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Remote Work Ergonomics: A Doctoral Capstone Experience

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Remote Work Ergonomics: A Doctoral Capstone Project

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Tampa Bay Regional Campus **NOVA SOUTHEASTERN** UNIVERSITY

Introduction

- Cumulative trauma disorders (CTDs) are injuries of the musculoskeletal system and are caused by repetitive motions, forceful exertions, vibration, and other situations that may damage bone and fascia.
- Musculoskeletal disorders (MSDs) are injuries that affect the human body's muscles, nerves, tendons, joints, cartilage, and spinal discs.
- Since the COVID-19 virus, more companies have shifted from in-person office work to work-fromhome. Typically, the home office set-up is a key aspect of remote work; however, most home office set-ups are not ergonomically correct which can lead to the onset of CTDs or MSDs. Occupational musculoskeletal disorders arise from "improper ergonomic working environments."

Capstone Site Description

Physio – Select Medical branch

Lilburn & Conyers, GA

Outpatient Orthopedic

Summary of Needs Assessment

- Dugar et al. (2021)
 - 75% of participants worked 7-9 hours without taking breaks.
 - Of the participants that took breaks, only 7% used their break time to stretch and only 21% used their break time to walk around.
 - 9% of participants laid in bed while working, 16% sat on the sofa, and 17% sat on their bed which exhibited that there was a lack of knowledge of sitting posture.
- Okuyan & Begen (2020)
 - Improper ergonomic working environments lead to occupational musculoskeletal disorders.
- Ahmed et al. (2022)
 - 50% of participants reported experiencing discomfort in various body parts during work from home office.
- Kalakatawi & Aziz (2021)
 - 12% increase in traumatic nerve injuries during the pandemic.

Literature Review Summary

Ergonomics

- Improper workstation ergonomics can lead to shoulder, neck, arm, and wrist pain (Ahmed et al., 2022)
- Proper ergonomic workspaces help employees work better from home (Ahmed et al., 2022)
- Computer users are at more vulnerable to potential health risks due to prolonged use of computer, inappropriate workstation design and posture (Hamid et al., 2022)
- Results showed that there was a significant reduced ergonomic risk observed for both shoulders when working in an ergonomically optimized workspace (Holgreve et al., 2022)

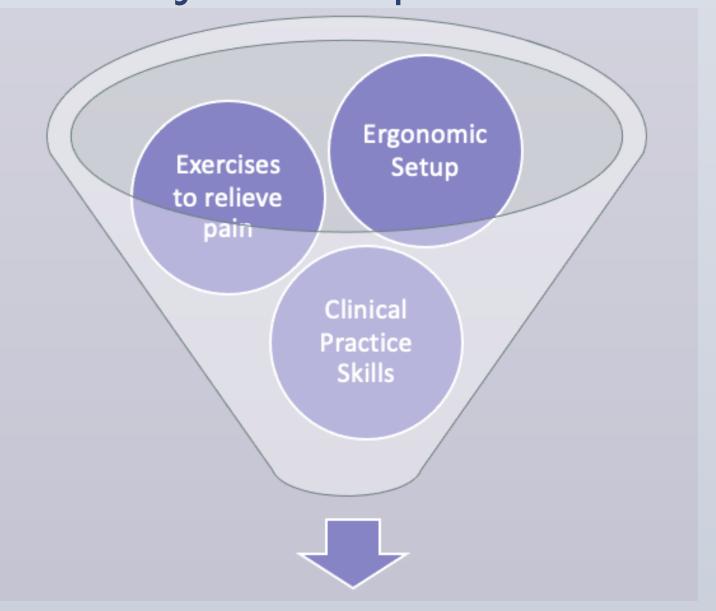
Pain

- Home and hybrid workers displayed an increased risk of pain in all body areas when compared to location workers (Bosma et al., 2023)
- Prolonged computer use compromises the health of the computer users which include neck, back, arm, and shoulder pain as well as muscle and joint issues with improper workstation design, poor posture and remaining in a steady position for extended periods of time (Hamid et al., 2022)
- Pressure is created between the wrist and workstation along with the repetitive motion of the wrist and digits as well as the writ extension over a long period of time leads to an increased vulnerability to injury while typing (Ahmed et al., 2022)

Ergonomic Recommendations

- To decrease muscle activity in the upper extremities, OHS requirements recommend using a forearm support when using a mouse and keyboard (Hamid et al., 2022)
- Important factors to consider to ergonomically optimize a workspace include chair height, seat pan depth and angle, desk height, mouse placement, type of keyboard, monitor positions, and balanced workstation (Emerson et al., 2021)
- Place computer/laptop screen should have a constant balance between head/neck and hand/wrist postures (Okuyan & Begen, 2021)

Capstone Project Description & Outcomes



ERGONOMIC RECOMMENDATIONS CONT..

Whether standing or sitting, ensure that ASDF row of the keyboard is at

Adjust height and position of the

keyboard to keep wrists flat and ensure hands are in line with forearms. Adjust arm rests to ensure that the weight of the forearm's rests on the

arm rest. Avoid hunching the

shoulders forward.

- Place the monitor screen 20-40 inches (about arm's length) away from the eyes. If using a small screen or laptop screen, place the monitor about 20 inches away. As the screen gets larger, so should the distance between the eyes and monitor. For dual monitors, bot monitors should be placed closely together and at the same height and distance to avoid significant head turning when looking
- To reduce eye strain, take microbreaks and follow the 20-20-20 rule. Take a 20 second break every 20 minutes by looking at things at least 20

between the monitors.

Take frequent stretch breaks.

ERGONOMIC RECOMMENDATIONS FOR REMOTE WORK KAYNATH BHAMANI, OTD-S³



STATISTICS

- Prior to the COVID-19 pandemic, only 5.7%, or about 9 million employees worked from home. This number jumped to about 17.6%, or about 27.6 nillion employees (United States Census Bureau, 2022). As of February 2020, the pandemic caused 46% of businesses to implement telecommuting policies (Okuyan & Begen, 2021).
- a study conducted by Ahmed et al. (2022), more than 50% of participants reported experiencing discomfort in various body parts during work from There was a 12% increase in traumation nerve injuries during the pandemic
- which could be caused by prolonged sitting for hours during the lockdown (Kalakatawi & Aziz, 2021).

WHAT ARE CTDS & MSDS?

Cumulative trauma disorders (CTDs) are are caused by repetitive motions, forceful exertions, vibration, and other situations that may damage bone and fascia (Connecticut Department of Public Health

injuries that affect the human body's and spinal discs (Centers for Disease Control and Prevention, 2020).

PREVENTION Have an appropriate ergonomic

ERGONOMIC

RECOMMENDATIONS

Neutral Posture: A neutral posture consists

of sitting with the neck straight, shoulders

straight down loosely at the sides, elbows

at a right angle, wrists straight, low back

support on a back rest of a chair, hips and

keyboard and mouse at elbow level. The

top of the monitor should be at or slightly

Work Area: Place items that are most often

used in the primary work zone such as the

keyboard and mouse. The primary work

zone is the area where the elbows are at

the sides and the hands are moved side to

placed in the secondary work zone, which

is the area within the outstretched arms.

side. Items used less often should be

below eye height. (Refer to figure 1).

Eye and Elbow Height: Position the

(Refer to figure 1).

(Refer to figure 2).

(Subramanian et al., 2020)

knees at a right angle, and feet flat on floor.

- Proper posture.
- Take frequent rest breaks (Hamid et al., 2021)
- npanies such as Google, Apple, or Ford ave implemented occupational therapy grams to address concerns such as titive stress injuries, improving gonomics, and enhancing employee ment iealth (Verma, 2023).

FACTORS TO CONSIDER WHEN OPTIMIZING YOUR WORKSPACE

- Mouse placemen Type of keyboard
- Monitor positions
- (Emerson et al., 2021)

Capstone Goals Achieved

All the goals I set for myself were achieved. There were a few changes to one of the goals along the way and the addition of another goal towards the beginning of capstone.

- 1. Identified and appraised 5 articles related to CTDs or MSDs.
- 2. Created a literature to disseminate and present to at least 2 target audiences.
- 3. Completed a certification related to hand therapy.
- 4. Gain more knowledge on specific UE diagnoses and how to treat them.

Implications for OT Practice

Remote work has become the "new norm" for many companies including students completing their education. Subsequently, with the rise of work-from-home employees, there is an increased risk of developing symptoms that are consistent with CTDs or MSDs. To prevent these disorders from occurring, employees must maintain an ergonomically correct workstation. This includes using a forearm support when using a mouse and keyboard, keeping most frequently used items closer to you, ensuring the wrists are in neutral position, and taking frequent rest breaks to stretch and complete some exercises.

Exercises for Remote Workers





except begin with your palm facing upwards.



Prayer stretch: Put your palms together in front of your chest. Slowly lower your hands towards your waist keeping your hands close to your stomach and palms together until you feel a moderate stretch in your forearm. Hold for 10-



Wrist flexion: Hang your forearm off a sofa, cable, or any surface with the palm facing upwards. Grab a weighted object of your choice (ex. 2lb weight, water bottle, rolled towel, can of beans, etc.) and place in palm of your hand. Slowly curl your wrist until you feel a slight stretch. Hold for 3 seconds.



Wrist extension: Repeat the steps above, except begin with your palm facing down. Your other hand can be placed on your forearm to provide support to focus on the wrist motion.

Figure 2: Exercises for remote workers used to disseminate to target audiences.

REFERENCES & ACKNOWLEDGMENTS

*References Available Upon Request

A special thank you to my mentor, Kyle Oatis OTR/L, Dr. Christina Kane, and Dr. Alicia Kopp for all their support throughout this experience. I truly would not have been able to complete this experience without them.



Figure 1: Ergonomic Recommendation Brochure used to disseminate to target audiences.

Occasional Access

(Secondary Work Zones)

ubramanian et al., 2020

njuries of the musculoskeletal system and

Musculoskeletal disorders (MSDs) are muscles, nerves, tendons, joints, cartilage

Chair height Seat pan depth and angle

Balanced workstations