

Ready for Duty: Training Movement Competency and Capacity for Paramedics

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CRE-MSD Training Webinar Series - Paramedics

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UNIVERSITY OF WATERLOO
FACULTY OF APPLIED HEALTH SCIENCES

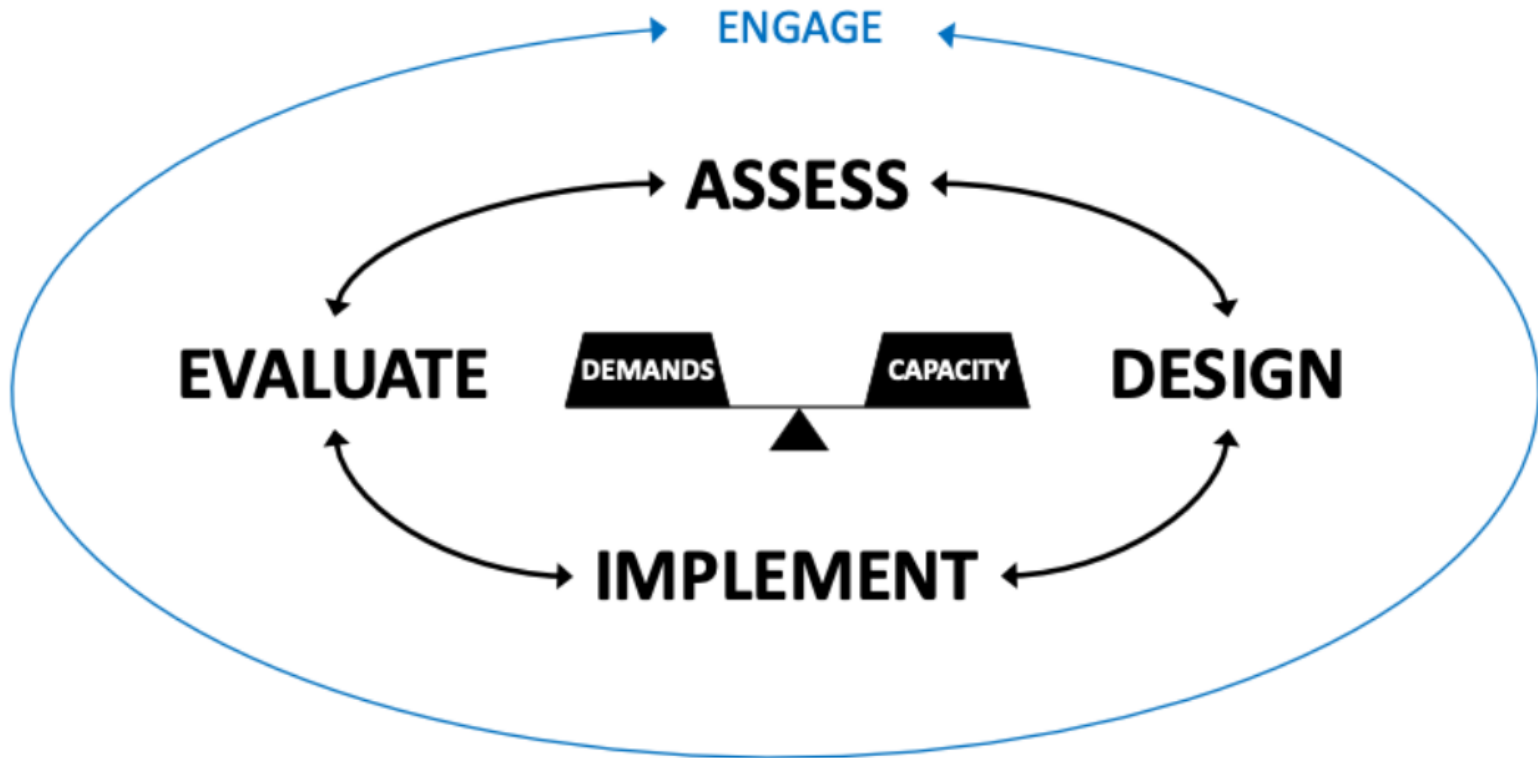


**OCCUPATIONAL
BIOMECHANICS &
ERGONOMICS LAB**
Optimizing Human Performance

Overview

- Tip the scale in favour of MSD prevention using the Demand-Capacity-Competency model
- Understanding and controlling paramedic demands
- Increasing capacity for work as a paramedic
- Improving movement competency for work as a paramedic





collaborative & iterative process
(flexible and adaptable to enable tailoring and progressions)

- Tyson Beach, CRE-MSD Webinar Oct 8, 2020

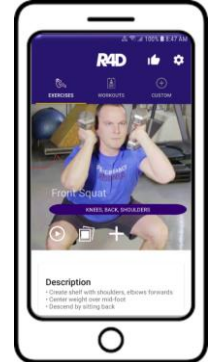


Demand-Capacity-Competency Model



Job Demands


Movement Capacity



Tip the scale for MSD prevention!



Ready for Duty eLearning Series - Movement Module



eLearning 45 minutes

Movement Module - 4th module in Ready for Duty eLearning series

The life of a paramedic can be both physical and mentally demanding. Rotating shift schedules, repeatedly having to perform physically and mentally demanding tasks, poor quality of sleep, exposure to highly stressful situations, and poor diets are some of the factors that over time can take their toll if left unchecked. A recent [Defence Research Development Canada \(DRDC\) report](#) highlights the toll that this work can have on your health and wellness as a paramedic, where paramedics experience much higher levels of overall fatigue and burnout than the average Canadian.





Understanding and controlling paramedic demands

Injury prevention in the workplace

Fitting the *work* to the *worker*

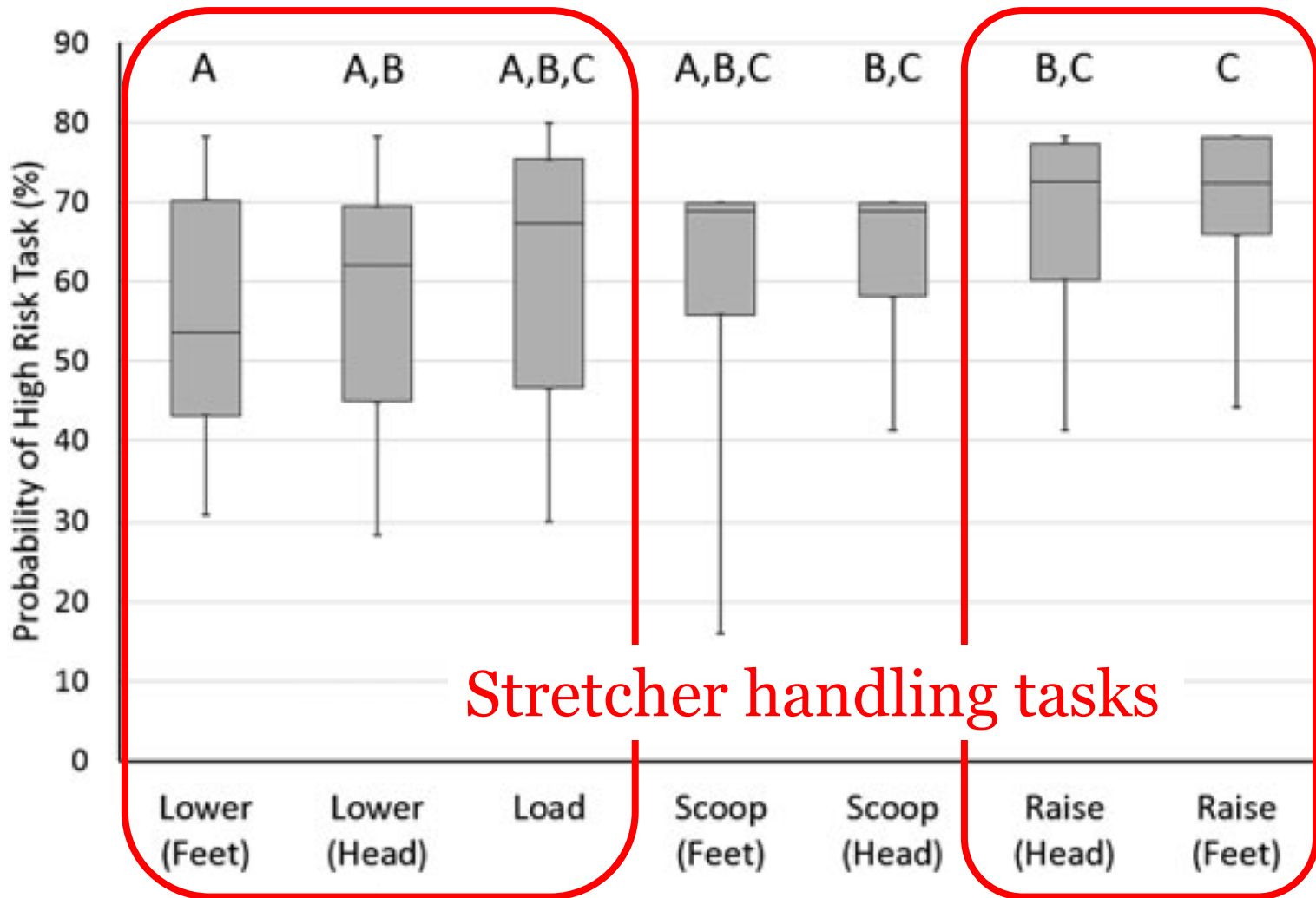
More important

VS

Fitting the *worker* to the *work*



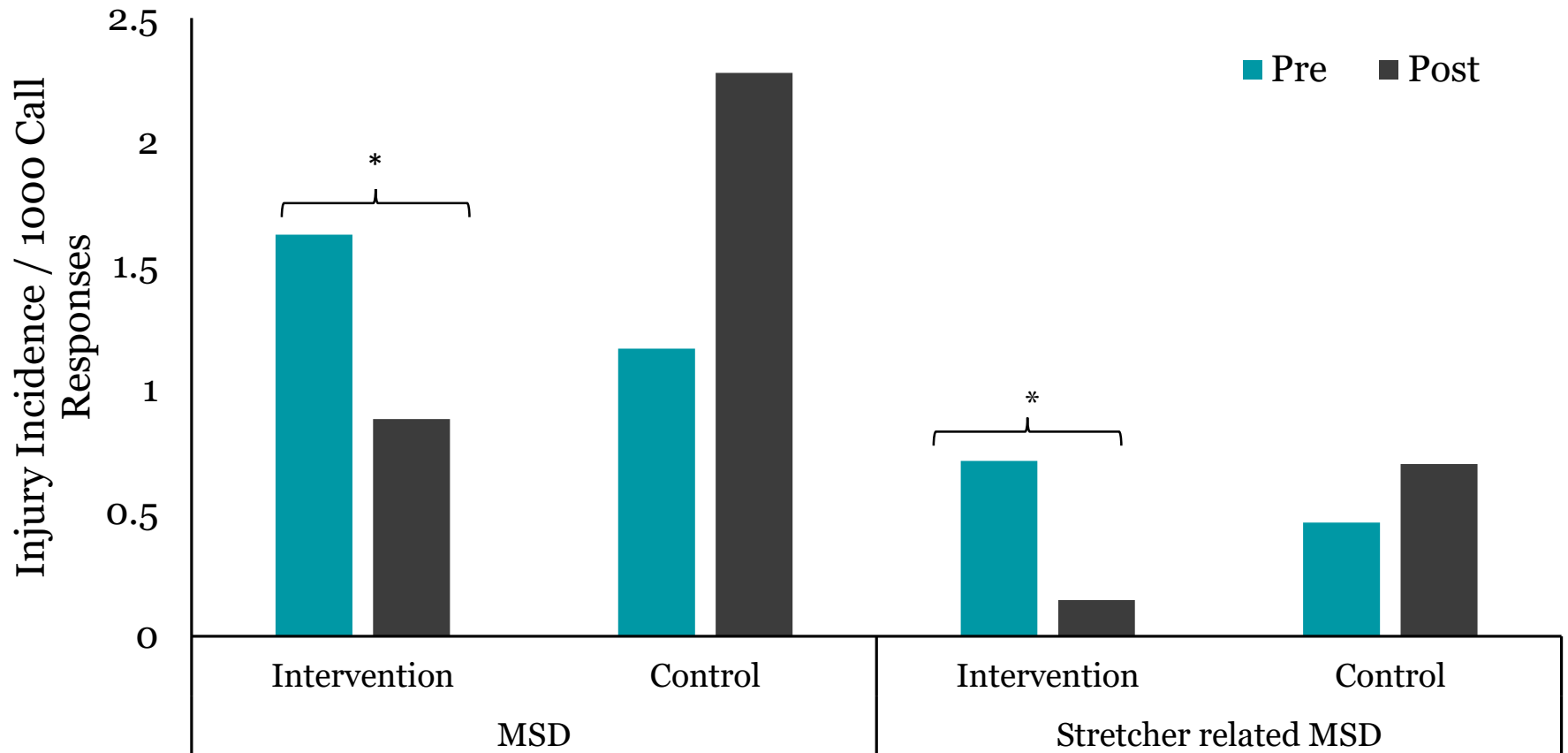
Cumulative Injury Risk by Paramedic Task



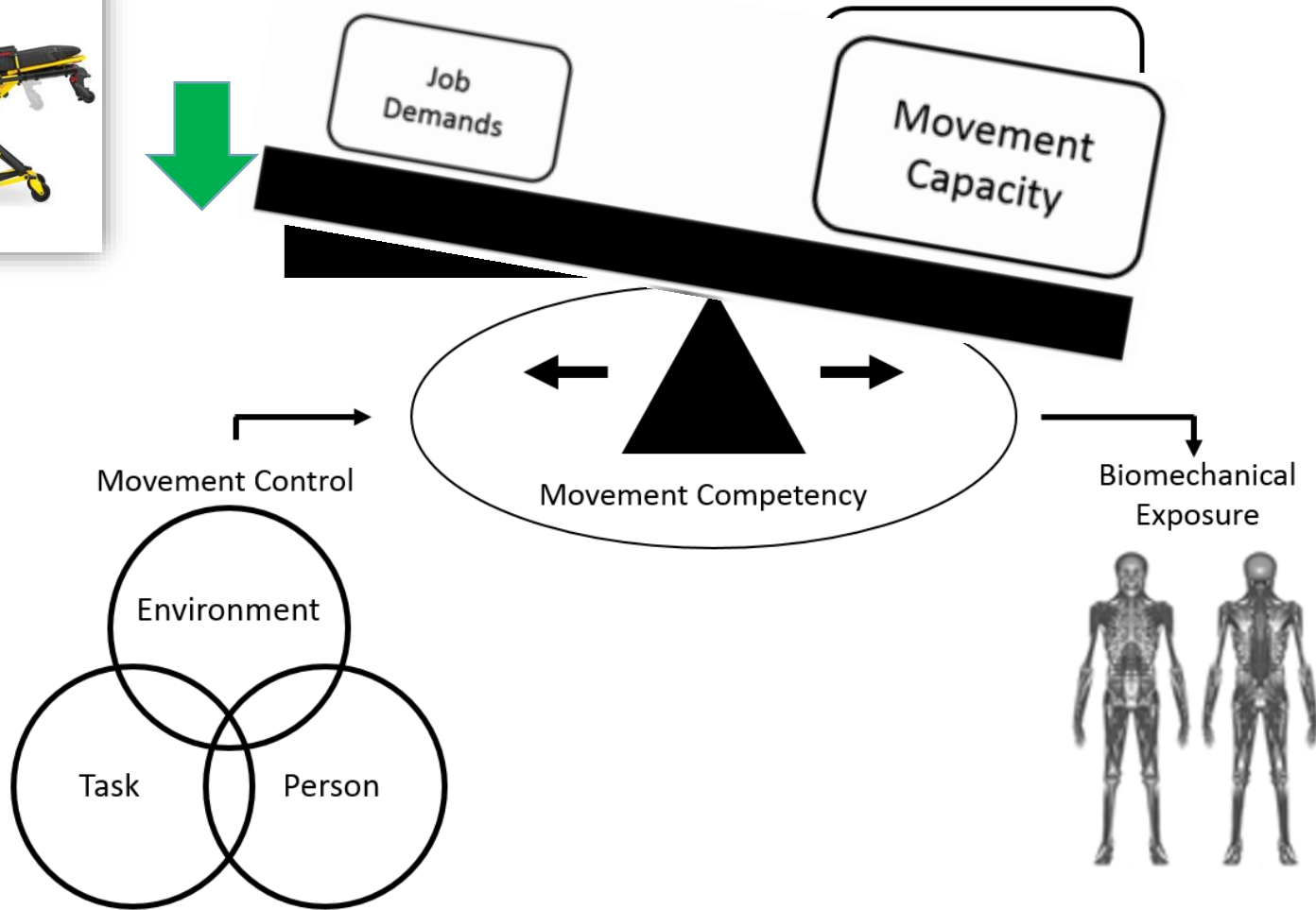
Fitting the work to the worker: Powered Stretcher and Load Systems



Powered Stretchers Reduce Injury Rates



Tip the scale in favour of MSD Prevention



MSD Prevention for the Paramedic Sector

Armstrong, D., Su-Wen Yap, B., & Fischer, S.L.

Providing effective pre-hospital patient care exposes paramedics to MSD hazards. Paramedic services can limit exposure to MSD hazards by implementing evidence-based, best-practice strategies as prescribed in the Ontario Emergency Medical Services (EMS) Section 21 subcommittee Guidance Note #10: Musculoskeletal Disorders. This position paper highlights the evidence-base for the recommended best-practices as prescribed in the Guidance Note.

Power stretcher and load systems offer a cost-effective intervention to reduce MSD in the paramedic sector. By reducing the physical effort required to raise/lower and load/unload the stretcher to the touch of a button, powered stretcher and load systems significantly decrease muscle effort and spine loading relative to manual stretcher use.^{1,2,3} Reduced physical demands offered by powered stretcher and load systems have translated into MSD reductions within paramedic services. For example, Niagara Emergency Medical Service (NEMS)

Key Messages

- Visit <http://www.pshsa.ca/ems-section-21-guidance-notes/> for a list of MSD prevention strategies proposed by the Ontario EMS Section 21 Sub-committee.
- Powered stretcher and load systems can cost-effectively reduce MSD.
- Paramedic input, support and feedback will facilitate adoption of MSD prevention related strategies.

Visit:

uwaterloo.ca/cre-msd



Increasing capacity for work as a paramedic



Ottawa Paramedic Physical Ability Test

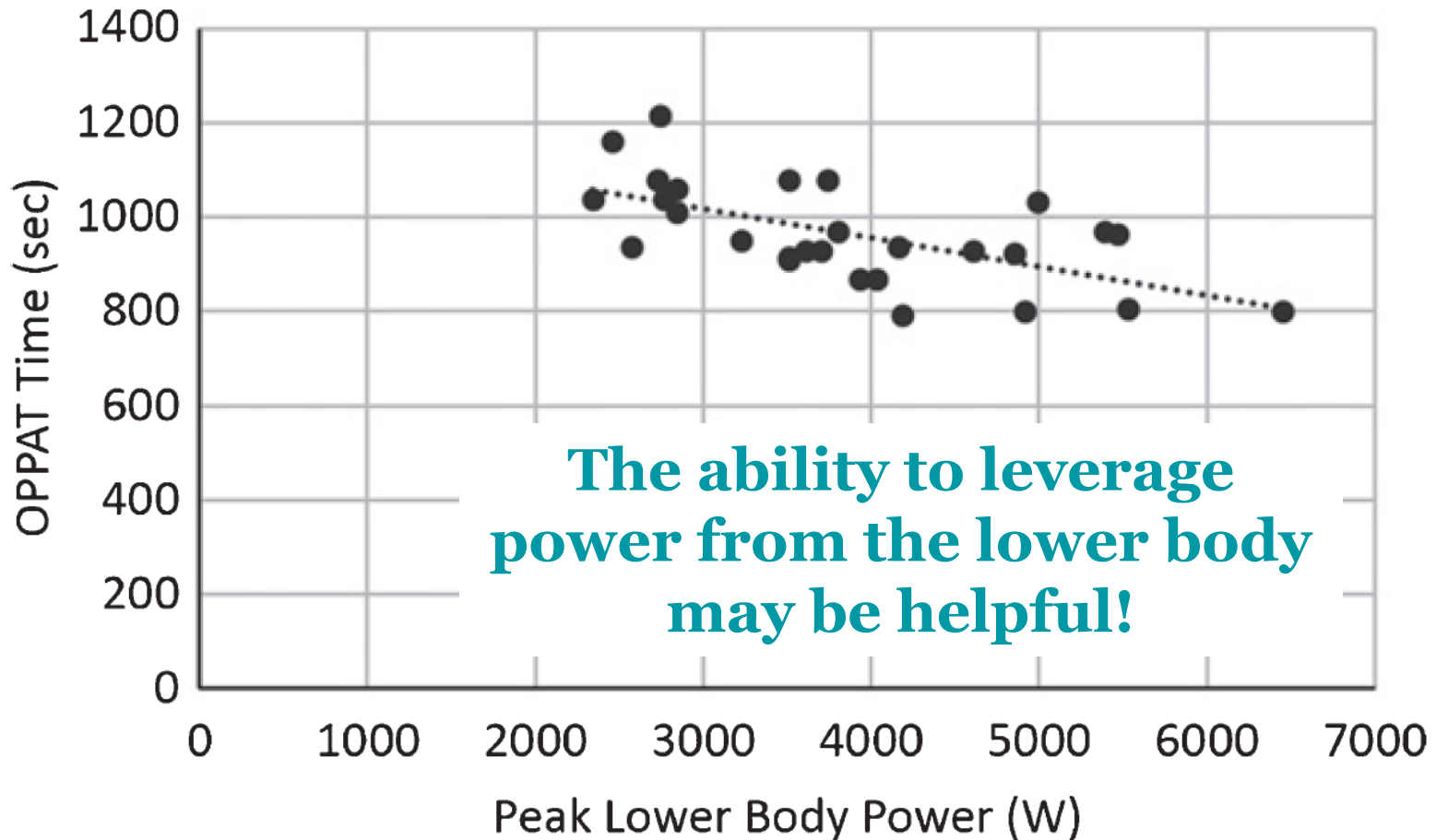
Ottawa Paramedic Physical Abilities Test (OPPAT) A Video Summary



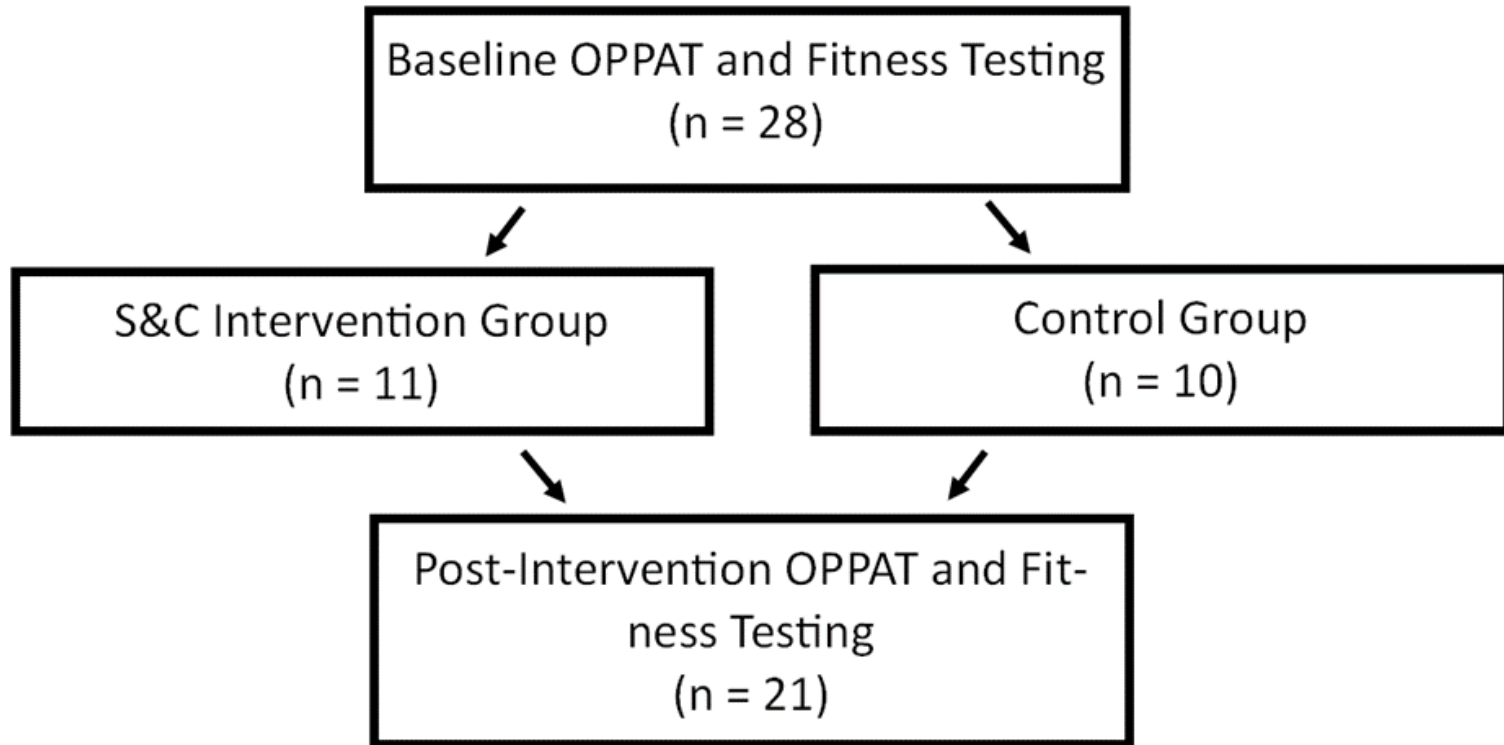
Fischer et al. (2017). *Applied Ergonomics* 65:233-239

Armstrong et al. (2019). *Ergonomics* 62(8):1033-1042

Strength and power are associated with performance



Exercise intervention study

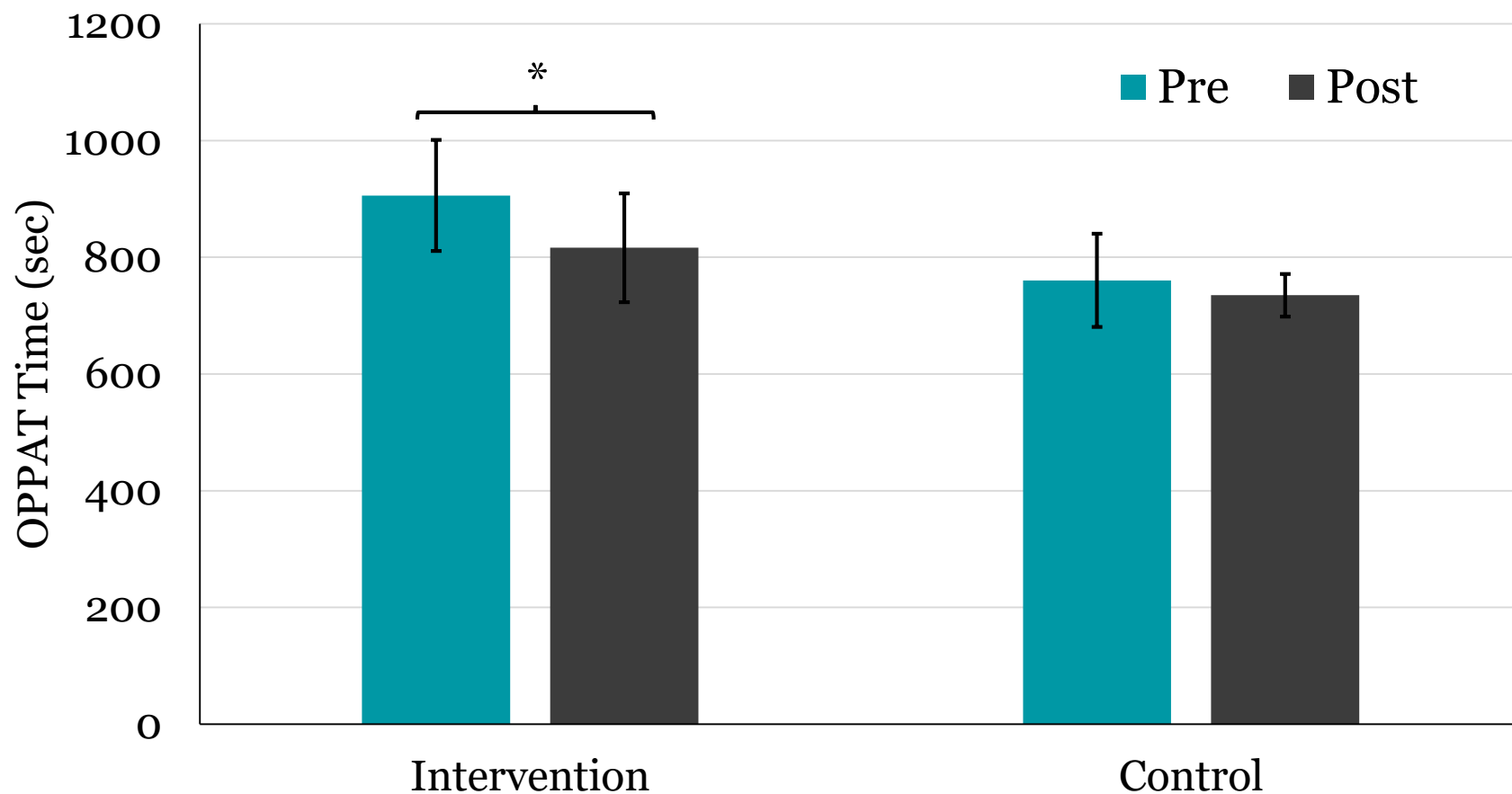




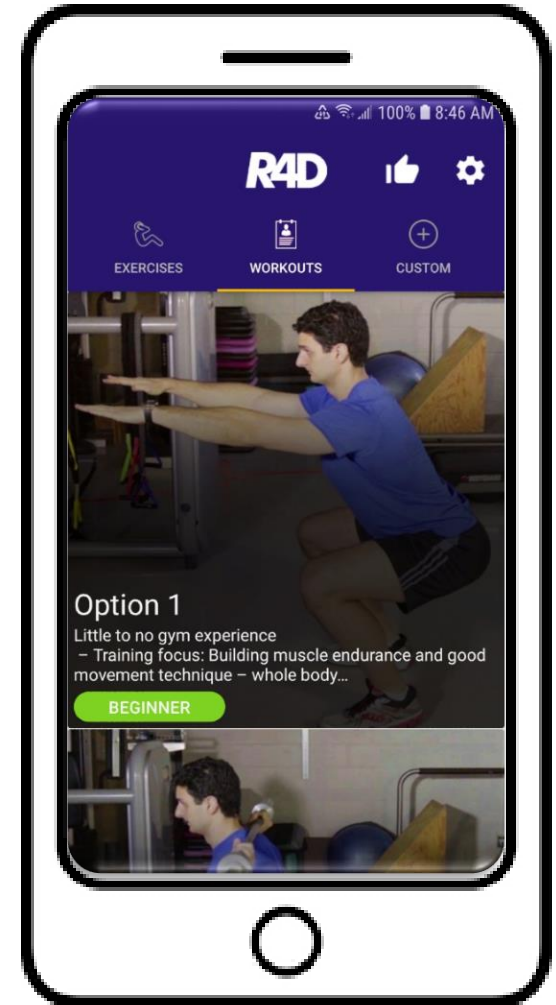
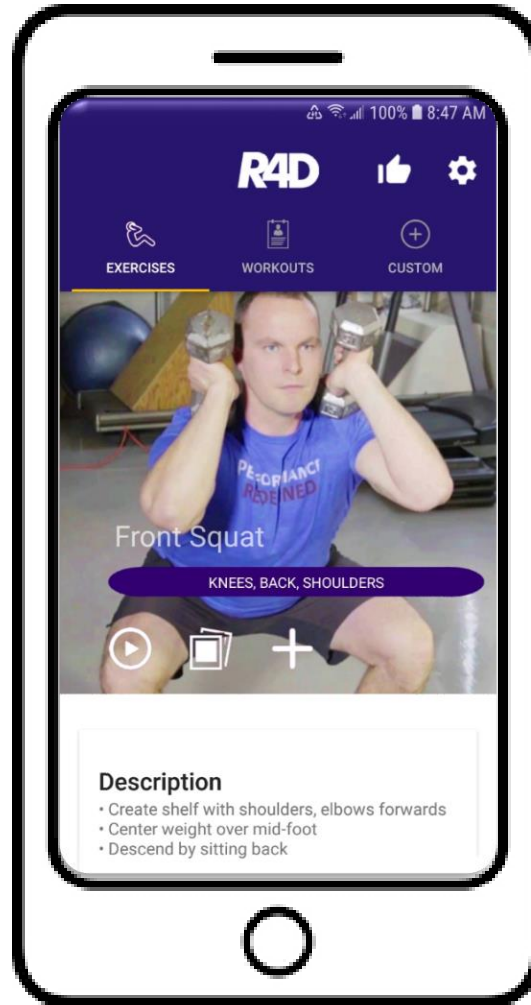
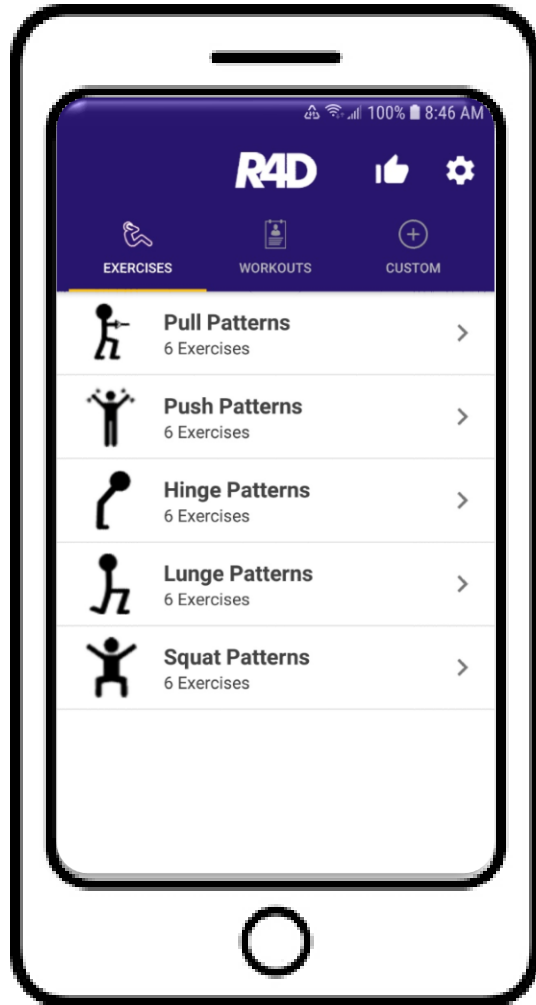




Movement-centric S&C improved performance

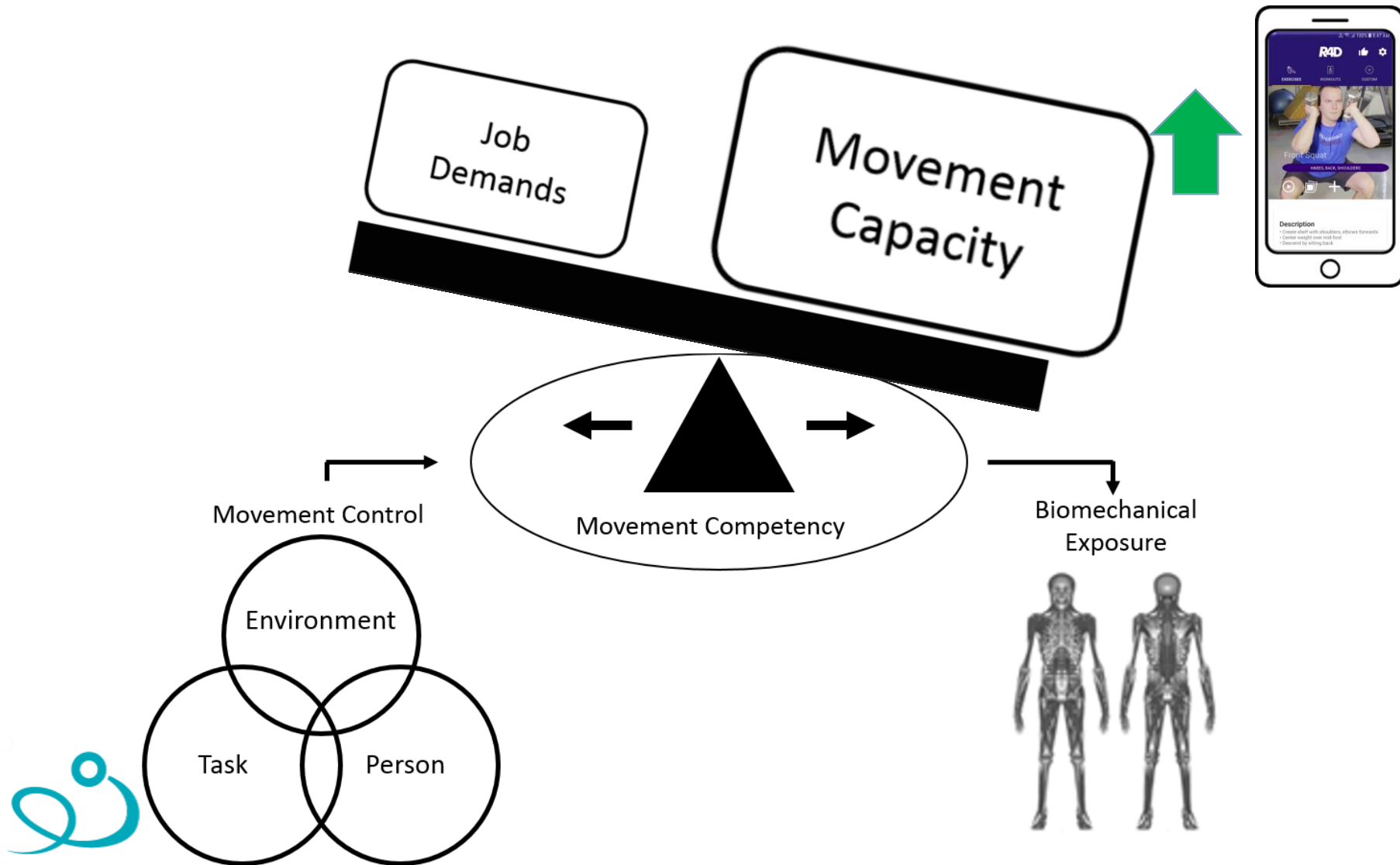


Ready For Duty (R4D) Application



Search for “R4D” at [PSHSA.ca](https://www.pshsa.ca)

Tip the scale in favour of MSD Prevention

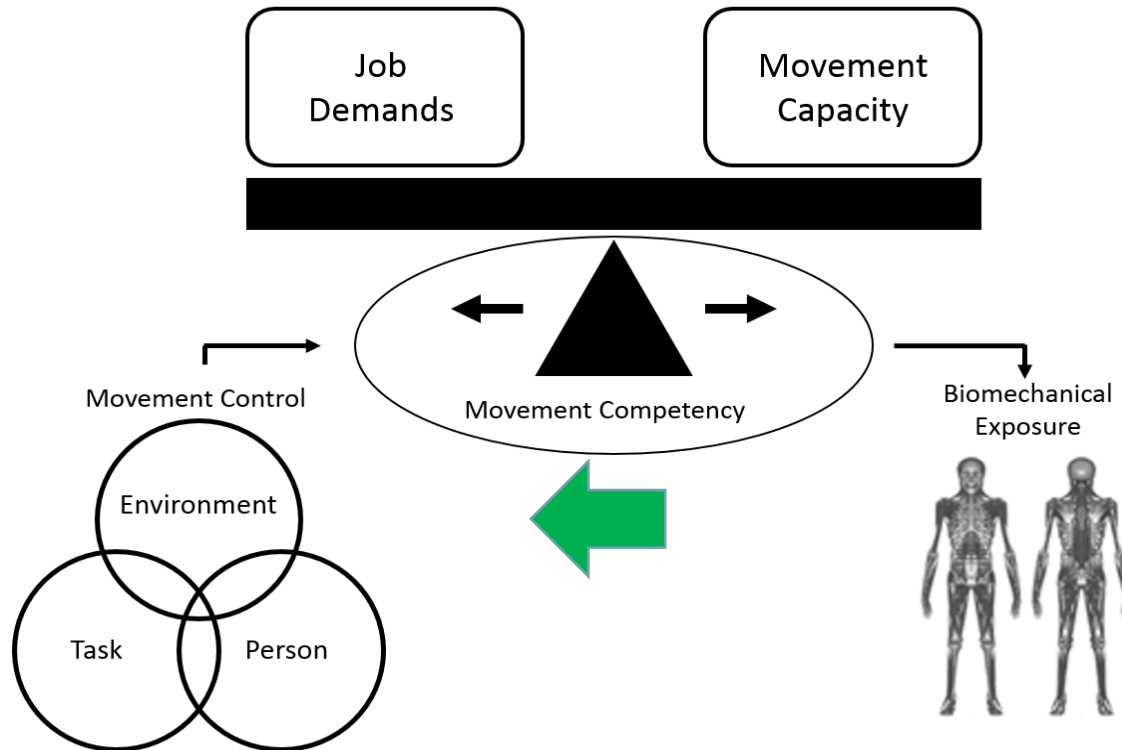




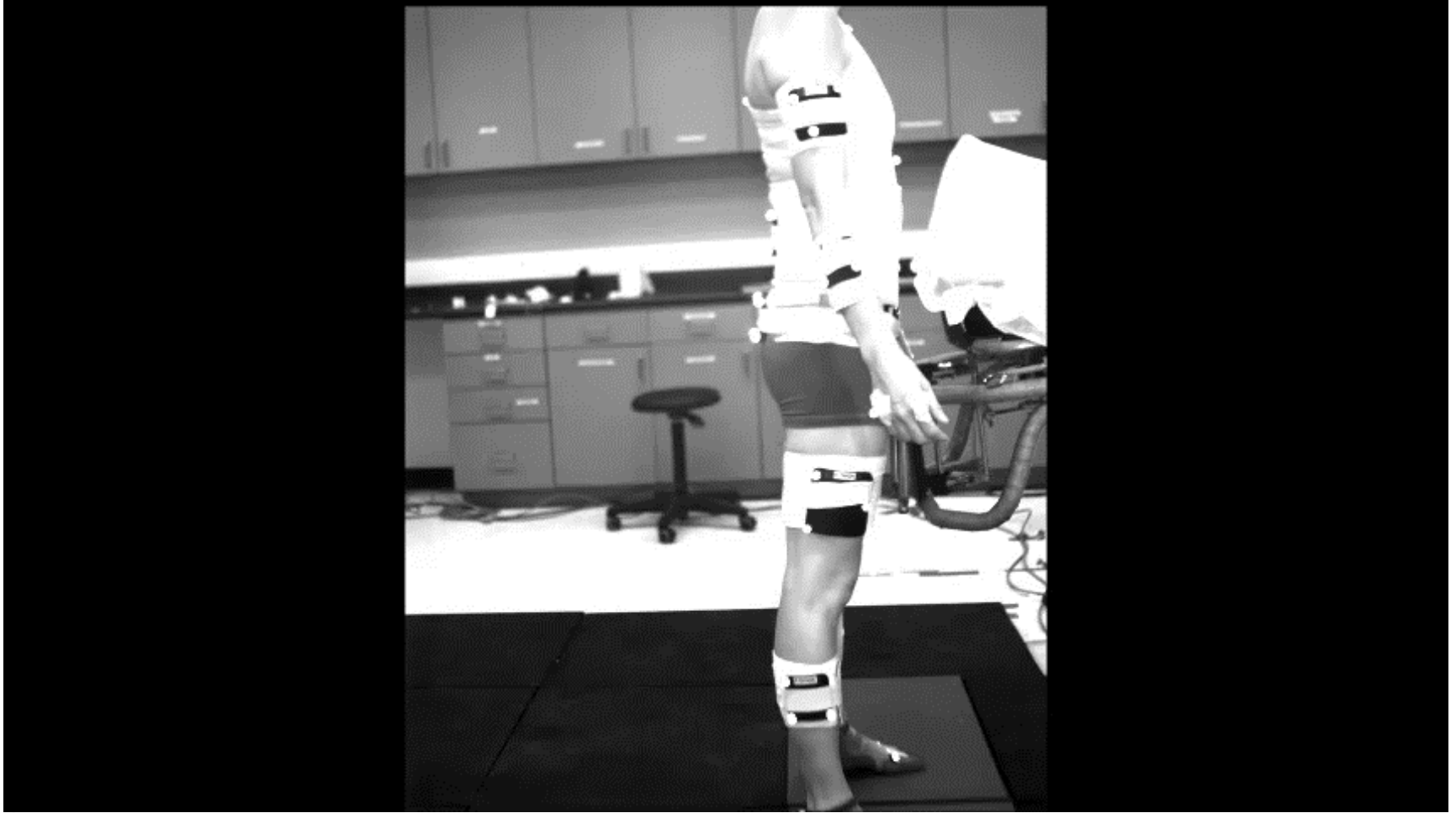
Improving movement competency for work as a paramedic

Why does movement competency matter?

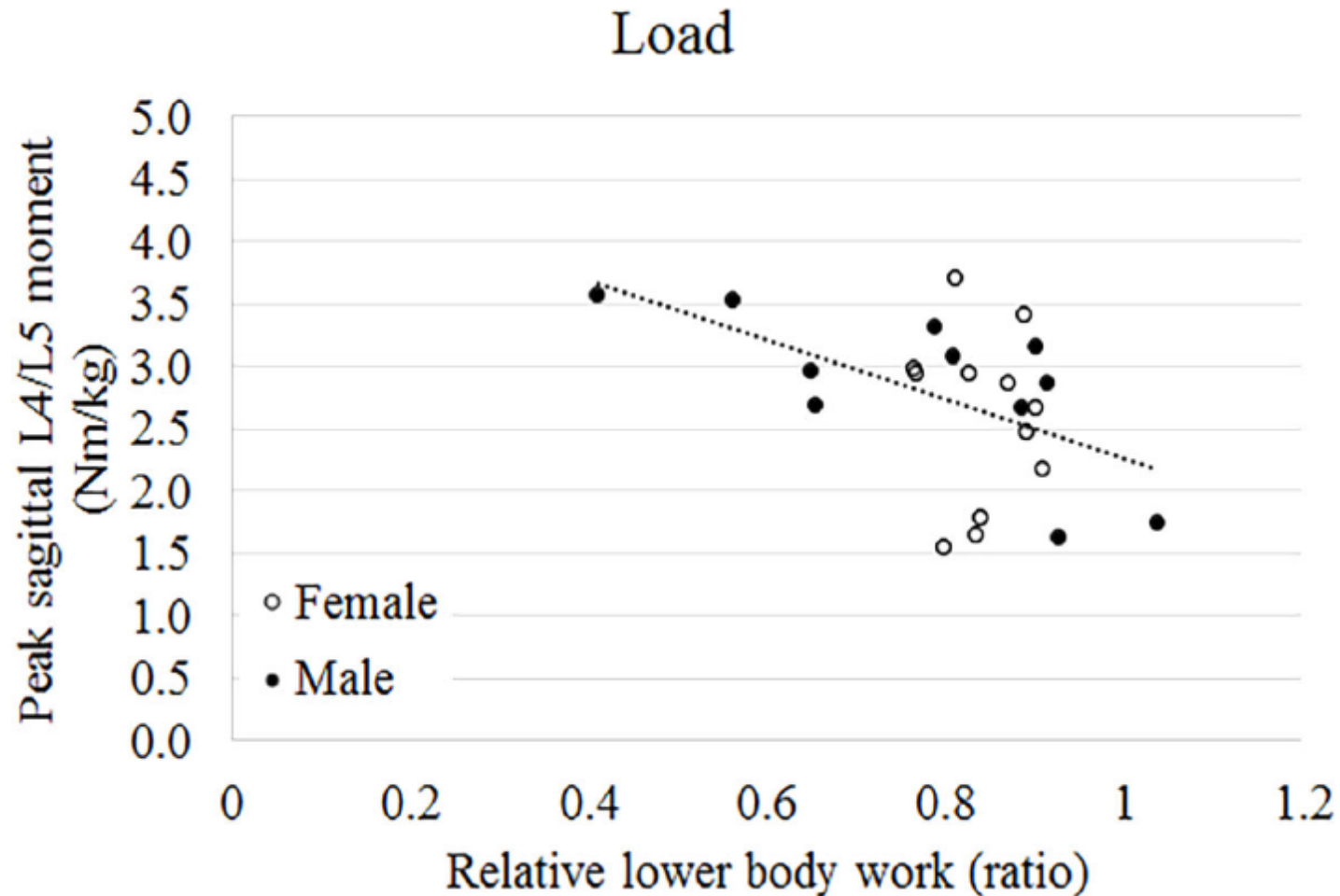
- Moving well can help leverage the body's capacity and reduce exposures



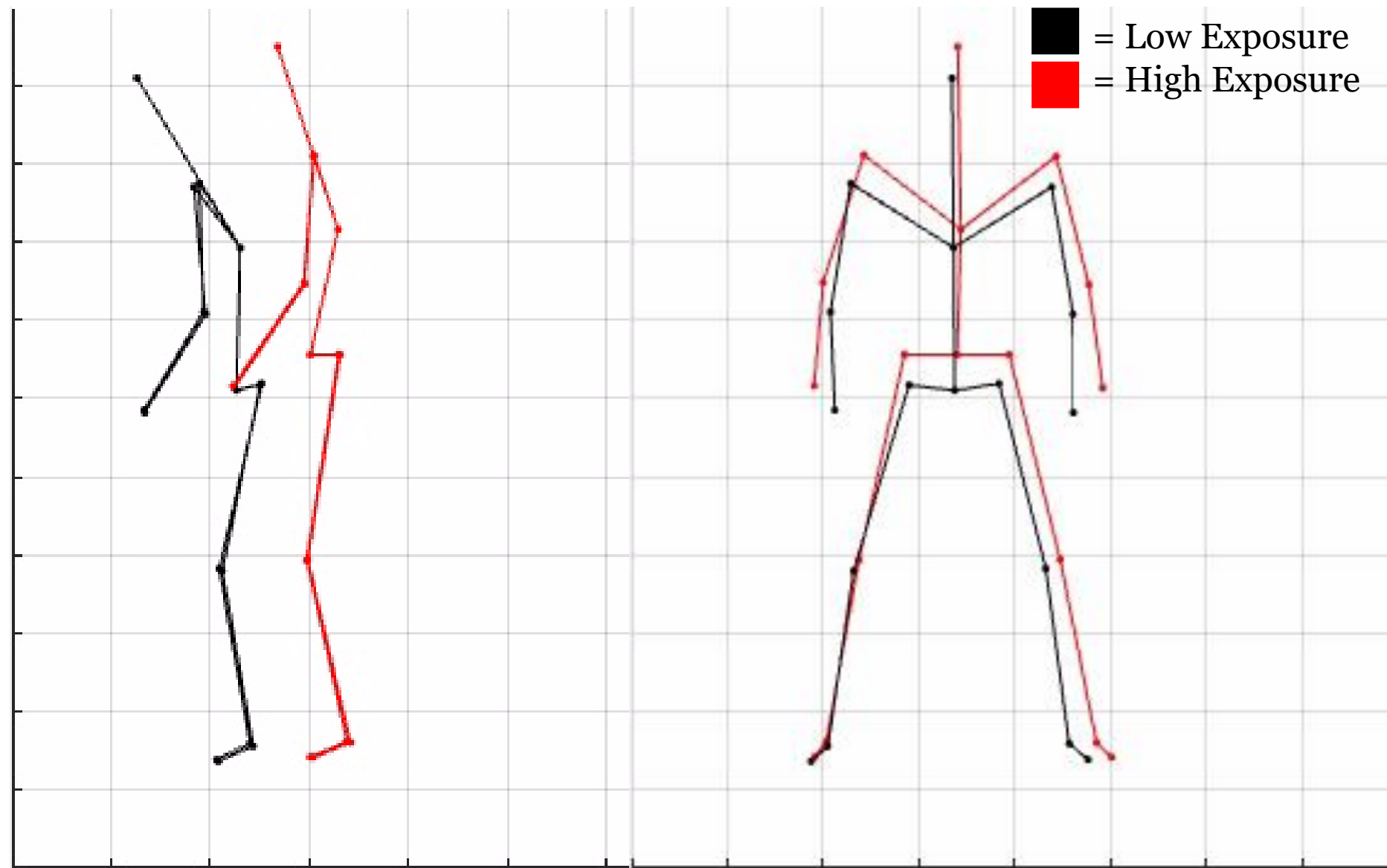
Biomechanics of paramedic lifting tasks



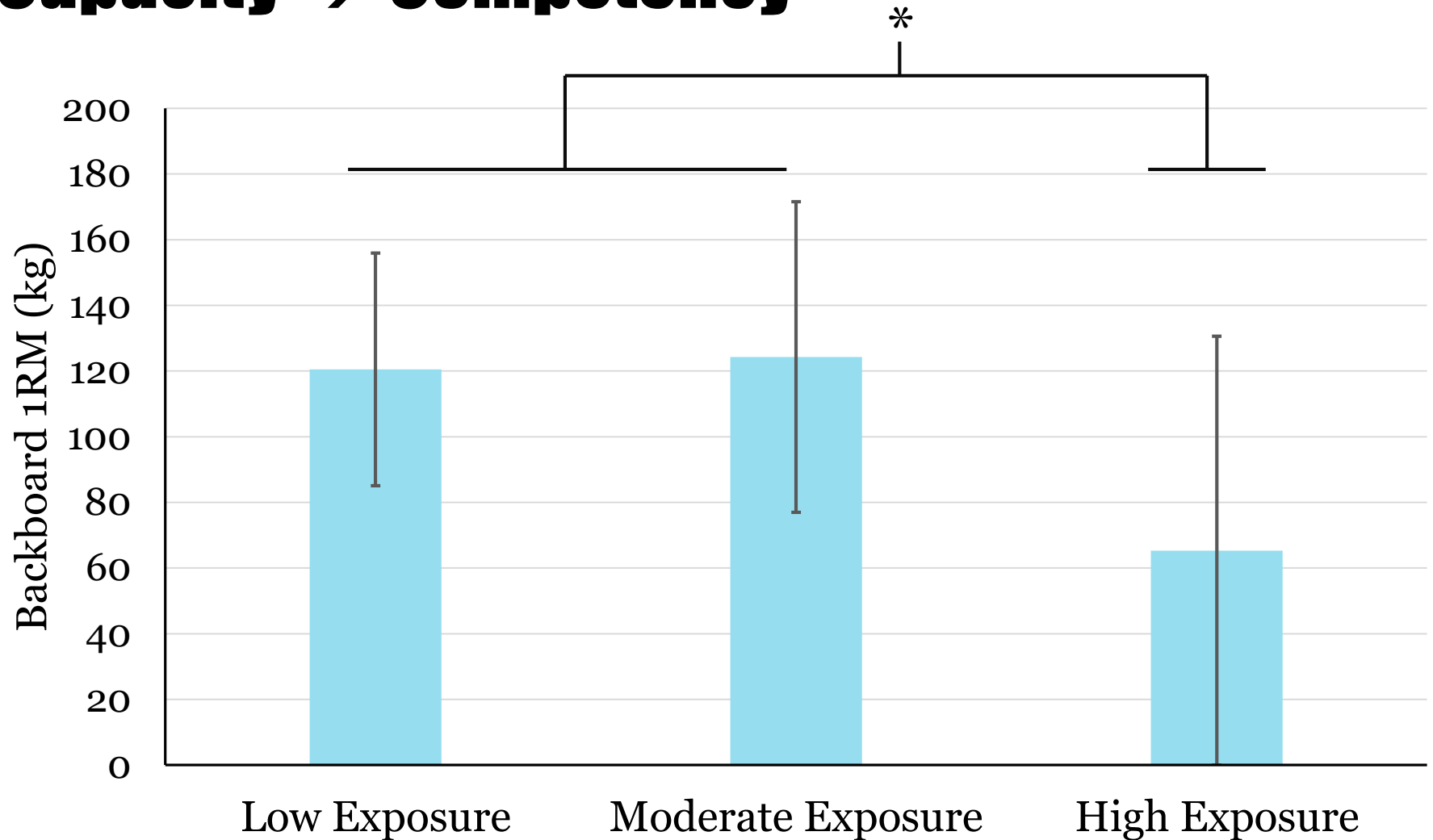
Importance of Lifting with the Lower Body



Identifying Low Exposure Whole-Body Movement Strategy



Capacity → Competency



specific component

offer *realistic* and sufficient *dose* of learning opportunities
learn to combine *ergonomic* and *movement* strategies

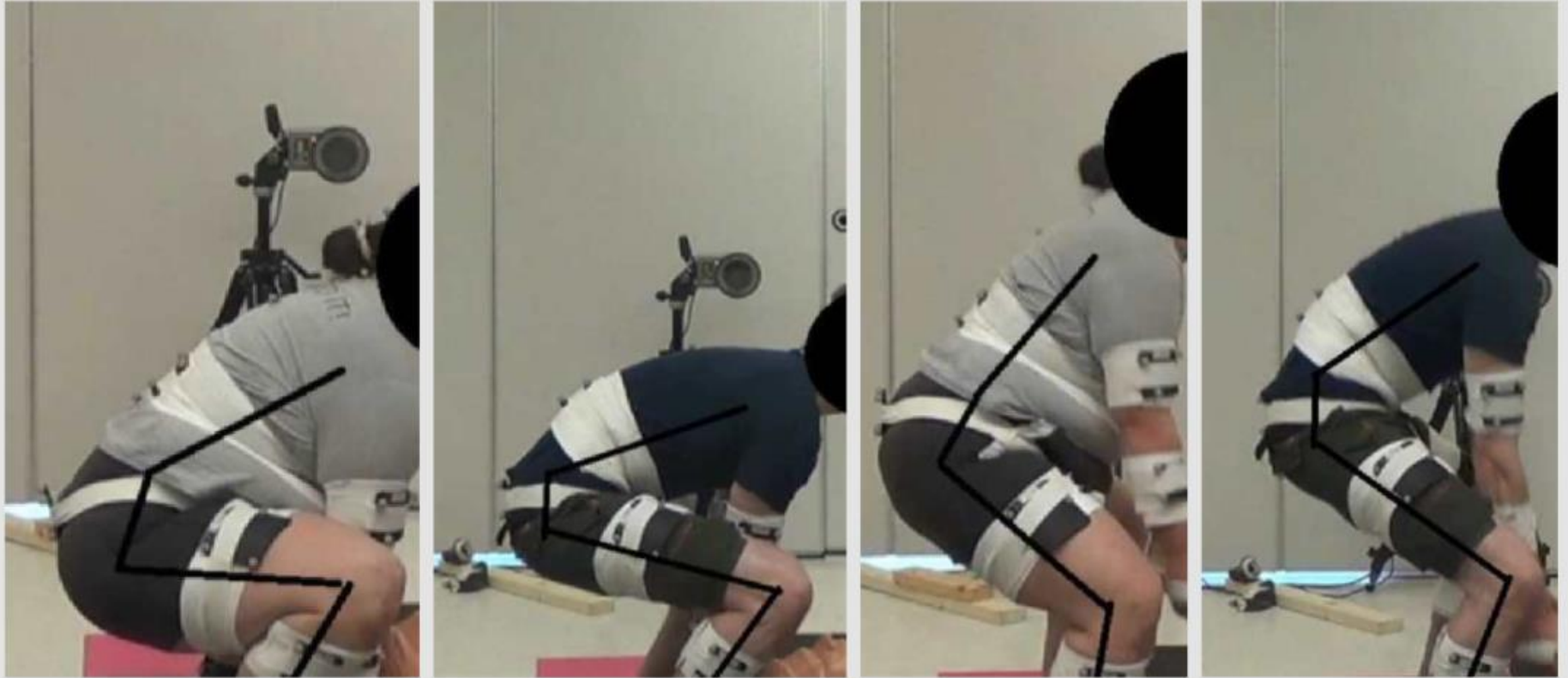


Carnegie et al., data analyses in progress

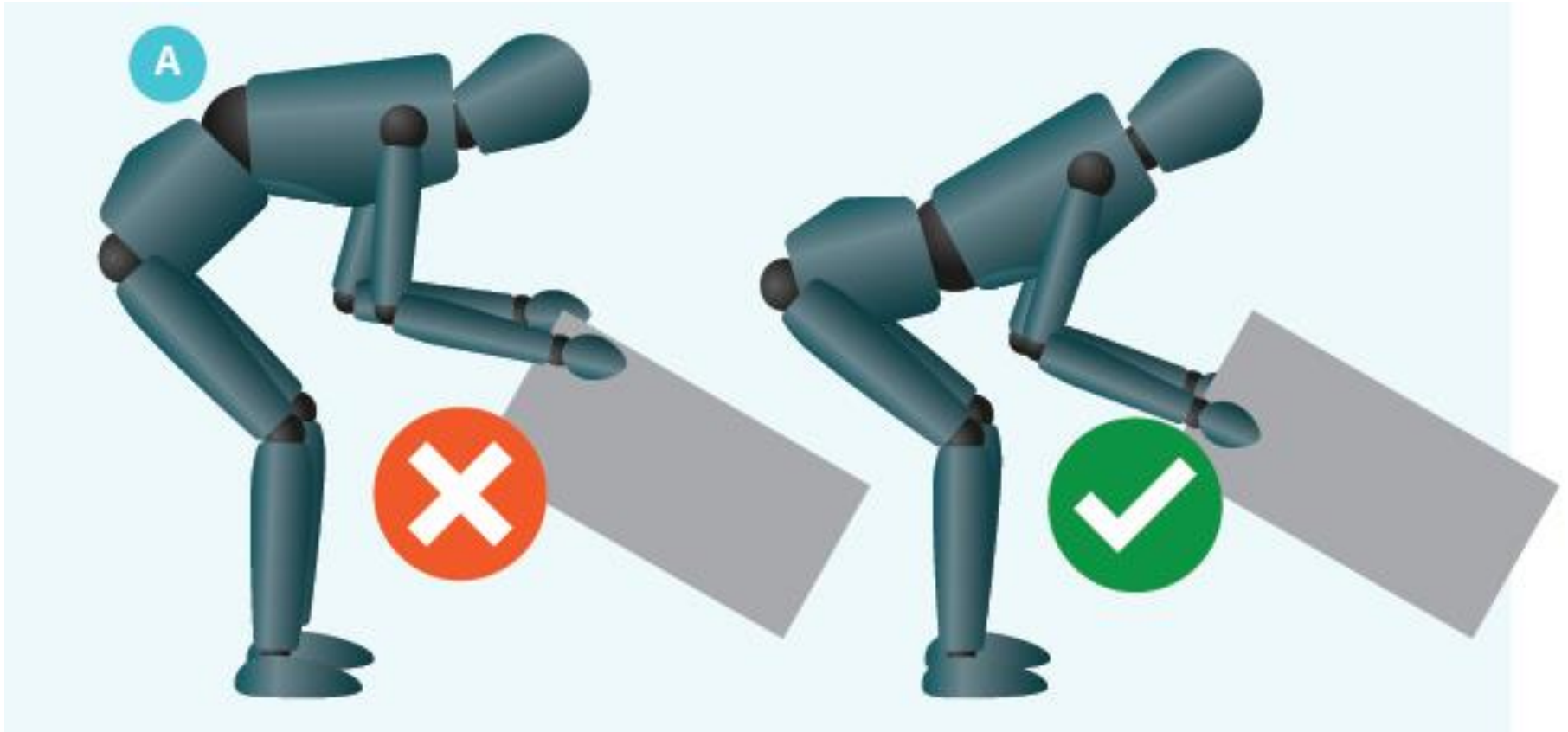


Emphasizing Key Features: **Straight** (normal low back curve)

Key Feature: Straight back



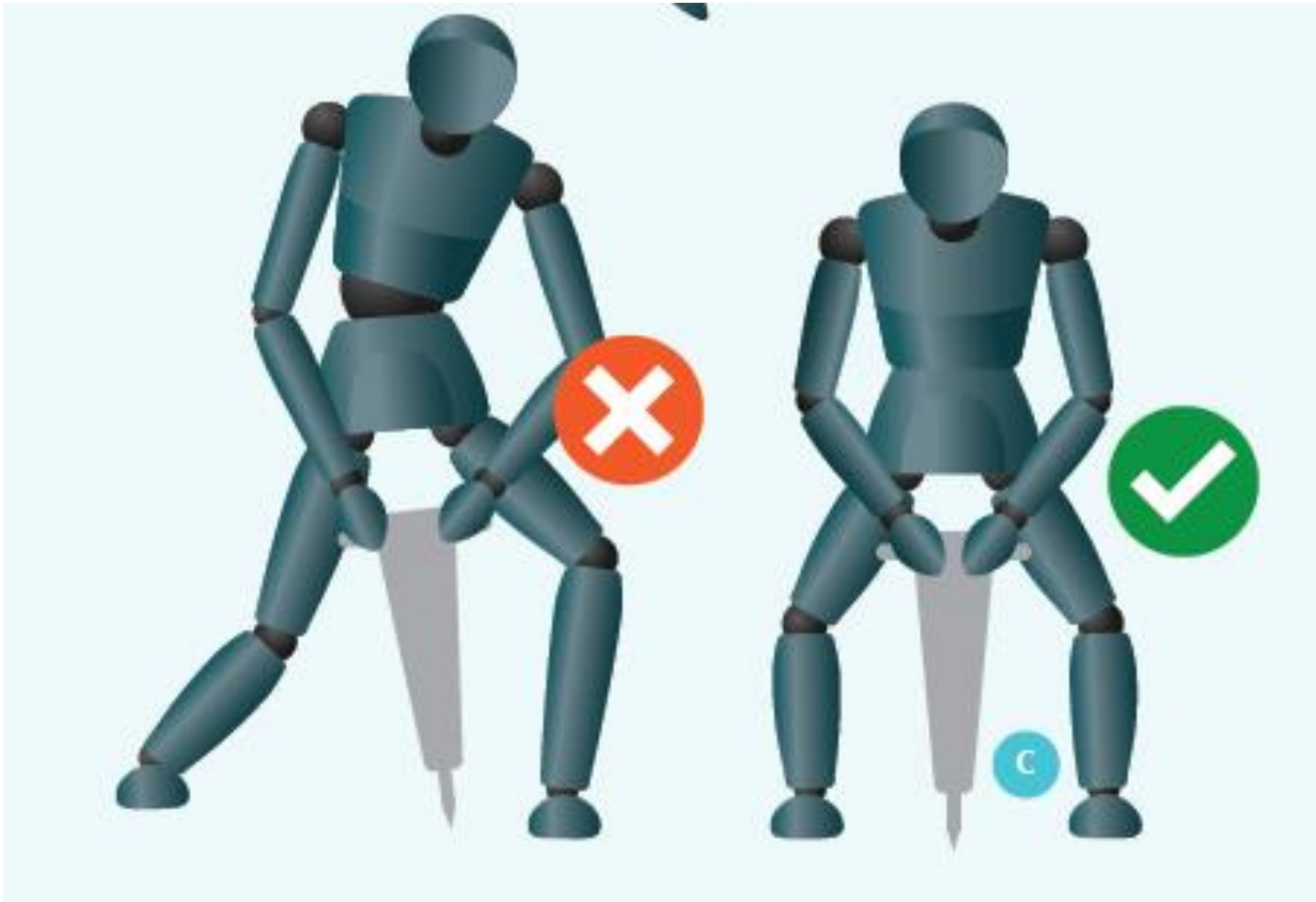
Avoid repetitive rounding, bending and twisting of the low back



Emphasizing Key Features: **Mid-foot** (bodyweight over mid-foot)



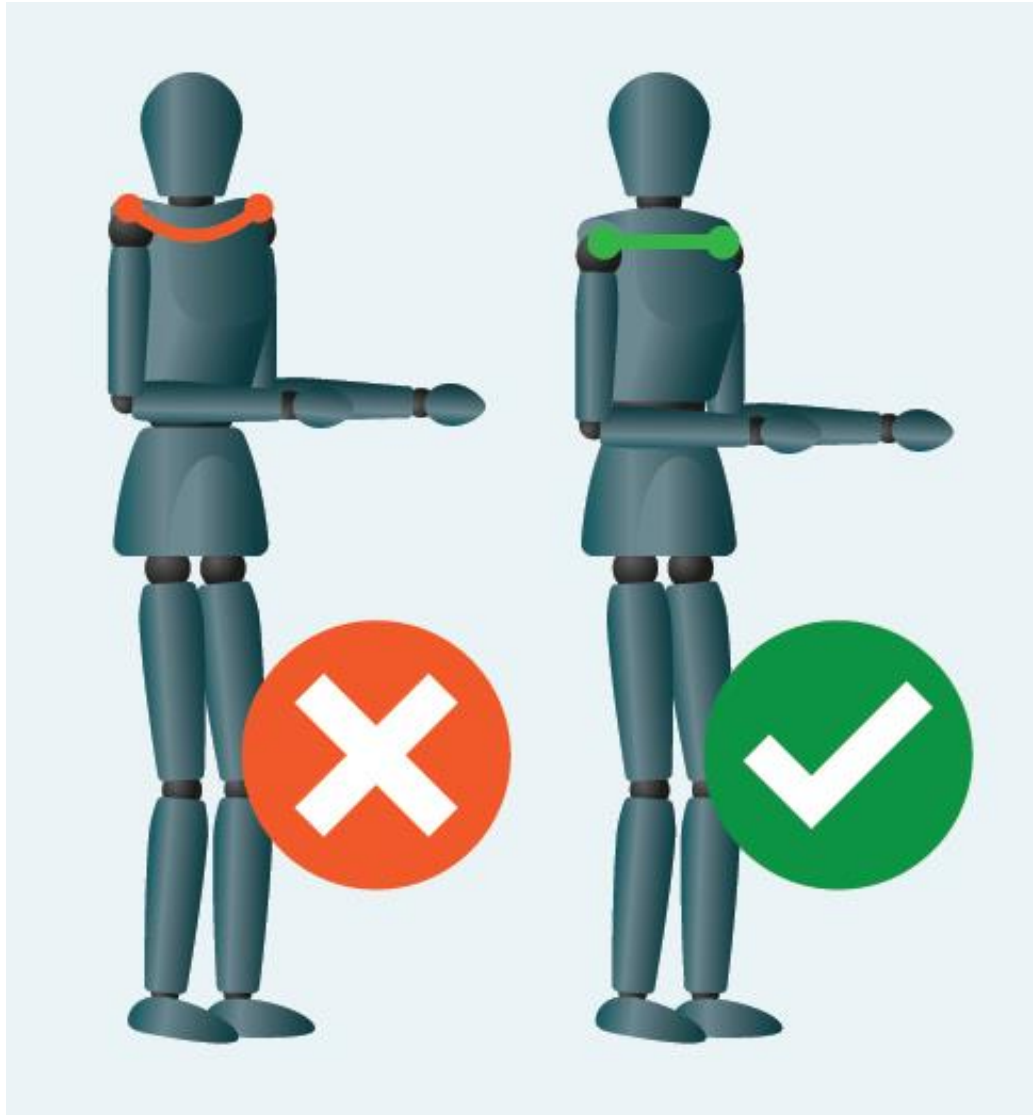
Centre bodyweight over the feet



Emphasizing Key Features: **Down** (shoulders away from ears)



Avoid shrugging or forward rounding of the shoulders



More resources

The screenshot shows a video player interface for a course titled "Introduction to Movement". The video content displays a navigation menu with four icons: a plate with a fork and knife, a bed with "Zzzzz..." above it, a person running, and a brain held by two hands. The running icon is highlighted in orange. Below the menu, the text reads "Introduction to Movement – Improving movement capacity and competency for career sustainability" with a purple "START COURSE" button. At the bottom of the video frame are logos for Wilfrid Laurier University, Ottawa Paramedic Physical Abilities Test (OPPAT), University of Waterloo, and the Occupational Biomechanics & Ergonomics Lab. A video control bar is visible at the very bottom of the player.



eLearning

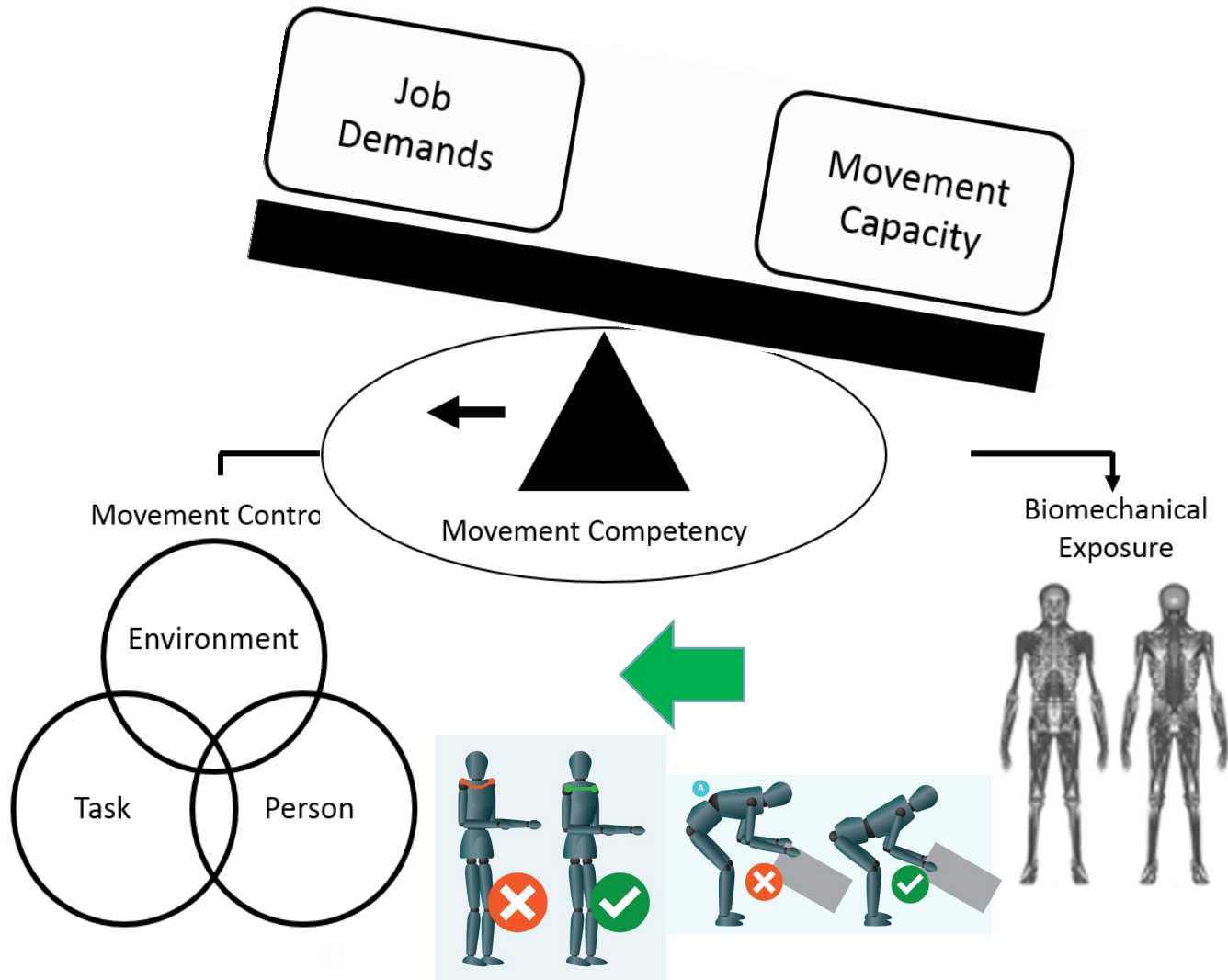


45 minutes



Search for “R4D” at [PSHSA.ca](https://www.pshsa.ca)

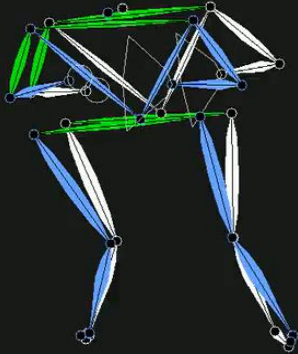
Tip the scale in favour of MSD Prevention



What's next: Real-time biomechanics analysis

OPEN SIDE VIEW

- PitchAI (via video from a mobile phone)
- 3D Motion Capture



proplayai™

S30FB02 | S30FB02.json
S30 | ProPlayAI Inc.
R | 180.3 cm

AERIAL VIEW



PLATE VIEW







v1.1 / 9
wrnchAI



What's next: Motor learning-based approach to coaching?

“...some lifters likely define a motor control strategy that considers minimizing biomechanical exposure in addition to completing the lift demands.”



Summary – Tip the scale in favour of MSD prevention!

- Follow the hierarchy of controls to reduce demands as possible
- Increasing physical capacity can increase performance in paramedic work
- Focus on and reinforce key movement features to promote improved movement competency





Paramedic Chiefs of Canada
To Advance and Align EMS Leadership in Canada



Paramedic Association of Canada
Association des Paramédics du Canada



ONTARIO ASSOCIATION
OF PARAMEDIC CHIEFS



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Doug Socha
Ottawa Paramedic
Service

▪ Connect with us:

- Twitter: @BiomechErgoLab
- Lab Website: <https://uwaterloo.ca/obel>



Free Resource available at <https://uwaterloo.ca/CRE-MSD>

Position Paper

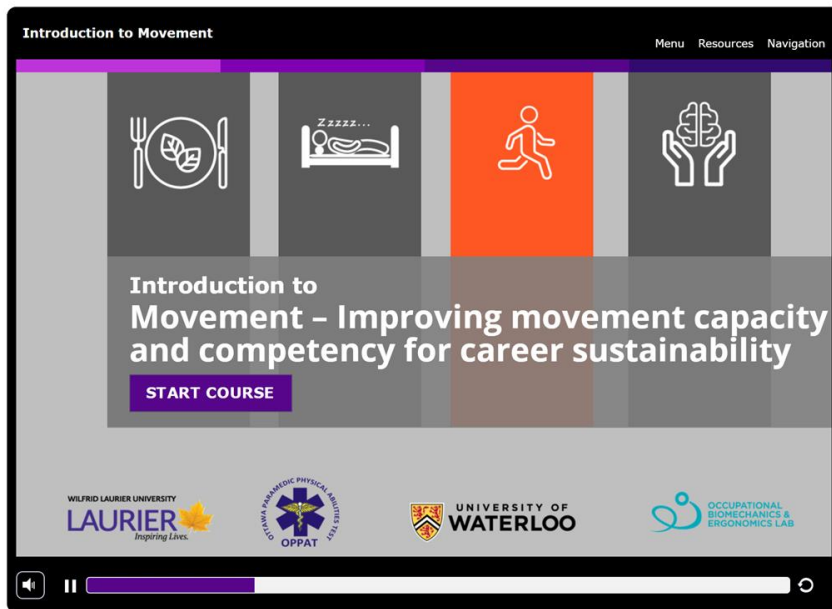


Centre of Research
Expertise for the
Prevention of
Musculoskeletal Disorders

MSD Prevention for the Paramedic Sector

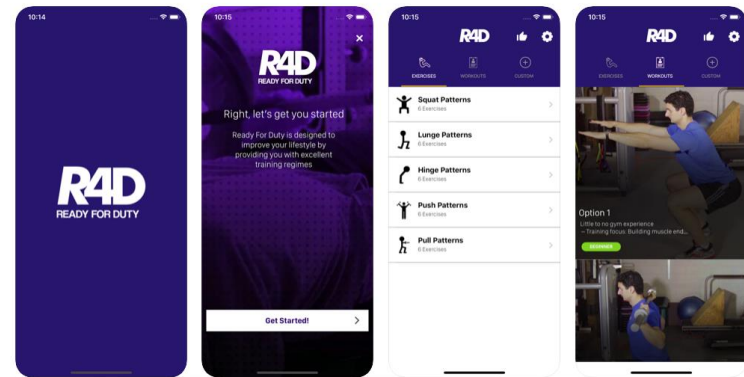
Armstrong, D., Su-Wen Yap, B., & Fischer, S.L.

Free Resources at <https://www.pshsa.ca/>



READY FOR DUTY 👤
Public Services Health and Safety Association
★★★★★ 4.5, 2 Ratings
Free

iPhone Screenshots



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