

**MOVEMENT ASSESSMENT AND (RE)TRAINING
FOR THE PREVENTION AND MANAGEMENT OF
MUSCULOSKELETAL DISORDERS –**

STRATEGIES FOR “OCCUPATIONAL ATHLETES”

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MSD Prevention in the Paramedic Sector

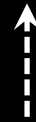
CRE-MSD

May 10, 2016

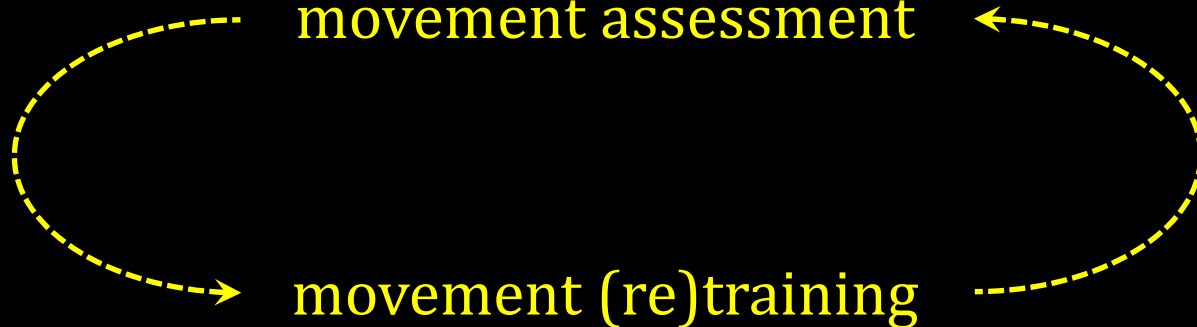


RESEARCH APPROACH

develop valid, reliable, and responsive tools to identify and monitor movement-related characteristics that limit performance and increase injury risk



movement assessment



movement (re)training



use information from movement assessments to design movement (re)training strategies to enhance performance and reduce injury risk

A



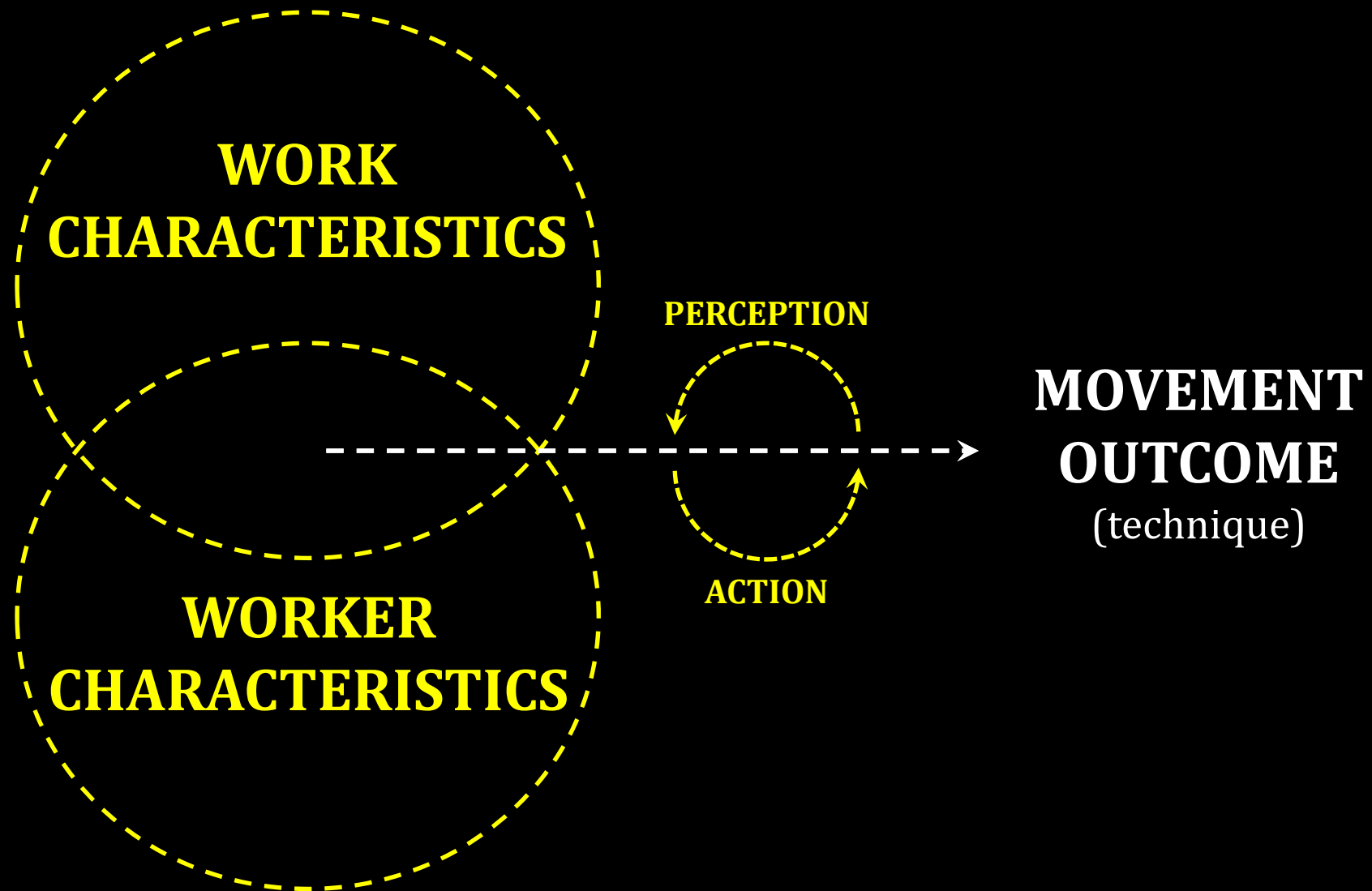
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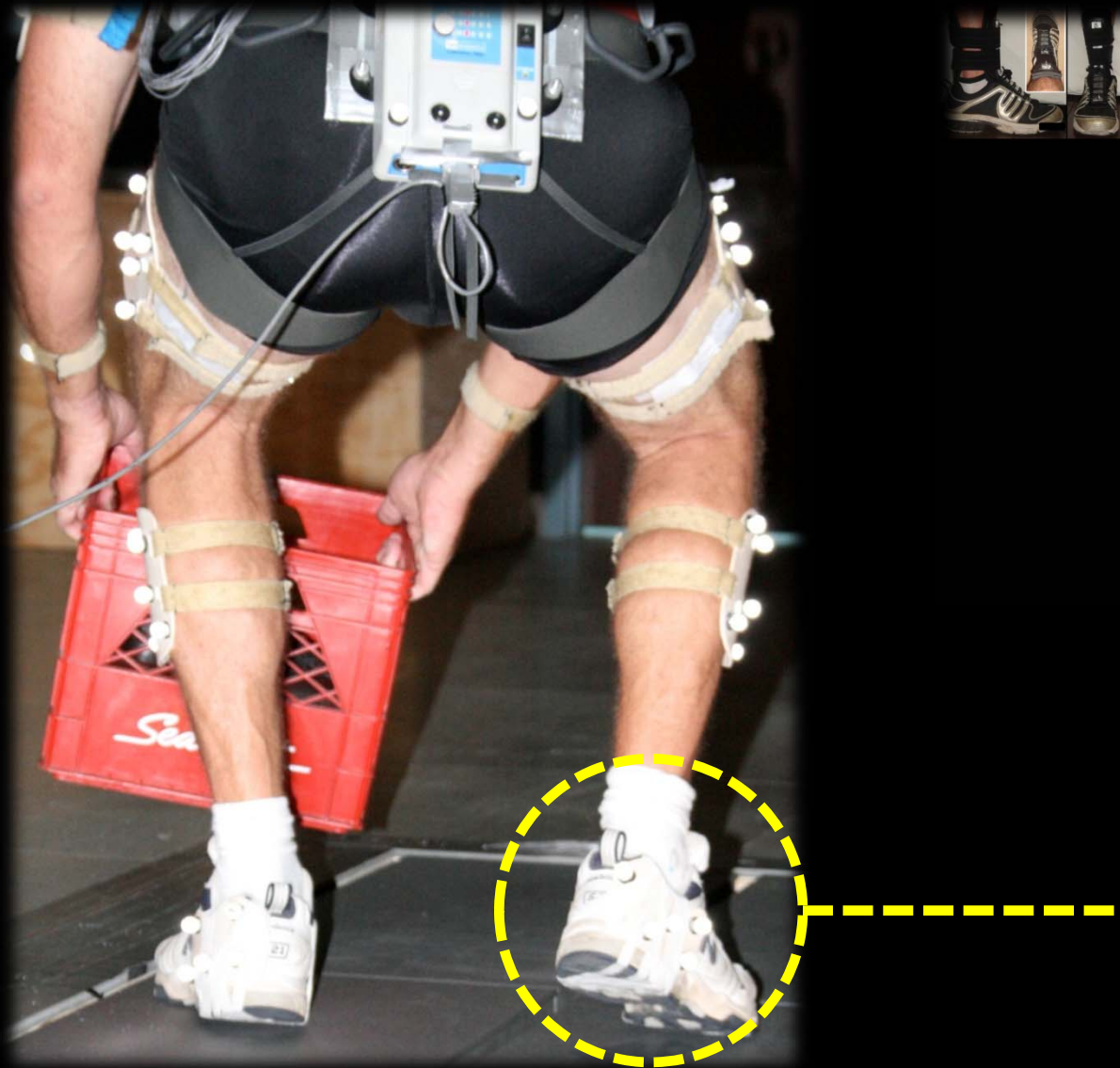
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MOVEMENT BEHAVIOUR

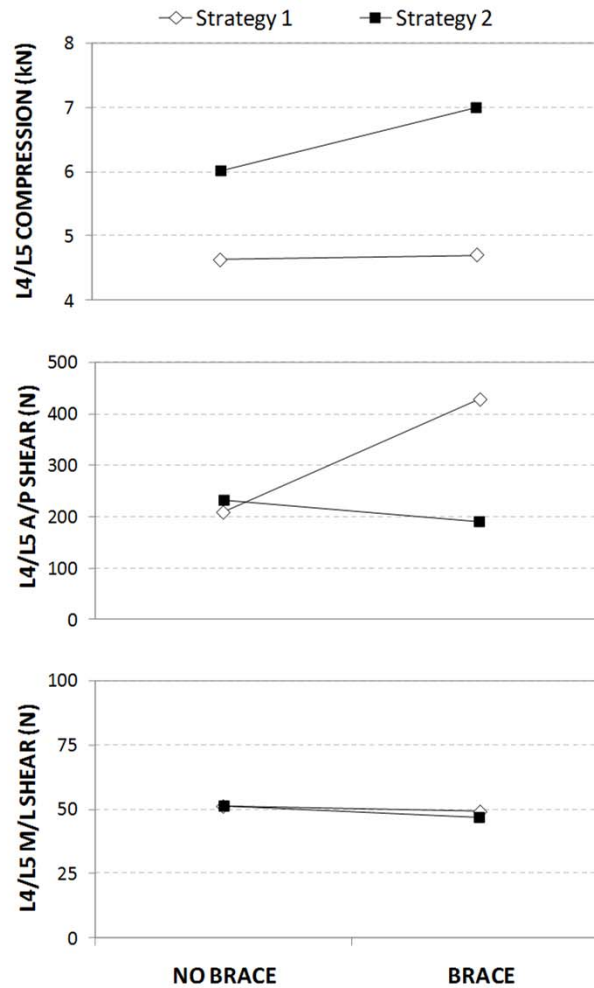


MOVEMENT ASSESSMENT



MOVEMENT ASSESSMENT

Strategy 1



Strategy 2



MOVEMENT ASSESSMENT

movement behaviour

work technique affected by interaction between individual, task, and environmental factors

implications

requires multi-faceted and individualized approach to assess and (re)train movement for musculoskeletal disorder prevention in occupational athletes

low-back injury prevention for occupational athletes involves more than technique instruction, "core" training and conditioning (work hardening)

MOVEMENT (RE)TRAINING

LIFT CORRECTLY EVERY TIME.

Bend your knees, not your back!

Prevent injuries: Make sure your 'stars' are aligned.

Ideally, you would be able to draw a straight line from the top of your head, through your shoulder and elbow, through the hip to your ankle. This represents proper alignment for lifting.

AMR
AMERICAN MEDICAL RESPONSE

WORLD-CLASS SAFETY BEGINS WITH YOU.

The advertisement features a paramedic in a white uniform and dark pants, carrying a green bag and a red and white cooler, walking past an ambulance. To the right, a blue vertical banner contains the text 'Bend your knees, not your back!'. Below this, a diagram shows three figures illustrating different lifting techniques: one with a rounded back, one with a flat back, and one with a straight line from head to ankle. A vertical X-ray of a spine is shown on the right side of the diagram.

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AMR
AMERICAN MEDICAL RESPONSE

WORLD-CLASS SAFETY BEGINS WITH YOU.

The advertisement features a paramedic in a white uniform carrying a stretcher and a first aid kit. A dashed yellow box highlights the text 'Bend your knees, not your back!'. Below this, a diagram shows three figures illustrating proper lifting technique with a vertical line through the head, shoulder, elbow, hip, and ankle. To the right of the diagram is a close-up of a human spine.



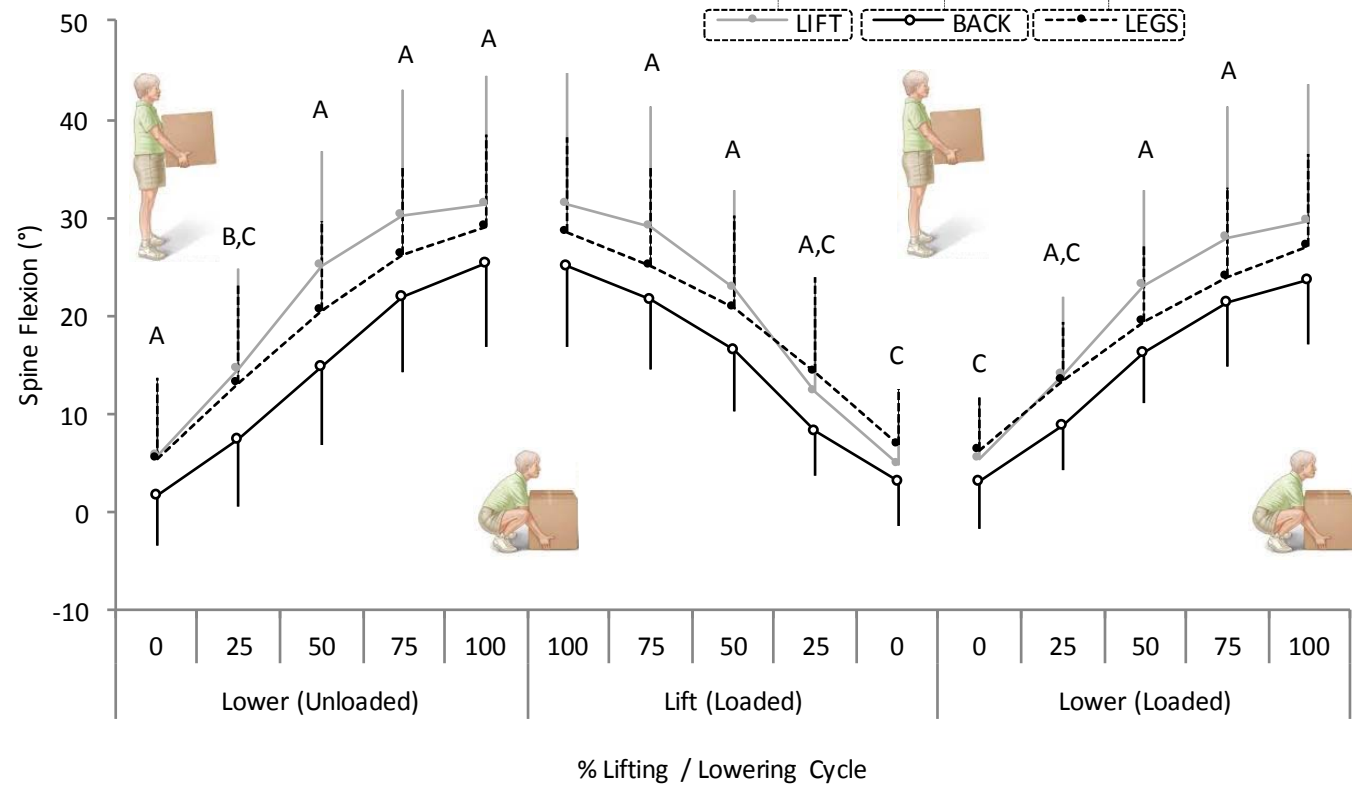
effective
instructions?

MOVEMENT (RE)TRAINING

“...lift with legs, not back...”

“...lift with straight back...”

“...lift...”



MOVEMENT (RE)TRAINING

**CORRECTLY
RY TIME.**



**Bend your
knees,
not your
back!**

Prevent injuries: Make sure your 'stars' are aligned.



Ideally, you would be able to draw a straight line from the top of your head, through your shoulder and elbow, through the hip to your ankle. This represents proper alignment for lifting.

**WORLD-CLASS SAFETY
BEGINS WITH YOU.**



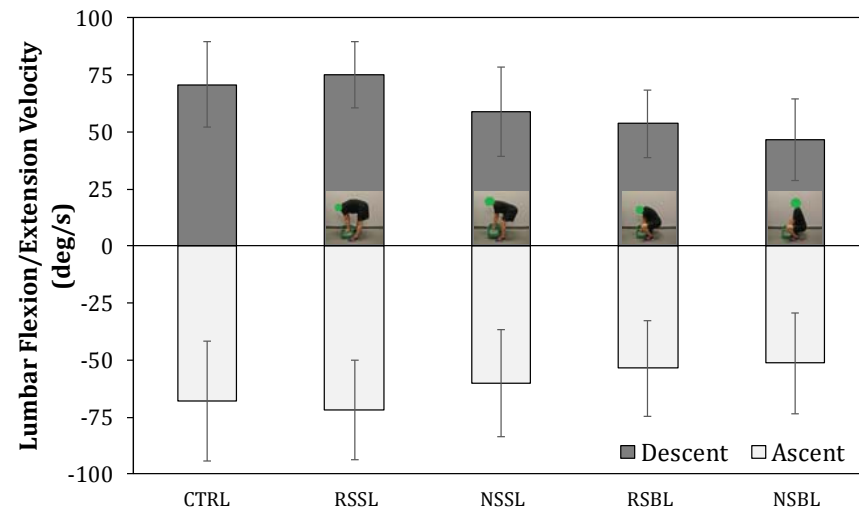
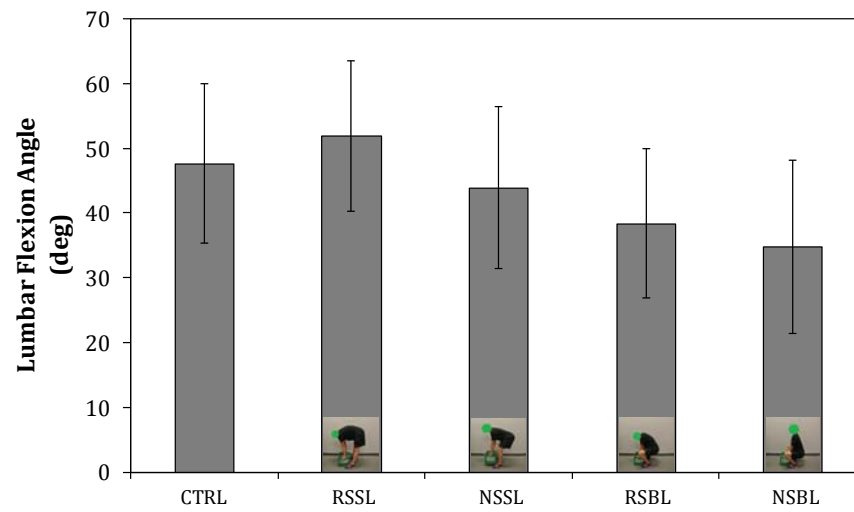
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effective
instructions?

MOVEMENT (RE)TRAINING



MOVEMENT (RE)TRAINING

Instructions should be spine-focused

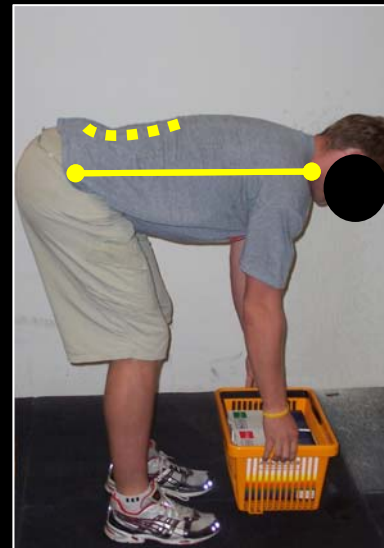
"maintain back curvature..." more effective than "...lift with legs..."

Direct observers' attention

teaching and learning

Explicit

spine curvature vs. trunk angle



MOVEMENT (RE) TRAINING

MOVEMENT MATTERS! , 'THE 7 "KEY" FEATURES',



1' IN'LINE'
(Knee in line with hip/foot)

What'to'Look'For'

1. Body from the front
2. Line from hip to toes
3. Position of knee in relation to line
 - Medial to the line
 - ~~Collateral~~
 - Lateral to the line

Coaching Tips

- ✓ Grip the floor with the toes
- ✓ Push the knees out
- ✓ Point knees in direction of toes

2' MID, FOOT'
(Bodyweight over mid-foot)

What'to'Look'For'

1. Body from the side
2. Line through middle of foot
3. Position of weight in relation to line
 - In front of the line (toes)
 - ~~Collateral~~
 - Behind the line (heel)

Coaching Tips

- ✓ Push through the floor
- ✓ Grip the floor with the toes
- ✓ Hinge at hips, lean forwards

3/4 STRAIGHT'
(Normal low back curve)

What'to'Look'For'

1. Body from the front, back or side
2. Two lines through hips/upper back
3. Distance between the two lines
 - Closer than standing
 - ~~Collateral~~
 - Farther apart than standing

Coaching Tips

- ✓ Stiffen trunk
- ✓ Let trunk move with hips
- ✓ Dowel touches head, back, hips

5' ALIGNED'
(Hips and shoulders aligned)

What'to'Look'For'

1. Body from the front, back or side
2. Two lines through hips/upper back
3. Alignment of the two lines
 - Shoulders rotate more than hips
 - ~~Collateral~~
 - Hips rotate more than shoulders

Coaching Tips

- ✓ Use upper/lower body together
- ✓ Rotate with hips
- ✓ Practice with one hand

6' DOWN'
(Shoulders away from ears)

What'to'Look'For'

1. Body from the front, back or side
2. Two lines through ears/shoulder
3. Distance between the two lines
 - Closer than standing
 - ~~Collateral~~
 - Farther apart than standing

Coaching Tips

- ✓ Elbows down/close to body
- ✓ Treat motions as push and pull
- ✓ Hold shoulders back

7' BACK'
(Elbow and shoulder together)

What'to'Look'For'

1. Body from the front, back or side
2. Line from shoulder to elbow
3. Movement at both ends of the line
 - Move in opposite direction
 - ~~Collateral~~
 - Only one end moves

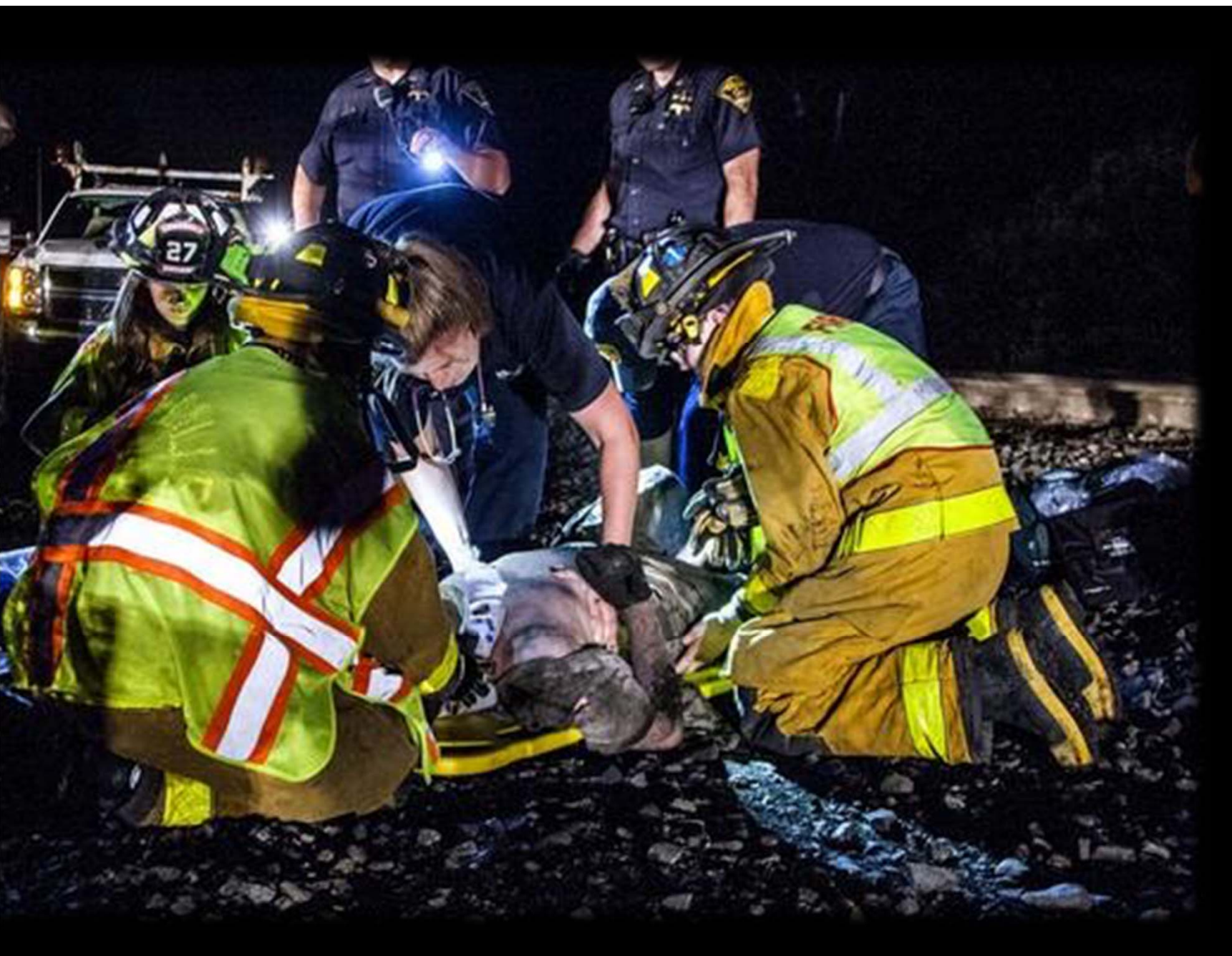
Coaching Tips

- ✓ Rotate thumbs out when pulling
- ✓ Pull shoulder blades together
- ✓ Limit how far elbows pulled back







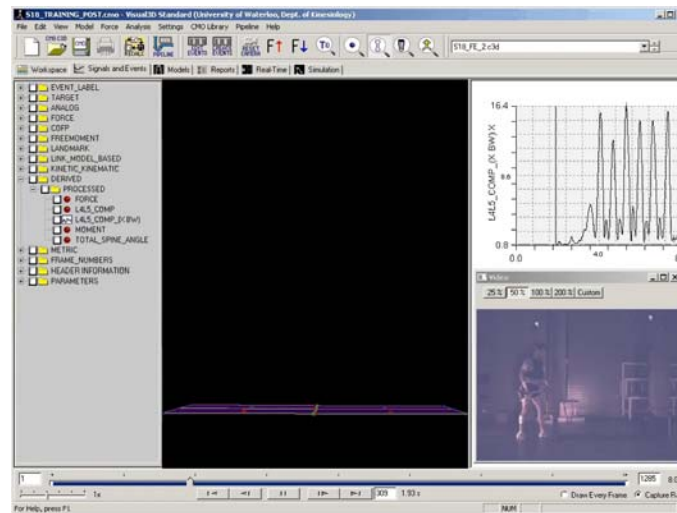


MOVEMENT (RE)TRAINING

advanced training methods



transfer of training

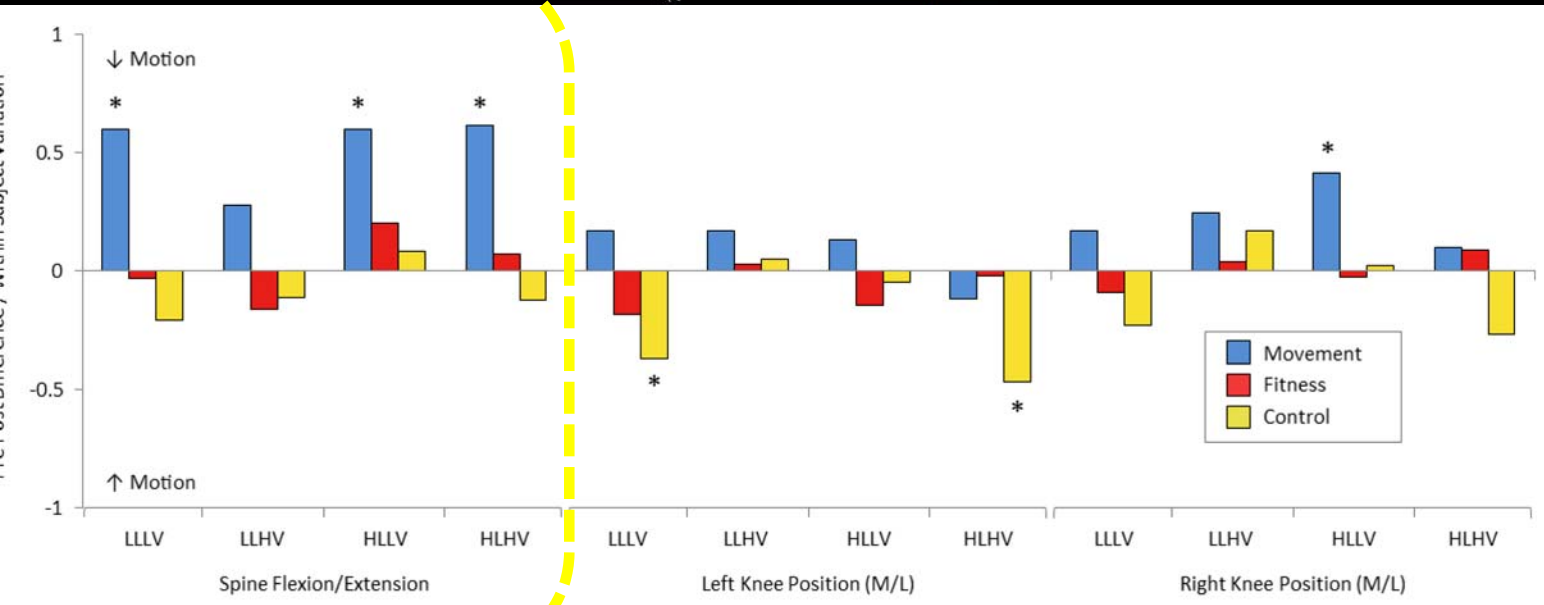
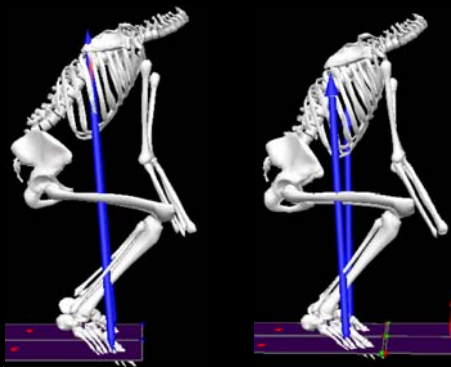


MOVEMENT (RE)TRAINING



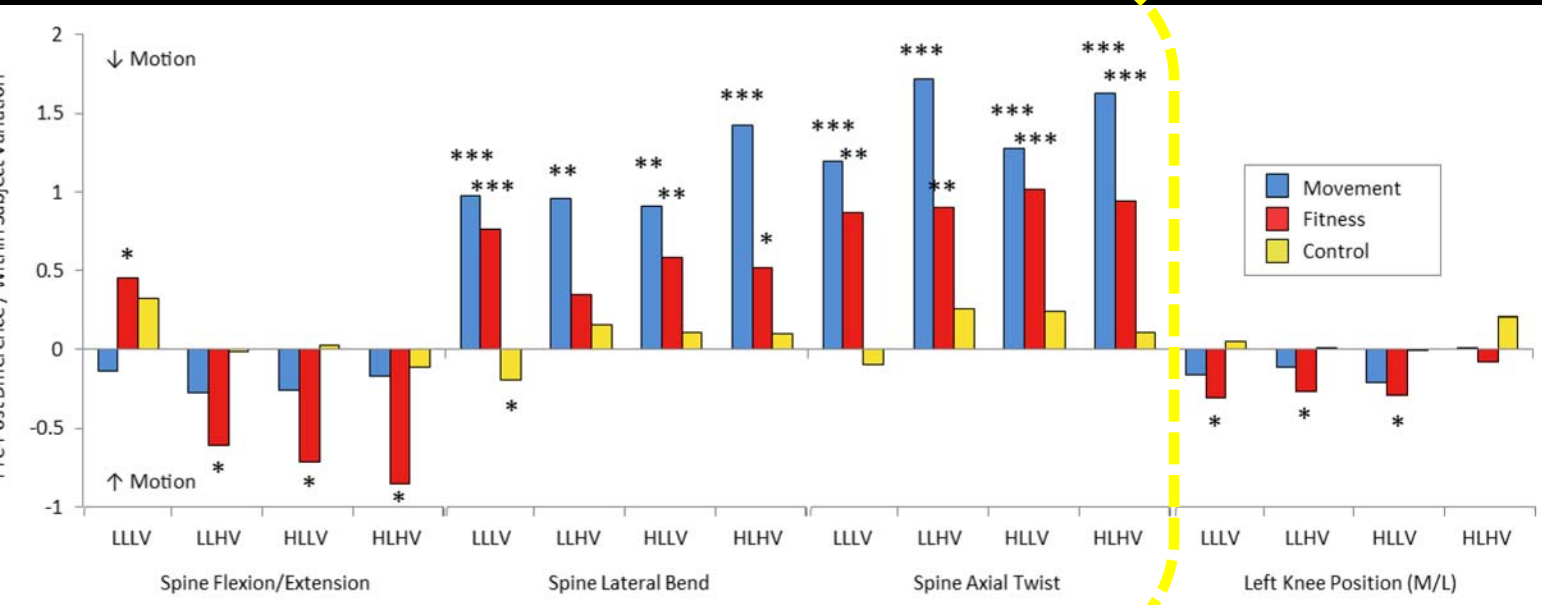
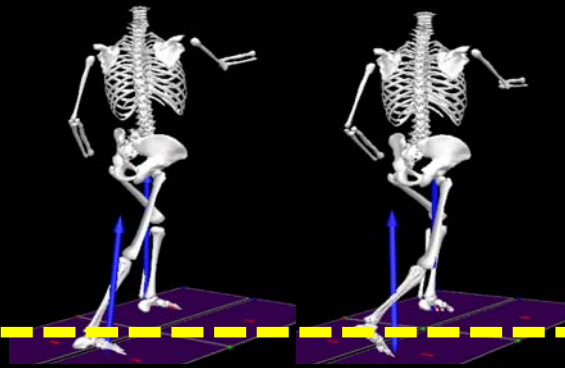
MOVEMENT (RE)TRAINING

LIFT PATTERN CHANGES
(GROUP-LEVEL COMPARISON)



MOVEMENT (RE)TRAINING

USH PATTERN CHANGES
(GROUP-LEVEL COMPARISON)



MOVEMENT (RE)TRAINING

movement behaviour

work technique affected by *interaction* between individual, task, and environmental factors

indications

requires multi-faceted and individualized approach to assess and (re)train movement for musculoskeletal disorder prevention in occupational athletes

positive *training transfer* can be facilitated by combining principles and practices of human movement, exercise, and ergonomics sciences

RESEARCH-INFORMED PRACTICE

(FIREFIGHTER HEALTH, FITNESS & PERFORMANCE)

Fire Fitness Trainer program

Education & training
Testing & certification



International impact

100 firefighters/year
100 departments



ACKNOWLEDGEMENTS



Ontario
MINISTRY OF TOURISM, CULTURE AND SPORT



**TORONTO
VARSITY BLUES**



**WATERLOO | APPLIED HEALTH SCIENCES
KINESIOLOGY**