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ERGONOMIC DESK INFORMATION

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The "Ergonomic" Chair

See additional info at: http://www.backdesigns.com/store/How-to-fit-an-ergonomic-chair-W9C230.aspx

<u>Recommended Use:</u>
Since different individuals have different types of body styles and sitting postures, a chair must be designed appropriately for the individual and their functional needs.

A. <u>Vision</u>:
   An individual's vision during different activities may affect their sitting posture. Sometimes raising a computer screen or using a slant board or copy holder can help solve sitting problems better than a chair.

B. <u>Seat height</u>:
   The seat of a chair should support the individual's thighs evenly while their feet and legs rest comfortably on the floor, foot rest, or knee rest. In a traditional office chair, the seat's front edge height should match the length of the lower leg (popliteal height). Most office chairs have a height adjustment. If an individual is short in stature and is given a standard chair, using a foot rest, foot platform, or foot ring may appropriate. This is only for upright and reclined tasks. Footrests generally don't work for forward tasks since they may constrain postures and increase slumping.

C. <u>Foot depth:</u>
   An individual must allow 1-3 inches of space behind the knees to avoid excessive pressure. Use a deeper seat for reclining, and a shallower seat for activities that require forward sitting. Larger individuals will prefer a larger surface for weight distribution.

D. <u>Seat width</u>:
   The conventional seat should, be at least two inches wider than the individual's thighs. Remember, the seat width can affect armrest width.

E. <u>Seat tilt</u>:
   Most people prefer a forward tilting seat for forward sitting, a nearly horizontal seat for upright sitting, and a backward tilting seat for reclining. Some chairs offer a "free float" seat tilting, which adjusts automatically with your body weight shifting.

F. <u>Seat cushion</u>:
   To help distribute one's weight better; a seat with a contour, extra padding, or variable density upholstery materials is an option. Less contoured or firmer seats will allow an individual to move easier in the seat.

G. Backrest height:
: A backrest will depend on the amount of activity that an individual is engaging in. For reclining, the backrest should reach the upper back or neck depending on how far the person reclines. For upright sitting, the backrest only needs to support the low back and perhaps the upper back. For forward activity, support for the low back is sufficient although some people prefer no back support at all.

H. Backrest height adjustment:
: Backrest contour should match the placement of the spinal curves. Women sometime need higher lumbar backrest placement and lower upper back and neck rest placement than men. The backrests on most chairs will adjust in height.

I. Backrest pivot:
: The backrest may pivot forward and back on a central axis. This will allow for greater movement in the low back and the upper back. This, however, may be uncomfortable if spinal flexibility is limited. Most of today's office chairs do not have the backrest pivot.

J. Seat to backrest angle:
: An individual's thigh-torso angle will influence their spinal posture. One must match their neutral thigh torso posture to their chair. By having appropriate adjustments, the individual will be able to maintain a neutral spine posture that will keep the low back comfortable. For example, the low back curve deepens into an arch as your thigh torso angle opens when you reach overhead. On the other hand, the low back flattens as your thigh torso angle closes, i.e. sitting on a low stool.

K. Adjustment controls:
: All adjustment controls should be within easy reach from a sitting position. This is important for seat and backrest tilt controls.

L. Armrest height:
: Armrests should be used to support the arms, not to support the body. Armrests used for upright and reclined sitting neck and back fatigue, and ease back and leg loads when entering and exiting the chair. Some office chairs have adjustable armrests. Armrests are not always recommended for computer data entry. The more active the task (e.g., intense data entry), there is less necessity for the armrest. The less active the task (intermittent data entry), there is more necessity for the arm support.

M. Armrest depth:
> Armrest for reclined or non-desk activities should support the entire forearm. For desk work, the armrest should be recessed to allow for easy access to the work surface. Support of just the elbow may be sufficient.

N. Distance between armrest:
> A correctly placed armrest may take some of the stress of the neck and back and helps the individual get in and out of the chair more efficiently. An armrest that is narrow interferes with arm movement and an armrest that is too wide is not used for full rest or support. Some chairs have an adjustable armrest width.

O. Swivel:
> A chair that swivels will allow the individual to move efficiently at his work Station. They will be able to change their reach and line of vision with less body twisting. If the individual does precise or fine motor work, a swivel chair may cause them to feel unstable.

P. Base:
> A large diameter base provides greater stability. If the individual prefers a chair that tilts far back or sits at high counter heights, a large base will be much more important.

Q. Gliders, and casters:
> Carpet casters are standard on most chairs. They are useful for moving forward and away from the table or desk. Use hard casters for carpet, use soft casters for hard (e.g., wood or tile) floors. Glides and breaking casters are for special applications. See article on casters at http://www.backdesigns.com/store/Chair-casters-can-affect-your-health-W43C230.aspx

R. Upholstery:
> Upholstery depends on the manufacturer. Most seats and back rests are made of high-density foam to give years of comfort under normal use. Most chairs are covered with nylon or a blended fabric. Upholstery costs increase as you move into leather or leather-based materials.

The "Ergonomic" Office

Most individuals that work in an office setting are "given" a desk and the equipment needed to perform the job. This does not necessarily have to limit an individual into a locked position based on the amount of space technology, or funds available. Changing some of the placements of the items that are used in an individual's daily occupation can help decrease tension, chronic pain complaints, and daily aches and pain. The following suggestions on areas to pay attention to and their solutions maybe helpful.

1. <u>COMPUTER SCREEN:</u>
    A. **Screen too low?**
        A low screen may force one's head into a forward and down position, thus straining the neck and upper back. **Easy solution**: Put the screen on top of a phone book, a sturdy box, or on top of the CPU (the main computer). **Money solution**: A monitor valet allows for easy positioning of the screen, forward and back and up and down. It will help free-up valuable desk space. Prices range at

    B. **Screen too high?**
        This forces the head to tilt back and the chin to move forward, thus straining the neck and possibly causing headaches.
        Easy solution: Place the computer screen directed on: the desk rather than on top of a phone book or CPU. **Money solution:** Extension cables to help relocate the CPU some distance from the screen may help. Floor CPU units will help free-up desk space. Floor stands are priced $25 and up. Extension cables are priced at $ 10 and up.

    C. **Screen distance?**

        The best distance from which to read a computer screen is generally much greater than reading distances for papers and books. Typical distances for reading from a paper or book is from 15" to 25". Computer screens should be much further away, sometimes 30" or more.

        Maximum viewing distance: First of all, there is no maximum viewing distance. As long as you can comfortably discern the information on the screen it's not too far away. Maximum viewing distance is limited only by the size and clarity of the characters on the screen. Guidelines which specify a viewing distance of, say, 24" to 30" have no basis for the 30". The "arm's-length" recommendation has even less basis - there is no correlation between visual capability and arm length.

        Minimum viewing distance: How close is too close depends on your Resting Point of Vergence (RPV). That's the distance at which your eyes converge with no stimulus for convergence, like in the dark. Studies show that people with far Resting Points of Vergence are less able to tolerate close viewing distances. People with short RPV's have no problem with farther viewing distances.

        The RPV averages about 45" looking straight ahead and about 35" at a 30° downward gaze angle. Someone with an RPV of 15" might not have a problem with a 15" viewing distance which would cause eyestrain for someone with an RPV of 50". We commonly see inadequte distance between a computer user and a CRT monitor, often between 18"-30".

Get the monitor back as far as possible, depending on your visual abilities, the screen display characteristics and your software interface. If possible, you should also lower it and tip it back so the top of the screen is farther from your eyes than the bottom of the screen.

Most desktop surfaces are too shallow for proper placement of a conventional CRT monitor. CRT monitors require a deeper desk, or the monitor needs to extend over the back edge of the desk, or you'll need to place your monitor on a separate table placed behind your desk. In an office setting, two workers could place their desks back-to-back, with each worker's monitor could be placed on the other worker's desk.

Flat panel monitors allow more distant placement of the computer screen on shallow desks.

Don't overlook other factors, such as glare, luminance balance, screen contrast, mental stress, and refraction. Some people need corrective eyeglasses or a different prescription for more comfortable viewing.

See http://www.backdesigns.com/store/Monitor-Positioning-Guidelines-W22C132.aspx for updated info.

D. Screen glares problems?

Glare may make the screen difficult to see and fatigue the eyes. It may also lead to headaches. Glare from a window overhead can make it difficult to see the displays. If a window or light source is behind the screen, the screen contrast becomes too dark to see. **Easy solution:** Reorient the screen so that it is perpendicular to the light source. Fashion a screen shade or hood from cardboard and tape being careful not to cover the screen ventilation holes. Vertical blinds can let in natural light while shading direct sunlight. **Money solution:** If one is unable to reorient the screen to avoid the glare or change the light source, a glare screen or hood is recommended. These are priced at $50 and up.

2. <u>**WRIST REST**</u>**:**

If a desk has edges that irritate the wrists and forearms, a wrist rest is recommended. A wrist rest can also possibly relieve aches and fatigue in the hands, arms, shoulders, and neck by increasing the support of the wrists and hands. A wrist rest will also help maintain a neutral posture in the wrists and arms.

Wrist rests are not for everyone. Generally, they are best used to rest upon when you pause between keystrokes, not while you are actively keying. Also, be certain that the wrist rest does not force you to reach uncomfortably far to access your keyboard. You may need a wrist rest if the hard edges of your desk irritate your wrists and forearms. For some, wrist rests can also relieve aches and fatigue in your hands, arms, shoulders and neck by increasing the support to your arms. Some people also use wrist rests to help maintain neutral postures in the wrist and arms. Be conscious of your overall function while in the chair. Fixating the arms or wrists maylead to increase strain in the small structures of the hands and in the neck & upper back.

Easy solution: Fold a hand towel to the same height as the keyboard. The towel may be taped to the desk so that it does not slip or fold. You may want to change the towel weekly because it will tend to compact and collect dirt and body oils. Additionally, most keyboards have legs in the back that can also change the angle of the wrist position. It is recommended that for one-third of the day, the legs be up, for another third of the day, the legs be down, and for another third of the day, a small increment of about 1/4 inch be placed at the front part of the keyboard to tilt the keypad up at the front. **Money solution:** Purchase a standard forearm support. These are priced at $15-$100.

3. <u>**DATA ENTRY**</u>**:**

Reading and writing on a flat surface will tend to put a posture of forward head, rotation and side bending to one side. The majority of the time this is done to the nondominant side. Prolonged use in this area may cause neck and upper back problems. **Easy solution:** Prop a clipboard at an angle against a thick book. The bottom edge of the clipboard may need to be taped so that it does not slide. **Money solution:** A copy holder that is upright or angled can be purchased in various sizes to hold a single page up to a book. Copy holders are priced at $19-$200.

4. <u>**DESK**</u>:
    A. Desk too high?

        A desk that is too high will usually cause a person to raise their chair height, which allows their feet to dangle and not touch the ground. This may allow one to feel unbalanced and compromise circulation in the feet. Furthermore, a desk that is too high may allow one to shrug their shoulders to reach the desk, straining the neck and upper back. **Easy solution:** Cut the legs down on the desk if possible. If not, the chair needs to be raised and a footrest needs to be established. A small step stool, a sturdy box, or a number of old phone books all make a good footrest. A footrest with increased surface area is best because it allows for an ease in foot placement underneath the desk. **Money solution:** Most office chairs have a pneumatic lift that adjusts the chair's height. A commercial footrest that angles and has a height adjustment will range in price from $30-$200. Additionally, a keyboard valet that lowers the keyboard may help with input and prevent the need of getting a chair that adjusts up, therefore, eliminating the footrest.

    B. Desk too low?

        A desk that is too low can force a person to slump or strain their entire back. The ideal desk is one that is just at or just above the elbow h eight. However, if much writing is done, the desk should be slightly higher than the elbow crease. For keyboard entry, the desk should be slightly lower than the elbow. Ideally, the person should fit their chair first before they fit the desk height. **Easy solution**: Place wood blocks under each of the desk legs. Stock lumber may already be at the correct height to maintain the proper height of the deck. Add layers as needed to adjust to the proper height. **Money solution:** Off-the-shelf desk raising devices arc available. They are easy to install and fit most desks. They range in price at $30-$100.

5. <u>**CHAIR**</u>:
    A. Chair too low?

        Sitting on a seat that is too low forces one to move into a forward head posture or slump position. This may strain the neck and upper back. Having a seat at the correct height will allow the feet to rest comfortably on the floor with the thighs and buttocks evenly and fully supported. **Easy solution**: Put a folded beach towel or slab of foam underneath the seat and secure it with tape. **Money solution**: Fabric covered seat cushions and wedges range in price from $15-$200.

5. <u>**CHAIR**</u>:
    B. Uncomfortable backrest?

The backrest on a chair should naturally follow the body contours. If it does not, it may tend to force the individual into a forward head or slumped posture causing strain on the neck and upper back. **Easy solution:** Roll a hand towel into a comfortable diameter and tape it accordingly. Then secure it to the back of the chair at a height that fits the small of the back. A small pillow could also be used. **Money solution**: There are severe portable lumbar supports commercially available with special straps for attachment. These range in price from $20 $200.

    C. Chair seat too long?

When the chair seat is too long the knees cannot be properly-positioned at a 90 degree fashion to allow the feet to sit comfortable on the floor. This forces the individual to slouch and strain the low back unless they are sitting at the edge of the chair seat. Sitting at the edge of the chair seat may cause fatigue and strain into the low back. **Easy solution:** Place a filler between the back and the chair's backrest. This can be a seat cushion, pillow, or towel. It should be the same thickness as the seat is long and can be padded to match the contours of the low back. **Money solution:** There are portable back supports commercially available that combine both space filler and contours for the back. They range in price from $20-$200.

    D. Ergonomic seating:

See "The Ergonomic Chair" handout for specifics on what makes a good ergonomically designed chair.

6. **MOUSE:**

A. Too much mouse movement?

Using a mouse requires repetitive shoulder and finger movements, which can irritate the shoulder, neck, and wrist areas. **Easy solution**: Switch to a track ball control. Using the track ball allows the individual to roll the fingers and the palm of the hand, allowing for easier and more fluid motions than the mouse. Additionally when using a track ball control, a wrist support is needed as when used in keyboard entry. The speed of the mouse may also be increased and there may be a loss of precision control with trackball use. This is useful if the individual works on a large of wide screen monitor. Some software packages help control the speed and some have a "ballistic gain" feature built in which causes the pointer to move further when the mouse is moved faster.

B. Hard to reach mouse?

The shoulder and neck can be strained if the individual has to reach too far for the mouse. Frequent movement between the mouse and keyboard can also cause excessive strain. **Easy solution:** Switch to a track ball control. There is less shoulder movement and less reach is needed. Additionally, the mouse can be moved closer to the keyboard. This may be a problem if the keyboard sits in a tray, which has no room for a mouse. A small keyboard platform may also have accommodation for a mouse or a track ball.

C. Clicking difficulty?

Repeated button clicking can lead to arm and finger fatigue and pain. This is evident in high incidences of data entry. **Easy solution**: Switch to a mouse or track ball that requires less force to activate a button. (Example: Microsoft mouse) Additionally, the mouse can be setup so that the hands are alternated for use. Furthermore, a pointing device or software with a drag lock feature such as Mac Power Click software or Kensington Thinking Mouse can be used. These devices allow you to click on an object and the computer software holds the object for you without having to keep the button depressed.

D. Pointing device size?

The pointing device can be too big or too small depending on the size of one's hands. This can cause strain on the ring or pinkie fingers. For persons having small hands, a pointing device wider than 2-4 inches or a three-button pointing device may be too large. **Easy solution:** If a smaller pointing device is needed, try switching to a narrower profile mouse or a pointing pen. Additionally, one may switch to a track ball control. Furthermore, if a pointing device is used, try not to keep the hand on it when not in use.

6.   <u>**MOUSE**</u>**:**

      E. Rest:

Repetitive extension of the fingers and hands or continuous holding of the fingers and hands suspended over the pointing device can lead to elbow, forearm, and shoulder figure and soreness which may also lead to additional neck pain. **Easy solution**: Rest the fingers gently on the pointing device to take the load off the hand and tendons. Additionally, use a forearm rest or wrist rest to take-pressure off and put the hand in a more neutral position.

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Routine For: ERGONOMIC INSERVICE STRETCHING PROGRAM   Oct 15, 2008
Created By: JON NETTIE, PT

CERVICAL SPINE - 23
Flexibility: Upper Trapezius Stretch

1) Gently grasp side of head while reaching behind back with other hand. Tilt head away until a gentle stretch is felt.

2) Place hand at crown of head, gently bend neck forward and then rotate away.

Hold __30__ seconds. Repeat __3__ times to each side.
Do _____ sessions per day.

CERVICAL SPINE - 24
Flexibility: Corner Stretch

Standing in corner with hands at shoulder level and feet __2__ in. from corner, lean forward until a comfortable stretch is felt across chest. Hold __30__ seconds.

Repeat __3__ times.
Do _____ sessions per day.
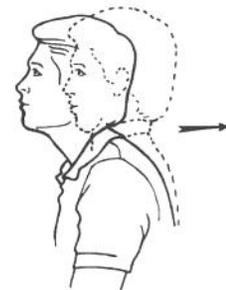
CERVICAL SPINE - 29
Chest/Bicep Stretch

Lace fingers behind back and squeeze shoulder blades together. Slowly raise and straighten arms.
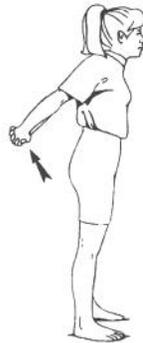
Hold __30__ seconds.
Repeat __3__ times per set.
Do _____ sets per session.
Do _____ sessions per day.

CERVICAL SPINE - 25
Flexibility: Neck Retraction

Pull head straight back, keeping eyes and jaw level.
Hold __5__ seconds.

Repeat __10__ times.
Do _____ sessions per day.
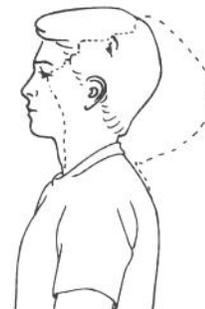
CERVICAL SPINE - 1
AROM: Neck Rotation

Turn head slowly to look over one shoulder, then the other.
Hold __5__ seconds.

Repeat __3__ times.
Do _____ sessions per day.

CERVICAL SPINE - 4
AROM: Neck Extension

Bend head backward, and return to starting position.
Hold __5__ seconds.

Repeat __3__ times.
Do _____ sessions per day.

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Routine For: ERGONOMIC INSERVICE STRETCHING PROGRAM   Oct 15, 2008
Created By: JON NETTIE, PT

HAND - 13
Wrist Flexor Stretch

Keeping elbow straight,
grasp involved hand and
slowly bend wrist back-
ward until a stretch is felt.
Hold __30__ seconds. Relax.

Repeat __3__ times.
Do _____ sessions per day.

HAND - 14
Wrist Extensor Stretch

Keeping elbow straight,
grasp involved hand and
slowly bend wrist down
until a stretch is felt. Hold
__30__ seconds. Relax.

Repeat __3__ times.
Do _____ sessions per day.

ELBOW STRETCH

Make a fist. Bend wrist down toward palm. Reach behind
you while straightening out your elbow. Stretch is felt in the
upper forearm, near the elbow.

Hold 30 seconds, repeat 3 times

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Routine For: ERGONOMIC INSERVICE STRETCHING PROGRAM   Oct 15, 2008
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BACK - 33
Hamstring Stretch

DONE IN SITTING: Sit at edge of chair and reach down
along leg until a comfortable stretch is felt in back of thigh.
Be sure to keep knee straight. Keep curve in the low back.

Hold __30__ seconds. Repeat __3__ times with each leg.
Do _____ sessions per day.

BACK - 44
Standing Backward Bend

Arch backward to make
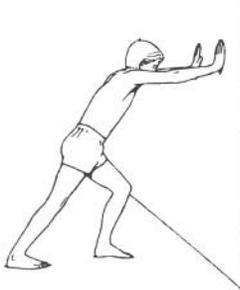hollow of back deeper.
Hold _5-30_ seconds.

Repeat __3__ times per set.
Do _____ sets per session.
Do _____ sessions per day.

ANKLE / FOOT - 14
Gastroc Stretch

Stand with involved foot
back, and leg straight.
Keeping heel on floor
and turned slightly out-
ward, gently lean into wall
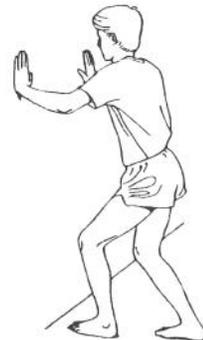until stretch is felt in calf.
Hold __30__ seconds.

Repeat __3__ times.
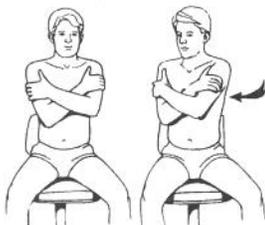Do _____ sessions per day.

ANKLE / FOOT - 13
Soleus Stretch

Stand with both knees bent
and involved foot back.
Keeping heel on floor and
turned slightly outward,
gently lean into wall until
stretch is felt in lower calf.
Hold __30__ seconds.

Repeat __3__ times.
Do _____ sessions per day.

BACK - 37
Lumbar Rotation in Sitting

Gently rotate trunk from side to side in a small, pain-free
range of motion. (Can also be done in standing.)

Repeat __10__ times per set. Do _1-2_ sets per session.
Do _____ sessions per day.

HIP / KNEE - 34
Stretching: Hip Flexor Stretch

Slowly rotate pelvis forward while slightly arching back.
Lunge forward until a stretch is felt on front of hip. Hold 30
seconds.

This can also be done in standing. Place a foot onto your
chair and repeat as above from the part of rotating your
pelvis forword.

Repeat __3__ times. Do _____ sessions per day.