





# **Ergonomic Technologies**

- No common definition
- Growing in popularity
- Can inform workers about inadequate lifting postures to prevent injury risks
- Can provide safety teams with data
- Most are looking at unfavorable postures
  - Some do look at the other of the OSHA eight risk factors related to WMSDs (force, repetition, static postures, quick motion, compression or contact stress, vibration, and extreme temperatures )

# Types of Ergonomic Technologies

#### Wearable Sensors

•Posture Sensors: Small devices worn on the body that monitor movements and provide feedback on posture.

•Movement Sensors: Devices like accelerometers and gyroscopes worn on the wrist or other body parts to track movements, repetitive actions, and overall activity levels.





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# Types of Ergonomic Technologies

#### Artificial Intelligence Systems

•Optical Motion Capture: Systems that use cameras and markers placed on the body to capture detailed movements and analyze posture and motion patterns.

#### •Inertial Motion Capture:

Wearable devices with inertial sensors that capture movement data without the need for external cameras. These systems are portable and can be used in various work environments.



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# **Types of Ergonomic Technologies**

#### Exoskeleton

 The aim of an exoskeleton is that it adjusts the way an individual puts force against other structures or the way an individual experiences forces that are externally applied.



# Types of Ergonomic Technologies

#### Ergonomic Data Analytic Software:

- Digital Ergonomic Assessment Tools: Software applications that guide users through ergonomic self-assessments by asking questions about their workstation setup, posture, and work habits.
- Remote Ergonomic Monitoring Platforms: Systems that collect data from various sensors and devices to provide a comprehensive view of workplace ergonomics. These platforms can offer insights, trend analysis, and recommendations for improvements.



# "If you can't measure it, you can't manage it"

- Some of the tools produce data that can be referenced. Others cannot.
- You must be familiar with the tools and its data to use it
- Employees should be familiar with data for coaching and correction
- Ergonomics can prevent acute injuries and chronic occupational disease

## **Should You Choose a Technology?**

#### Pros

- Wearable technology should not interrupt the workflow
- Provide consistent monitoring
- Provides a perception of caring about health and safety
- More constant coaching

#### Cons

- Technological challenges
- Social challenges and privacy concerns
- Economics
- Proprietary information
- Low number of validation studies

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Should You Choose a Technology? Job Title Roy Drop 06 00 🛧 on nn 🛧 05.86 ooking Room Operato elivery Specialist 99.05 🛧 00.00 1 eet Mechanic 100.00 🛧 eneral Utility (GU) 100.00 🛧 100.00 🛧 91.07 🛧 75.00 🔶 91.11 🛧 GES "A" 98.54 🛧 98.97 🛧 94.52 1 92.41 1 89.65 1 87.66 1 GES "B" Hostler/Jockey (Loc **10.00** nspector 100.00 🛧 100.00 🛧 100.00 4 99.80 🛧 100.00 🛧 88.89 laintenance Med Material Handler 98.47 100.00 1 84.72 个 88.20 🛧 57.14 AL 97.62 Munchies Operato 99.81 🛧 100.00 个 Over the Road Drive 97.82 🛧 99.69 1 98.09 🛧 95.64 个 85.61 🛧 95.28 🛧 98.52 个 PEC Driver 98.77 🛧 100.00 🛧 90.00 🔶 97.14 🛧 OM 98.73 100.00 194.13 194.48 189.44 95.54 🔶 92.48 个 Avg. Score





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### THE POWER OF DATA

- Sometimes patients give an inaccurate description of a precise mechanism of injury.
- Other times, the medical provider cannot immediately be there onsite to view the workspace, machinery/equipment.
- Patients can minimize or over-state the complexity or the physical demands required of a particular job/task (and sometimes they just don't know).
- Medical providers are scientists at their core we practice evidence-based medicine, so the more objective data that can be provided to them on the particular alleged work injury, the better.









5) Attendance history – With the help of employer to help determine risk of exposure.

6) Post offer of employment testing results (if applicable) – To review baseline status of patient (any notable physical exam abnormalities, or pertinent findings, also review medical history relative to the current claim of injury).

# CARPEL TUNNEL KNOWN CAUSATIVE FACTORS

- Power gripping
- <sup>•</sup> Power grasping
- <sup>•</sup> High force
- <sup>•</sup> High repetition

No high force/repetition present

minimal (6)

injury.

Days of actual alleged exposure was

Job coaching and early intervention

done immediately upon report of

 Any activity that increases pressure/swelling on the median nerve (vibratory hand tools/machining)

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# RESULTS

SAFETY – Identified that the process the patient described had been implemented for years. They were able to quantify the exact number of days/hours that the machine was not operating and employees had to implement the back-up process which was only conducted a total of 16 days out of the months the employee had been experiencing symptoms...

ATTENDANCE – And OF those 16 days that the machine was not functioning and the back-up process was implemented, the patient only worked a total of SIX of those days performing the work-around....

ERGO – When the Athletic Trainer noted the employee had been handling the part improperly and was immediately job-coaching on proper handling...(thus removing the potential exposure right away).

TASK ANAYLYSIS – Showed that the part that was being handled weighed only 5.8lbs which was designed to be a twohanded lift, at a rate of 6 parts per minute, followed by a five-minute gap (break) in between run times. Once the parts were loaded into a bin 8 inches from the ground, they were stacked in baskets (that are on a cart), one on top of the other. The total force required to push the fully loaded cart was 14.4 lbs of push force, which was well-below the designed ergonomic threshold for the task, at 35 lbs. There was no power gripping/grasping associated with the physical demands of the job, OR the back-up process.

PAST RECORDS – Indicated prior history of "several years" of numbness/tingling in both hands. Records also showed nerve damage of the brachial plexus with cervical radiculopathies.

POET – No prior post offer of employment testing, as the patient had been an employee there prior to any implementation of a post offer test.

# FINAL DETERMINATION No forceful gripping/grasping done on a repetitive basis No vibratory hand tool usage FINAL RECOMMENDATION Unable to establish a causal connection between the alleged workplace exposure and the development or aggravation/acceleration of bilateral

 carpal tunnel syndrome.
 Exposures were not of the nature/magnitude to produce, aggravate, accelerate or precipitate any underlying pre-existing structural deficiencies

beyond their natural course.Not a work-related injury/illness.

