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- Clear browser cache using these instructions
- Switch to another browser
- Use a hardwired Internet connection
- Restart your computer/device

Still having issues?

- Call 866-782-9924 (M-F, 8 AM-8 PM ET)
- Email customerservice@OccupationalTherapy.com

CONTINUED

Therapeutic Office Ergonomics for Computer Use-Intensive Rehab Patients

Jeannie Koulizakis, MPT, CEES
Founder & CEO, ErgoRx.com
Director of Physical Therapy, Nova Pain and Rehabilitation

CONTINUED

Learning Outcomes

1. After this course, participants will be able to identify the need and role of computer work ergonomics in today's spine and joint rehab healthcare.
2. After this course, participants will be able to describe basic research about office ergonomics on which to base evidence-based therapeutic ADL training.
3. After this course, participants will be able to list computer workspace risk factors in order to make evidence-based workplace accommodation recommendations

2

CONTINUED

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3

- Adults spend more than 11 hours per day watching, reading, listening to or simply interacting with media.
- Media includes computers, tablets and smartphones.
- That's up from nine hours, 32 minutes just four years ago
- At this rate what will happen in four years from now?

Retrieved from: https://www.marketwatch.com/story/people-are-spending-most-of-their-waking-hours-staring-at-screens-2018-08-01/print

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CONTINUED

Q1 2018 Share of Daily Time Spent by Platform Based on Total US Population

	Live + Time-Shifted TV	Radio	TV connected Devices	Internet on a computer	App/Web on a Smartphone	App/Web on a tablet
Adult- 18+	43%	16%	7%	6%	21%	7%
18-34	26%	16%	14%	7%	29%	7%
35-49	37%	16%	8%	7%	25%	7%
50-64	48%	17%	4%	6%	19%	7%
65 +	60%	14%	2%	4%	13%	7%

Based on information retrieved from https://www.marketwatch.com/story/people-are-spending-most-of-their-waking-hours-staring-at-screens-2018-08-01/print

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CONTINUED

Children, Teens & Screen Time

- **No evidence of link** (yet) between increased screen time for children, teens and:
  - cardiovascular disease
  - diabetes
  - high cholesterol

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Children, Teens & Screen Time

- Ages 8 to 18 are spending 7+ hrs. on screens per day
- **Evidence of link to obesity** - SLIPPERY SLOPE:
  - kids start snacking
  - ignore cues they are full
  - exposed to food advertising
  - exposed to blue light known to disturb sleep
  - poor sleep hygiene linked to obesity

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Adult Screen Time

- **For many, screen time = work**
- **Evidence of link between technology devices and:**
  - cardiovascular disease, diabetes, high cholesterol
  - **WMSD** - work-related musculoskeletal diseases
- **Primary WMSD risk factors:**
  - poor postures
  - poor movement patterns during work

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Common WMSDs:

- Neck and upper back pain
- Muscle strains and low back injuries
- Carpal tunnel syndrome
- Tendinitis
- Rotator cuff injuries (affects the shoulder)
- Epicondylitis (affects the elbow)

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Body parts most affected by WMSD:

- Low Back- 63%
- Neck 53%
- Shoulder 38%
- Wrist 33%

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Impact of WMSD in the Workplace

- Work related MSDs are among the most frequently reported causes of lost or restricted work time.
- According to the Bureau of Labor Statistics (BLS) in 2013, MSD1 cases accounted for 33% of all worker injury and illness cases.

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Human Cost of MSD Injuries

- Cost 1: The Employee
  - Physical and financial well being affected
- Cost 2: The Family
  - MSD can be the catalyst for financial demise and divorce
- Cost 3: The Team
  - Increases work on coworkers

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Human Cost of MSD Injuries

- Cost 4: The Morale
  - Working in pain kills morale
- Cost 5: Productivity
  - Working in pain also kills productivity
- Cost 6: Culture
  - Working in pain is never cause to celebrate

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Human Cost of MSD Injuries

- Cost 7: Absenteeism & Presenteeism
  - Presenteeism may cause more aggregate productivity loss than absenteeism
  - With MSD's presenteeism is often a substantial hidden cost
  - A recent study in one company showed 70% of employees experiencing fatigue, discomfort, or pain on a daily basis

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Financial Burden of WMSDs

- Average direct cost of WMSD injury is between $12,000-$100,000
- Between direct and indirect cost Osha statistics indicate that WMSD-related expenses cost a staggering $20 to $50 billion a year
- Costing the US alone $88 billion a year low back and neck pain is widespread and expensive despite the fact that treatments don't work overtime to prevent re-injury

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What is Office Ergonomics?

- Office ergonomics is a process for protecting screen users from WMSD risks
- Office ergonomics involves optimizing human performance by designing a computer workspace environment to safely minimize effort
- To reduce WMSD risk, best-practices include using ideal postures and movement patterns

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For Whom is Office Ergonomics?

- Employers are traditionally responsible for providing a safe and healthful workplace for their workers, including ergonomic furnishings and ergonomics training.
- BUT, people don't always acknowledge their pain
- People don't only work for others

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For Whom is Office Ergonomics?

- For the gig economy, remote workers, and the self-employed, most need to provide a safe work environment for themselves.
- Spine and joint healthcare practitioners should consider including evidence-based therapeutic ADL instruction for patients, across the lifespan, interacting with screens for more than 4 hours per day.

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Learning Outcomes

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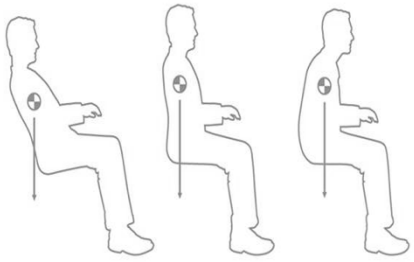
Ideal Seated Posture

For purpose of posture observation, 3 possible postures:



Recline Upright Forward Leaning

21

Which Posture is Best?

1974 Research #1:

- "Lumbar disc pressure and myoelectric back muscle activity during sitting. Studies on an office chair"
  - reclining reduces the load on the lumbar spine and paraspinal musculature

Recline

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CONTINUED

Which Posture is Best?

1979 Research #2:

- "The influence of back rest inclination and lumbar support on the lordosis in sitting"
  - Four angles of backrest inclination and four different sizes of lumbar support were studied on 38 healthy subjects.
  - When sitting down from a standing position, the pelvis rotates and the lumbar lordosis decreases.
  - Increases in the backrest-seat angle had only minor effect on the lumbar lordosis.
  - A lumbar support had a significant influence: the lordosis increased with increasing support

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CONTINUED

Which Posture is Best?

1981 Research #3:

- "Epidemiologic aspects of low back pain in industry"
  - reclining pumps nutrients to the intervertebral discs compared to upright
  - upright postures is where the effects of gravity on the spine are most pronounced
  - reclining reduces compression of the discs and, thus, reduces the rate of disc fluid dissipation

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Which Chair is Best?

2006 Research #1: Stability ball versus standard office chair:

- **"Stability ball versus office chair: comparison of muscle activation and lumbar spine posture during prolonged sitting."**
  - Prolonged sitting on a stability ball does not greatly alter the manner in which an individual sits
  - appears to increase the level of discomfort
  - Therefore, it is important to fully explore a new chair design and consult scientific research before implementing its use

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Which Chair is Best?

2008 Research #2: Impact of leisure seating on LBP:

- **"Seated Postures: Extending Concepts of Postural Health Beyond the Office"**
  - Sustained kyphosed postures adversely affect spinal ligaments, muscles and joints and lead to neuromuscular and cumulative trauma disorders and loss of spinal stability.
  - ostures popularly assumed in recreational or leisure seating lead to cumulative damage to soft tissues of the spine.
  - health professionals must consider the impact of leisure seating design and recreational sitting behavior.

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Which Chair is Best?

2012 Research #3

- **"Can we reduce the effort of maintaining a neutral sitting posture?"**
  - The ability to maintain a neutral lumbar posture with less lumbar multifidus activation in recline is advantageous during prolonged sitting.
  - Evidence that chair design on longer duration sitting may affect LBP.

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What about standing?

- Some say sitting is the new smoking
- sitting may increase risk of cardio disease but no evidence supports that standing desks diminish that harm
- standing burns only 8 calories more than sitting
- standing for long periods can cause enlarged veins and blood to pool in feet
- standing and sitting are both fine in moderation
- Inactivity is the new smoking

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Ideal Sit-Stand-Move Patterns

2015 Research #4 :

- **"The sedentary office: a growing case for change towards better health and productivity."**
  - Sit to do computer work
  - every 20 minutes stand for 8 minutes AND MOVE for 2 minutes.
  - In absence of standing desk, about every 20-30 minutes take a posture break and stand and move for a couple of minutes.
  - Simply standing is insufficient. just walking around is sufficient.

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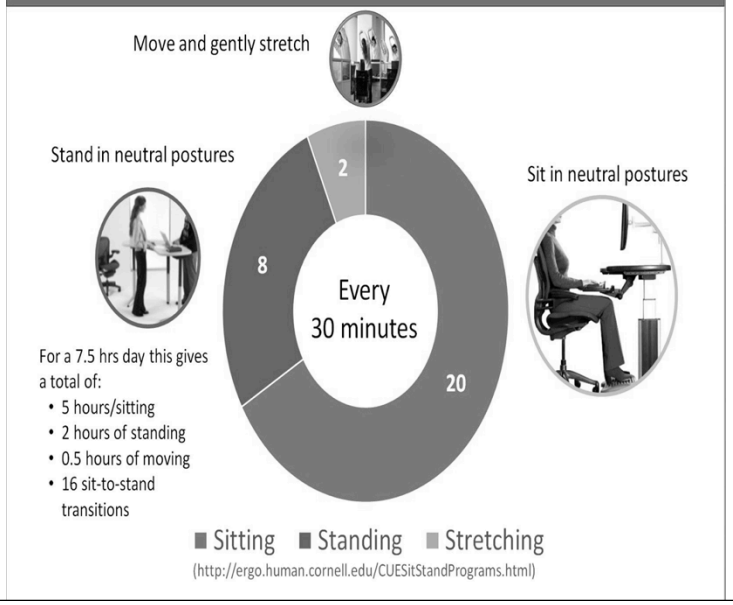
HEDGE'S 3S's IDEAL WORK PATTERN



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Real World Posture Behaviors

2001 Research #1:

- "Office Seating Behaviors, An Investigation of Posture, Task, and JobType".
  - 75% found to be forward leaning
  - "The finding reported in this paper can be seen as top line or headline findings"

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Real World Posture Behaviors

2016 Research #2:

- "What am I sitting on? User knowledge of their chair controls."
  - Posture observation field research
  - n=1004 office workers, 23 different companies
  - 60 different office chairs
  - 47% leaning forward

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CONTINUED

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CONTINUED

Posture Risk Assessment: RULA & REBA

- RULA (Rapid Upper Limb Assessment) has been validated on groups of computer users
- RULA focuses on the neck, trunk and upper limbs
- REBA (Rapid Entire Body Assessment) focuses on standing postures
- Quick and easy to complete
- Scores indicate the level of intervention required to reduce MSD risks.

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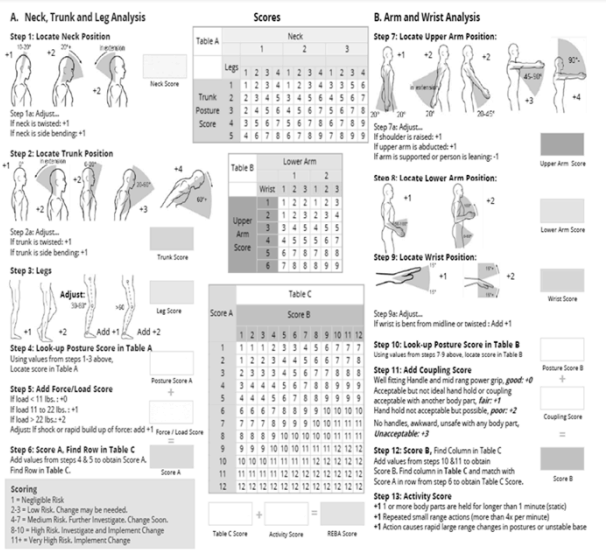
RULA Form



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RULA Scoring

Upper Arm	Lower Arm	Wrist	Wrist Twist	Posture Score A		Muscle Use		Force /Load		Score A	
					+		+		=		Look Up in Table C for Grand Score

Neck	Trunk	Legs	Posture Score B		Muscle Use		Force / Load		Score B
				+		+		=	

MUSCLE USE: Raise the score by 1 if the posture is mainly static, e.g. held for than 10 minutes or repeated more than 4 times per minute

FORCE/LOAD: 0= 4 or less pounds of load or force. Most force/loads for computer work are zero for RULA

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CONTINUED

RULA Scoring

Score	Level of MSD Risk
1-2	negligible risk, no action required
3-4	low risk, change may be needed
5-6	medium risk, further investigation, change soon
6+	very high risk, implement change now

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Case Study #1

RULA = 4

Low risk, change may be needed

Upper Arm	Lower Arm	Wrist	Wrist Twist	Posture Score A		Muscle Use		Force /Load		Score A	
					+		+		=		Look Up in Table C for Grand Score
Neck	Trunk	Legs	Posture Score B		Muscle Use		Force / Load		Score B		
				+		+		=			

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Case Study #2

RULA = 6

Medium MSD Risk, Change Soon

Upper Arm	Lower Arm	Wrist	Wrist Twist	Posture Score A		Muscle Use		Force /Load		Score A		
					+		+		=			Look Up in Table C for Grand Score
Neck	**Trunk**	**Legs**	**Posture Score B**	**Muscle Use**		**Force / Load**		**Score B**				
					+		+		=			

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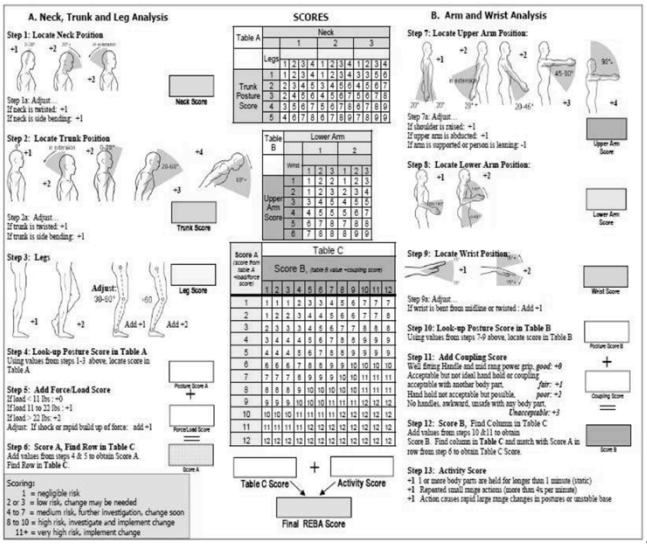
REBA Form



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40

REBA Scoring

Score	Level of MSD Risk
1	negligible risk, no action required
2-3	low risk, change may be needed
4-7	medium risk, further investigation, change soon
8-10	high risk, investigate and implement change
11+	very high risk, implement change

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Case Study #1

REBA =4

Medium risk, further investigation, change soon

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Case Study #2

REBA =7

Medium risk, further investigation, change soon

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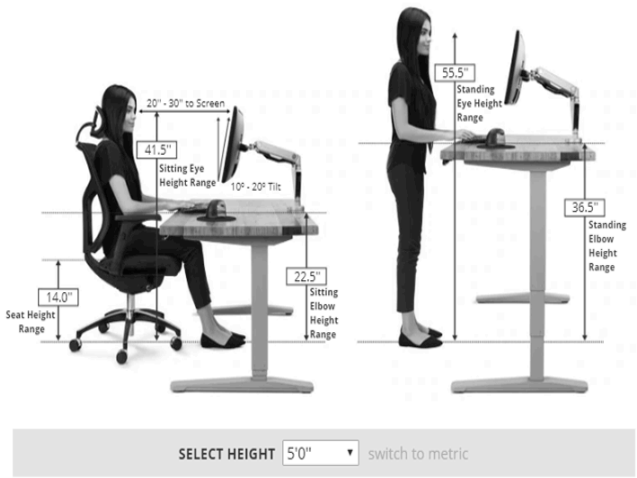
Ergonomic Workspace Fitting



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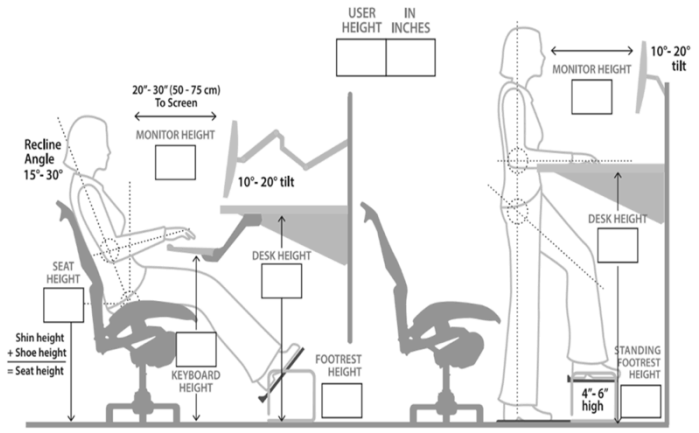
Ergonomic Workspace Fitting



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Ergonomic Workspace Fitting

CLIENT HEIGHT	HEIGHT in IN	SEAT HEIGHT	SITTING MONITOR HEIGHT	SITTING KEYBOARD HEIGHT	SITTING DESK HEIGHT	STANDING FOOTREST HEIGHT	STANDING KEYBOARD HEIGHT	STANDING MONITOR HEIGHT	STANDING FOOTREST HEIGHT - see spreadsheet
4'10"	58	17.7	43.8	22.3	28.3	4.2	36.5	57.5	A
4'11"	59	18.0	44.5	22.7	28.7	4.2	37.2	58.2	A
5'	60	18.3	45.3	23.1	29.1	4.3	37.8	58.8	A or B
5'1"	61	18.6	46.1	23.5	29.5	4.4	38.4	59.4	A or B
5'2"	62	18.9	46.8	23.9	29.9	4.4	39.1	60.1	A or B
5'3"	63	19.1	47.6	24.3	30.3	4.5	39.7	60.7	B or C
5'4"	64	19.4	48.3	24.6	30.6	4.6	40.3	61.3	B or C
5'5"	65	19.7	49.1	25.0	31.0	4.7	41.0	62.0	B or C
5'6"	66	20.0	49.8	25.4	31.4	4.7	41.6	62.6	B or C
5'7"	67	20.3	50.6	25.8	31.8	4.8	42.2	63.2	B or C
5'8"	68	20.6	51.3	26.2	32.2	4.9	42.8	63.8	B or C
5'9"	69	20.8	52.1	26.6	32.6	5.0	43.5	64.5	B or C
5'10"	70	21.1	52.9	27.0	33.0	5.0	44.1	65.1	B or C
5'11"	71	21.4	53.6	27.3	33.3	5.1	44.7	65.7	C
6'	72	21.7	54.4	27.7	33.7	5.2	45.4	66.4	C
6'1"	73	22.0	55.1	28.1	34.1	5.2	46.0	67.0	C
6'2"	74	22.3	55.9	28.5	34.5	5.3	46.6	67.6	C
6'3"	75	22.6	56.6	28.9	34.9	5.4	47.3	68.3	C
6'4"	76	22.8	57.4	29.3	35.3	5.5	47.9	68.9	C
6'5"	77	23.1	58.1	29.6	35.6	5.5	48.5	69.5	C
6'6"	78	23.4	58.9	30.0	36.0	5.6	49.1	70.1	C

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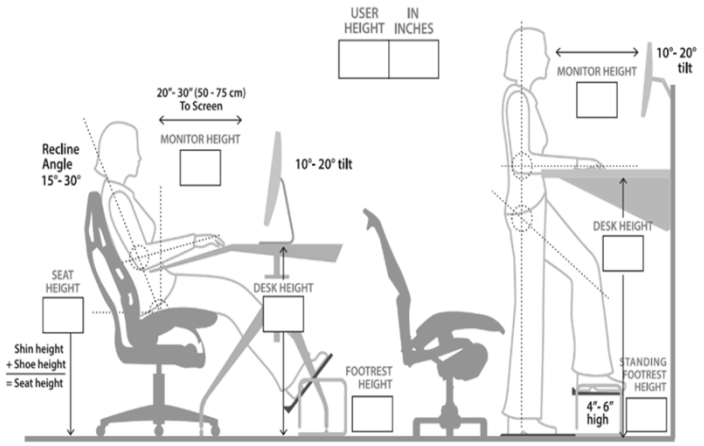
Ergonomic Workspace Fitting



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Ergonomic Workspace Fitting

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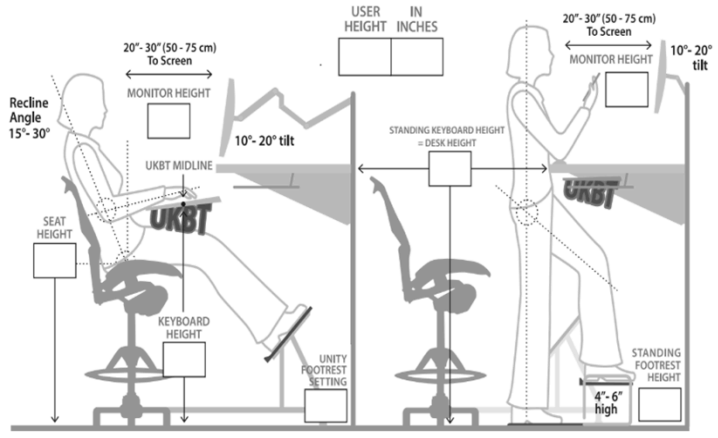

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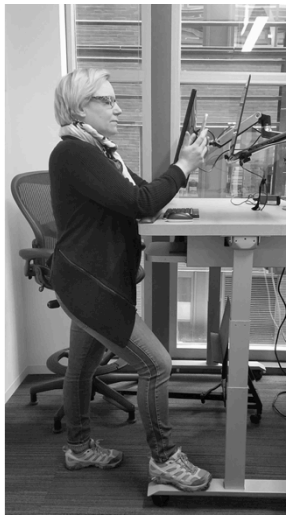

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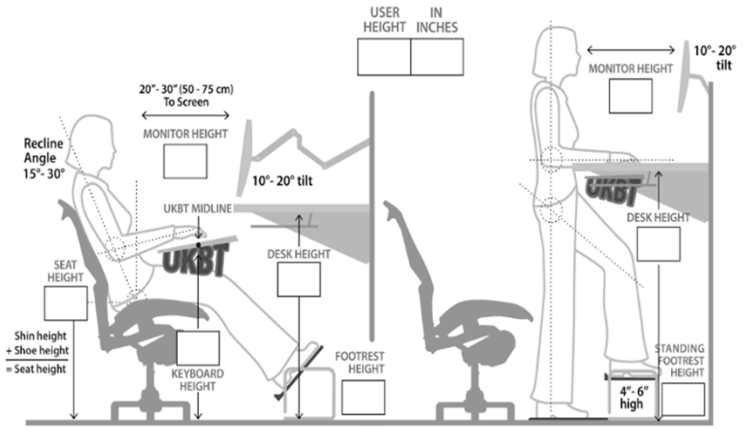

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Ergonomic Workspace Fitting

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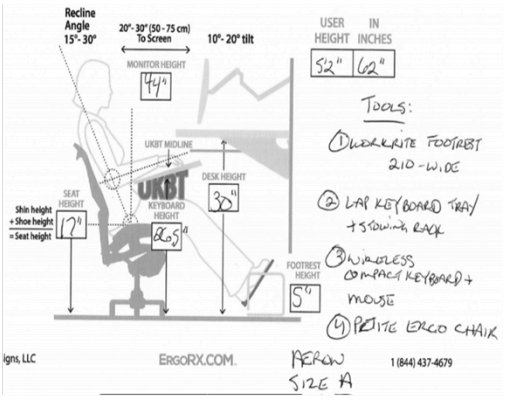
Ergonomic Workspace Fitting



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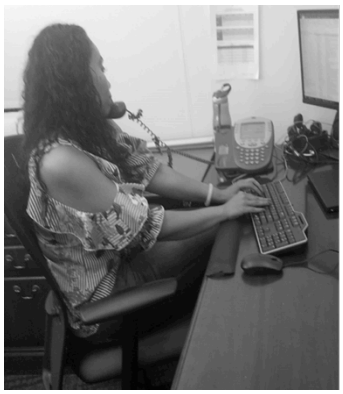
Ergonomic Workspace Fitting

Multiple Monitor & Neck Pain Solution

BEFORE



AFTER

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Ergonomic Workspace Fitting

Multiple Monitor & Neck Pain Solution

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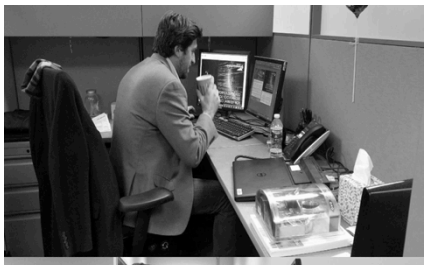
Before & After



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Before & After

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Before & After

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Before & After

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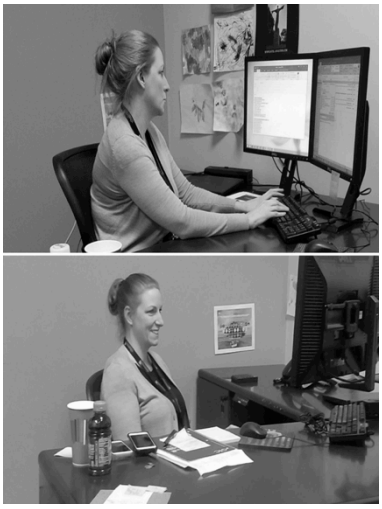
Before & After



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Before & After

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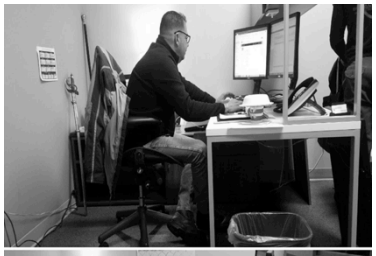
Before & After



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References:

- SLIDE 4,5 https://www.marketwatch.com/story/people-are-spending-most-of-their-waking-hours-staring-at-screens-2018-08-01/prin
- SLIDE 6,7 https://www.marketwatch.com/story/people-are-spending-most-of-their-waking-hours-staring-at-screens-2018-08-01/print
- CBS News Health experts say parents need to drastically cut kids' screen time August 6,2018 By Ashley Welch
- Slide 22 Andersson, et al. (1974). "Lumbar disc pressure and myoelectric back muscle activity during sitting. 1. Studies on an office chair,"Scandinavian Journal of Rehabilitation Medicine.
- slide 24 1979 Andersson, GBJ, Murphy, RW, Ortengren, R., Nachemson, A., and Elfstrom, G., 1979, The influence of back rest inclination and lumbar support on the lordosis in sitting. Spine, 4, 52-58.

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References

- slide 25Gregory DE, Dunk NM, Callaghan JP. Stability ball versus office chair: comparison of muscle activation and lumbar spine posture during prolonged sitting. Hum Factors. 2006 Spring; 48(1):Pg. 142 -53.
- slide 26 Jennifer Pynt, Martin G. Mackey, Joy Higgs. (2008). Kyphosed Seated Postures: Extending Concepts of Postural Health Beyond the Office. Journal of Occupational Rehabilitation, March 2008, Volume 18, Issue 1, pp 35-45.
- slide 27 O'Sullivan, K., McCarthy, R., White, A., O'Sullivan, L., Dankaerts, W. (2012). Can we reduce the effort of maintaining a neutral sitting posture? A pilot study. Manual THerapy, Volume 17, Issue 6, Pg 566-571.
- Adam Ruins Everything - The Problem with Standing Desks https://www.youtube.com/watch?v=s7N2MvjH0j8
- slide 29 Buckley, J. P., Hedge, A., Yates, T., Copeland, R. J., Loosemore, M., Hamer, M., Bradley, G., & Dunstan, D. W. (2015). The sedentary office: a growing case for change towards better health and productivity. Expert statement commissioned by Public Health England and the Active Working Community Interest Company. *British Journal of Sports Medicine*, bjsports-2015.

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References

- slide 31 Dowell, W.R., Yuan, Fei, and Green, B. (2001). Office Seating Behaviors, An Investigation of Posture, Task, and JobType. Proceedings of the Human Factors and Ergonomic Society 45th Annual Meeting. HFES, Santa Monica, CA.
- Slide 34-37 McAtamney, L. & Corlett, E.N. (1993) RULA: a survey method for the investigation of work-related upper limb disorders, Applied Ergonomics, 24, 91-99
- slide 34, 40-41 Hignett S1, McAtamney L. Rapid entire body assessment (REBA). Appl Ergon. 2000 Apr;31(2):201-5.lide 26 Jennifer Pynt, Martin G. Mackey, Joy Higgs. (2008). Kyphosed Seated Postures: Extending Concepts of Postural Health Beyond the Office. Journal of Occupational Rehabilitation, March 2008, Volume 18, Issue 1, pp 35-45.
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References

- slide 34, 40-41 Hignett S1, McAtamney L. Rapid entire body assessment (REBA). Appl Ergon. 2000 Apr;31(2):201-5.lide 26 Jennifer Pynt, Martin G. Mackey, Joy Higgs. (2008). Kyphosed Seated Postures: Extending Concepts of Postural Health Beyond the Office. Journal of Occupational Rehabilitation, March 2008, Volume 18, Issue 1, pp 35-45.
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- Adam Ruins Everything - The Problem with Standing Desks https://www.youtube.com/watch?v=s7N2MvjH0j8
- slide 29 Buckley, J. P., Hedge, A., Yates, T., Copeland, R. J., Loosemore, M., Hamer, M., Bradley, G., & Dunstan, D. W. (2015). The sedentary office: a growing case for change towards better health and productivity. Expert statement commissioned by Public Health England and the Active Working Community Interest Company. *British Journal of Sports Medicine*, bjsports-2015.
- slide 31 Dowell, W.R., Yuan, Fei, and Green, B. (2001). Office Seating Behaviors, An Investigation of Posture, Task, and JobType. Proceedings of the Human Factors and Ergonomic Society 45th Annual Meeting. HFES, Santa Monica, CA.

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Questions?

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