Desk Problem #2

Solution:

Remove under Desk Drawer
+
Raise the Desk

• Most plastic under desk pencil trays can be slid out of brackets easily.

• Some older desks may have larger built in drawers, however they usually can be removed with a screwdriver/drill.

Tip: Taller employees especially those over 6 feet tall will typically fit best to a 30 inch work surface and sometime will even need above 30 inches.
Adjusting The Chair
• Seat height adjustment is usually standard in every office chair.

• The seat height lever is located to the user's right hand side in most chairs.

• Seat height ranges vary and knowing the range of your chair is critical to adjusting your workspace.

• **Office chair seat heights usually have a seat height range of 16 -22 inches**

**Tip:** You can figure out your seat height range by lowering your chair to the lowest position and measure from floor to mid seat cushion, then raise your chair as high as it will go and repeat the measurement. This will give you your seat height range.
• The seat pan tilt feature adjusts the angle of the seat pan.

• Most employees prefer a neutral or level seat pan setting.

• Some employees prefer a slightly forward tilted seat pan.
• The seat pan slide feature adjusts the depth of the seat.

• The seat pan slide lever is commonly located on the users left hand side of the chair or underneath the seat cushion at the front of the chair.

• You will typically need to brace the castors or legs of the chair with your feet when you adjust the seat pan.

• The recommended amount of room between your seat pan and the back of your knees is 2-4 finger widths.
• The backrest height adjustment on a multifunction chair positions the height of the lumbar cushion or curvature of the backrest for the user.

• On most newer multifunction chairs the backrest height has a ratchet system built inside the backrest. To adjust the height pull up on the backrest until the lumbar support is most comfortably placed at your low back.

**Tip:** Remember how to find your spinal neutral?

The largest space between your low back and your backrest is where you want the lumbar cushioned area placed.
• The backrest angle will assist in providing the support needed to sit upright in the chair.

• The amount of angle people need will depend on many factors such as body type or personal preference.

• In general it helps to have the backrest angle close enough for good ergonomic positioning.

**Tip:** Think 90-90-90, but remember that few people will want their backrest up completely vertical.
• On a multifunction chair, armrests usually have adjustable height and angle features.

• The height and angle of armrest should be adjusted last of all chair and desk adjustments.

To adjust:
• In the keyboarding position with the arms relaxed, raise the armrests up to the highest level without pushing the up on the arms. Pushing up on the arms will make your shoulders hike.

• Angle can be adjusted to preference following.

Tip: Armrests commonly prevent users of corner workstations from sliding their chair close enough to their keyboards.

To solve this: Lower the armrests so the chair can slide closer or remove them.

Many employees do not use armrests. You can order a chair without armrests or remove them on most chairs.
• **Multi-position Armrest Adjustment:**
• Forward and backward
• Pivot (angle)
• Width- Closer to users body or away from users body
Mouse Position:

- Your mouse should be in reach of your hand when your arms are resting at your side in the neutral ergonomic position.

- Commonly used items such as telephone, calculators and documents should remain in the yellow zone if possible to prevent sustained reaching in awkward postures.
Mouse Position:

- Position mouse as close to keyboard as possible without interfering in mouse function.

- Excessive lateral position of the mouse can result in shoulder and wrist pain.

- Mouse should be operated using the whole arm not just the wrist.

- Obstructions such as a large and bulky mouse pad can lead to awkward mouse positions or the mouse being held away from the keyboard.

**Tip:** The bottom of the mouse will collect lint and build up over time and this may lead to the user lifting and dropping the mouse instead of sliding. Cleaning and removing the lint will reduce the friction.
Mouse Position:

A wrist rest for the mouse may be necessary.
Regular Mouse – hand is in pronated position or palm down

Vertical Mouse - hand and wrist is in a more vertical position and is a good option to try for anyone reporting hand and wrist pain from regular mouse use.
Keyboard Angle:

- Tabs flipped up in the back of the keyboard can lead to increased wrist angle when typing.
Keyboard Angle:

- Addition of a wrist rest is helpful to decrease the wrist angle when typing.

- Addition of a wrist rest alone may not be enough to decrease the typing wrist angle and sometimes the tabs at the keyboard will still need to be flipped down.
Monitor Height:

- The top of the monitor should be at eye level height for employees that do not wear corrective lenses or for users that wear glasses but do not look out of the bifocal portion of the lens to view the monitor.

- Bifocal users that use the bottom part of the lenses to view the monitor will find that most of the time they will be more comfortable with a lower monitor position than eye level. The reason for this is that it decreases frequent head tilt to view the monitor.

- Bifocal users that use the top part of their lenses to view the monitor should keep the monitor height at eye level the same as regular users.
Dual Monitor Set Up:

**V Split** – Allows user to view both screens equally however the head will need to rotate slightly to look at both

**Primary/Secondary** – Primary use screen is directly in front of worker. Second monitor is for occasional use since head will need to rotate to view.
Dual Monitor Set Up
Triple Monitor Set Up

- Primary monitor remains straight ahead

- Secondary monitors to both right and left which gives user the opportunity to shift head position equally throughout the day.
Triple Monitor Set Up

- Increasing the distance away from the monitors will increase the field of view and promote less head rotation to view secondary monitors.
Problem: Employee reports neck and wrist pain

What ergonomic risk factors are present?
Ergonomic Risk Factors:

- Increased wrist and neck angle
- Looking down at monitors
- Not sitting upright
Solution:

- Moved backrest to support lumbar neutral
- Raised monitors
What ergonomic risk factors are present?
Ergonomic Risk Factors:

- Forward head and looking down at monitors
- Non Neutral wrist and upper arm angle
- Slouched posture
- Keyboard away from body
Solution:

- Moved Backrest to support neutral spine

Continued Problem:
- Employee still looking down
- Keyboard distance too far away from body
Solution:
Raise monitors

Solution:
• Moved keyboard closer
• Raised monitor
What ergonomic risk factors are present?

**Problem:** Forearm and neck pain
Ergonomic Risk Factors:

- Contact Stress at forearm
- Reaching up to keyboard
- Vision at center of screen
Solution:
- Elevated chair
- Raised monitor

Problem:
- Continued contact stress at forearm
- Increased wrist angle typing

Solution: (not Pictured)
- Wrist rest
Problem: Shoulder pain

What ergonomic risk factors are present?
Ergonomic Risk Factors:

• Surface is too high

• Arms held away from body
Solution 1:

- Under desk keyboard tray
- Wrist rest
Solution 2:

- Raise chair
- Add footrest
Before You Start

• Intake Form
• Assessment Checklist
• Bring a tape measure
• Check your schedule for amount of time you have available

Questions for the employee prior to visual assessment, adjustment and ordering.

• Reason for Assessment?
• If there is pain or discomfort is it related to a known medical condition?
• How long has the employee been at the current workstation?
• Has the employee made any recent changes?
• If so, What? Did it help?
• Was there a prior workstation or equipment that worked better for you?
• How often do you sit or stand at the current workstation?
• What percentage of work is using the mouse, typing, or paper document work?
Ergonomic Assessment Checklist

• Breaks the assessment down into sections
• Good reminder for things you might not have thought of during the assessment

Ergonomic Assessment Checklist

Chair
• Back supported/shoulders relaxed?
• Seat depth/width?
• Hip and knee angle 90-100 degrees?

Keyboard/Mouse
• Elbows 90-100 degrees?
• Keyboard centered?
• Mouse and keyboard within easy reach?

Monitor/Documents
• Monitors centered in front of user?
• Viewing Distance, arm length or greater?
• Top of screen at eye level?
• Screen Glare?
• Documents easy to view?

Phone
• Phone within easy reach or using a headset?

Workstation Appearance
• Frequently used items within easy reach?
• Under desk leg room clear and non cluttered?
• Lighting OK?
Equipment Ordering

- Check options before ordering your chair
- Desk Height, Depth, Length and Under Desk Clearance.

- Be familiar with local furniture vendors and products available.
- Many local vendors with provide a demo chair before purchase.
- Equipment can often be found online.
- Remember to measure chair and desk dimensions prior to ordering.

- **Standard Chair Seat Pan – Height 16-22 inches**
  - Stool style chair - Height 21-31 inches.
  - Ring is attached. Will not work on regular desk height.
- **Standard Desk Height – 28-30 inches**
Transitional Sit to Stand Workstations

Table Top:

- Pre assembled and set directly on work surface

- No desk modification needed however obstructions such as overhead cabinets or shelving may need to be removed for monitor clearance.

Tip: A table top version will add 1/2 to 1 inch to current keyboard height. Keep this in mind for shorter employees who are already maxed out on chair height.

Whole Surface Raise:

- Will raise entire work surface up through addition of electric legs under current work surface.

- This works well with desk surfaces that are not all one unit or not attached to wall.

- Can also purchase electric Sit to Stand table.
Problem: Wrist pain

Ergonomic Risk Factors Present?
Ergonomic Risk Factors:

- Increased wrist and elbow angle
- Looking down at monitor
Solution:

- Raise work surface

- Still need to raise monitor, need taller standing position
Remote Assessments
Question and Answer