



Be kind to your spine -

Strategies to reduce musculoskeletal stress

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Objectives

- ▶ recognize the impact of the digital epidemic on head postures
- ▶ discuss different postural challenges between among dental workers
- ▶ compare stressful clinical postures to safer neutral positioning
- ▶ identify how magnification, illumination, and non-traditional seating can reduce MSD risks
- ▶ create a personal “be kind to your spine” strategic plan

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There is just so much to know!



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The spine

Digital epidemic

Relative risk

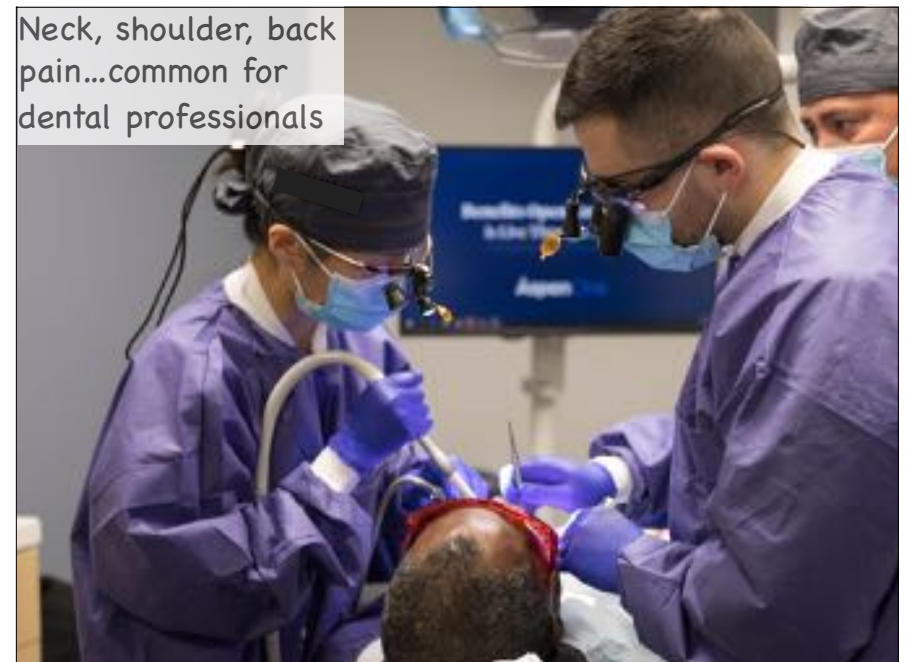
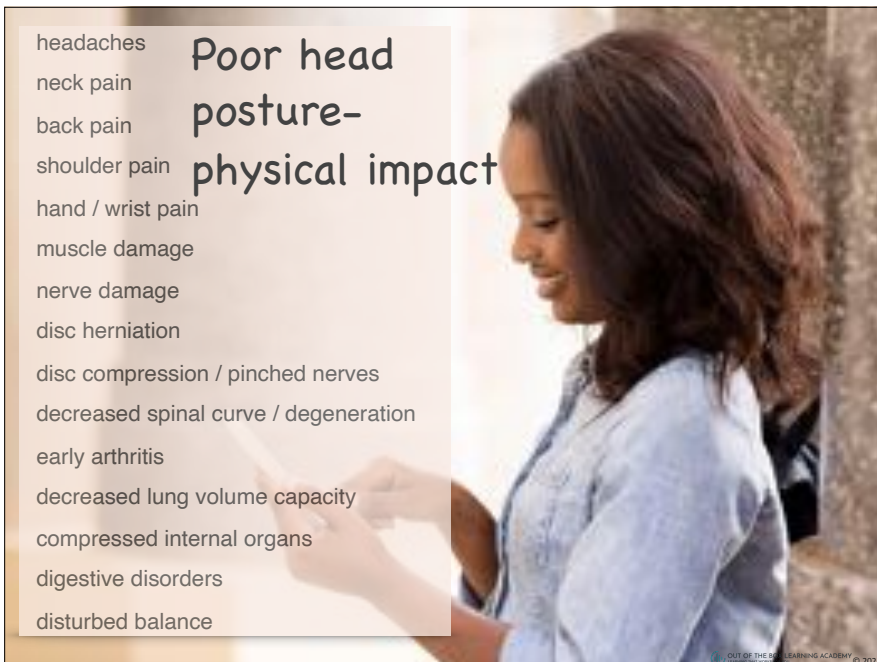
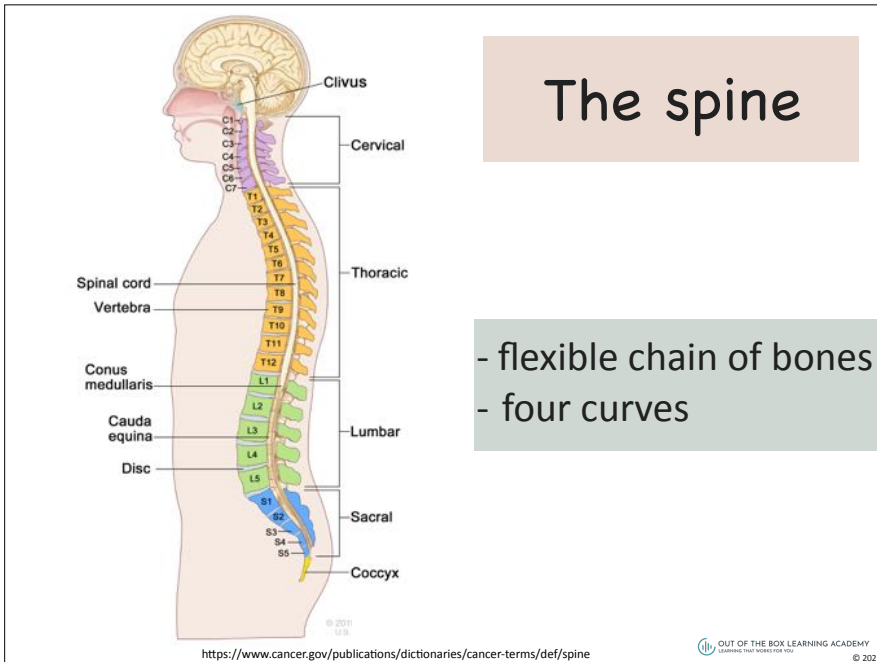
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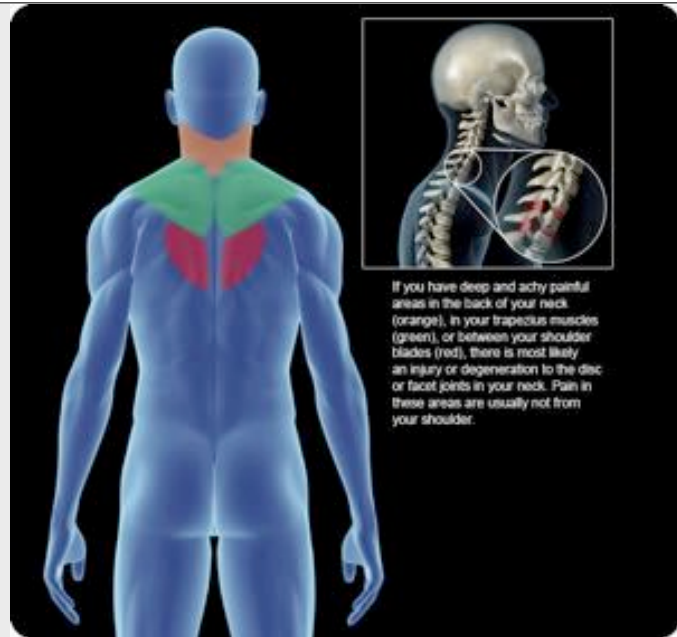


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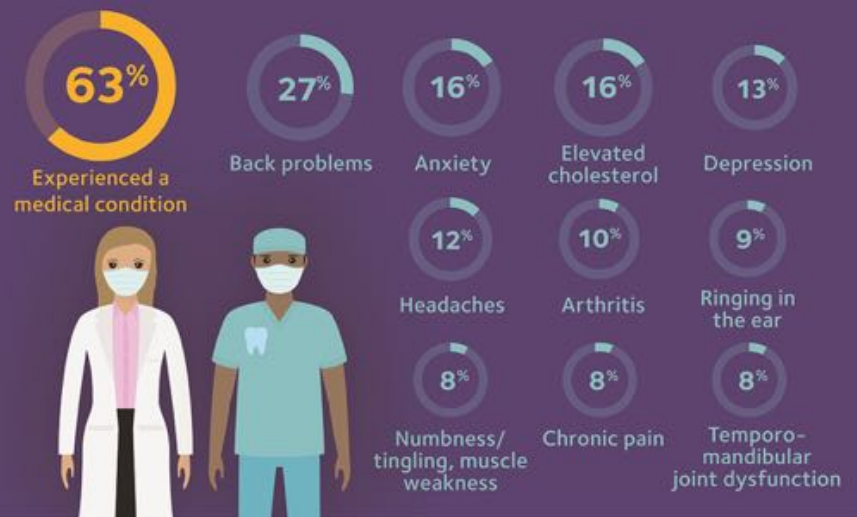
ADA survey of dentists 2007- primary pain sites



2007 Survey of current issues in dentistry-Physical Well-Being, November 2008. ADA.

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COMMON MEDICAL CONDITIONS



Source: ADA 2021 Dentist Health and Well-Being Survey Report

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Dentists – 2021 data



- ▶ 27% - back problems
- ▶ most reported issue

ada.org/publications/ada-news/2022/february/dentist-health-and-well-being-survey-report-finds-dentists-struggle-with-anxiety © 2023 OUT OF THE BOX LEARNING ACADEMY



Dental hygienists' work settings



- ▶ solo - no assistant
- ▶ repetitive work
- ▶ static postures

- ▶ tight schedules
- ▶ few/no breaks
- ▶ room layouts

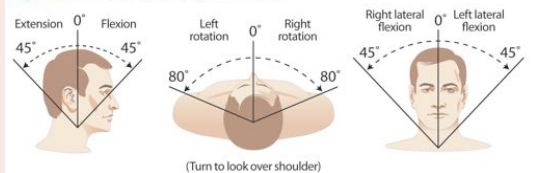
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Primary injury sites



Neck mobility

Figure 1: Cervical spine range of motion



Moves freely 60%



Tight ROM - right to left 40%



2022 Electrologists survey n = 20

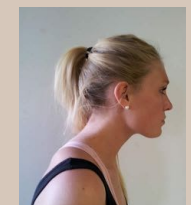
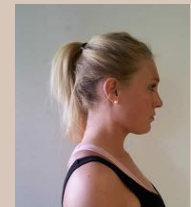
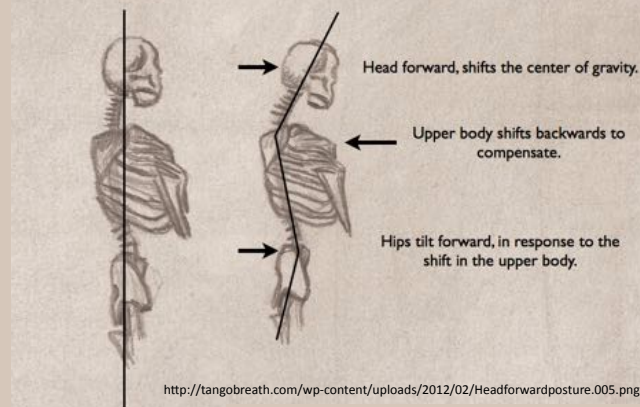
Forward head posture Flexed neck

Forward head posture Neck flexion



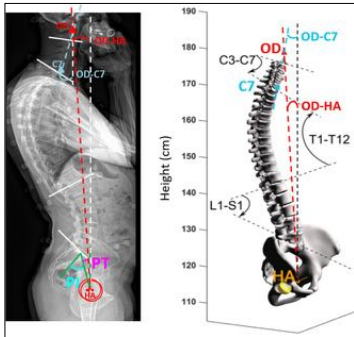
Good posture

Forward head posture



Lee KJ, Han HY, Cheon SH, Park SH, Yong MS. The effect of forward head posture on muscle activity during neck protraction and retraction. J Phys Ther Sci. 2015 Mar;27(3):977-9.

Forward head posture



- ▶ Upper airway resistance syndrome
80 % forward head posture
- ▶ Obstructive sleep apnea
cervical hyperextension and
anterior head projection

Attali V, Clavel L, Rémy-Neris S, Skalli W, et al. Cervical Spine Hyperextension and Altered Posturo-Respiratory Coupling in Patients With Obstructive Sleep Apnea Syndrome. *Front Med (Lausanne)*. 2020;7:30.
Pai DM, Pavia KP. Clinical phenotype of South-East Asian temporomandibular disorder patients with upper airway resistance syndrome. *J Oral Rehabil*. 2018;45(1):25-33. OUT OF THE BOX LEARNING ACADEMY © 2023

Reaching - FHP and rounded shoulders



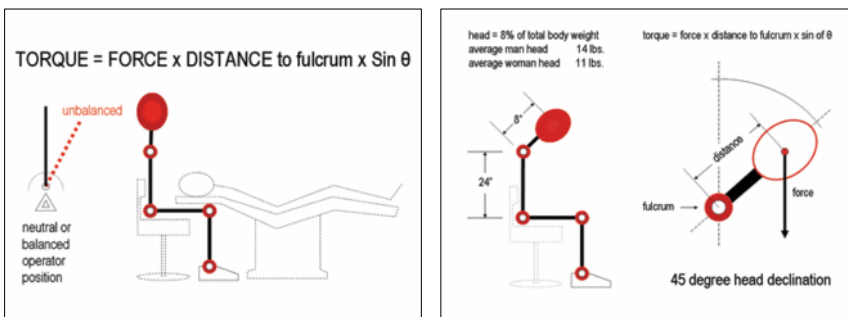
- ▶ loaded flexion and overhead reaching
- ▶ muscle activity
- ▶ **FHP / rounded shoulders**
 - ▶ greater scapular internal rotation
 - ▶ greater scapular upward rotation

Impacts shoulder mechanics!

Thigpen CA, Padua DA. Head and shoulder posture affect scapular mechanics and muscle activity in overhead tasks. *J Electromyogr Kinesiol*. 2010 Aug;20(4):701-9.

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Neutral vs. flexed neck

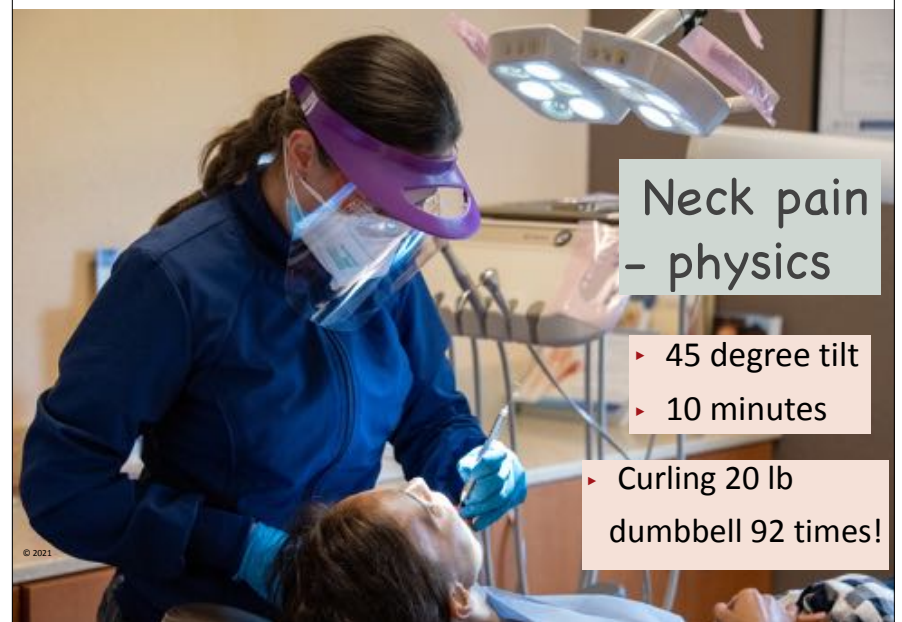


- ▶ head - 8% body weight
- ▶ female - 11 lbs male - 14 lbs

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Neck pain - physics

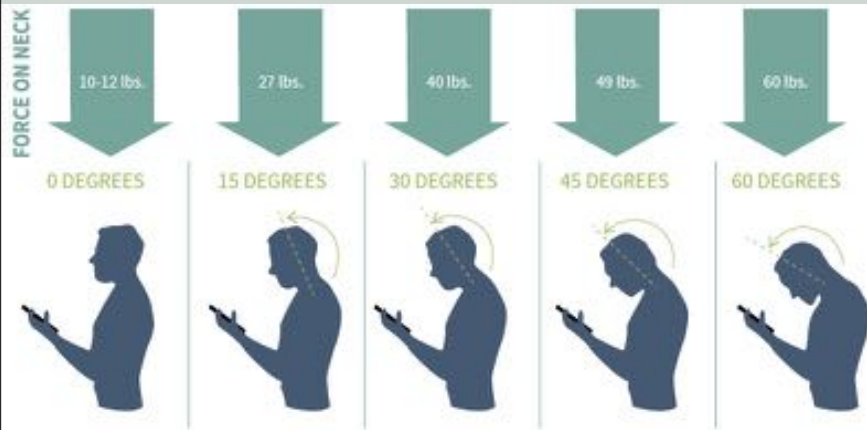
- ▶ 45 degree tilt
- ▶ 10 minutes
- ▶ Curling 20 lb dumbbell 92 times!



© 2021

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Neck flexion - strain on spine



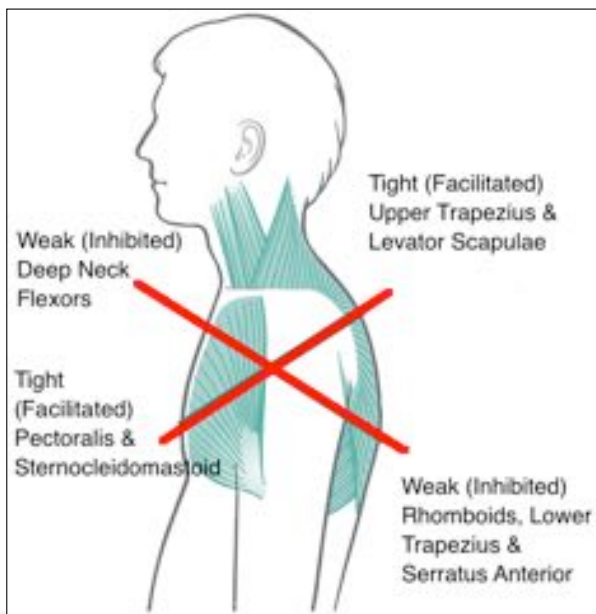
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Posture over time

End result



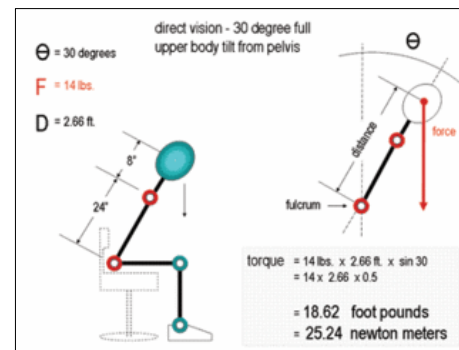
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Mujawar JC, Sagar JH. Prevalence of upper cross syndrome in laundry workers. Indian J Occup Environ Med. 2019 Jan-Apr;23(1):54-56.

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Upper body / torso posture



- ▶ 30 degree tilt
- ▶ 10 minutes

Curling

- ▶ 20 lb dumbbell - 92 times
- ▶ 100 lb barbell - 53 times

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Loupe / Light Benefits and Updates

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Magnification benefits
...properly fitted

Career longevity!



- **promotes neutral posture**
- **neck / shoulders / back**
- decreases fatigue
- reduces MSD risk

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Spotlight!
The latest
innovations
in magnification
and illumination

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What do quality loupes deliver?

- improved posture
- combat physical stress
- reduced eye strain
- more precise procedures
- enhanced clinical outcomes
- standard of care

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Optics

- ▶ clear - edge to edge
- ▶ brighter image/light
- ▶ new ergo options

Frame

- ▶ larger carrier lens
- ▶ better eye protection
- ▶ multiple frame sizes
- ▶ new frame designs



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No magnification

2.5x

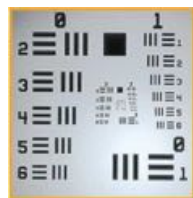
4.0x



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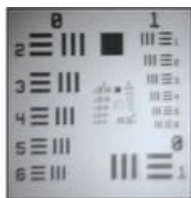


Optical clarity -
resolution - critical!



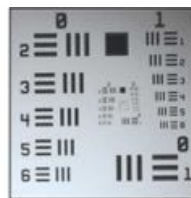
Original

(22.63 LP/mm)



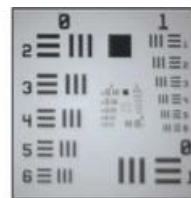
Manufacturer A

(10.03 LP/mm)



Manufacturer B

(20.16 LP/mm)



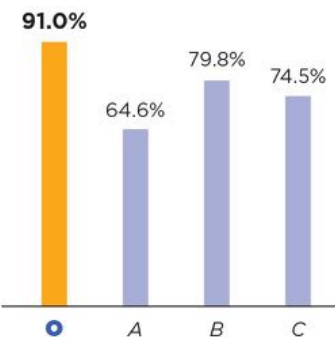
Manufacturer C

(17.96 LP/mm)

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Optical clarity - light passing through

Percentage of Light
Passing Through the Optics



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Frame components



- ▶ frame size
- ▶ carrier lens height
- ▶ flat vs curved lens
- ▶ temple arms
- ▶ hinges
- ▶ temple tips
- ▶ nose pad

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Trending....larger carrier lenses



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Ocular options



Galilean

- ▶ Micro - 2.5
- ▶ Macro - 2.5
- ▶ HDL - 3.0



Variable

- ▶ Mini
- ▶ Standard

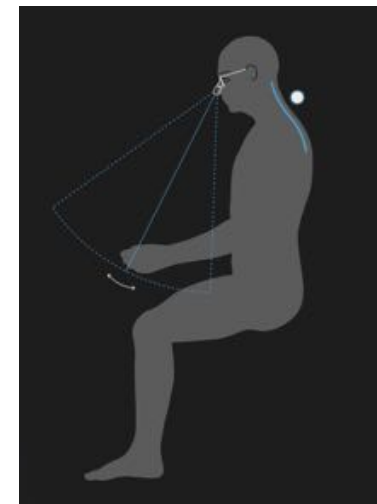
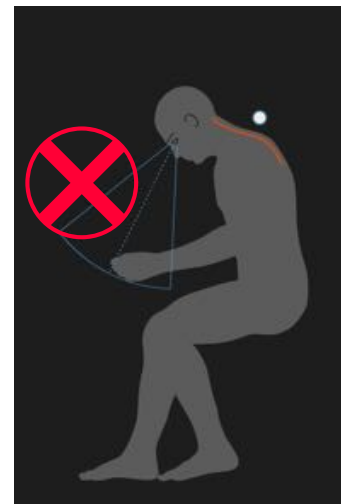


Traditional Prisms

- ▶ 3.5 to 5.5

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Ear Posture? - still not neutral



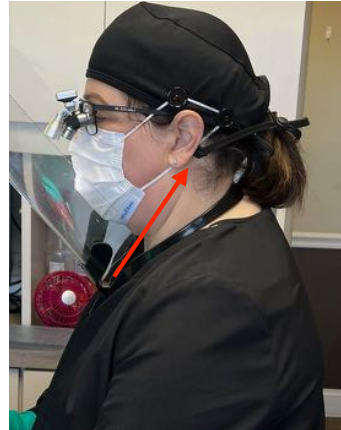
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What do you see?

student



seasoned clinician



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Deflection loupes

- ▶ patient is fully reclined
- ▶ measurements are critical
- ▶ eliminates neck flexion
- ▶ do not correct forward head posture



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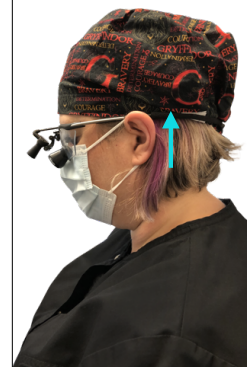


Not the complete answer!

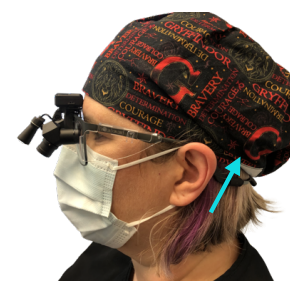
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Ear position

- ▶ less neck flexion
- ▶ more comfortable
- ▶ less neck strain



Traditional sport frame
2.5 Galilean



Traditional - large lens
3.0 deflection/ergo



Powered loupe/light combo
3.5 deflection/ergo

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Illumination



- improves posture
- combats physical stress
- reduces eye strain
- enhances clinical outcomes



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Lighting system options



- frame supports a wired unit
- wireless unit attached to loupes or safety glasses
- powered system - fully integrated into frame
- reduces eye strain

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90 CRI



70 CRI



We have been living in a 70 CRI world!
More accurate color rendering

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More accurate color rendering



- soft tissue irregularities
- lesion detection
- margins

- bleeding points
- edema
- richer subtleties

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Eyes - computer vision syndrome



- eye strain
- visual blurring
- dryness
- irritation / burning

Contact lenses wearers

- higher risk CVS
- 6+ hours computer + contacts
- less tear volume
- tear film unstable

Parihar JK, Jain VK, et al. Computer and visual display terminals (VDT) vision syndrome (CVDTS). Med J Armed Forces India. 2016 Jul;72(3):270-6.

Gowrisankaran S, Sheedy JE. Computer vision syndrome: A review. Work. 2015;52(2):303-14.

Tauste A, Ronda E, et al. Effect of contact lens use on computer vision syndrome. Ophthalmic Physiol Opt. 2016 Mar;36(2):112-9.

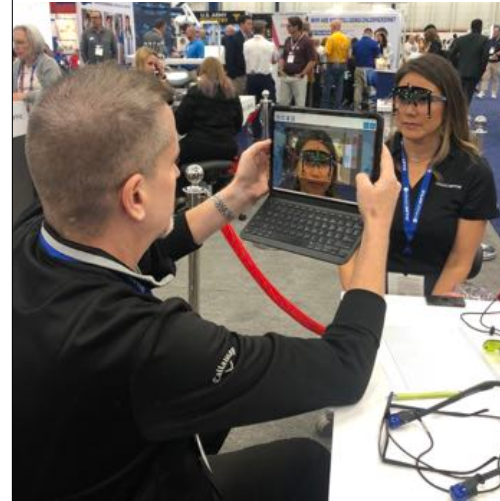
Kojima T, Ibrahim OM, et al. The impact of contact lens wear and visual display terminal work on ocular surface and tear functions in office workers. Am J Ophthalmol. 2011 Dec;152(6):933-940.

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Custom measurement

- pupillary distance
- convergence
- declination angle

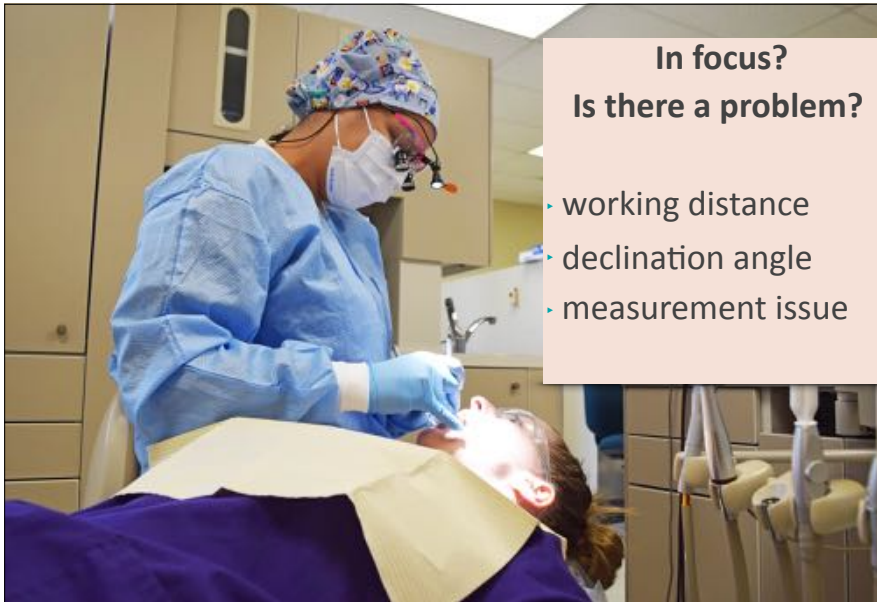


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In focus? Is there a problem?

- working distance
- declination angle
- measurement issue



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Precision measurements – critical



- working distance

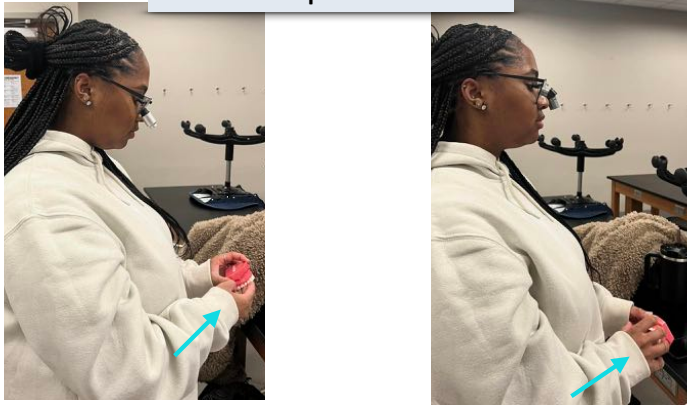


- declination angle

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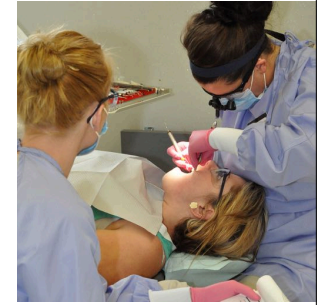
Off site measuring challenges

- ▶ Same object
- ▶ Arm position?



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Measurement issues!



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Fit is it and....it matters

- ▶ uneven ears
- ▶ high cheekbones
- ▶ low nose bridge
- ▶ long eyelashes

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Loupes hygiene



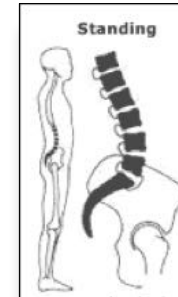
Problems or issues??
▶ Call tech support

- ▶ both hands - on/off
- ▶ storage case
- ▶ avoid hot cars
- ▶ tighten screws

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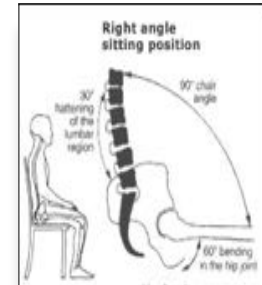
Seating strategies

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Standing

- neutral pelvic posture
- healthy lumbar curve
- even disc pressure



Traditional seating

- vs.**
- rotated pelvis
 - flattened lumbar spine
 - uneven disc pressure

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Mandal AC. Balanced sitting posture on forward sloping seat. www.acmandal.com

Goldilocks – your custom saddle

- ▶ seat pan style
- ▶ padding
- ▶ upholstery

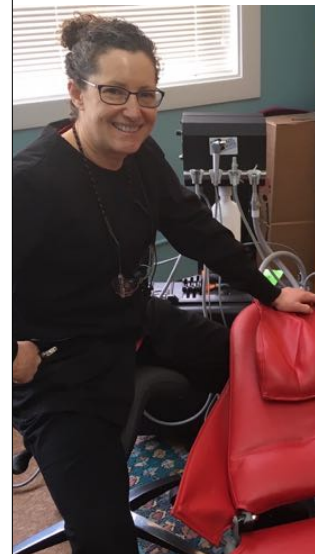


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Customizing your saddle

Adjustable height

- ▶ hips higher than knees
- ▶ vary patient chair height



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Customizing your saddle

Adjustable tilt

- ▶ spine supports core
- ▶ balanced weight - tripod



First things first

- ▶ adjust **your** stool first
- ▶ then the patient chair
- ▶ understand patient chair controls



Adjusting seat pan height

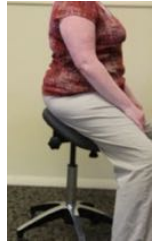


- evaluate leg length (inseam)
- adjust cylinder height
- position higher than traditional

Getting on the saddle



- stand behind the saddle
- get on from behind or the side



Creating a balanced

Hips

- higher than the knees
- create a 60-70 degree angle



Center of balance

- falls within base of support
- avoid sitting on the front rim

Elevated neutral support



*Spine supports body...
not weak back muscles*

- neutral posture
- pelvis / arms / shoulders
- balanced buttocks
- deep breathing



Pelvis

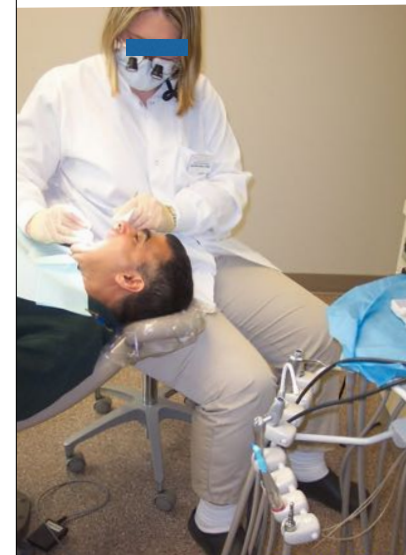
- buttocks level on stool
- 5-15° forward seat pan tilt

Knees

- slightly lower than hips
- popliteal arch > 90°

Feet

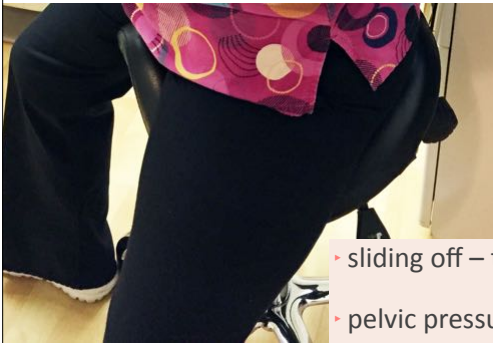
- flat on floor
- shoulder width apart



Additional positioning thoughts

- torso facing patient chair
- eliminates twisting
- even weight distribution

Adjustment issue



- sliding off – tilt / uniform fabric
- pelvic pressure - tilt
- inner thigh pressure - foam / height / tilt

- skin irritation – gripping / height / tilt
- hip discomfort – too wide / too narrow

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Creating synergy



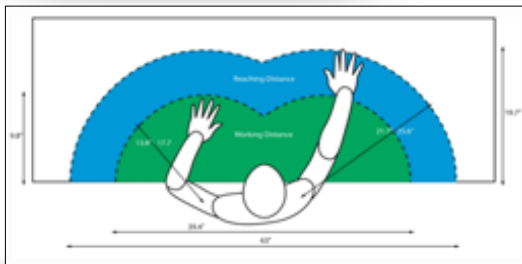
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Spatial relationships

ERGONOMIC
PRINCIPLE

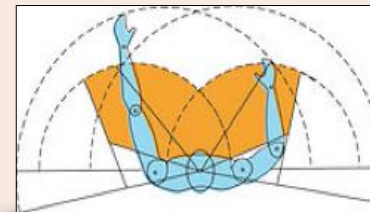
Reaching distance

- working - 14 to 18"
- reaching - 22 to 26"



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Effective ergonomic design



Increases / Improves

- job satisfaction
- productivity
- quality of work
- quality of life

Reduces

- stress
- fatigue
- discomfort
- injuries

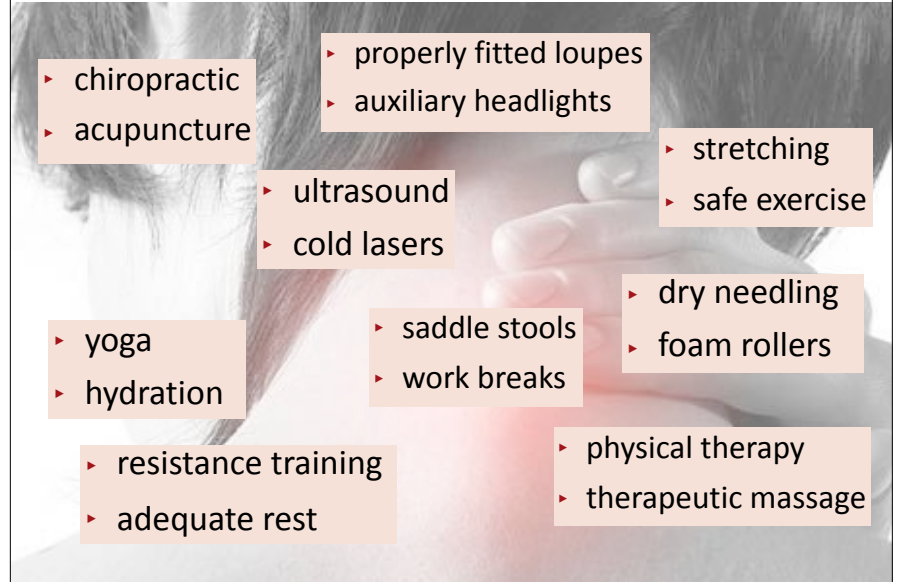
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Help!

- ▶ necks are killing us
- ▶ schedules are jammed
- ▶ getting burned out



- ▶ chiropractic
- ▶ acupuncture
- ▶ properly fitted loupes
- ▶ auxiliary headlights
- ▶ stretching
- ▶ safe exercise
- ▶ ultrasound
- ▶ cold lasers
- ▶ dry needling
- ▶ foam rollers
- ▶ yoga
- ▶ saddle stools
- ▶ work breaks
- ▶ resistance training
- ▶ adequate rest
- ▶ physical therapy
- ▶ therapeutic massage
- ▶ hydration



Dynamic - strengthening solutions



LEVATOR STRETCH
(Chin-to-Armpit)
Anchor right hand behind your back or chair. Bring chin toward left armpit. Hold 2-4 breath cycles.



Scalene Stretch
(Ear-to-Shoulder)
Anchor right hand behind your back or chair. Slowly bring left ear toward left shoulder. Hold 2-4 breath cycles.



The Un-Twister
Legs in tripod position, bend to your left side, resting left elbow on left knee. Stretch right arm overhead and look toward ceiling. Hold 2-4 breath cycles.



NECK & SHOULDER COMBO
Elbow at 90 degrees and shoulder height. Gently pull arm across front of body with opposite arm. Look over shoulder being stretched. Hold 2-4 breath cycles.

All 20 stretches available in the "Chairside Stretching" posturedontics.com

Protect yourself!

- ▶ stay emotionally centered
- ▶ acquire your own
- ▶ equipment that fits you
- ▶ solid company relationships





Begin Anywhere!

"A plan in your head isn't worth the paper that it's written on."

Yogi Berra

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anne@anneguignon.com

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TEST

Which feature is critical in frame selection?

- a. Size / height of carrier lens
- b. Pantoscopic tilt
- c. Adjustable nose pads
- d. All are important

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TEST

What should a clinician expect when getting measured for magnification loupes?

- a. An accurate declination angle
- b. Positioning the ear over the shoulder
- c. Keeping the clinician's torso upright
- d. A, B, C

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Which factors improve success when adjusting to magnification loupes?

- a. Being patient with adjustment time
- b. Customizing temple arms and notepads
- c. Keeping the head still - looking over the oculars
- d. All factors are important



Which strategy helps **reduce the risk for developing a musculoskeletal disorder?**

- a. Daily stretching
- b. A workday that includes planned breaks
- c. Properly fitted loupes with an auxiliary headlight
- d. All strategies accomplish different goals but reduce risk



A properly fitted saddle stool can help a clinician with which of the following?

- a. Maintain a healthy lumbar curve.
- b. Sit more erectly.
- c. Position more closely to the worksite.
- d. All statements are true.



Which statement about saddle seat pans is **FALSE?**

- a. The seat pan size and shape need to fit the user.
- b. Clinicians with a narrow pelvis or tight hip flexor muscles typically prefer a narrow saddle.
- c. The ideal forward seat pan tilt is ALWAYS 15 degrees.
- d. Supports a balanced tripod posture.