

# Environment, Labor & Safety+ Conference



Worker Safety:

## Strategies to Manage Muscular Fatigue in Meat Processing



# PRESENTERS:



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Environment, Labor & Safety+  
**Conference**



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Vice President, On Site Therapy, LLC

Occupational Therapist

Black Belt – Industrial Time Standards MODAPTS®

Co-Developer

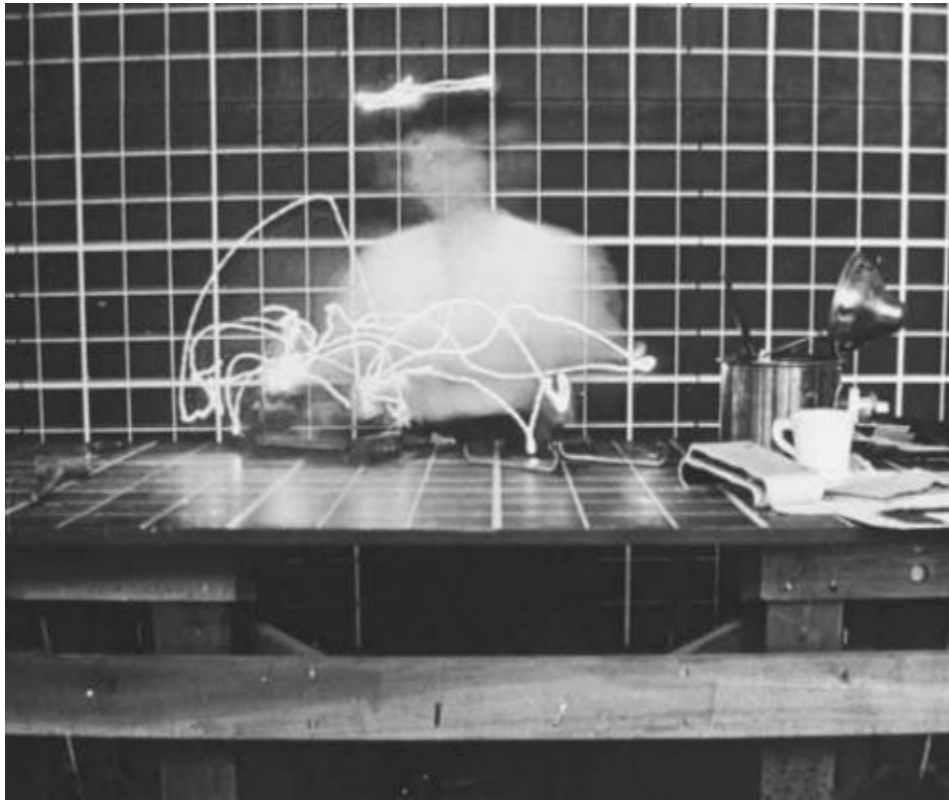
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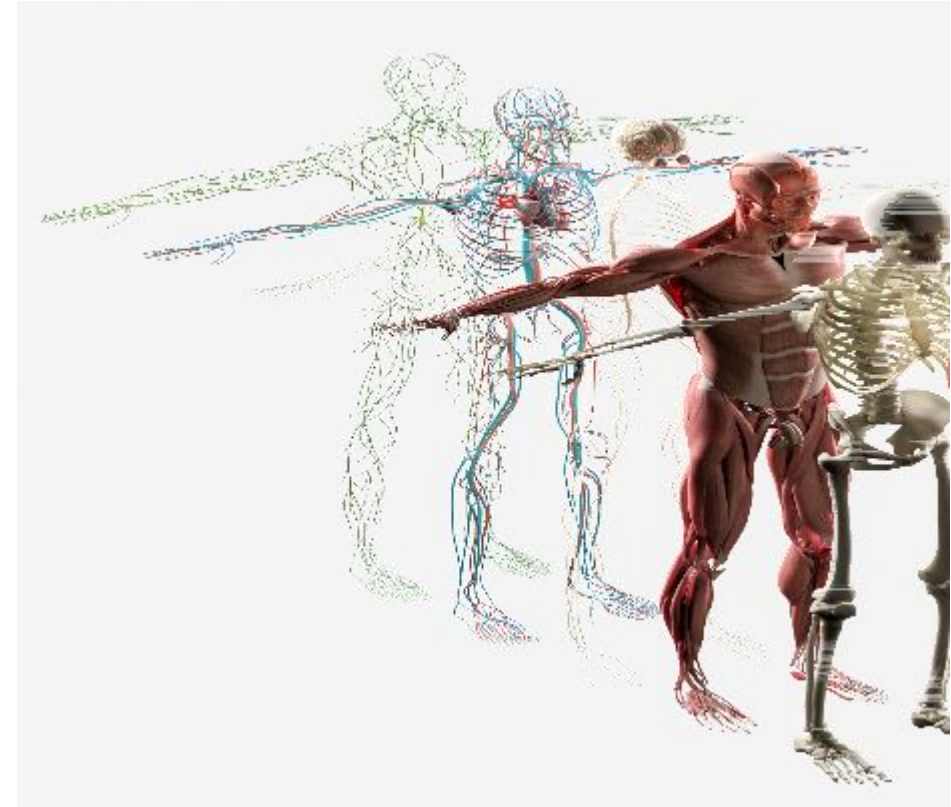
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# APPLYING ERGONOMICS & HUMAN FACTORS



**Ergonomics & Motion Analysis  
Early 1900's**

*Frank & Lillian Gilbreth*



**Ergonomics & Human Factors  
2024**

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**ELS+ Conference**



# The Physicality of Work

Duration

Posture

Repetition

Weight/Force

Distance(s)



## Fatigue

Live Hanger: 8-12 hour shift + Standing + 26 birds/minute + 5 Lb. Weight + conveyor to shackle



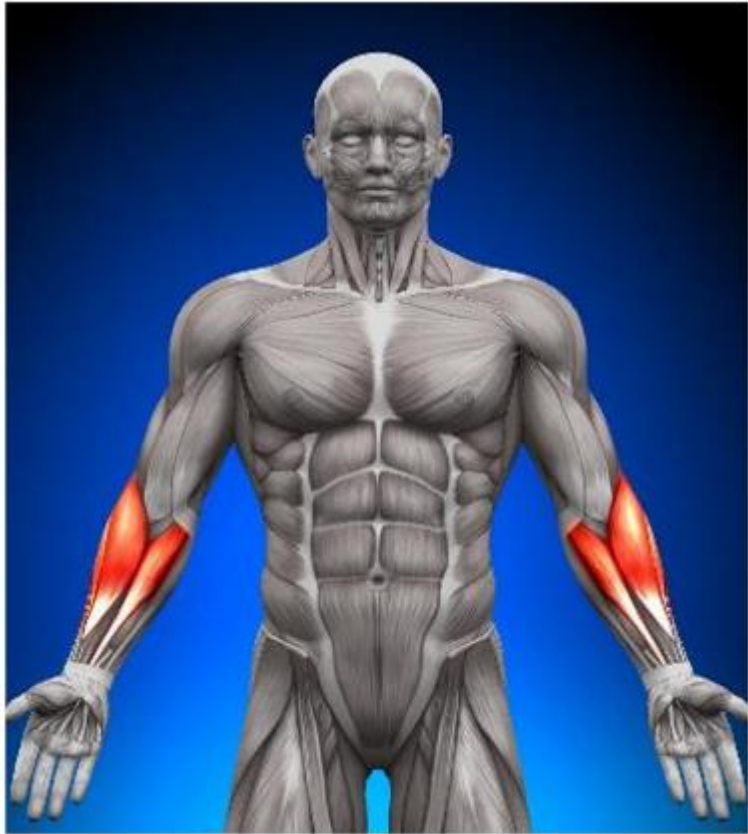
*osha.gov*

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# Impact of Worker Fatigue



# Purpose for the Solutions



## REPETITIVE WORK

Ergonomic risk factors, muscles and tendons become extremely strained or fatigued more quickly.



## PROLONGED STANDING

Reduced circulation, blood pools, and localized fatigue increases the longer employees must stand. Muscles and tendons become more susceptible to strain as they become fatigued from prolonged standing.

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# COMMON APPROACHES...

## Wrapping



## Elbow Strap



## Taping



## Stretching



## Job Rotations



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# EMERGING USE OF COMPRESSION...

Medical → Sports → OCCUPATIONAL / WORK



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# OCCUPATIONAL COMPRESSION WEAR



**Forearm / Short  
Power Arm Sleeves**



**Full Arm / Long  
Power Arm Sleeves**



**OST Performance Socks**



# Timeline of Innovation...

2016



2017



2018-2019



2021



2022



2023-2024

Product Development



Introduction of Power Arm Sleeves Performance Socks



Industry Pilot Testing

- Meat Processing
- Manufacturing
- Transportation
- Distribution
- Food Processing

AON

AIG

Employer Integration

Independent Research Published



ASU

National Ergo

Affiliated with The Institutes

Patent Pending

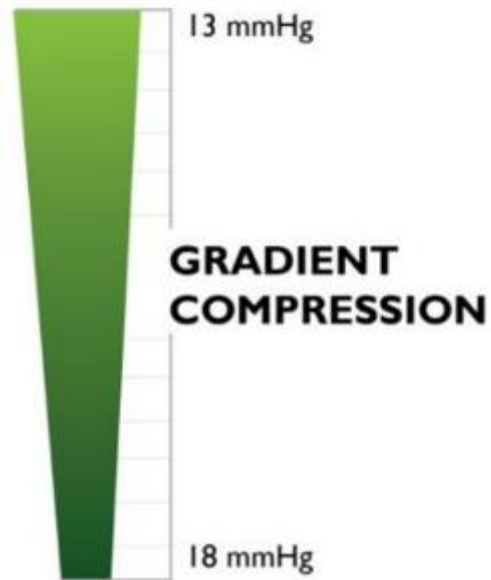
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# Power Arm Sleeves

- ✓ **Advanced Fiber Matrix**
- ✓ **Moisture Wicking**
- ✓ **6-9 Months Durability**
- ✓ **Machine Wash & Dry**



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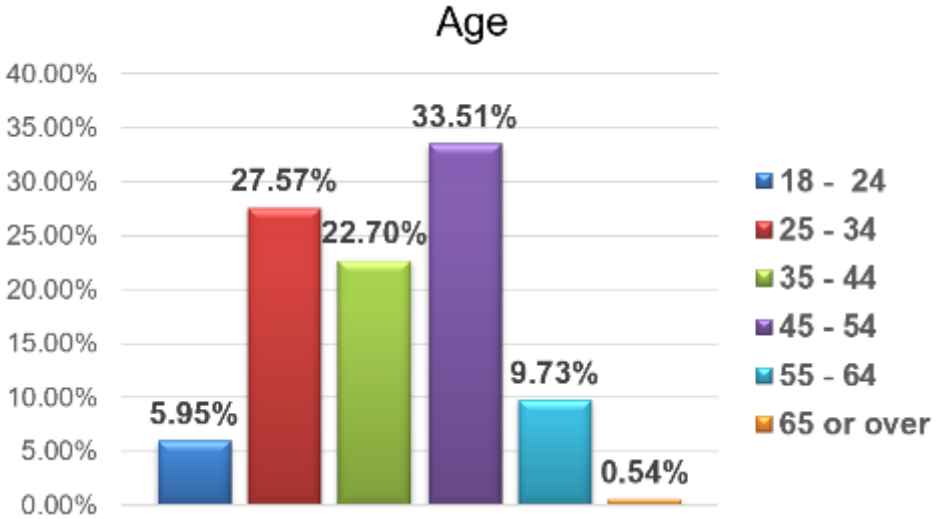
# PORK PROCESSING

3 Locations  
185 Participants



Pilot Process

POSITIONS:
Skinner
Position Hogs
Raise Neckbones
Bone Ham End
Membrane Skinner
Trimmer
Whizard Operator
Crew Leader
Jowl Line Straight Knife
Bandsaw Operator
Bone Shoulder End
Trim Loins
Utility
Palletizer
Combo Loin
Lead Person

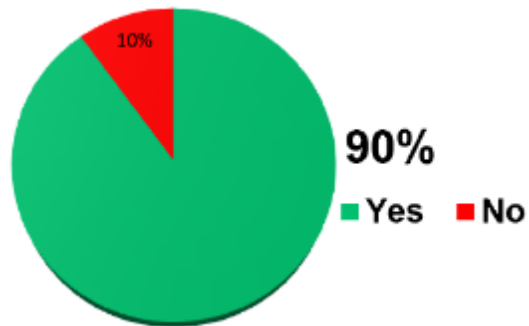


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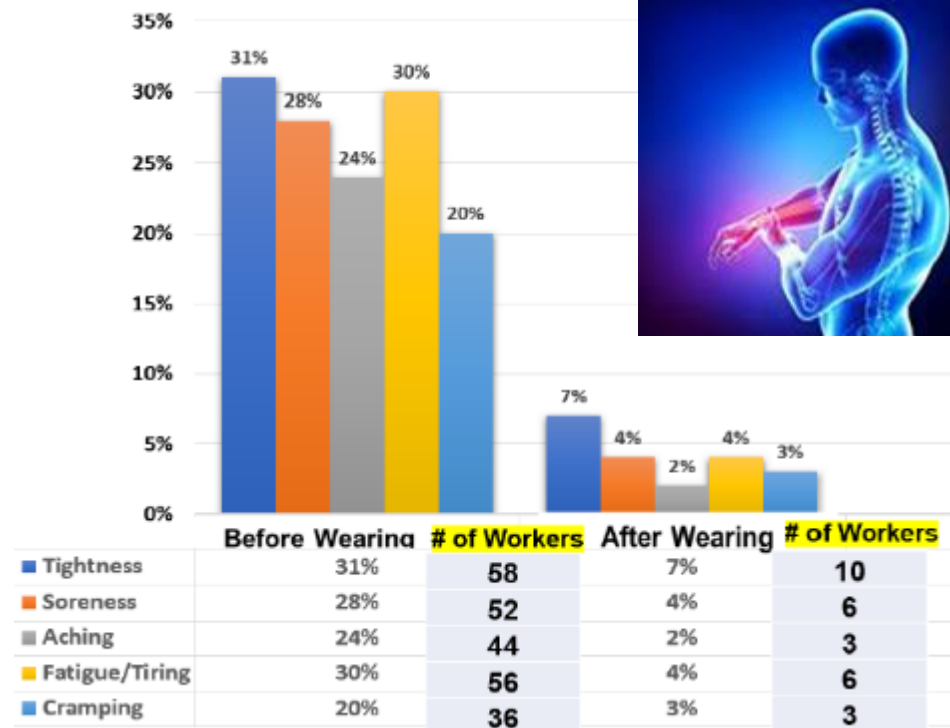


# PORK PROCESSING

**Beneficial**



<b>TIGHTNESS</b>	Reduced by <b>77%</b>
<b>SORENESS</b>	Reduced by <b>86%</b>
<b>ACHING</b>	Reduced by <b>92%</b>
<b>FATIGUE</b>	Reduced by <b>87%</b>
<b>CRAMPING</b>	Reduced by <b>85%</b>



Crew Leader - I've noticed that my arms don't get as tired and I work a lot better in performing my job.

Bone Shoulder Ends - I have no fatigue or pain on my forearm like I used to when I would get off work.

Trim Tongue - I used to have some pain on elbow and shoulders but it went away since using the sleeves.

Raise Neck Bone - Before using I had soreness and cramping but after using sleeves they help reduce pain and soreness.

Membrane Skinner - Less fatigue on arms, makes feel better when working on the line.

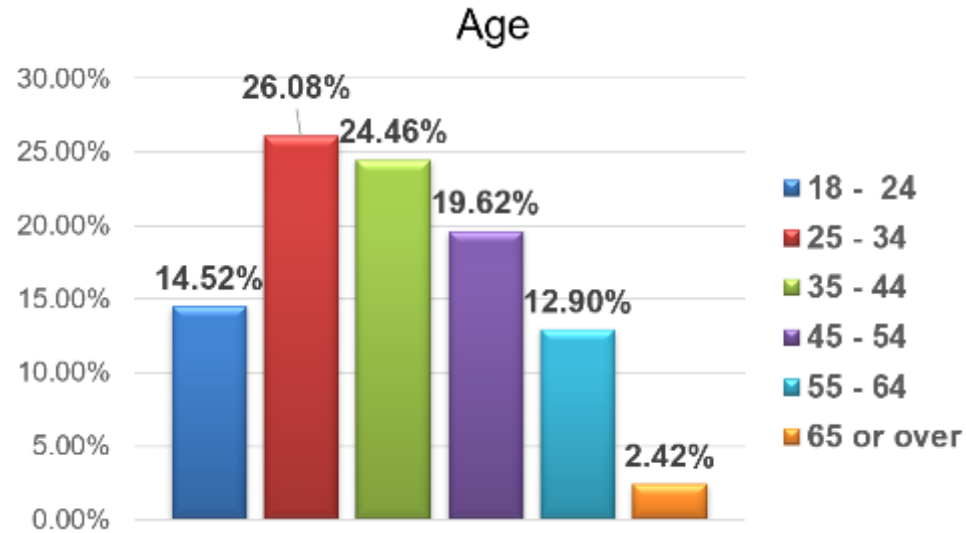
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# POULTRY PROCESSING

10 Locations  
474 Participants

POSITIONS:
Shoulder Cutter
Debone
Hanger
Chiller ReHanger
Turkey Hanger
Trimmer
Cutter
Puller
Stacker
Tray Packer
Laborer
Team Lead
Evisceration
Thigh Deboner
Tub Room
Skin Feeder
Floor Person



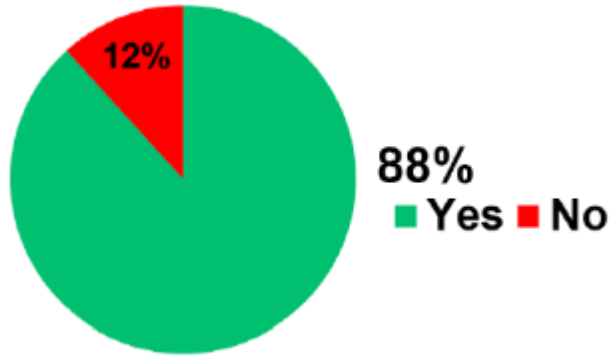
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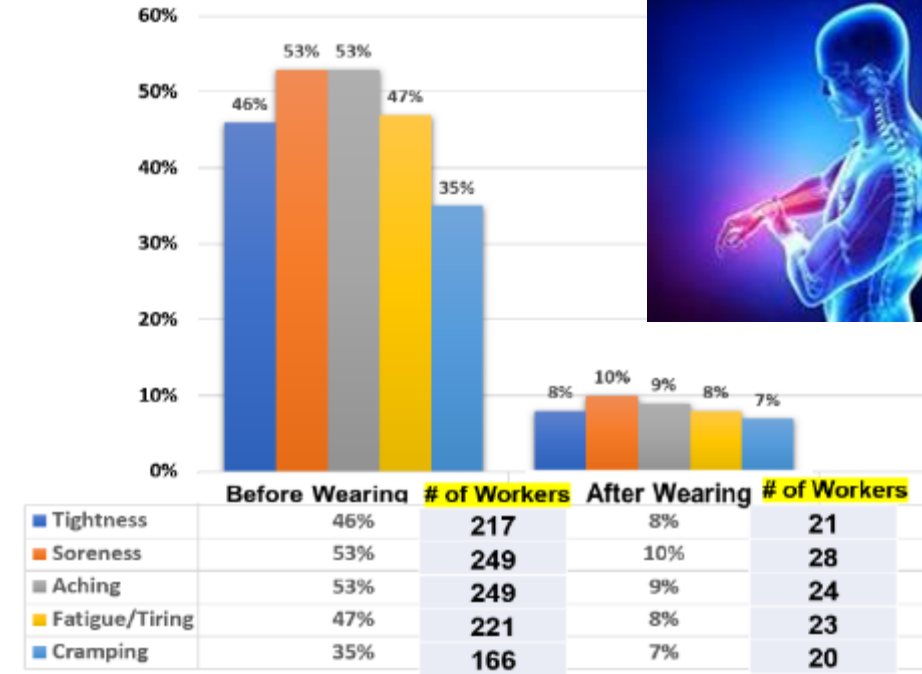


# POULTRY PROCESSING

**Beneficial**



<b>TIGHTNESS</b>	Reduced by <b>83%</b>
<b>SORENESS</b>	Reduced by <b>81%</b>
<b>ACHING</b>	Reduced by <b>83%</b>
<b>FATIGUE</b>	Reduced by <b>83%</b>
<b>CRAMPING</b>	Reduced by <b>80%</b>



Debone Trimmer - I've been able to sleep at night since wearing the sleeves. My hands are not swollen and sore when I get home from work anymore.

Rehang - One thing I noticed was my arm did not get as tired and my elbow did not hurt..

Turkey Hanger - I was wearing wrist bands for pain and these helped more than they did.

Debone - Provides support to my wrist, elbow and shoulders. I felt better after my work shift. More circulation and helped a lot.

Production Supervisor - Arms felt supported and stronger.

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# BEEF PROCESSING

3 Locations  
113 Participants

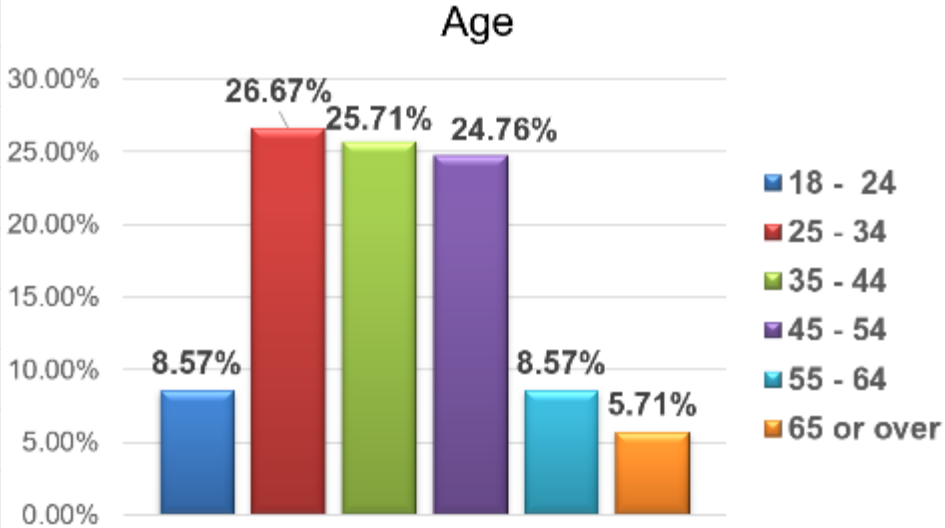


Pilot Process

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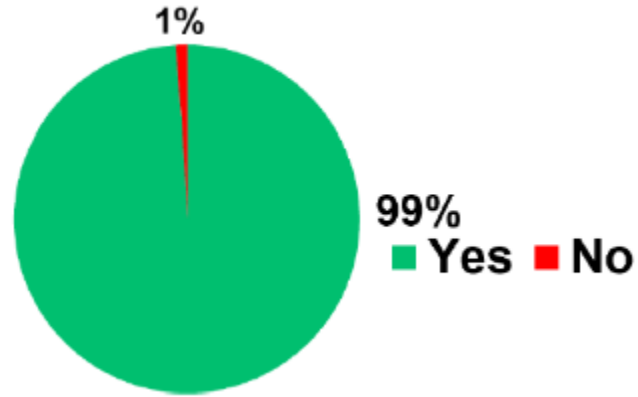
**POSITIONS:**

Trimmer
Block Table
Patty Packer
Team Lead
Trim and Saw
Trim Caps
Packing
AHT Trainer
Supervisor
Trim Hanging Tender
Block Table
Lift Driver
Lead
Ribber
Multi Form Operator
Pet Food



# BEEF PROCESSING

**Beneficial**



**TIGHTNESS** Reduced by **92%**  
**SORENESS** Reduced by **94%**  
**ACHING** Reduced by **98%**  
**FATIGUE** Reduced by **96%**  
**CRAMPING** Reduced by **93%**



Trimmer - The Sleeves help to support my arms, wrists, and hands.

AHT Trainer- I have less cramping and feel stronger grip.

Trim Hanging Tender - The sleeves helped reduce the tiredness I was feeling in my arms & shoulders.

Packaging - Don't feel as tired when I get home. I feel like I can do more than just sitting.

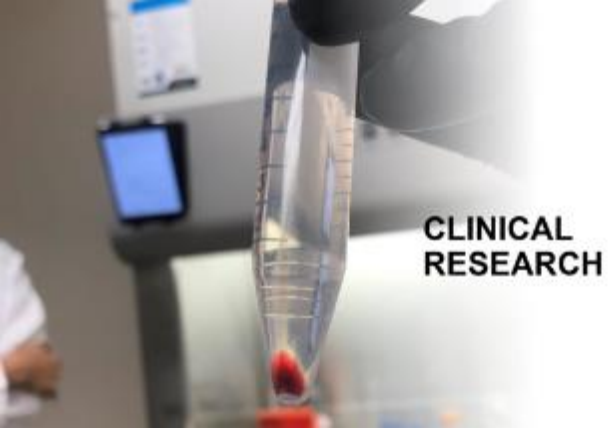
Supervisor- I really like wearing them a lot.

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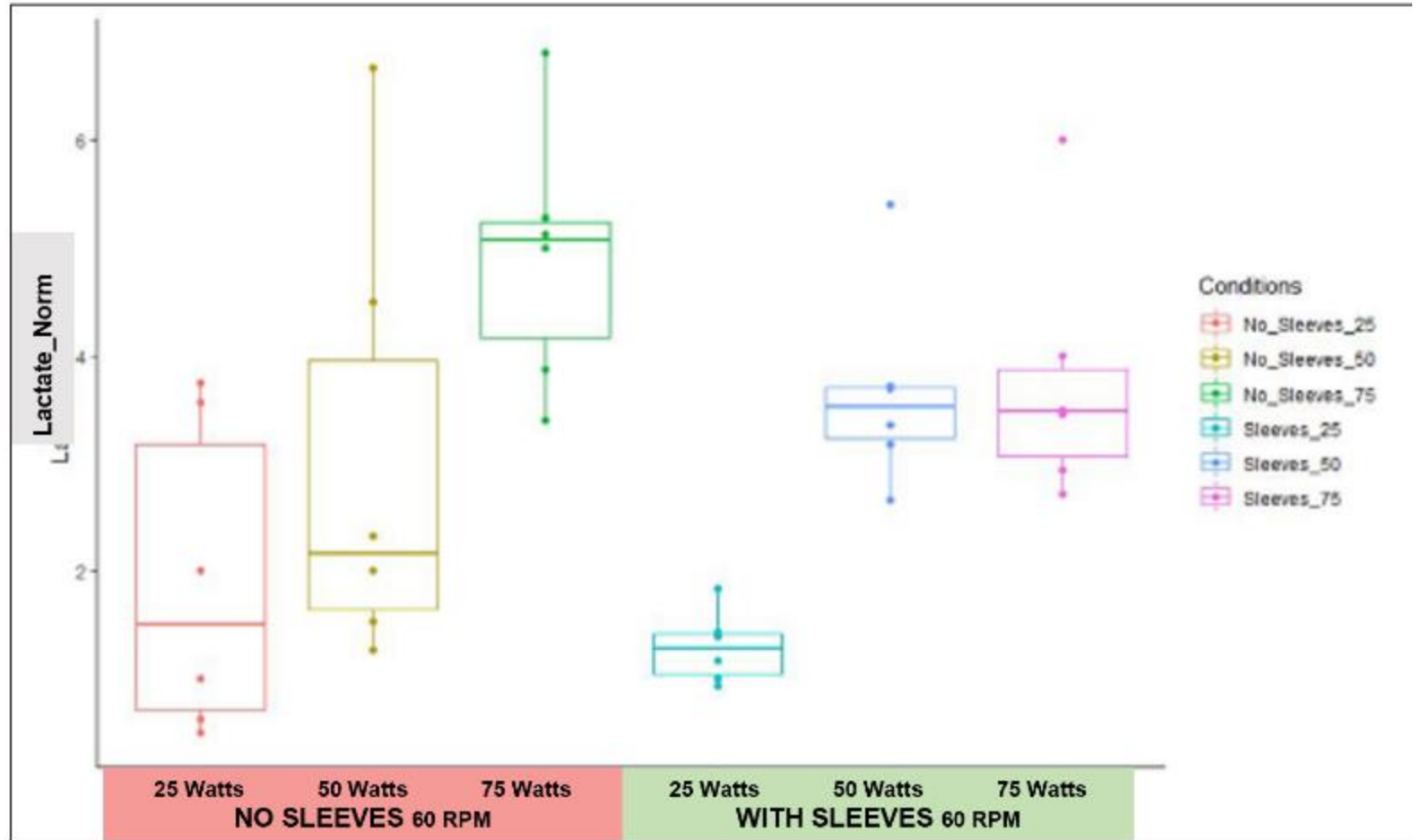




# What are the differences in biomarkers' expression with and without arm compression sleeves before and after fast-paced, repetitive upper extremity activity?



- Clinically Significant Results
- Decrease in Lactate / Fatigue Biomarkers
- Less Fatigue At Higher Work Rates



Rohrer, A., Conde, D., Montaivo, S., Gomez, M., Juarez, J., & Ibarra-Meja, G. (2022). Changes in Lactate After the Completion of Repetitive Cycle Exercises With and Without Compression Arm Sleeves. *Physical Ergonomics and Human Factors*, Vol. 63, 2022, 227–231.



# Bottom Line...ROI



**\$18,000.00 Savings in Coban Wrap**

**Poultry Processing ROI                      7.8 : 1**

**Beef & Pork Processing ROI      7.0 : 1**



**Upper Extremity  
MSD Injuries  
2 Year Study  
Reducing WC Costs**



**Ergonomics COMBINED Approach**

- Compression (**200 Pairs of Power Sleeves**)
- Scissor Gloves
- Knife Gloves

**OUTCOME Results 2 year period**

**27% MSD Injury Reduced 2018 vs 2017**

**46% MSD Injury Reduced 2019 vs 2018**

**49% WC Expenses Reduced 2019 vs. 2018**

**99% Sprain / Strain Complaints from this group reduced**

(used on Breast Cutters, Thigh Poppers, Skin Puller and Cone Loaders)





# Testimonials

## SAFETY

**“I have implemented this great product in a poultry processing plant. The results have been astonishing! Line workers that had been complaining of arm and hand pain dramatically fell once they were outfitting with the compression sleeve. Big drop in recordable cases. Was a sceptic but no more!”**



# Testimonials

## OCCUPATIONAL HEALTH NURSE

**“I was a skeptic but since I have handed out the product on the breast cutter line I have not had one person in here with a c/o of pain. We are going to target skin pullers, thigh poppers and cone line next. I have seen savings on our Coban and bio freeze. This is a great product”**

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# Testimonials

## ON SITE ATHLETIC THERAPY GROUP

“If properly measured and fitted, they can be used by new hires that perform highly repetitive upper extremity motions as an injury/soreness prevention tool. The sleeves can also be used for MSD/ Soft Tissue issues as a "non-rigid" first aid treatment tool with great success. Biceps tendinitis (using the sleeves that go from mid bicep to wrist), medial and lateral epicondylitis, wrist flexor/extensor pain, and distal forearm/wrist edema can be helped greatly. Early symptom recognition is a must and can make these compression sleeves even more effective. Couple these sleeves with other first aid measures and there is a great chance these soft tissue issues can be rectified quickly as a first aid case.”

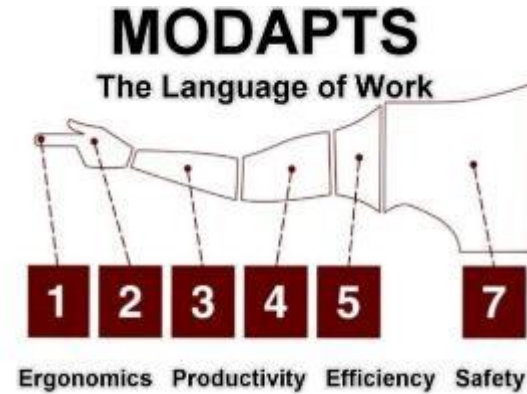
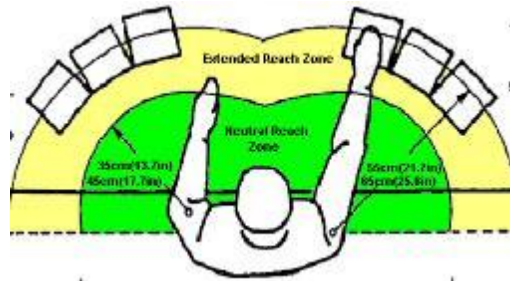
**Moore Wellness Systems**

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# Strategies to Integrate Fatigue Management

## Physical Demands / Motion Analysis



## Occupational Lymphatics with Stretching



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# Strategies to Integrate Fatigue Management



## Occ Med Clinic



## Line Specific / Injury Prevention Strategies

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# Prolonged Standing



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## OSHA.Gov – **PROLONGED STANDING**

“Another problem related to standing for long periods of time is the “static load” placed on the legs and back. Circulation is reduced, blood pools, and localized fatigue increases the longer employees must stand. Muscles and tendons become more susceptible to strain as they become fatigued from prolonged standing.”

## **OST Performance Socks**



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## Lower Leg – “Often” & “Very Often”

Pilot Results - **562 Workers**

### REDUCTION of SYMPTOMS

**Tightness**



# of Workers  
Before **190**  
After **37**

**Soreness**



# of Workers  
Before **229**  
After **38**

**Pulling**



# of Workers  
Before **157**  
After **21**

**Swelling**



# of Workers  
Before **133**  
After **13**

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## Feet – “Often” & “Very Often”

Pilot Results - 562 Workers  
**REDUCTION of SYMPTOMS**

### Tightness



# of Workers  
Before **223**  
After **29**

### Soreness



# of Workers  
Before **296**  
After **44**

### Swelling



# of Workers  
Before **187**  
After **15**

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# OCCUPATIONAL COMPRESSION WEAR



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