

# Musculoskeletal Diseases: What are they and what can we do about them?

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# Where are we going?

- ◆ What are MSDs?
- ◆ What is the incidence of MSDs?
- ◆ What causes MSDs?
- ◆ What can we do about decreasing MSDs in the workplace?
- ◆ Please feel free to ask questions throughout



**51<sup>st</sup> Annual Iowa Governor's  
Safety & Health Conference**



# Who am I?



# What are MSDs?

- ◇ Musculoskeletal...
- ◇ ...health
- ◇ ...diseases
- ◇ ...disorders
- ◇ ...injuries
- ◇ ...conditions



# World Health Organization (WHO)

- ◆ Musculoskeletal health refers to the performance of the locomotor system, comprising intact muscles, bones, joints and adjacent connective tissues.
- ◆ Musculoskeletal impairments comprise more than 150 different diseases/conditions.
- ◆ Pain experienced in musculoskeletal structures is the most common form of non-cancer pain.

# WHO

- ◇ Musculoskeletal conditions include conditions that affect:
  - ◇ joints, such as osteoarthritis, spondyloarthritis
  - ◇ bones, such as osteoporosis, osteopenia, traumatic fractures
  - ◇ muscles, such as sarcopenia



# WHO

- ◆ Approximately 1.71 billion people have musculoskeletal conditions
- ◆ Musculoskeletal conditions are the leading contributor to disability, with low back pain being the single leading cause of disability in 160 countries.
  - ◆ Low back pain is the main contributor to the overall burden of musculoskeletal conditions.
- ◆ Musculoskeletal conditions significantly limit mobility and dexterity, leading to early retirement from work, lower levels of well-being and reduced ability to participate in society.

# WHO Data Resources

- ◇ <https://vizhub.healthdata.org/rehabilitation/>
- ◇ <https://www.who.int/news-room/fact-sheets/detail/musculoskeletal-conditions>

**160M**

people have been affected  
by low back pain.



The highest need is in the United  
States of America, where

**150M**

people could benefit from  
rehabilitation.



# Bureau of Labor Statistics

◇ <https://www.bls.gov/iif/>

## LATEST NUMBERS



### NONFATAL INJURIES AND ILLNESSES, PRIVATE INDUSTRY

#### Total recordable cases:

2,654,700 in 2020



#### Cases involving days away from work:

1,176,300 in 2020



#### Median days away from work:

12 in 2020



#### Cases involving sprains, strains, tears:

266,530 in 2020



#### Cases involving injuries to the back:

128,220 in 2020

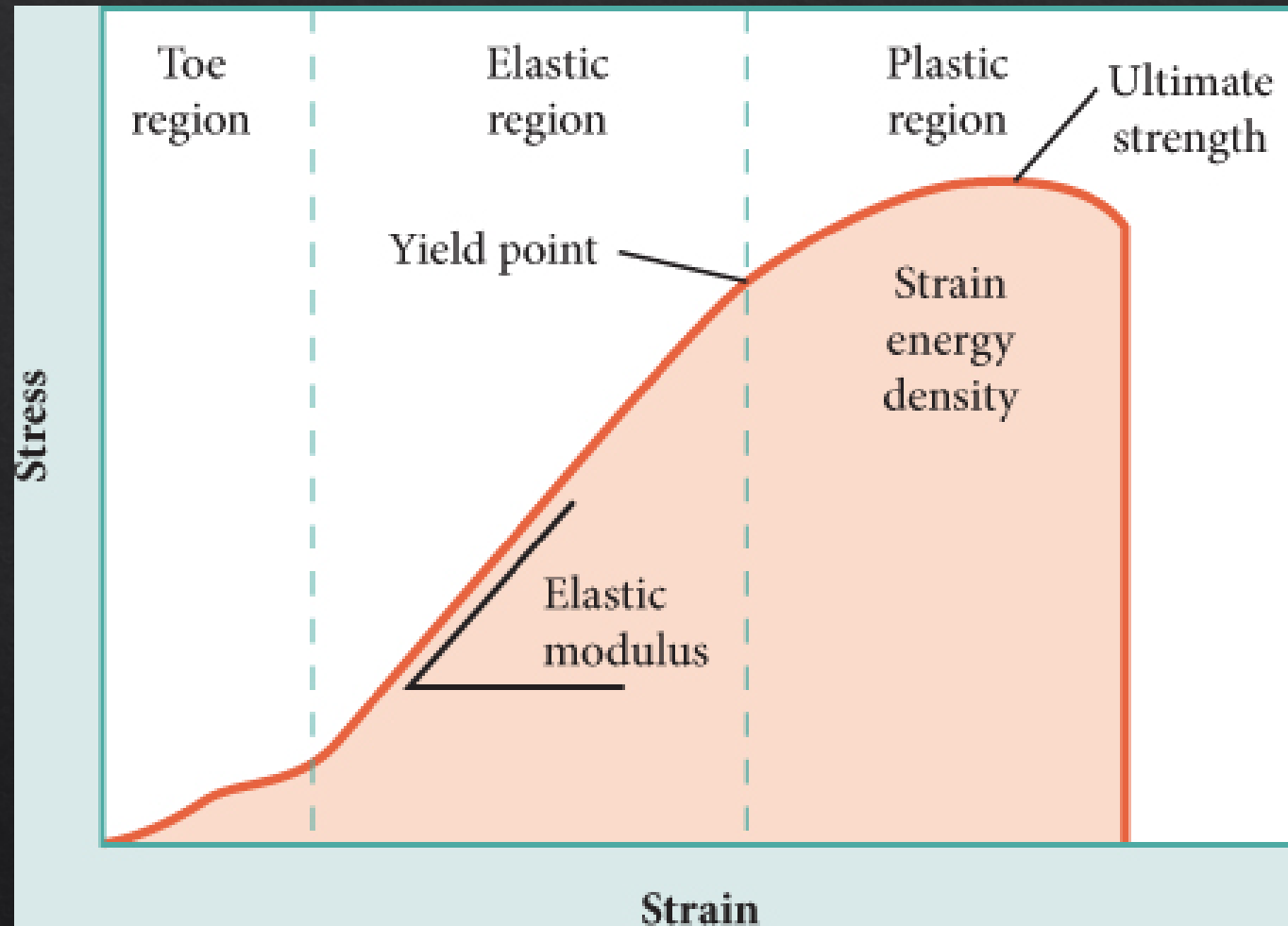


# MSD Etiology

- ◇ Manner of causation of a disease or condition.



# Stress-Strain Curve



# Models of Injury

## Steps to create the model:

- ◆ Failure tolerance

  - ◆ The stress level above which failure will occur

- ◆ Actual stress

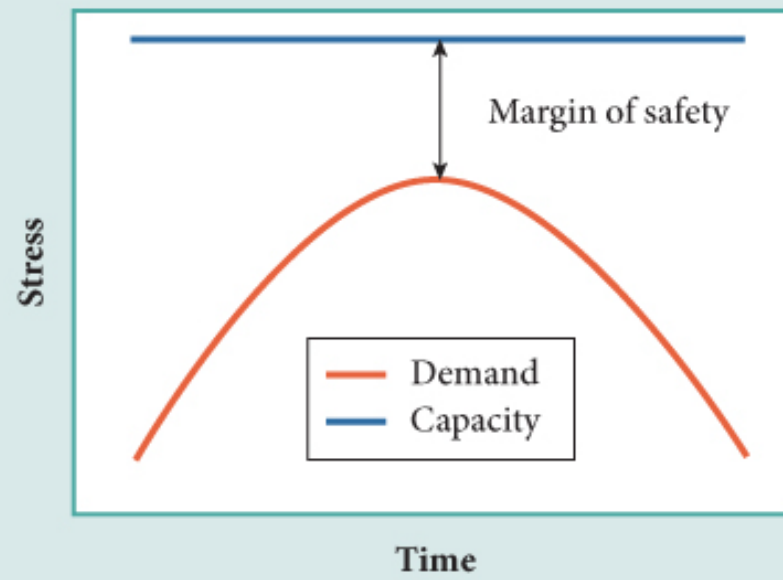
  - ◆ How much stress the body is subjected

- ◆ Margin of safety

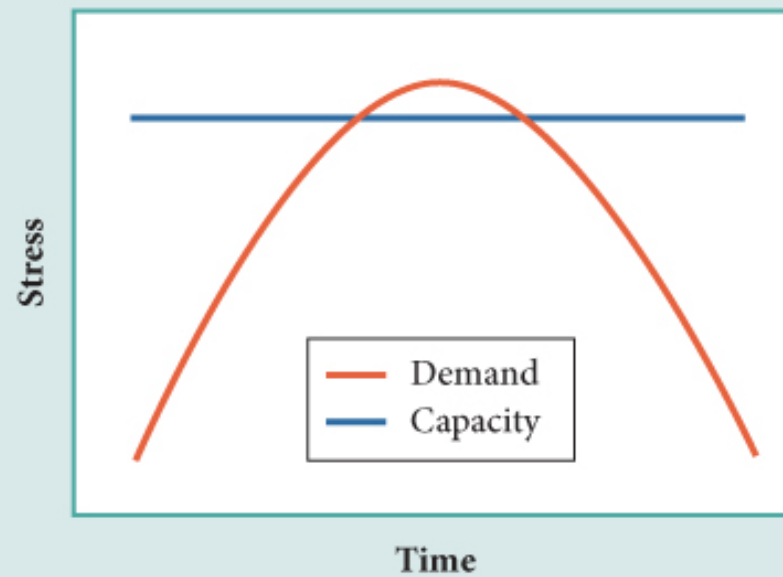
  - ◆ The difference between the failure tolerance and the actual stress applied to a body



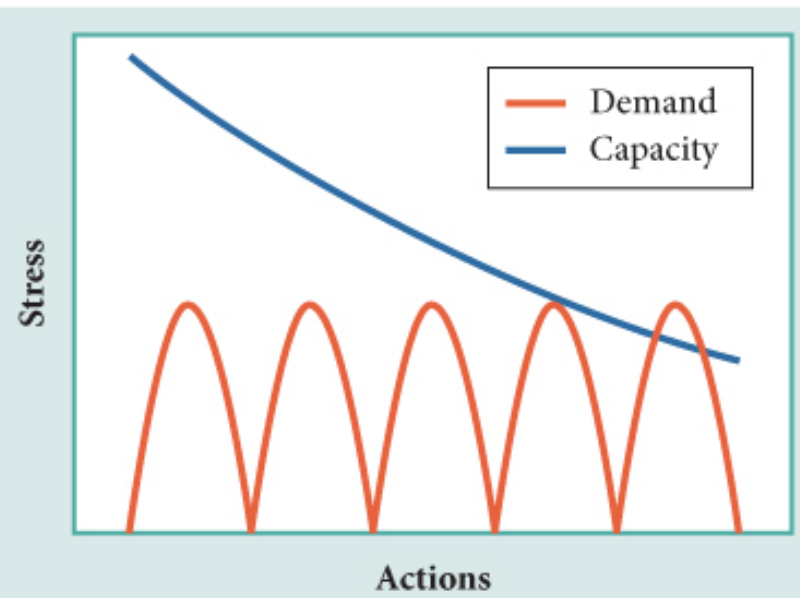
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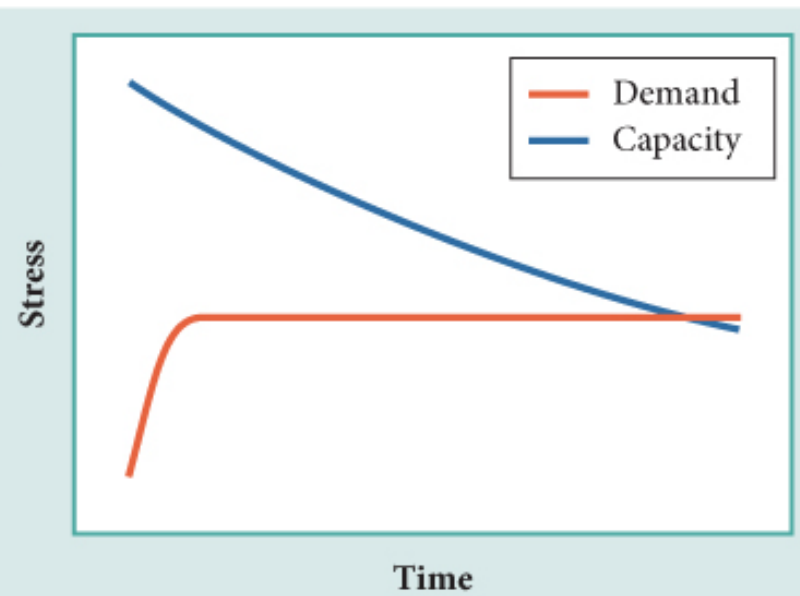
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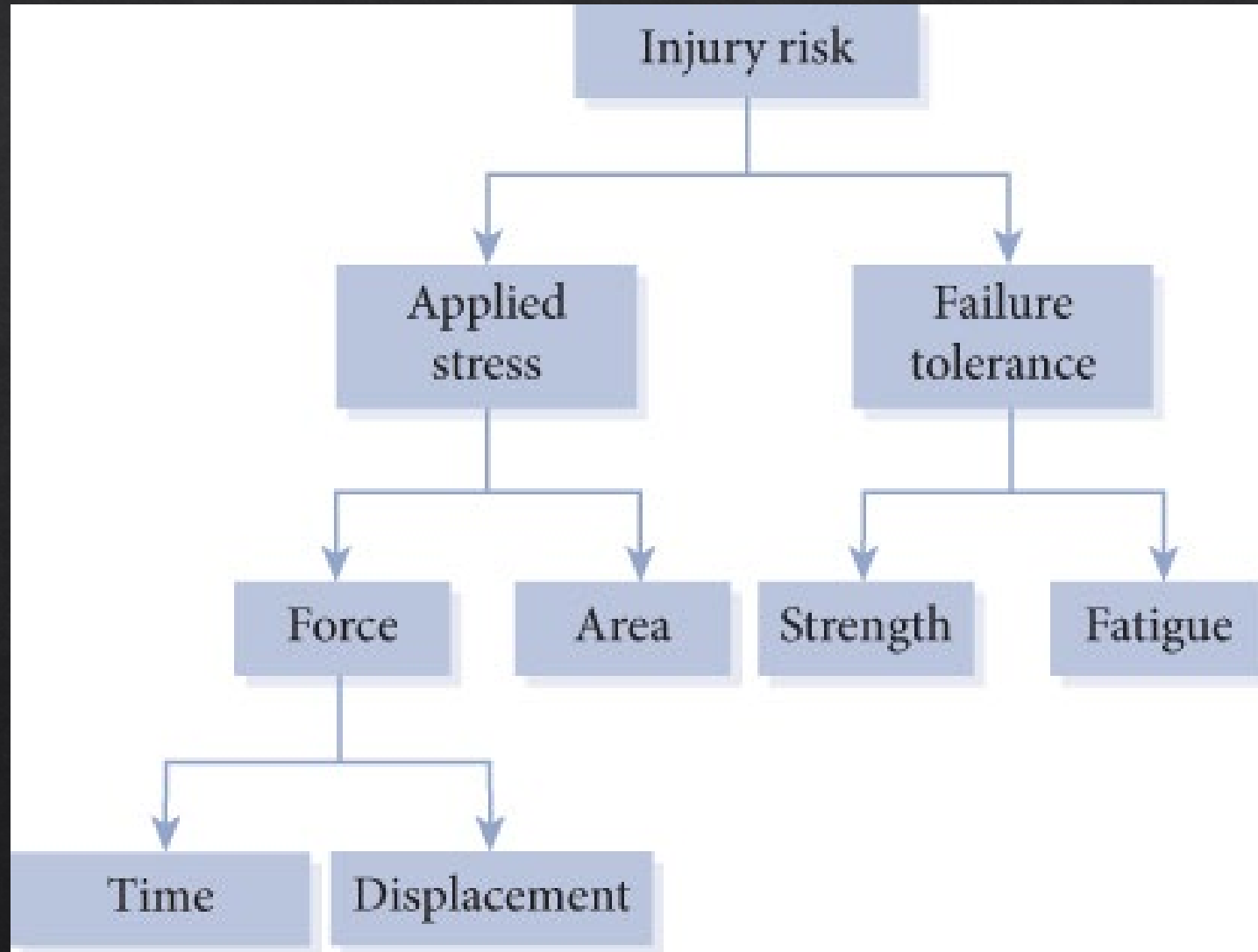


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# A Model for Decreasing Injury Risk



# Reducing MSD Incidence (Applied Stress)

◇ Other presenters

◇ Ergonomics

- **How to Leverage Artificial Intelligence for Accurate and Reliable Ergonomic Assessment**, Jean E. Robillard, M.D, Alec Diaz-Arias, PhD, *and* Don Triggs, CPE, *Inseer, Inc.*

◇ Be Switzerland

◇ Don't do too much of anything for too much time

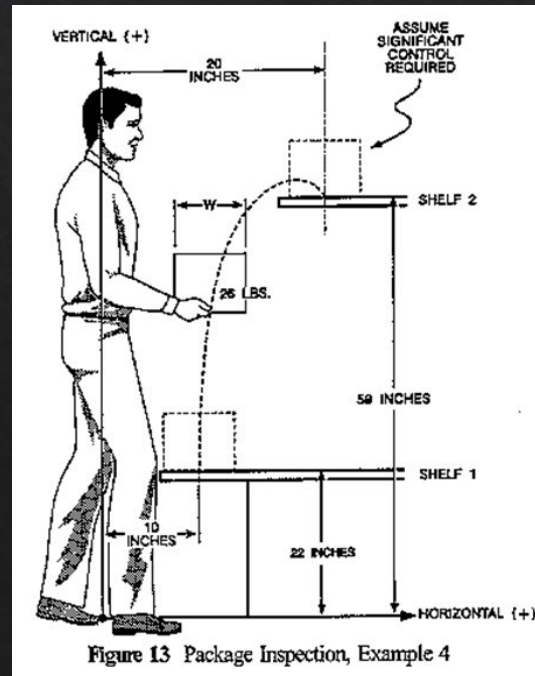




# Ergonomics



[www.osha.gov](http://www.osha.gov)



# Ergonomics



<https://ergo.human.cornell.edu/>

<https://www.osha.gov/ergonomics>



# Reducing MSD Incidence (Failure Tolerance)

- ◇ What role does physical activity play?
- ◇ Google “Manufacturing Fitness Program” or the like
- ◇ Other presentations
  - ◇ Care and Prevention

- **The Industrial Athletic Trainer: A Valuable Asset to your EHS Team**, Michael Donahue, DAT, MEd, ATC, *CareOnSite*



# Reducing MSD Incidence (Failure Tolerance)

## Facts

- More than 60 percent of U.S. adults do not engage in the recommended amount of activity.
- Approximately 25 percent of U.S. adults are not active at all.
- Physical inactivity is more common among:
  - Women than men.
  - African American and Hispanic adults than whites.
  - Older than younger adults.
  - Less affluent than more affluent people.
  - Social support from family and friends has been consistently and positively related to regular physical activity.

<https://www.cdc.gov/nccdphp/sgr/adults.htm>

# Reducing MSD Incidence (Failure Tolerance)

What's Your Role?

## Employers



As an employer, you can help improve the health of your employees and create healthier communities by promoting physical activity in your workplace and surrounding community.

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### On This Page

[Worksite Physical Activity  
Can Improve Employee  
Health and Save Money](#)

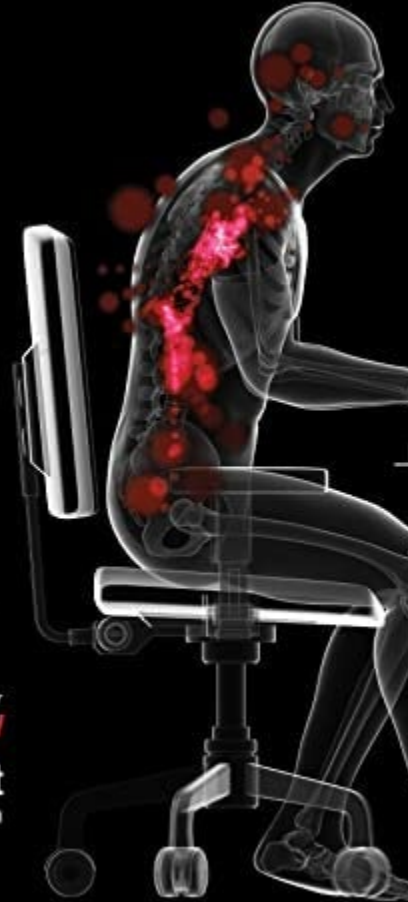
<https://www.cdc.gov/physicalactivity/activepeoplehealthynation/everyone-can-be-involved/employers.html>

# Deskbound

Standing Up  
to a  
Sitting World

*From the Author of the New York Times Bestseller  
**Becoming a Supple Leopard***

**Dr. Kelly Starrett**  
with Juliet Starrett and Glen Cordoza





# Discussion?



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