



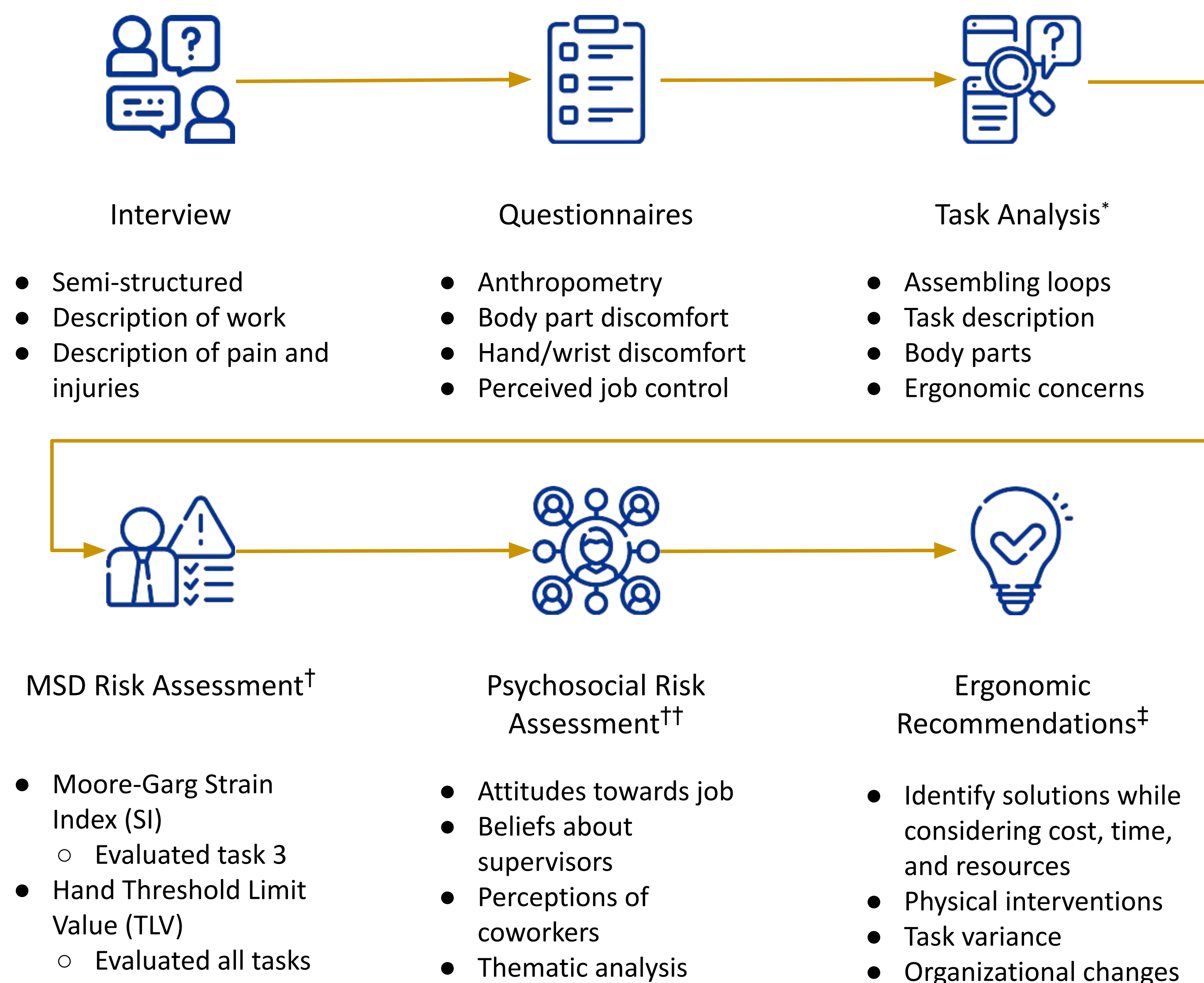
Introduction

- Work-related musculoskeletal disorders (WMSDs) are a dominant occupational health issue for older adults in the workforce. [1, 2]
- Existing literature has not investigated the prevalence and development of WMSDs among older adults working as clean room assemblers. [3]
- PVP is a 76-year-old female medical implant clean room assembler who experiences pain while assembling orthopedic products during the night shift.



- **Objective:** Use **human factors/ergonomics methods** to **better understand** the prevalence and development of WMSDs among older adults working as clean room assemblers and **provide ergonomic recommendations** to the product assembly industry.
- **Significance:** Practitioners can use the insights gained from this research to **improve worker health, comfort, and productivity** for aging employees in the workforce.

Methods



* Phase 1
† Phase 2
†† Phase 3
‡ Phase 4

Phase 1: Task Analysis

Task Number	Task Description	Body Parts	Ergo. Concerns
1	Lift arms to the driver’s fork and begin assembling braid	Shoulders, arms, hands	Awkward posture (reaching)
2	Thread braid through fork	Hands, fingers	Awkward posture (pulling)
3	Construct attachment and detachment mechanisms	Shoulders, arms, hands	Awkward posture (reaching)
4	Pull braid through fork and adjust	Hands, index fingers	Repetition, long duration
5	Inspect completed loop for debris	Eyes, hands, fingers	Strain (visual)
6	Package loop, place in order bin	Shoulders, arms, hands	Repetition, long duration
7	Clean and sanitize cell, prepare materials for incoming shift	Entire body	Awkward posture (reaching)
8	Lift chemical waste container from ground	Entire body	Awkward posture (lifting)
9	Transfer chemical waste container to waste cart	Entire body	Awkward posture (lifting)

Phase 2: MSD Risk Assessment

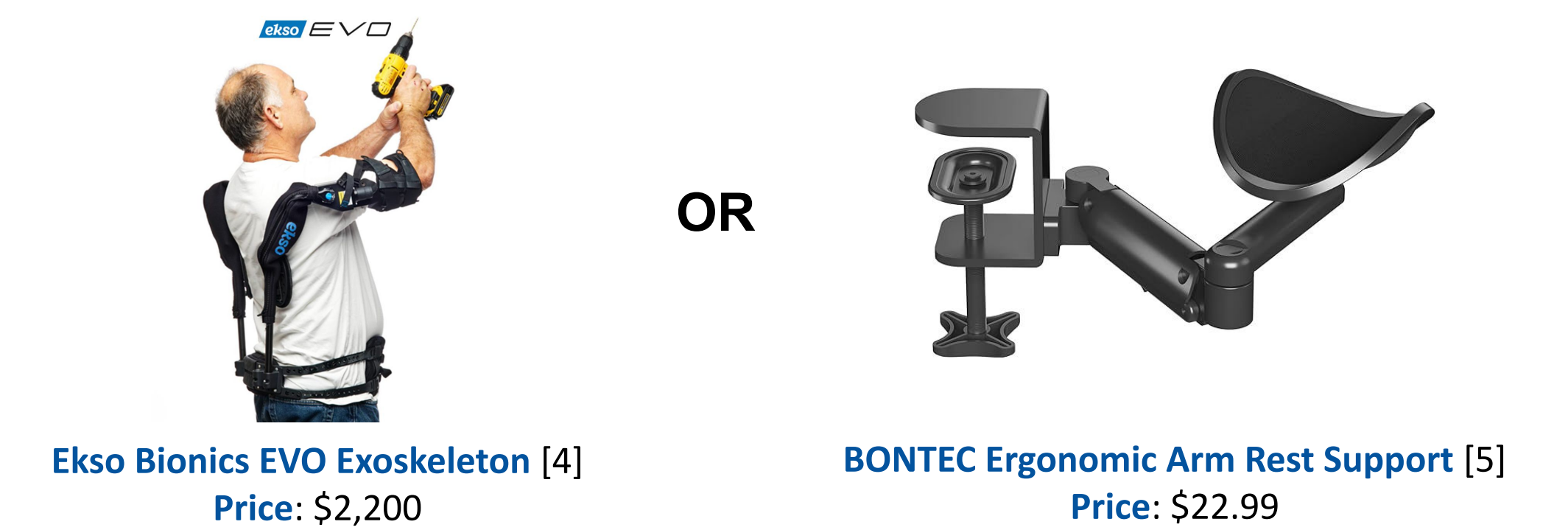
Moore-Garg SI (Task: Constructing attachment and detachment mechanisms)	
Photo of Task	Results
	<p>SI = 10.13 (left and right) Hazardous</p> <p>Factors: Awkward posture, long duration, repetition, fine motor control</p>
Hand TLV (Task: Assembling femoral adjustable and tibial free loops)	
Photo of Task	Results
	<p>TLV for Hand Activity</p>

Phase 3: Psychosocial Risk Assessment

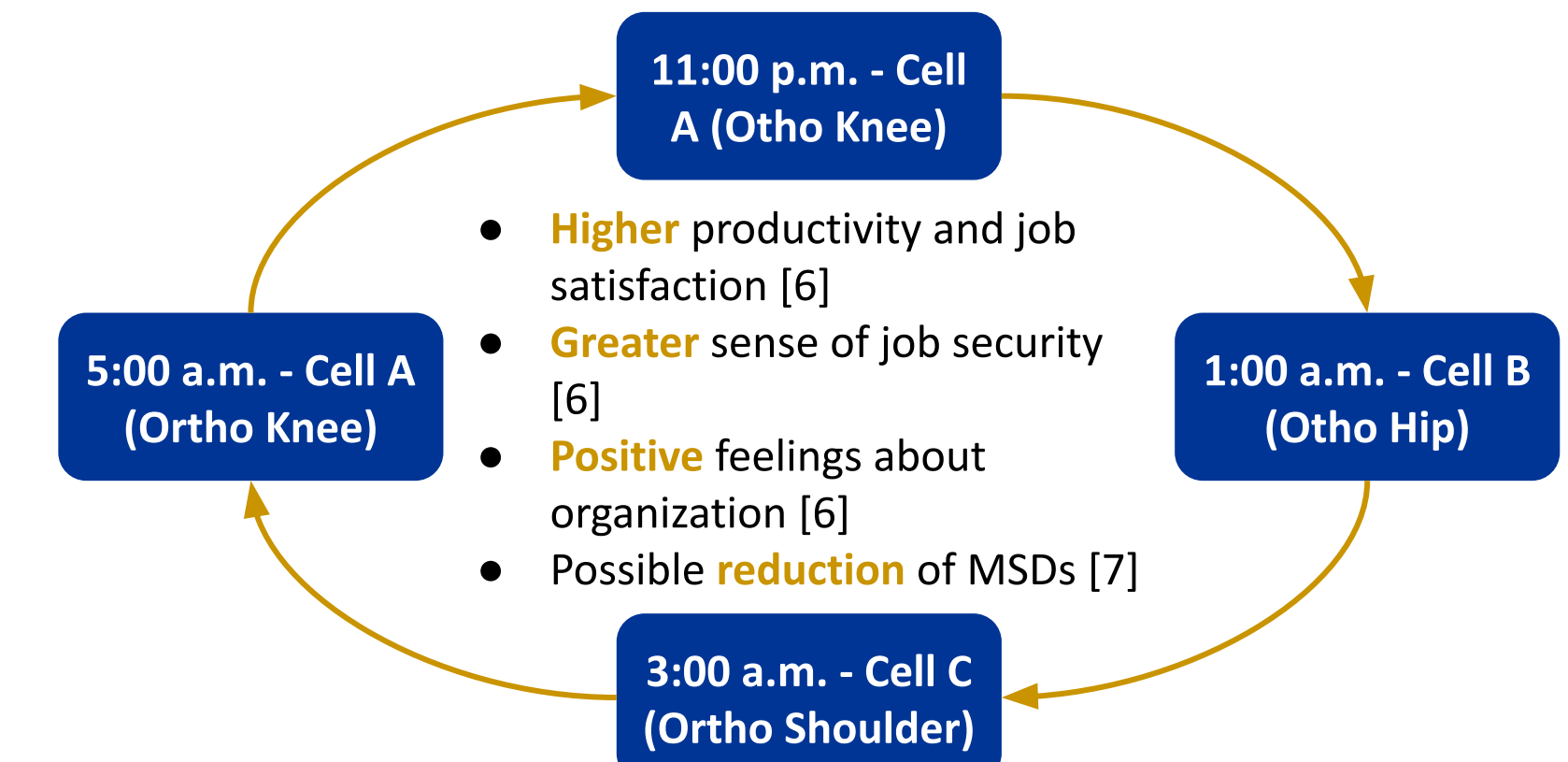
- High Workload, Pressure, and Repetition**
“I’m **pressured** to complete my work, even when my hands hurt. If I don’t meet my quota for three shifts, I’m placed ‘under review.’ They reprimand me and ask me why I’m not assembling more loops.”
- Lack of Job Control**
“For the most part, I can’t choose **what** I do, **when** I do it, or **who** I do it with. I have been here 18 years and I wish to choose certain things.”
- Organizational and Management Issues**
“A lot of the people who I work with are either **rude, stupid, or careless...**”
“The third shift supervisor is an **entitled brat** who doesn’t listen to concerns from senior assemblers like me and Juliet [coworker].”

Phase 4: Ergonomic Recommendations

Upper Limb Support (Limit Awkward Posture)



Job/Cell Rotation (Reduce Repetition and Long Duration)



Organizational Changes (Improve Psychosocial Life)

1. **Task Delegation:** Distribute the order quantity and productivity quota across multiple assemblers to avoid time pressure and high physical workload and repetition.
2. **Education:** Educate supervisors on how to listen to, develop plans for, and execute on critical feedback from subordinates. Change leadership if feedback is not considered.
3. **Training:** Provide employee training on how to effectively manage coworking relationships. Incorporate teamwork activities/exercises to facilitate positive social job interactions.

Conclusions

- Awkward postures, repetition, and long duration are the most prominent ergonomic concerns for this job.
- Job tasks are hazardous for the distal extremities and the organization itself contributes to negative feelings.
- Ergonomic interventions may improve the working environment by targeting specific concerns and hazards.
- When asked if she regrets being in pain while at work, PVP responded: “I’m always in pain, but this is life...” “When all is said and done, **I don’t regret living with my pain.**”

References and Resources

With support from: