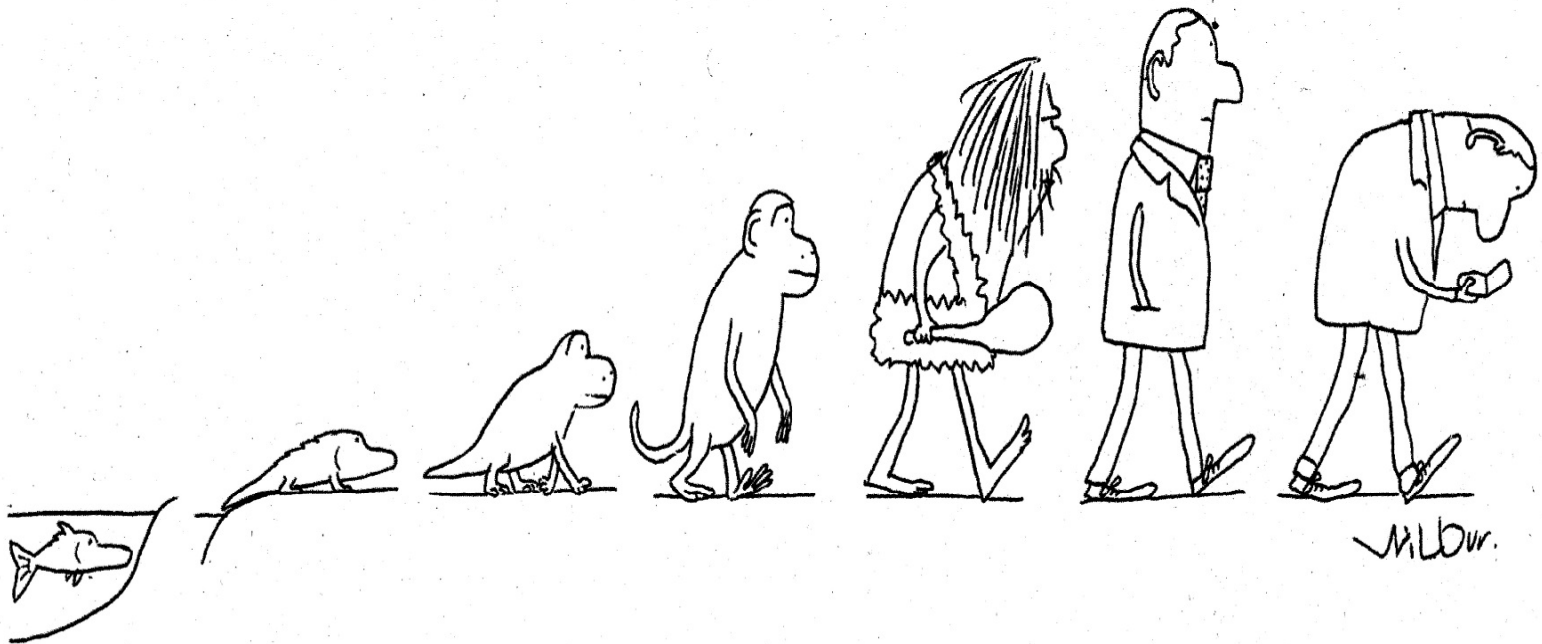




or

Staying in Line with the Digital World



Beth Colbert, OTR-CHT, Kathy Rake, OTR-CHT, Chris Ross, PT



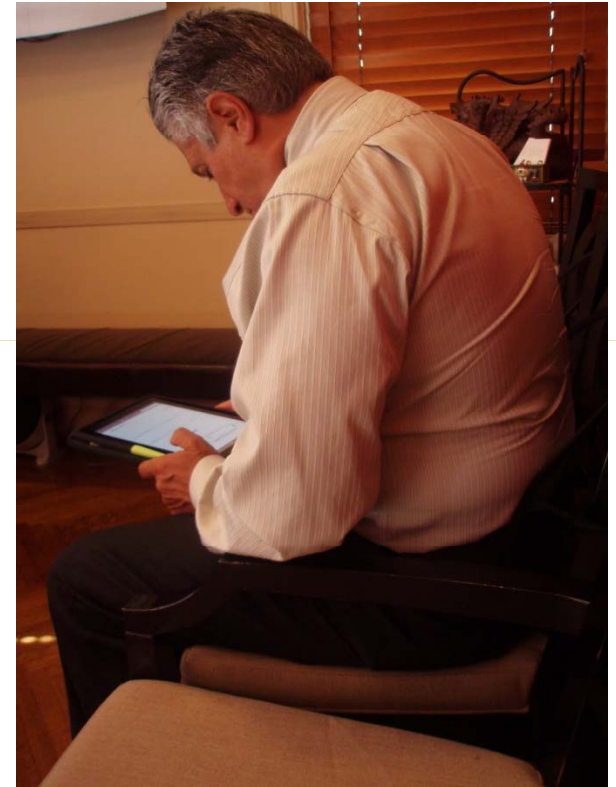
Objectives

- Participants will gain understanding of the basic anatomy of the spine, the wrist and hand as it relates to **The digital world**
- Participants will gain insight into the risks related to prolonged and repetitive use of technical devices
- Participants will gain knowledge and specific techniques for injury prevention

Technology, and the effects on our posture, does not discriminate in sex or age.



Cellular Phones



Tablets and computers

Postural awareness:
take a picture (with your phone OF COURSE)

We are beginning to see, much more regularly, injuries to the spine and extremities that are caused by an increase in use of desk top and lap top computers, tablets and smart phones. These injuries result from prolonged use in inappropriate positions. These “injuries” caused by poor postural positions are similar to work related injuries.



Dental hygienists



Administrative work



Texting

Your neck



Construction work

Office work

Your back



Landscaping

Texting....AGAIN

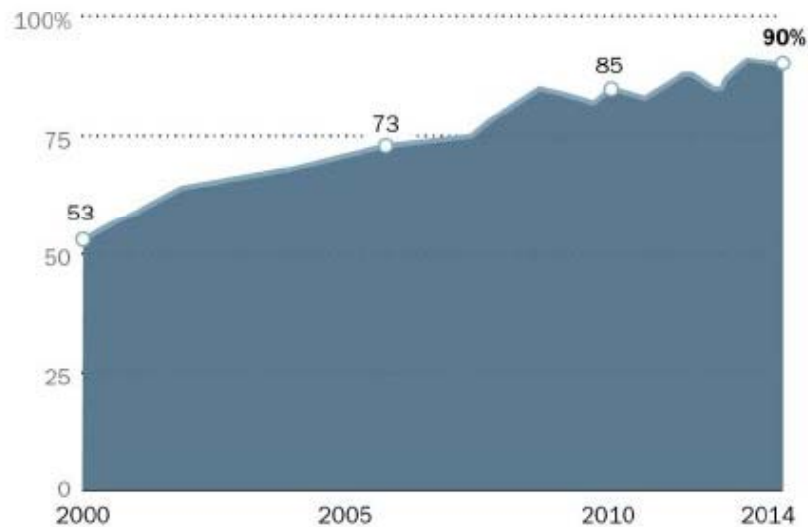
Your fingers and wrist

How many of us are using

(Sounds like a drug addiction, right???)

Cell phone ownership, 2000-2014

% of American adults who own a cell phone, over time

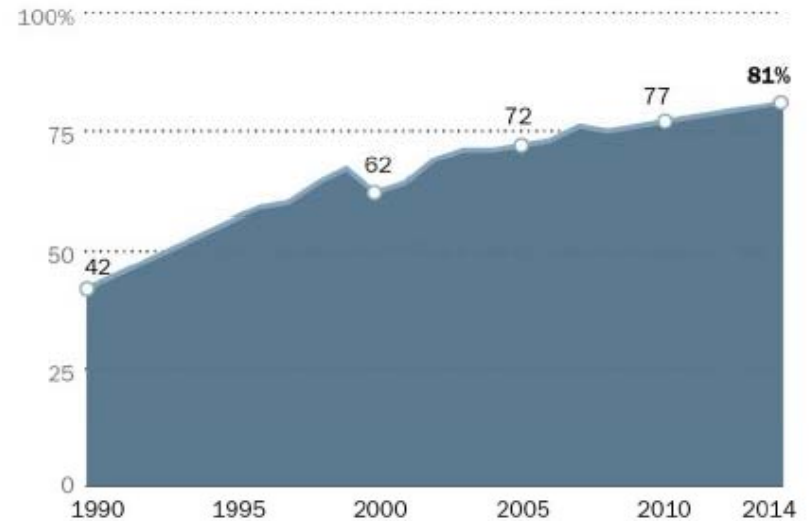


Source: Pew Research Center Internet Project surveys, 2000-2014.

PEW RESEARCH CENTER

Computer use, 1990-2014

% of American adults who use computers, over time



Source: Pew Research Center Surveys, 1990-2014

PEW RESEARCH CENTER

Cell phones/Smart Phones

Laptops/desktops/tablets
E-book readers

Who's using

(Don't be shy, we all use)

Cell owners in 2014

Among adults, the % who have a cell phone

All adults	Have a cell phone 90%
Sex	
a Men	93 ^b
b Women	88
Race/ethnicity*	
a White	90
b African-American	90
c Hispanic	92
Age group	
a 18-29	98 ^{cd}
b 30-49	97 ^{cd}
c 50-64	88 ^d
d 65+	74
Education level	
a High school grad or less	87
b Some college	93 ^a
c College+	93 ^a
Household income	
a Less than \$30,000/yr	84
b \$30,000-\$49,999	90
c \$50,000-\$74,999	99 ^{ab}
d \$75,000+	98 ^{ab}
Community type	
a Urban	88
b Suburban	92
c Rural	88

Source: Pew Research Center Internet Project Survey, January 9-12, 2014. N=1,006 adults. Note: Percentages marked with a superscript letter (e.g., ^a) indicate a statistically significant difference between that row and the row designated by that superscript letter, among categories of each demographic characteristic (e.g., age).

* The results for race/ethnicity are based off a combined sample from two weekly omnibus surveys, January 9-12 and January 23-26, 2014. The combined total n for these surveys was 2,008; n=1,421 for whites, n=197 for African-Americans, and n=236 for Hispanics.

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Computer users in 2014

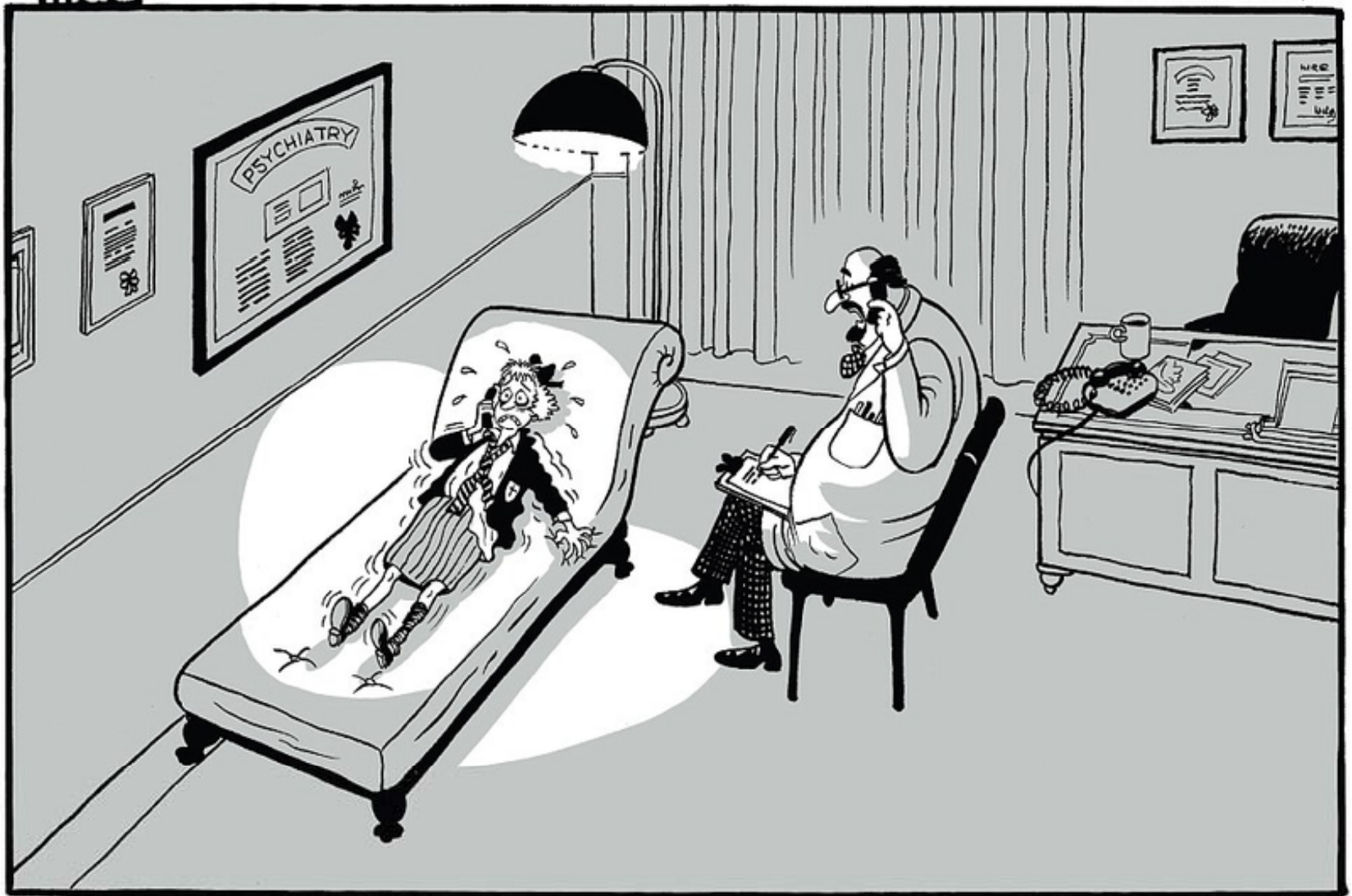
Among adults, the % who use computers at workplace, school, home, elsewhere

All adults	Use computers 81%
Sex	
a Men	80
b Women	81
Race/ethnicity	
a White	83 ^c
b African-American*	77
c Hispanic	71
Age group	
a 18-29	89 ^d
b 30-49	86 ^d
c 50-64	84 ^d
d 65+	56
Education level	
a High school grad or less	66
b Some college	89 ^a
c College+	94 ^{ab}
Household income	
a Less than \$30,000/yr	65
b \$30,000-\$49,999	84 ^a
c \$50,000-\$74,999	92 ^{ab}
d \$75,000+	96 ^{abc}
Community type	
a Urban	81
b Suburban	81
c Rural	79

Source: Pew Research Center Internet Project Survey, January 9-12, 2014. N=1,006 adults. Note: Percentages marked with a superscript letter (e.g., ^a) indicate a statistically significant difference between that row and the row designated by that superscript letter, among categories of each demographic characteristic (e.g., age).

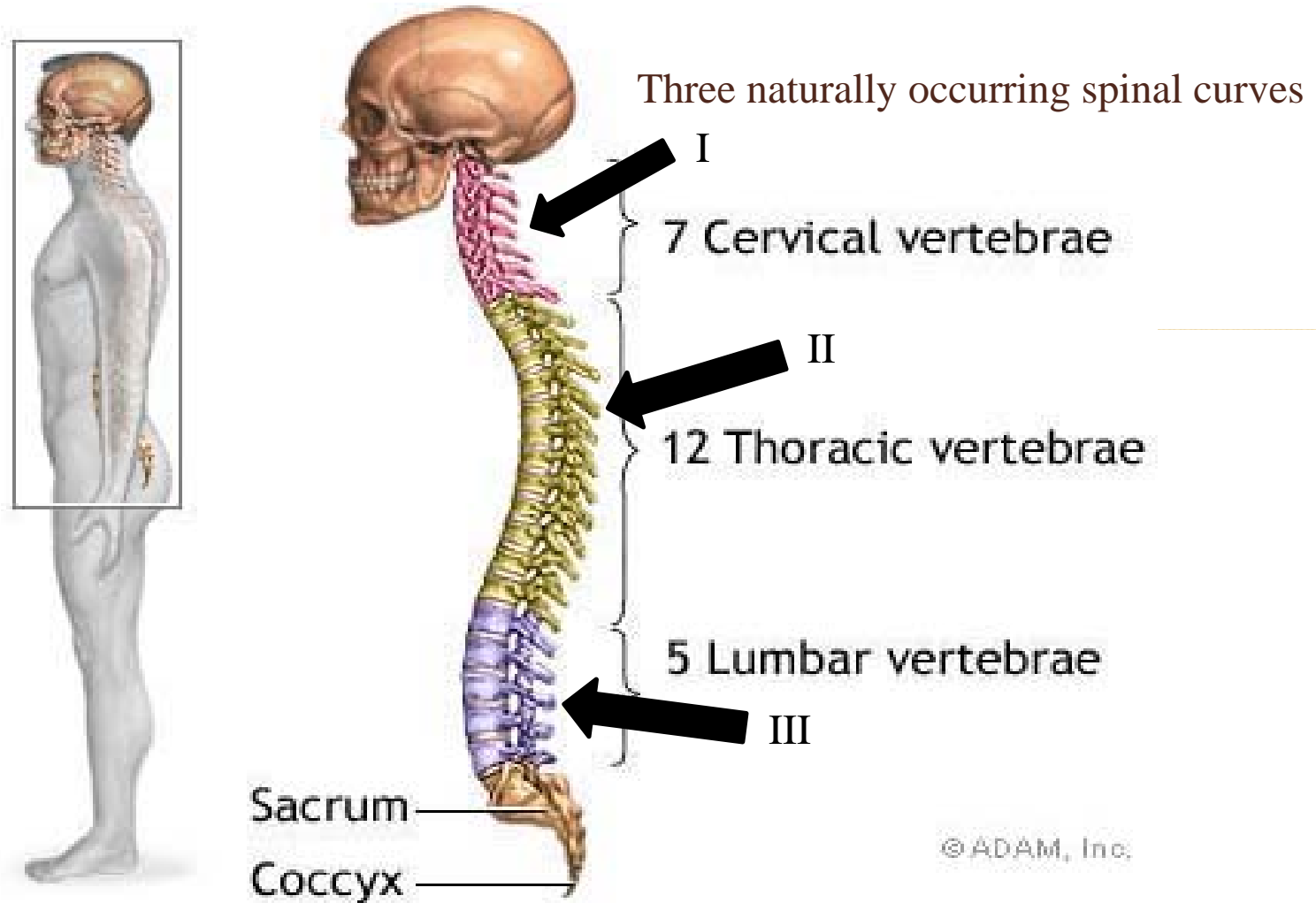
* n=94 for African-Americans

PEW RESEARCH CENTER

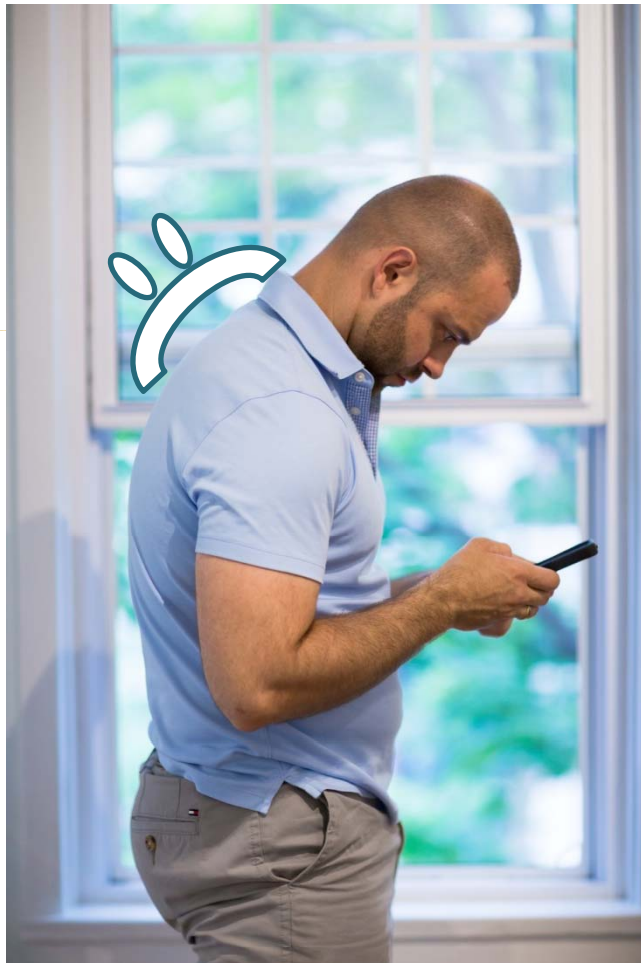


'Trust me. If they do ban mobile phones in schools, you will gradually learn to speak without one.'

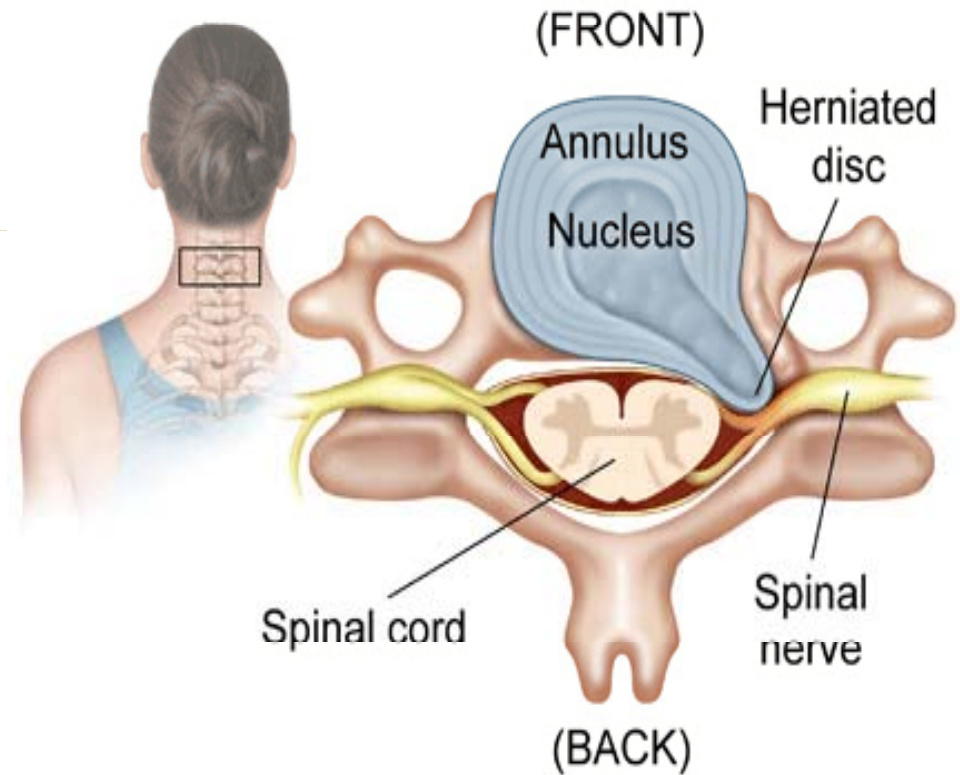
How does it affect our Neck and Back



Posture affecting neck

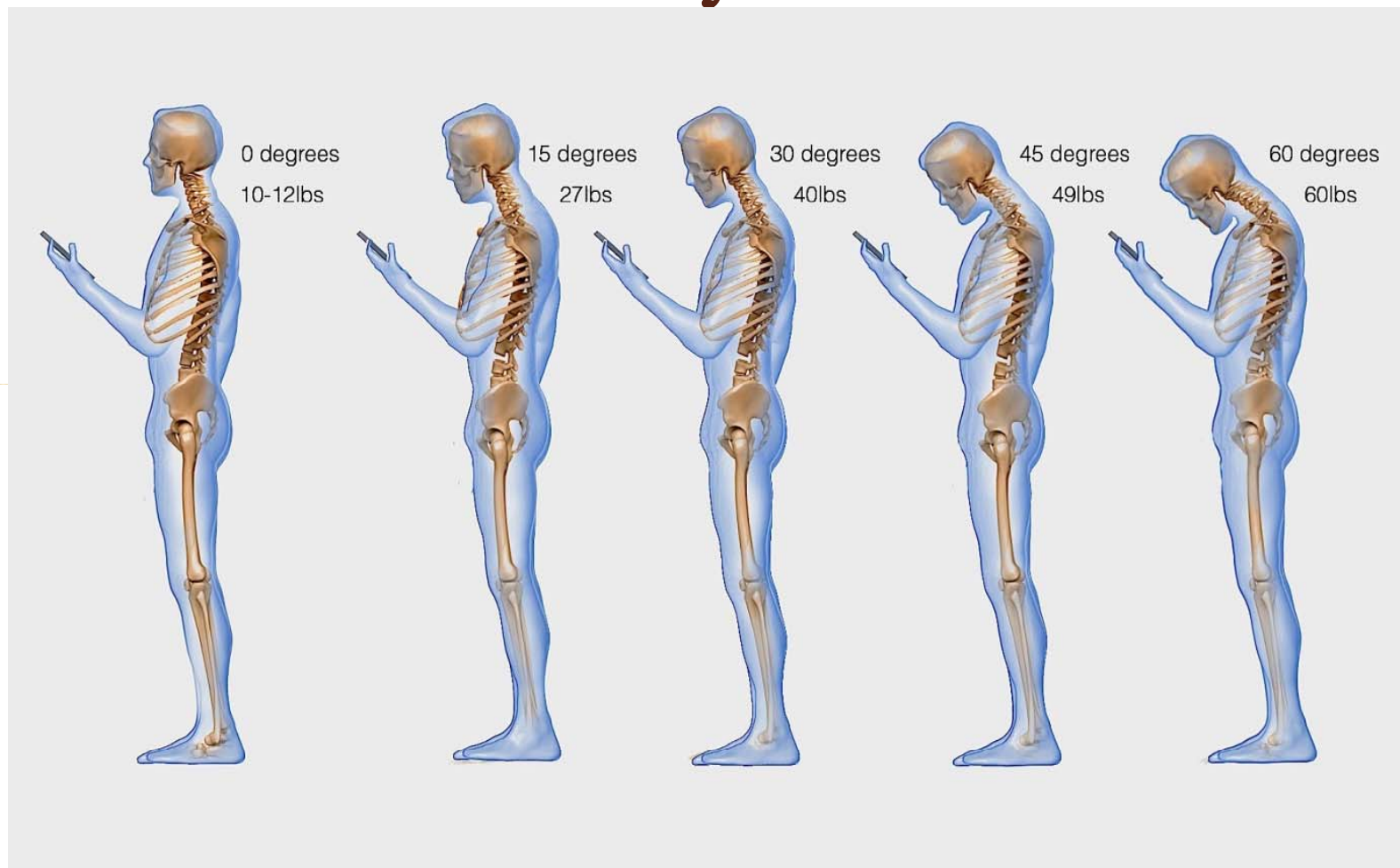


Mechanical effect



This is not unordinary posture, but it is the length of time we spend in these positions that jeopardize the soft tissue of our spine.

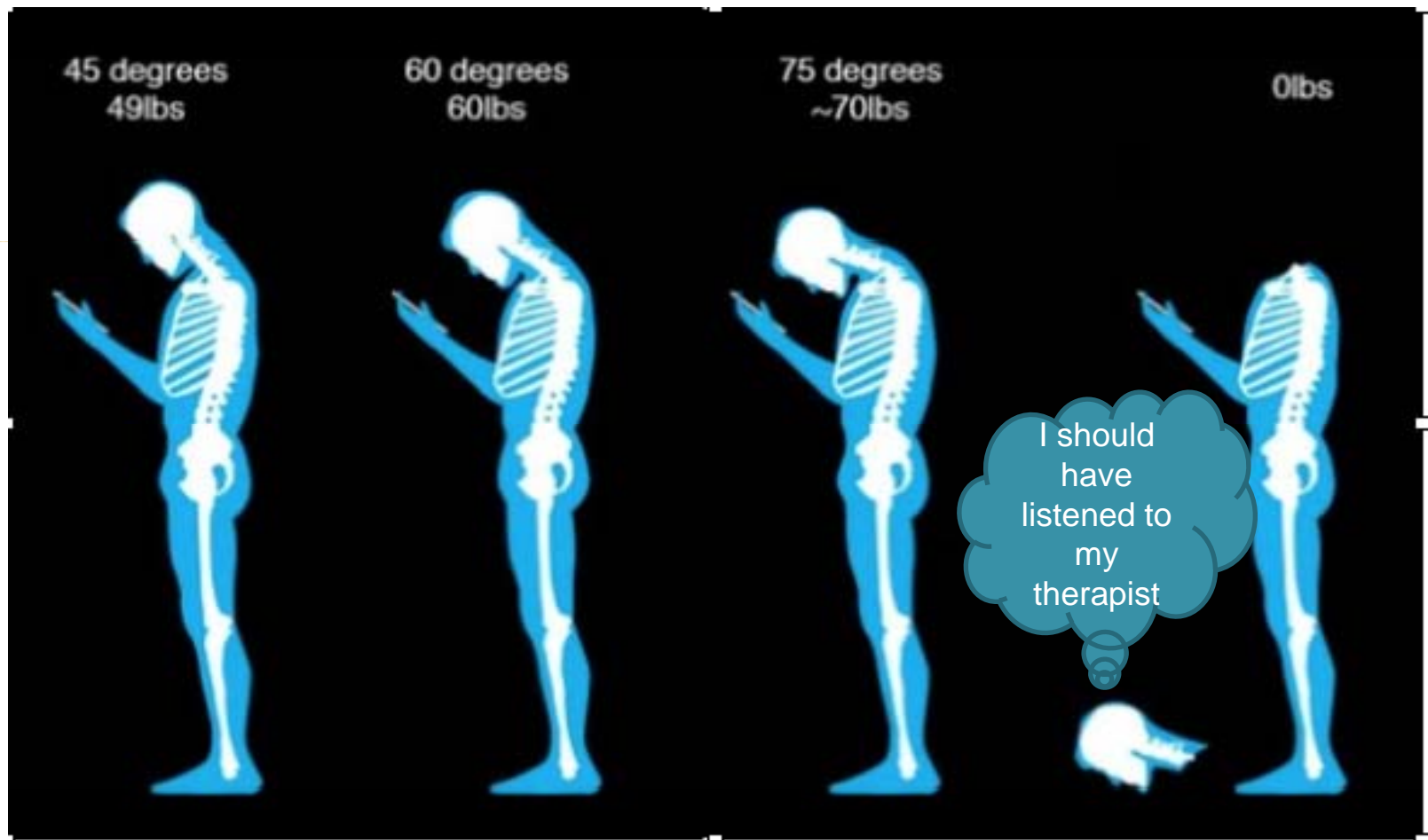
Stress on your neck



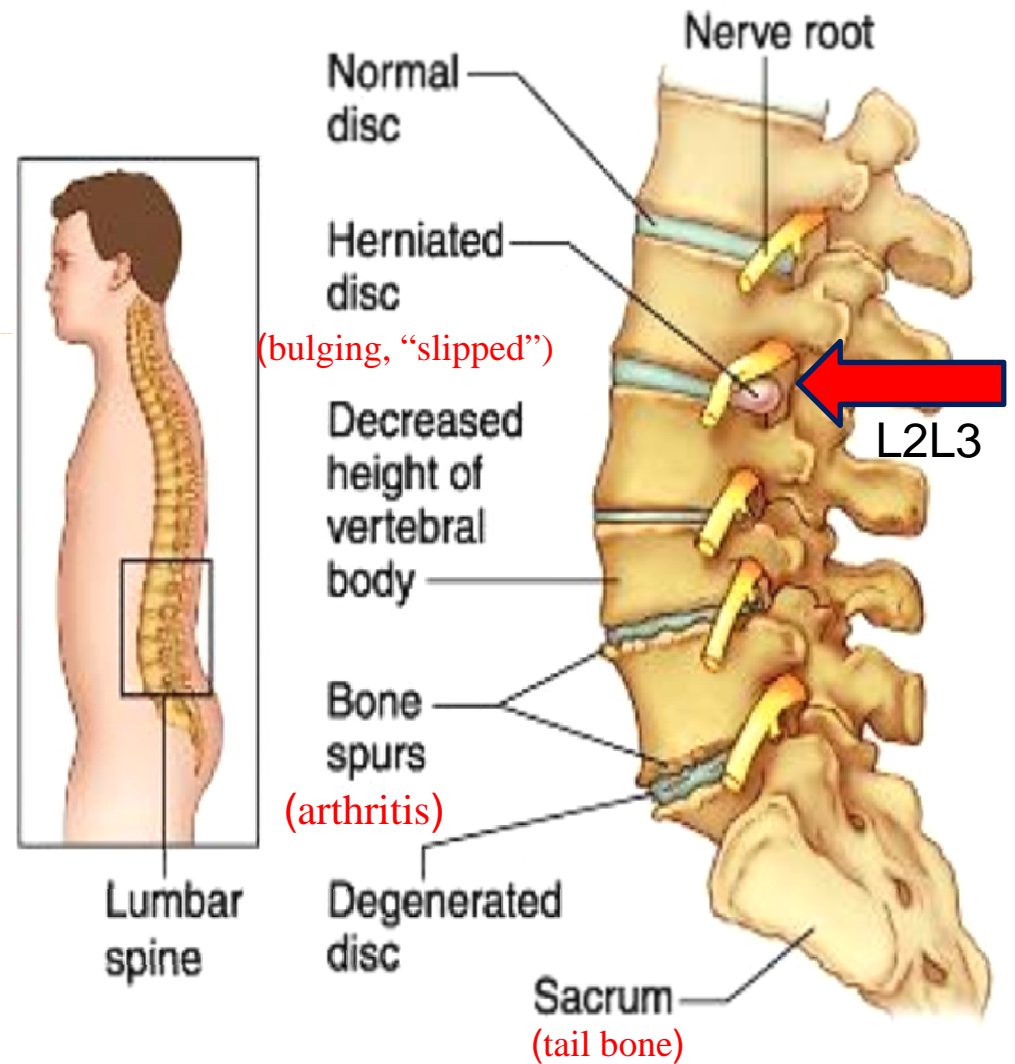
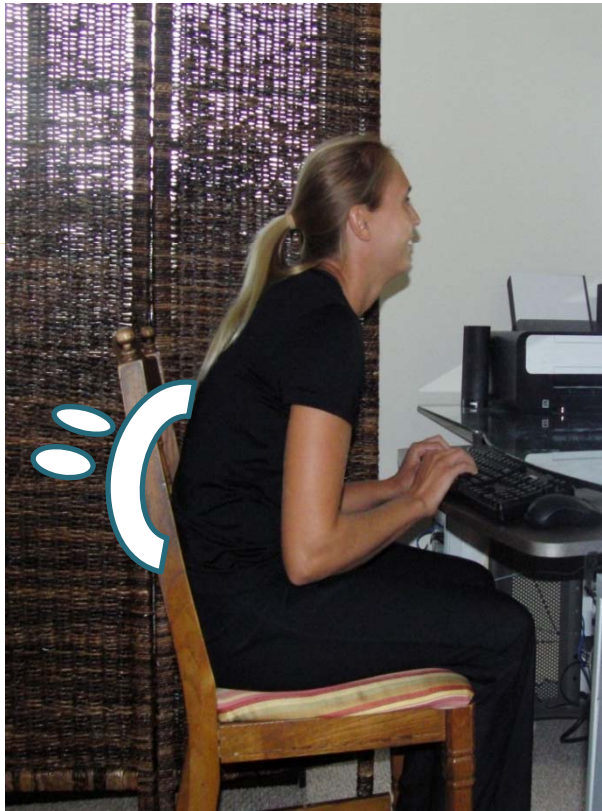
With every 15 degrees of forward neck bend there is an accompanying
10-15 pounds of force applied to the structures in the neck

Dr. Kenneth Hansraj/Surgical Technology International 25th Edition; Assessment of Stresses in Cervical Spine Caused by Posture of the Head

Or..... Losing your head over your phone.

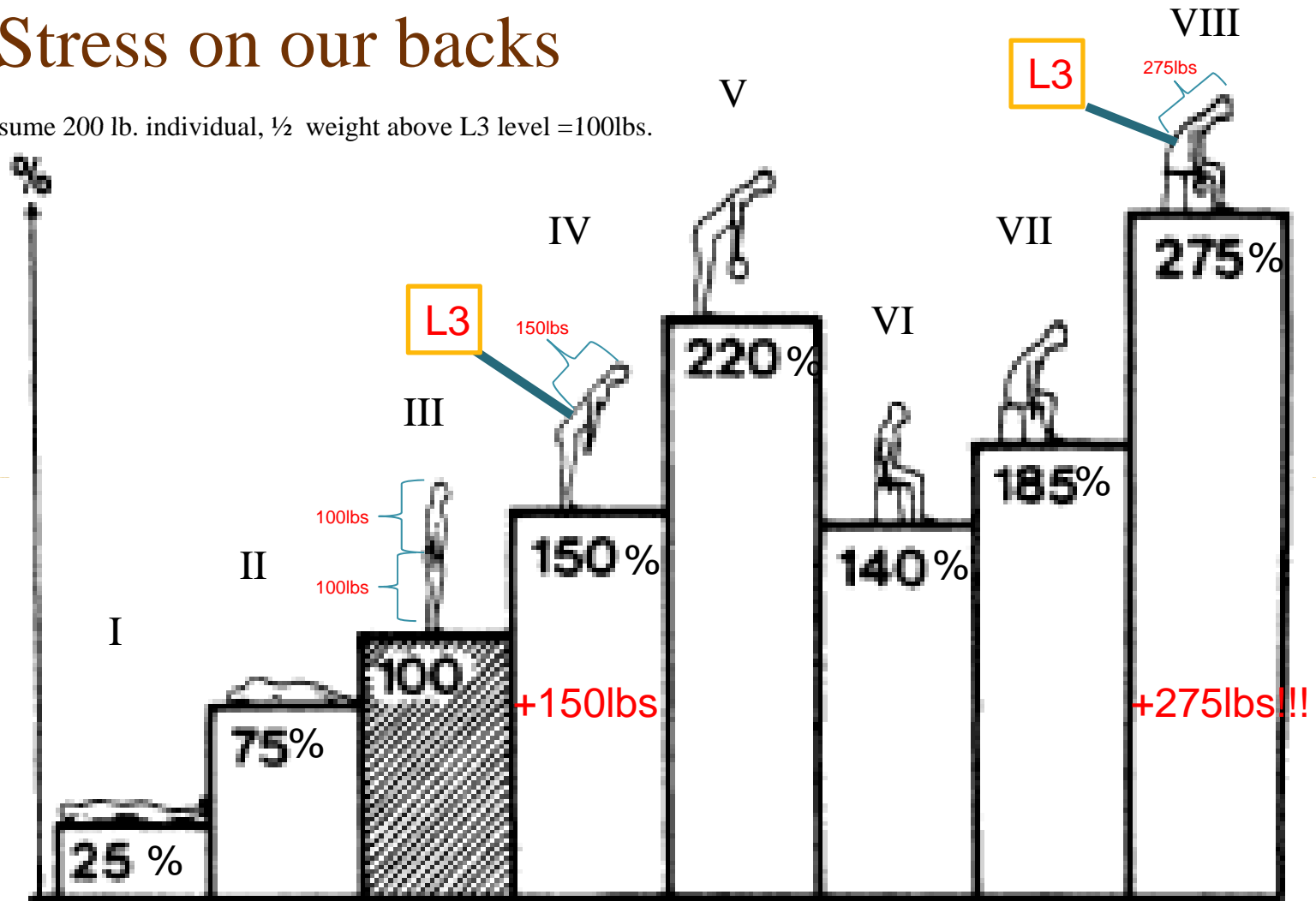


Posture affecting back



Stress on our backs

Assume 200 lb. individual, $\frac{1}{2}$ weight above L3 level = 100lbs.



Percentage increase in lumbar disc pressure (L3) with positional changes in back.
(accounting for the body weight above the L3 level)

Jensen, Gail; Phys Ther. 1980, 60: 765-773 Biomechanics of the Lumbar Intervertebral Disk: A Review

Nachemson A: The load on lumbar discs in different positions of the body. Clin Orthop 45:107-122, 1966



How Do You Correct

Stop the

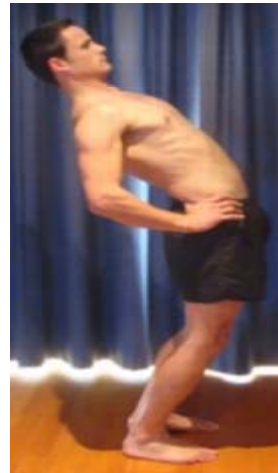


'y posture

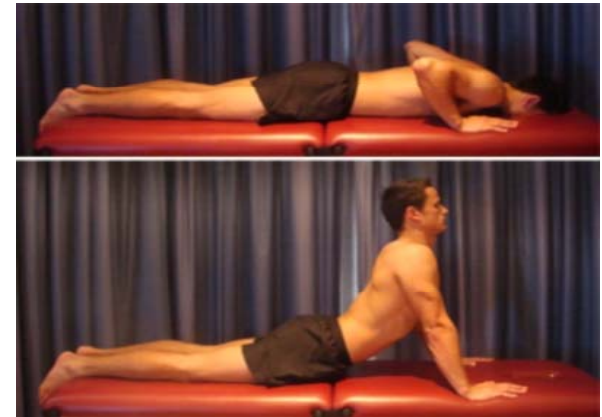
Sitting with lumbar support



Frequently restore the curves in your neck and back



or



Modifying our Activities

- Reduce the over use

Adopt usage time limits



- Re-positioning

- *Change position regularly

- *Stand

- *Walk away

- *Straighten up

Conclusion

- Change your (poor) habits:

 - Limit your time

 - Positioning of your electronic device



- Healthy activities

 - Flexibility and strength exercises

Wrist Pain, Hand Pain , and Thumb Pain - Oh My!

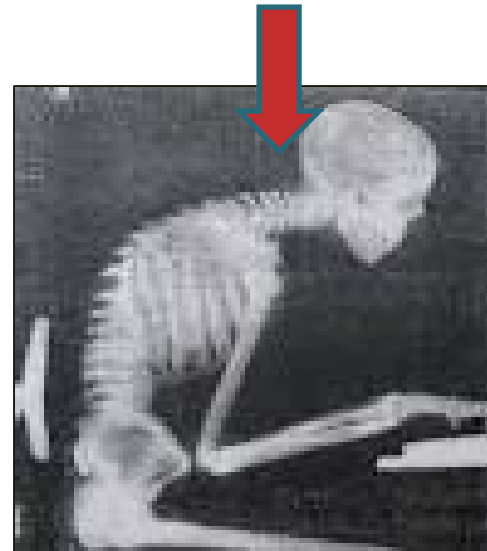


How our “High Tech” World Affects
our Upper Extremities

- Poor Posture not only affects your neck and back, it can also cause nerve impingement , muscle tension , and altered motions of the arm.




So stress and tension here:



Can cause pain , numbness, or feelings of weakness here.



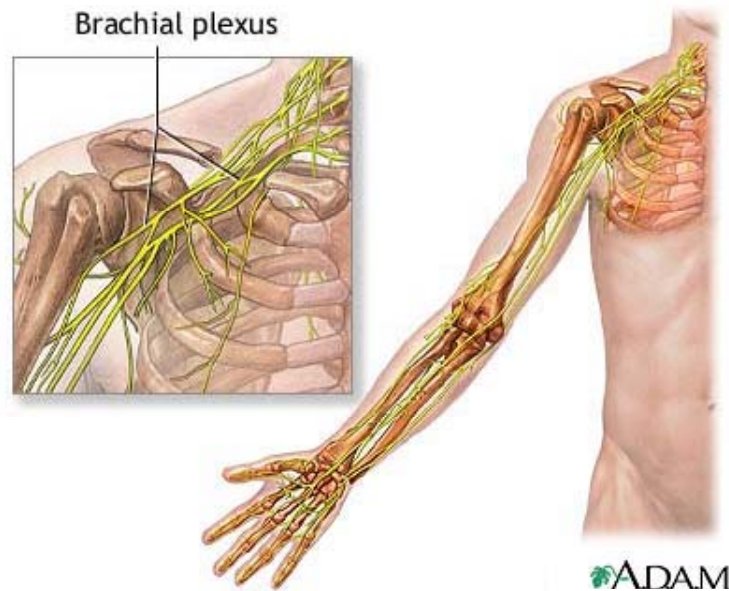


Upper Extremity problems that can be caused by faulty ergonomics and repetitive strain:

- Thoracic Outlet Syndrome

- Cubital and Carpal Tunnel Syndromes
- Tendonitis
- Arthritic changes in base of the thumb

Thoracic Outlet Syndrome, Cubital Tunnel Syndrome, and Carpal Tunnel Syndrome are usually caused by pressure on nerves at various points along the neural pathways. Poor posture , poor ergonomic design and repetitive motions can be contributing factors.



Devices that can lead to Upper Extremity Problems:

- Desk Top Computers
- Laptop Computers
- IPads, Tablets, Notebooks
- Cell phones, smart phones



Desk Top Computers

- If a large percentage of your day is spent at a computer, an ergonomically correct set up is vital to your arm and hand health.
- Your computer and desk are your “equipment” for your job as much as a backhoe is to a construction worker.
- You have a right to work with the appropriate equipment! (You wouldn't ask the construction worker to dig the hole with a spoon, would you?)



What an Ergonomically correct workstation should look like.





Desk considerations:

- Appropriate work height: You should be able to work with shoulders relaxed, not hiked up , or drooped down
- Desk should have a rounded edge, not a sharp one
- Computer monitor should be at eye level so neck stays in good position
- An eye level document holder next to the screen may be helpful.

How Many Things are Wrong Here?



Chair Considerations

- Good back support is essential; look for a chair with a curved lumbar support , or use a lumbar cushion or insert.



Good back support will help with upper body posture

- Your chair should also have armrests so that the weight of your arms is not continually dragging on the shoulder and neck area.
- Armrests should be generously padded so there is not too much pressure at the back of the elbow.



Keyboard considerations:

- Keyboard should be positioned so hands are even with, or slightly bent down from the forearms. Hands should never be higher than the forearms.

- What's wrong here?



- Hands should never rest on the desktop as you are keying; a foam wrist rest can be used to rest wrists on as you take breaks between tasks.

➤ If keyboard work makes up a large percentage of your work, consider trying an ergonomic keyboard. Typically this type of keyboard is split and angled to decrease tension on forearms and wrists.



Angled position of wrists on typical flat keyboard



Split and angled ergonomic keyboard will keep wrists in better anatomical position



There are several types of ergonomic keyboards available on the market.

A word about mice

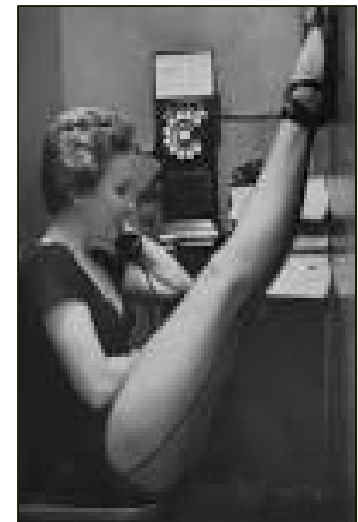


- Many types of ergonomic mice exist. Most are designed to put the wrist in a more neutral position and to reduce stress on joints and tendons of the index finger which is most often used for clicking.



If “mousing” is a large component of your job tasks or computer use, consider looking into an ergonomic mouse. Your local office supply store may be able to help you select one to meet your preferences and your needs.

- In summary , good ergonomics is highly important for preventing injury, but even with a good ergonomic set up, remember to stretch frequently, and alternate sitting and standing as often as you can.



LAPTOPS are...

- Portable.....YES
- Convenient.....YES
- Full of Ergonomic IssuesYes, Yes,
Yes, Yes, Yes, Yes, Yes, Yes, Yes, Yes



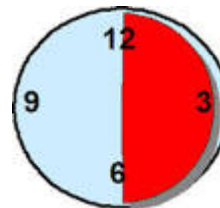
- Think about how and where you are using your laptop: on your lap? In bed? on a coffee table or cafeteria table?



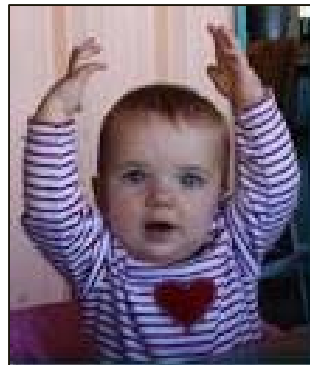
- Brief use of the laptop in these positions is okay, but if you will be working for several minutes to hours, try to make your laptop set up as much like a desktop set up as possible.
- A docking station with an external keyboard and external mouse is the ideal.



- If there is no good alternative to improving your set up, do a quick task analysis.
- If you will be doing mostly **reading**, position the laptop for good **monitors** height to reduce neck and eye strain.
-
- If mostly **keying**, position laptop for good **keyboard** position.
-
- If it is an even mix, default for good keyboard position and make sure you are taking frequent posture and UE stretch breaks. Every 20 - 30 minutes is recommended.

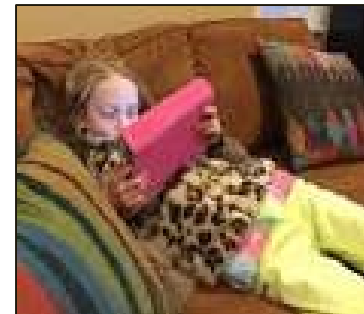


Examples of upper extremity stretches ~



Even Higher Tech! iPads, Tablets and Notebooks

- The size and convenience of these devices make them even more portable and easier to use anywhere, inviting poor posture and positioning.



- Frequently holding your device with a side, or lateral pinch can lead to pain and irritation at the base of the thumb.



- Brief intervals in these less than optimal positions are okay, but if you are using your device for long periods or heavy workloads, try these positioning tips:
- Screen should be vertical so use an easel prop or docking station
- Use an external keyboard and mouse



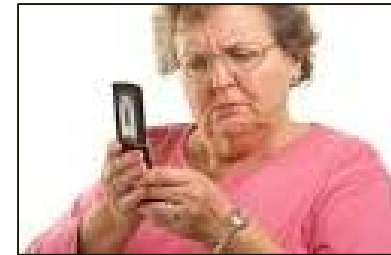
- If holding the device even for short term use, try to keep the wrist straight, or in neutral alignment to decrease stress on tendons and ligaments.



- Avoid prolonged side , or lateral, pinch to hold the device.

The pitfalls of Texting! (yes, there are more than one!)

- Some studies have shown that for many people over 80% of their cell phone use is spent texting.



- Postural Issues that were previously covered are certainly a concern.
 - You also need to consider the stresses put on the smaller joints and tendons of the thumb.
-



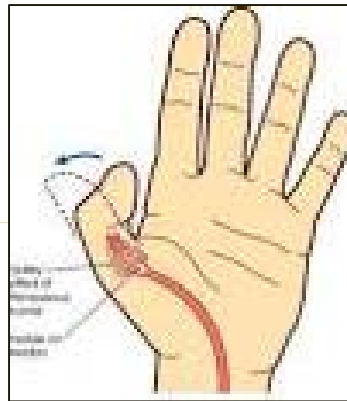
“Texting Thumb”

- Problems occur from the unnatural motion, and the frequency of motions of the thumb.
- This can cause :
- DeQuervains Tendonitis

DeQuervains Tendonitis is inflammation of the tendons that move the thumb out away from the hand. Primary symptom is pain on the thumb side of the wrist.



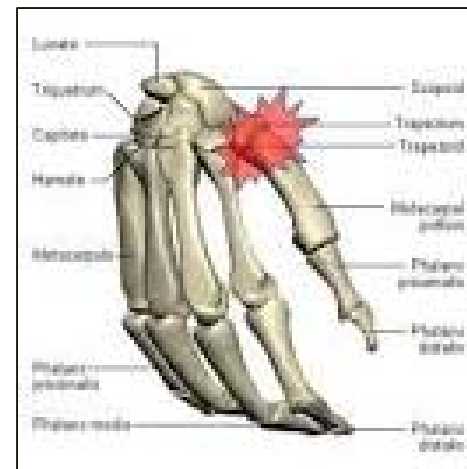
➤ Trigger Thumb (tenosynovitis)



Inflammation of the flexor tendon of the thumb will cause catching or “triggering” of the tendon on a band of tissue at the base of the thumb when you are bending and straightening the thumb.

Thumb Arthritis

Repetitive stress through the lower joint (carpometacarpal joint) of the thumb can eventually lead to arthritic changes . Primary symptom is pain most notably with tip pinch and lateral pinch.





Tips for healthy texting:

- Reduce the number of keystrokes by keeping messages brief.
- Take advantage of word prediction or completion tools that may be available on your phone.
- Choose a device with a full keyboard rather than one with 3 letters to a key

- When possible , rest your thumb by using other fingers to key.



- Stretch hands and arms frequently
- And last but not least.....

- It may be old fashioned, but try making an actual phone call now and then ~



- Keeping fit and active is always a key to healthy living in our high tech world that can lead to a more sedentary lifestyle.



<https://www.youtube.com/watch?v=ZLwIP8cBaWA>

<https://www.youtube.com/watch?v=4FBMWGGJMbY>

Remember – be proactive about preventing injuries!

Even in our high tech world, an ounce of prevention is worth 10 pounds of cure!!!



May you have happy and healthy hands !



Q and A

