
Manager
Expert
Worker

40% of all employees have a WMSD

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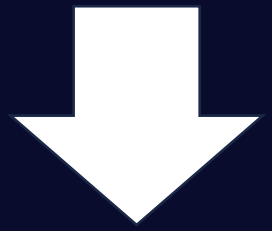
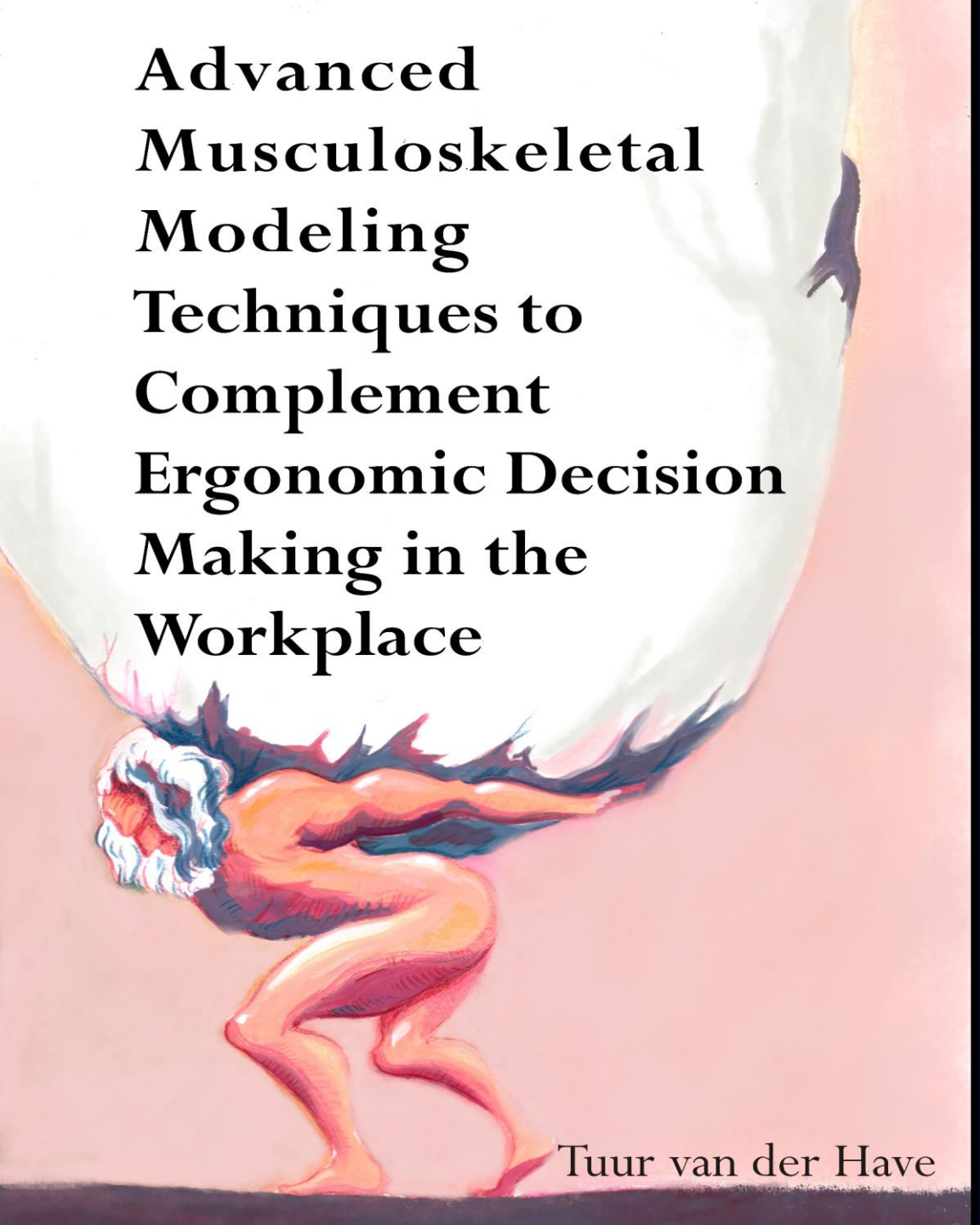
How and when does a work-related musculoskeletal disorder originate?

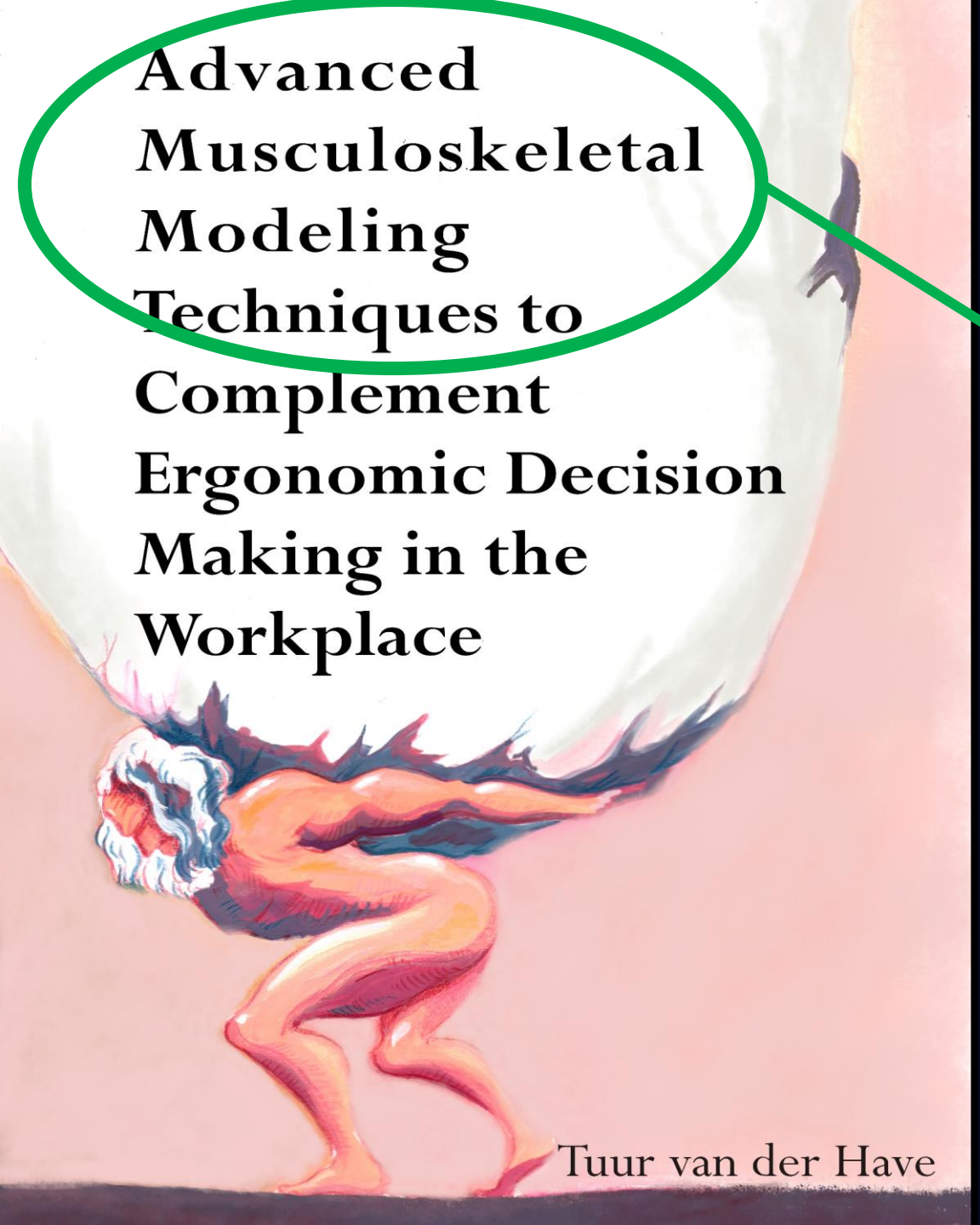


Can we use that information to prevent future injuries?



Dr. Tuur van der Have

Human Movement Biomechanics Research Group
KU Leuven



A method to quantify the physical load during occupational tasks

But why is this important?

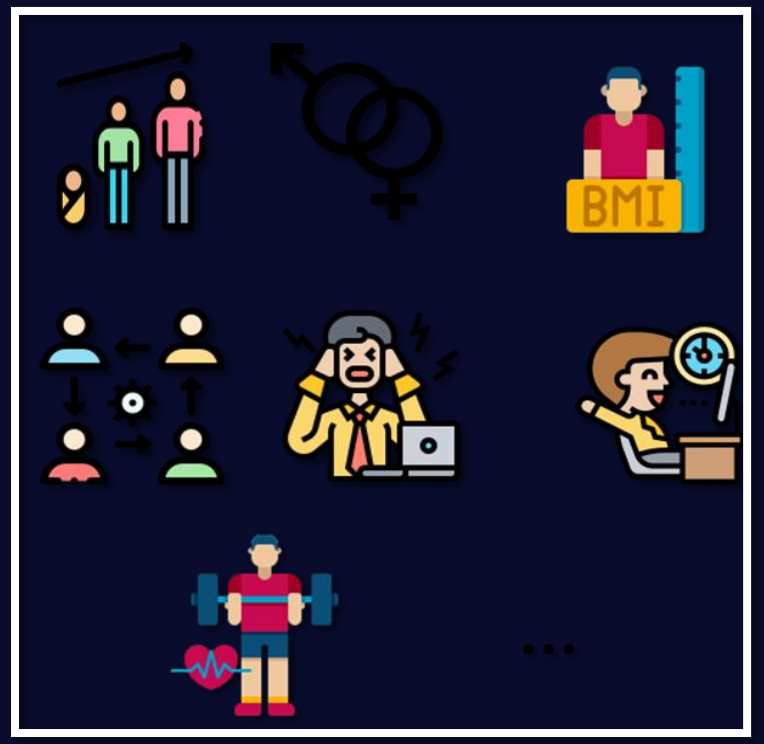
How does a work-related musculoskeletal disorder originate?

Physical load

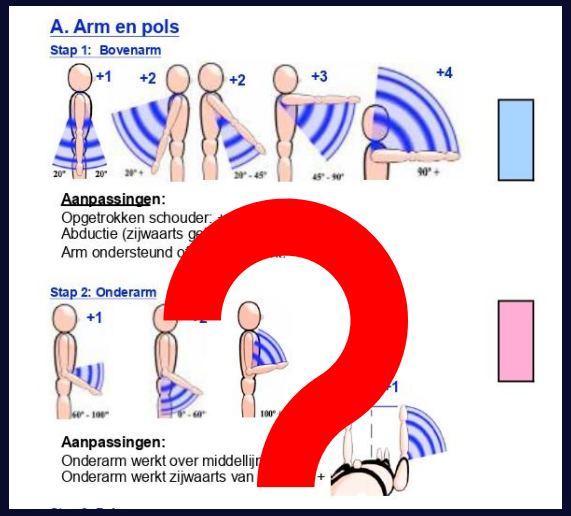
Loading capacity

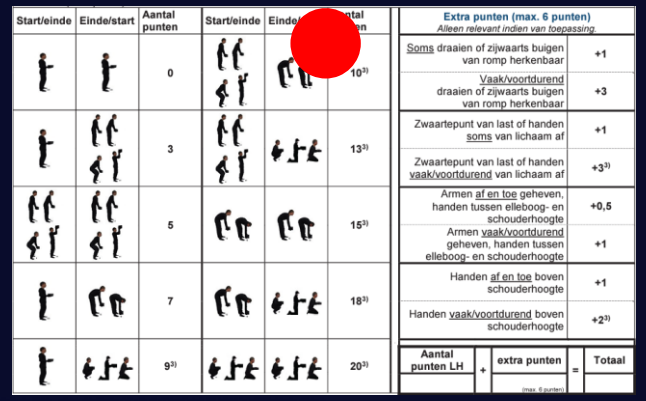
How does a work-related musculoskeletal disorder originate?

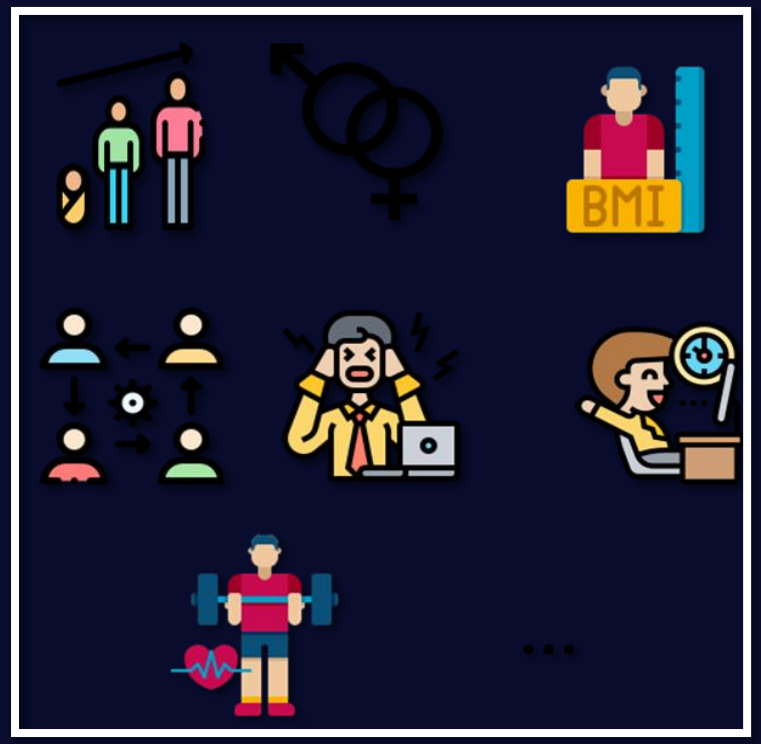
Physical load



How does a work-related musculoskeletal disorder originate?







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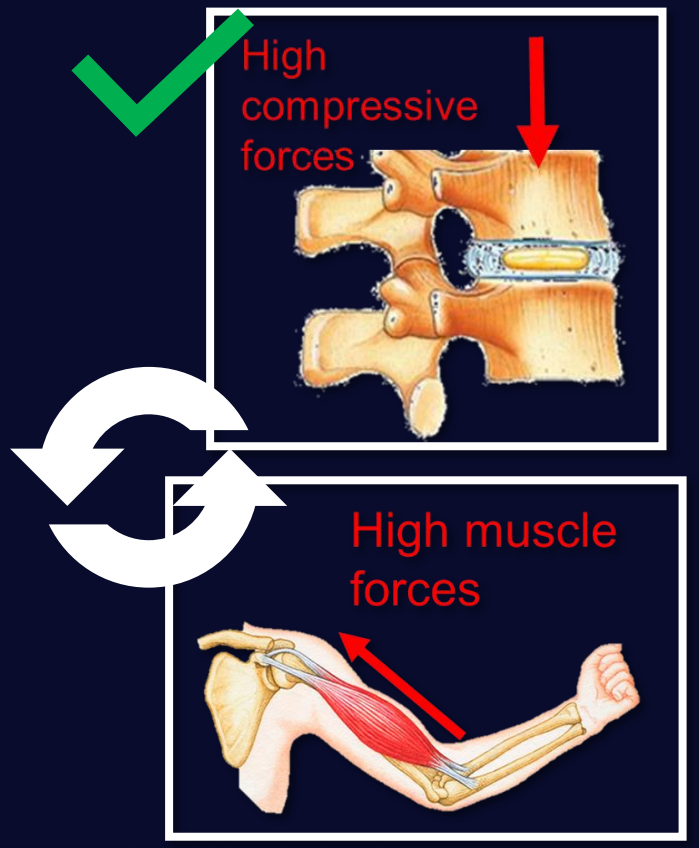

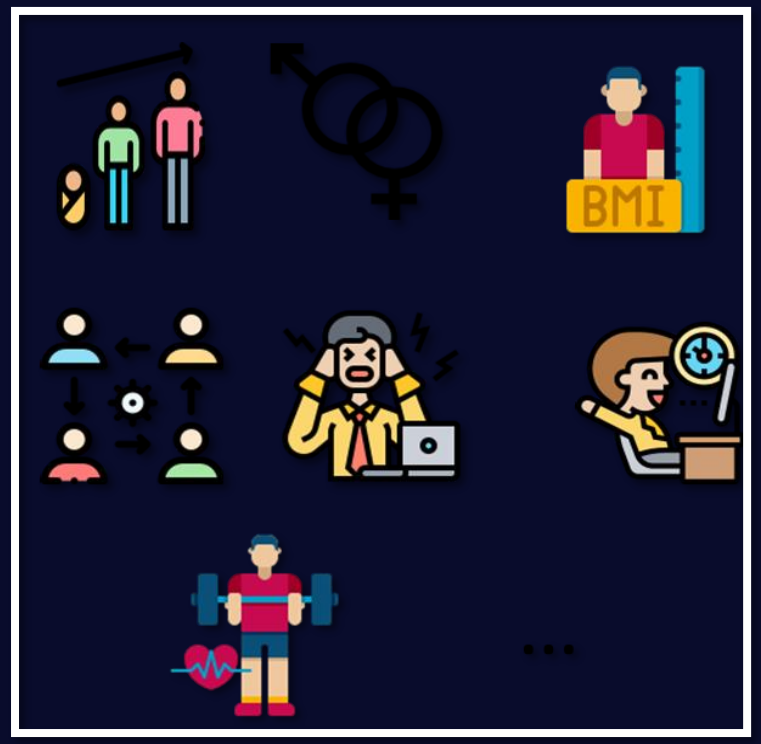

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3 main question originate from this figure

1) How do we quantify those forces?
2) Do ergonomic principles appropriately manage the internal forces?
3) When is there an imbalance?

➔ injury

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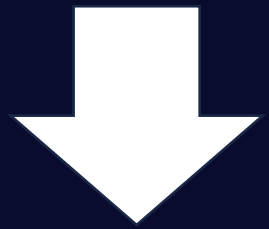
How and when does a work-related musculoskeletal disorder originate?



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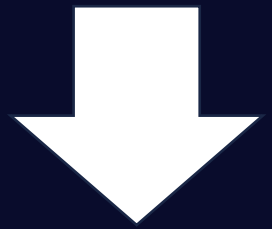

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➔ injury

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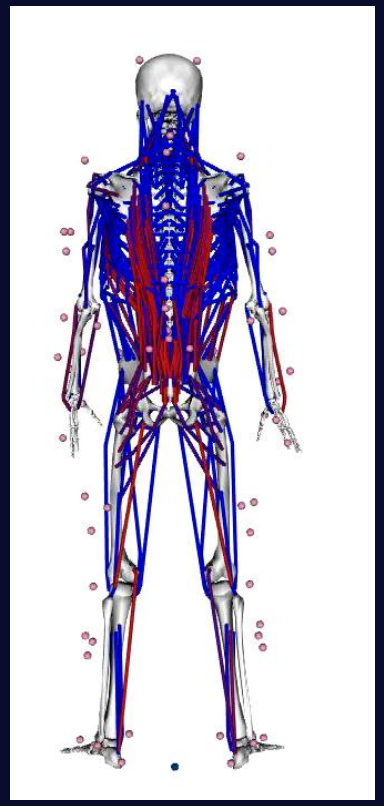
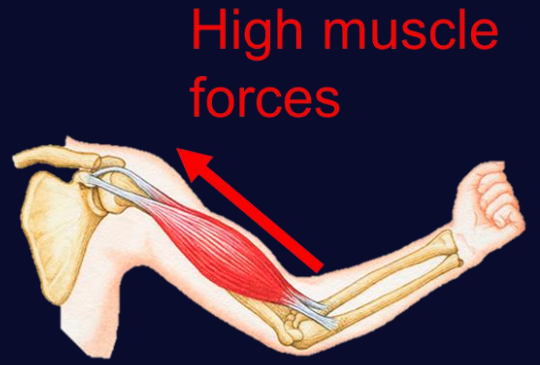
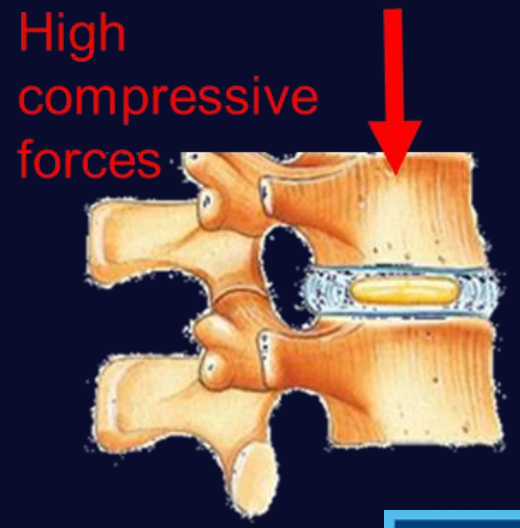
Full-body musculoskeletal models can be used to estimate these risk factors

A mathematical description of the human musculoskeletal system including bones, joints, and muscles







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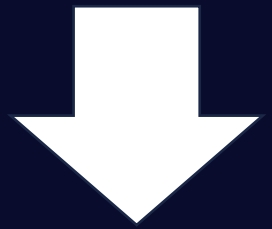

1) How do we quantify those forces?
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➔ injury

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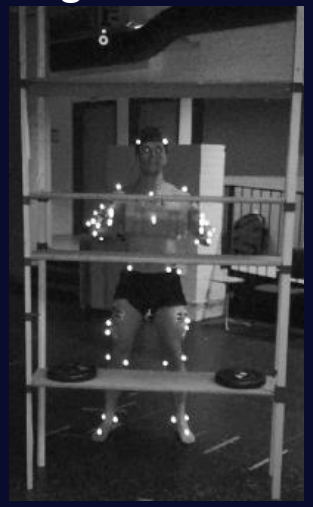
Loading topography during occupational tasks

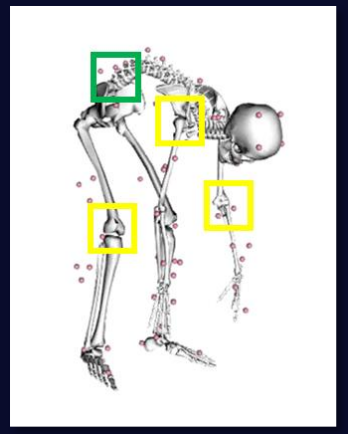
Low lift

Ergonomic lift



Overhead wiring

Stoop



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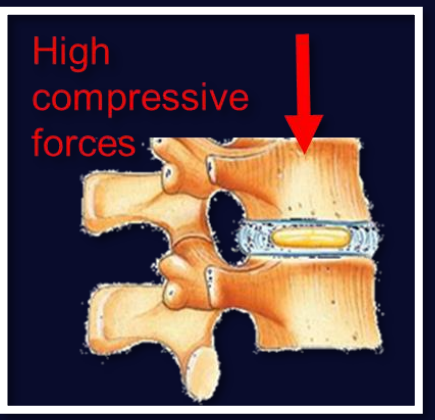

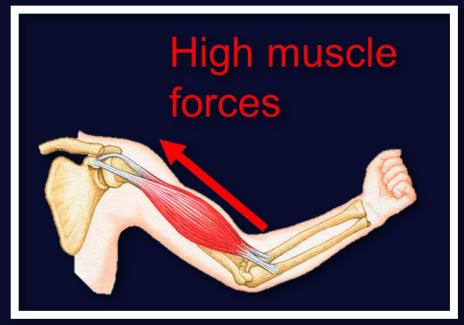

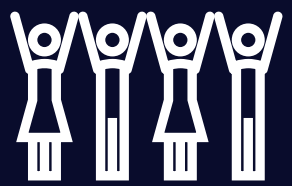

= 20

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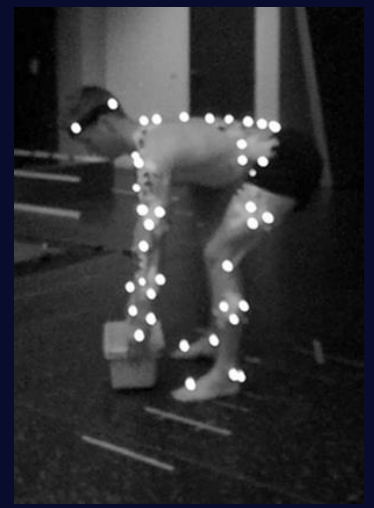
Job rotation based on a single joint analyses

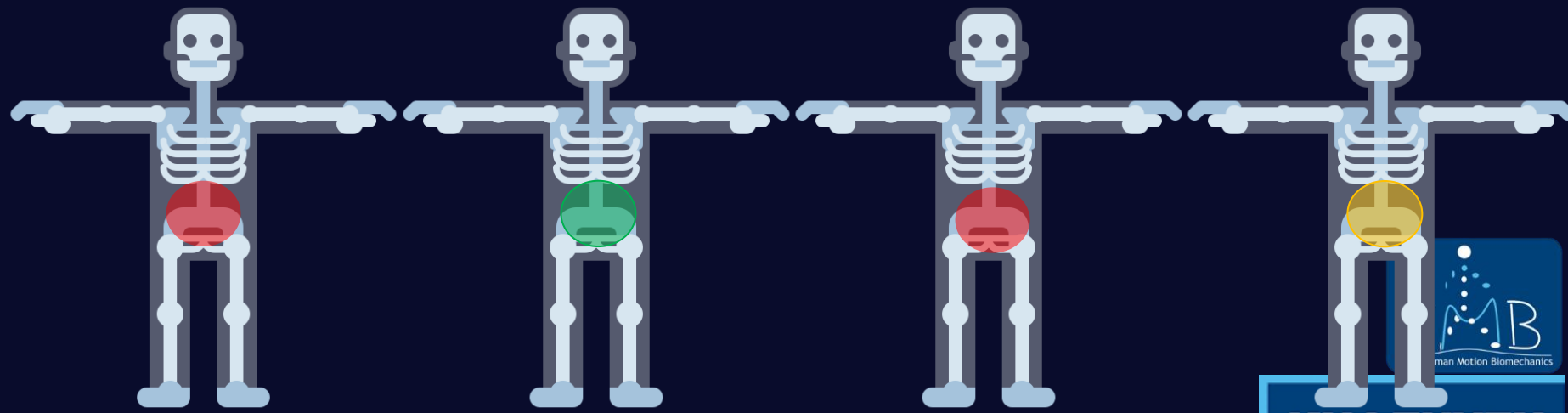
Start/einde	Einde/start	Aantal punten	Start/einde	Einde/start	Aantal punten
		0			10[3]
		3			13[3]
		5			15[3]
		7			18[3]
		9[3]			20[3]

Extra punten (max. 6 punten) *Alleen relevant indien van toepassing*	
Soms draaien of zijwaarts buigen van romp herkenbaar	+1
Vaak/voortdurend draaien of zijwaarts buigen van romp herkenbaar	+3
Zwaartepunt van last of handen soms van lichaam af	+1
Zwaartepunt van last of handen vaak/voortdurend van lichaam af	+3[3]
Armen af en toe geheven, handen tussen elleboog- en schouderhoogte	+0,5
Armen vaak/voortdurend geheven, handen tussen elleboog- en schouderhoogte	+1
Handen af en toe boven schouderhoogte	+1
Handen vaak/voortdurend boven schouderhoogte	+2[3]

Aantal punten LH	+	extra punten (max. 6 punten)	=	Totaal





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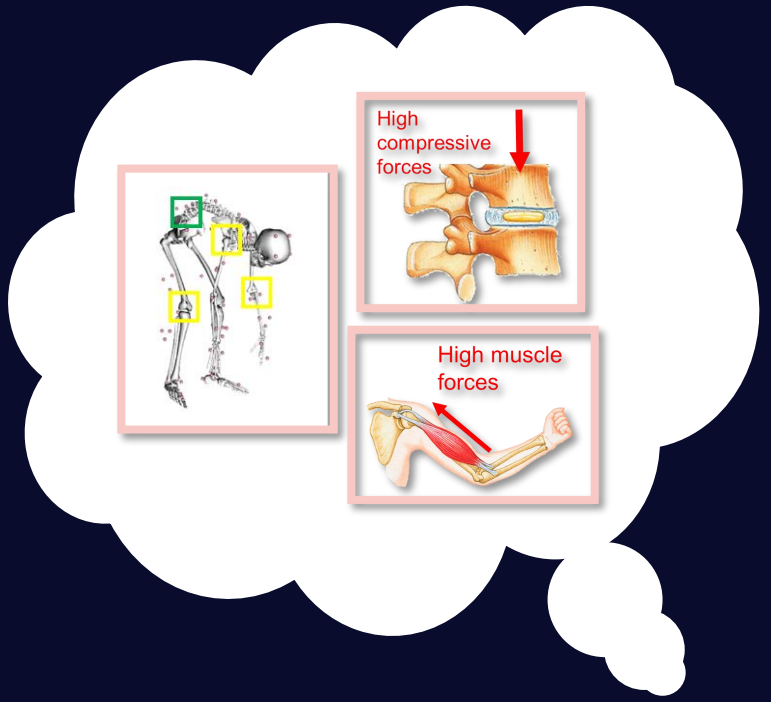
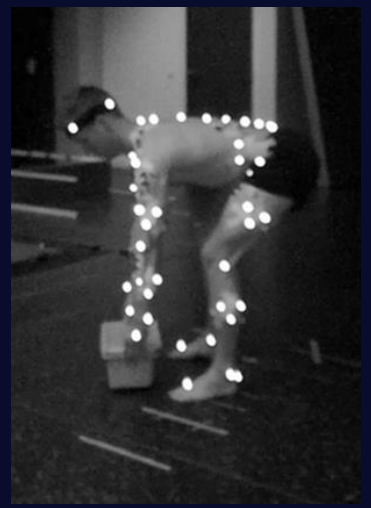
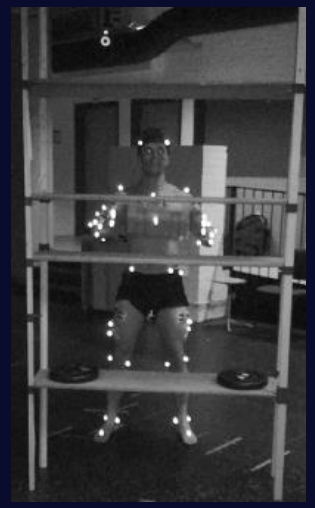
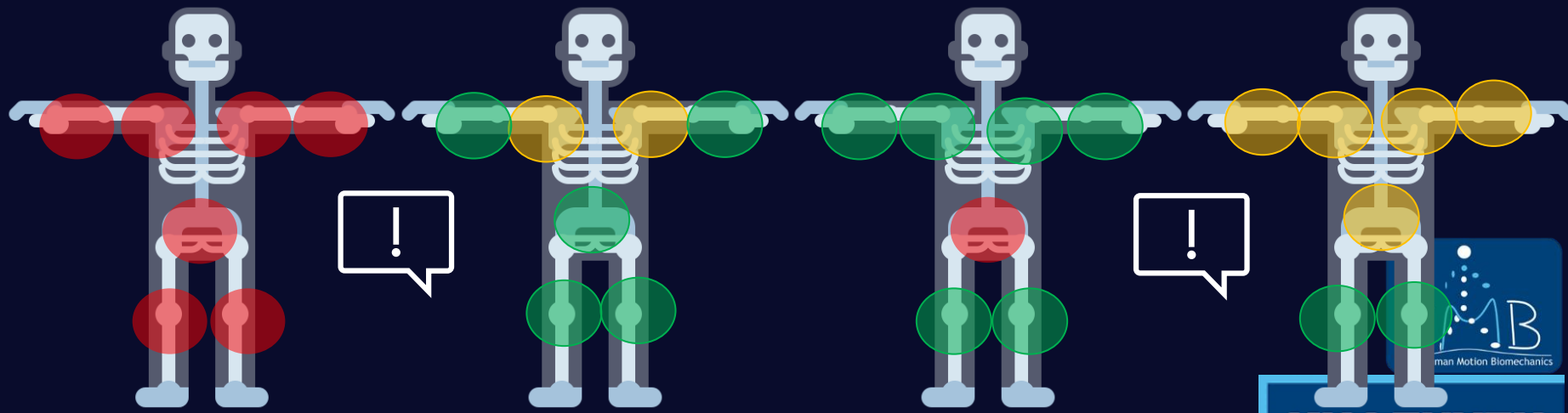
Job rotation based on loading topography







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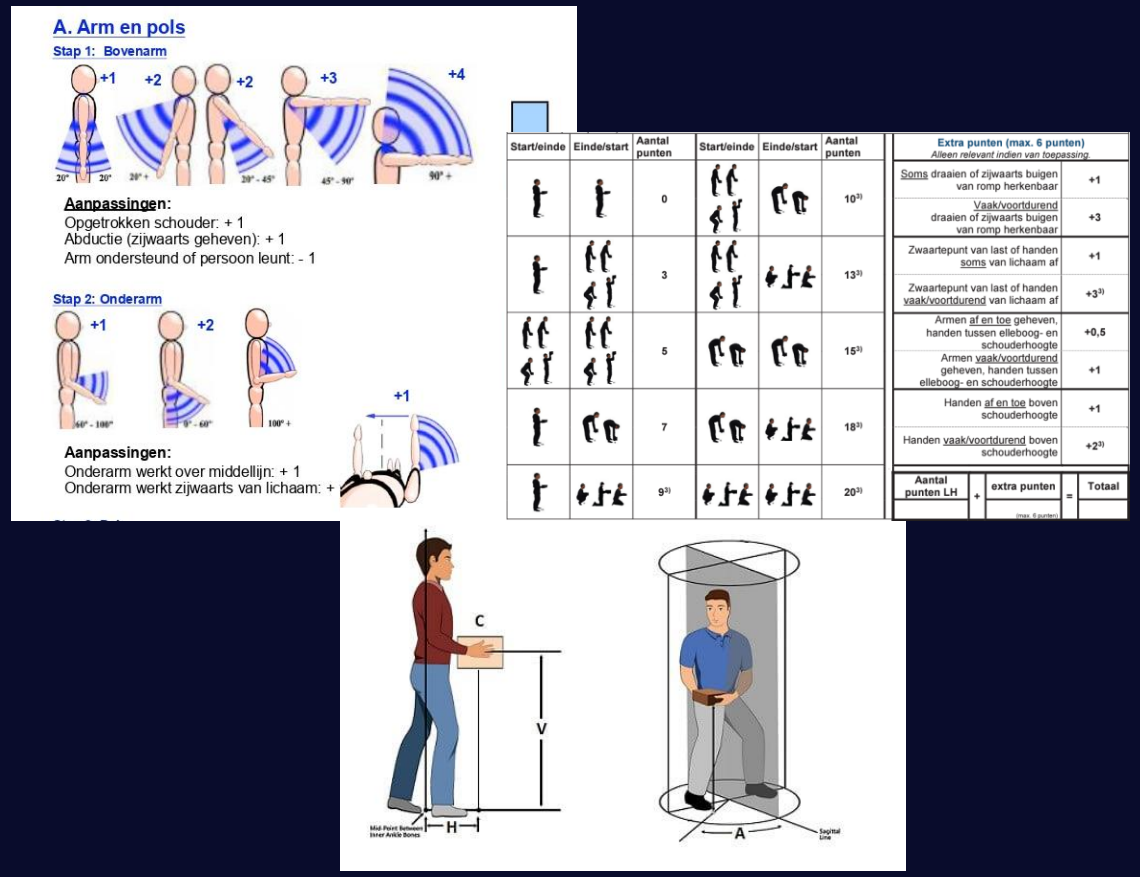
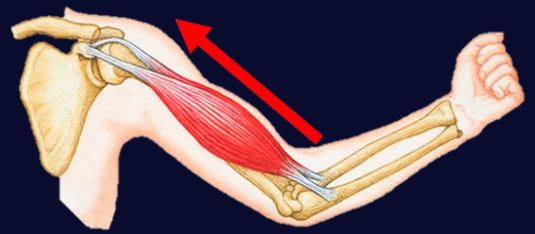
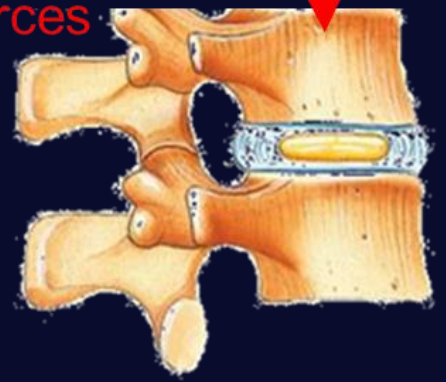
There is a difference!



High muscle forces



High compressive forces



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Confirmed by other papers

We know it doesn't work: Why do we still use how to lift training for the prevention of musculoskeletal disorders?

Jodi Oakman [a], Katrina A. Lambert [b], Susan Rogerson [c], Alison Bell [d]

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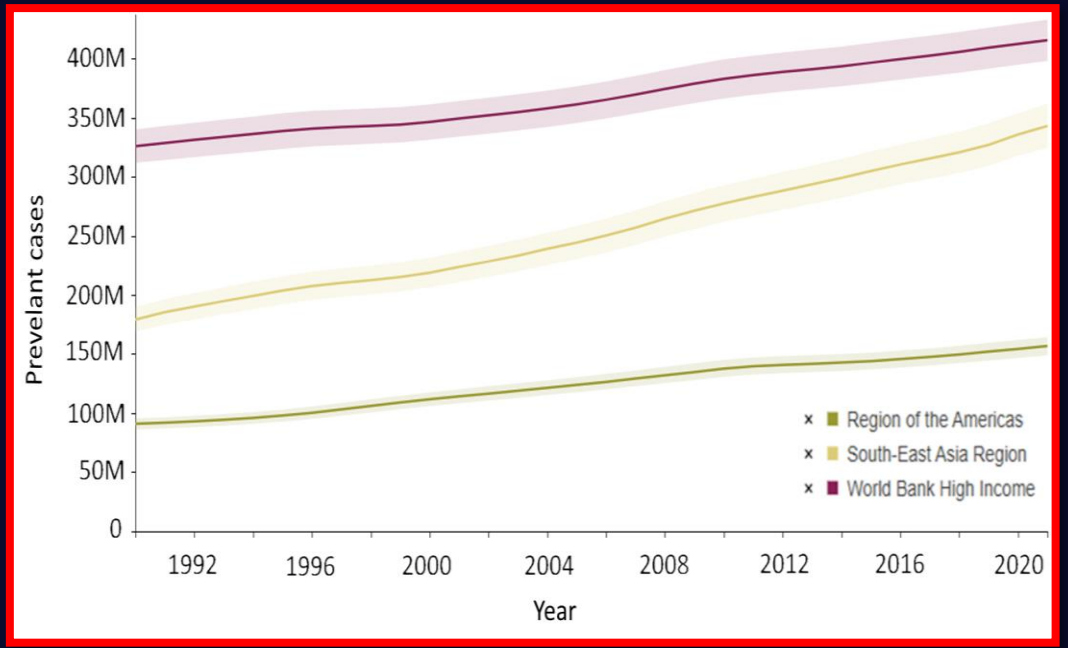
Highlights

- How to lift training remains highly prevalent in MSD prevention.
- Employers continue to use HTLT training in their MSD prevention strategies.
- OHS professional will offer HTLT training if requested despite its ineffectiveness.
- Greater focus needed on ensuring translation of research evidence into practice.

Effect of training and lifting equipment for preventing back pain in lifting and handling: systematic review

BMJ 2008 ; 336 doi: https://doi.org/10.1136/bmj.39463.418380.BE (Published 21 February 2008)

Conclusions There is no evidence to support use of advice or training in working techniques with or without lifting equipment for preventing back pain or consequent disability. The findings challenge current widespread practice of advising workers on correct lifting technique.



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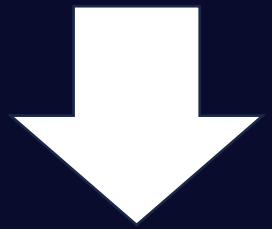

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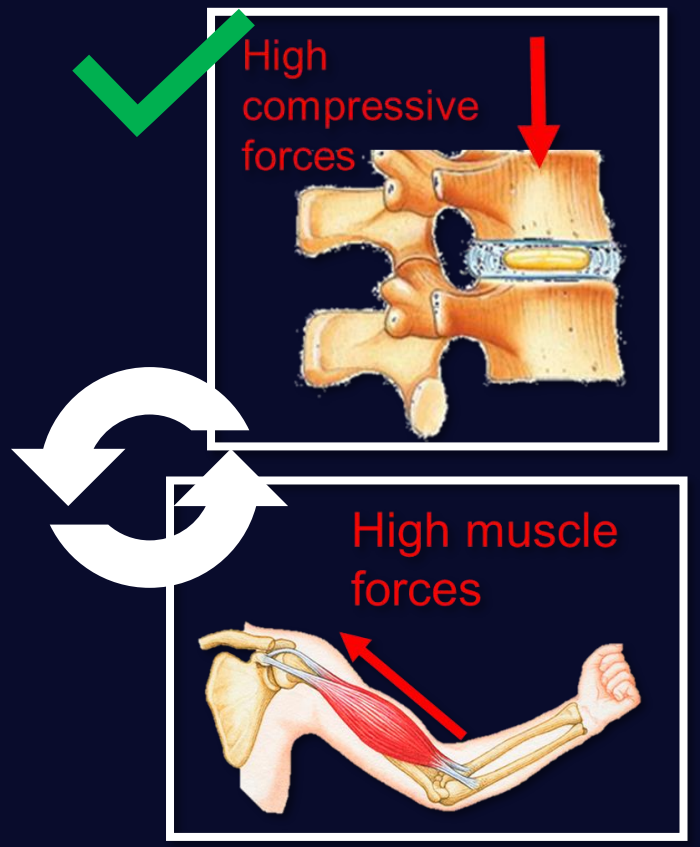

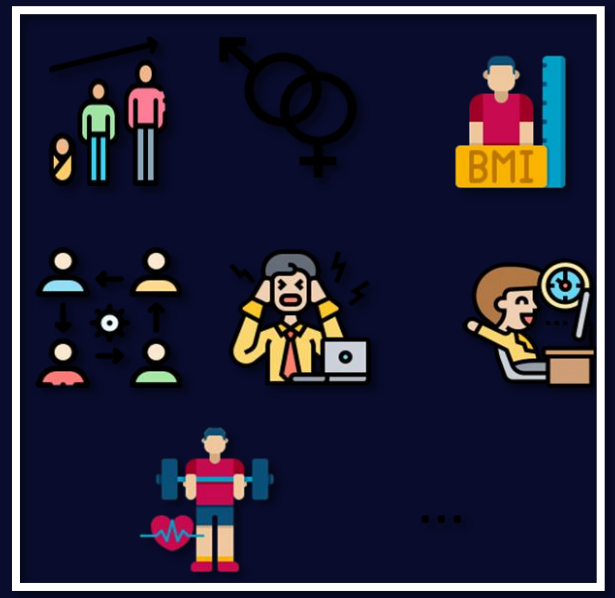

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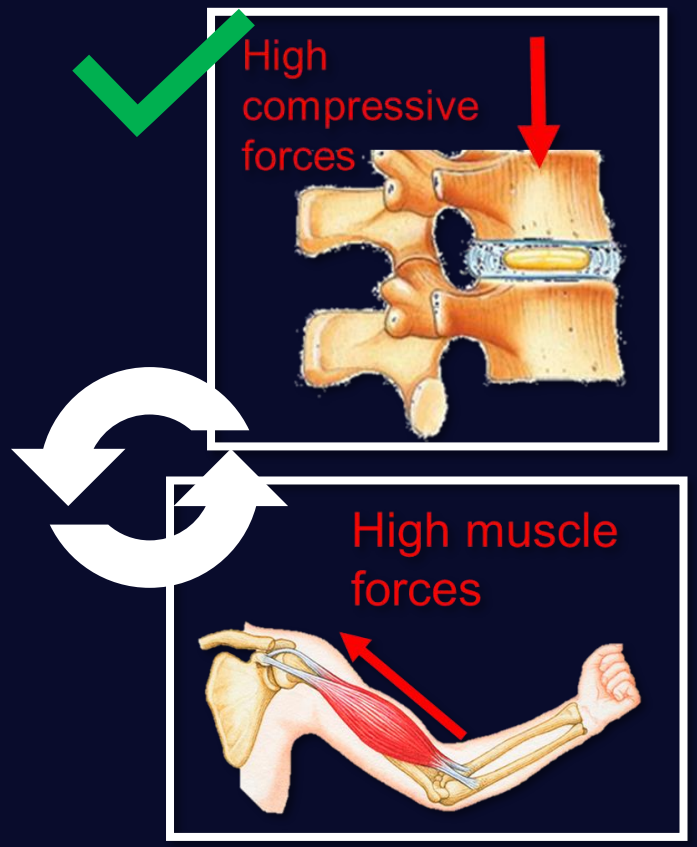

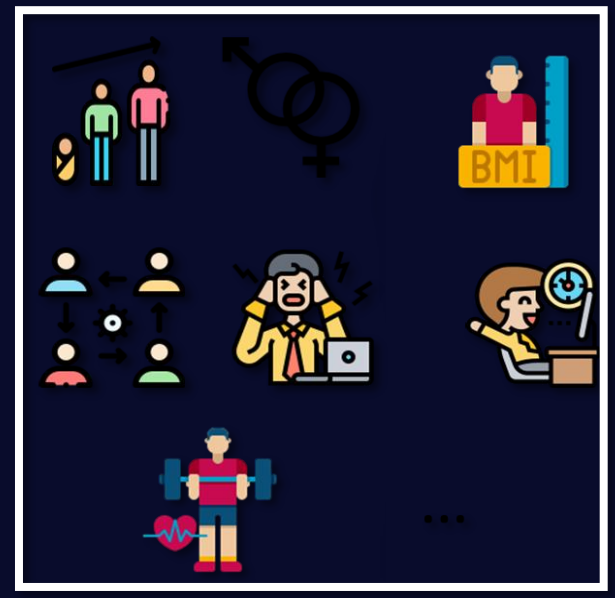

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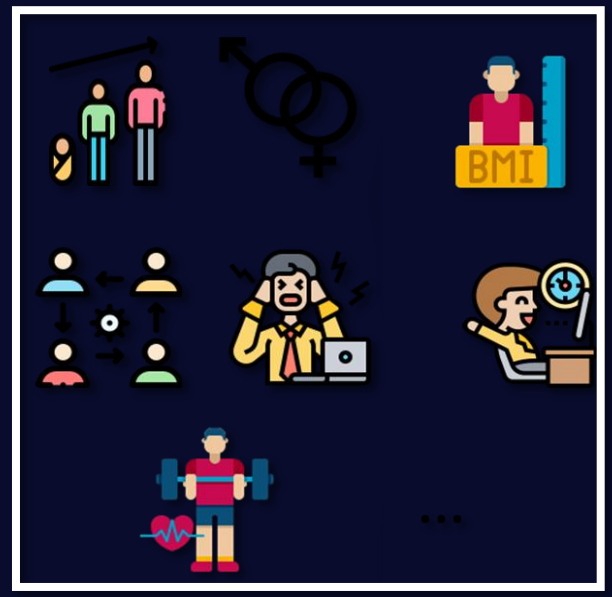
How does a work-related musculoskeletal disorder originate?

100%

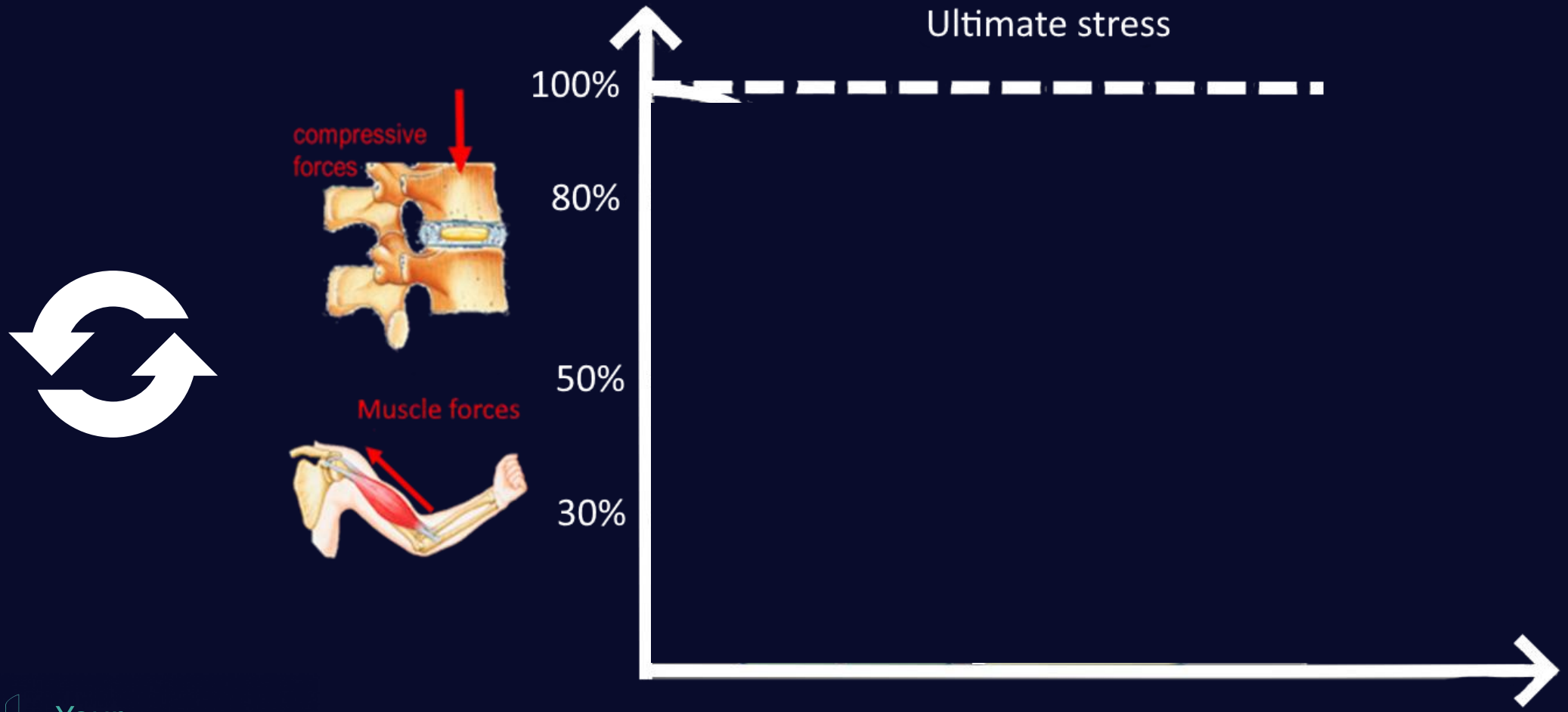
80%

50%

30%



How does a work-related musculoskeletal disorder originate?



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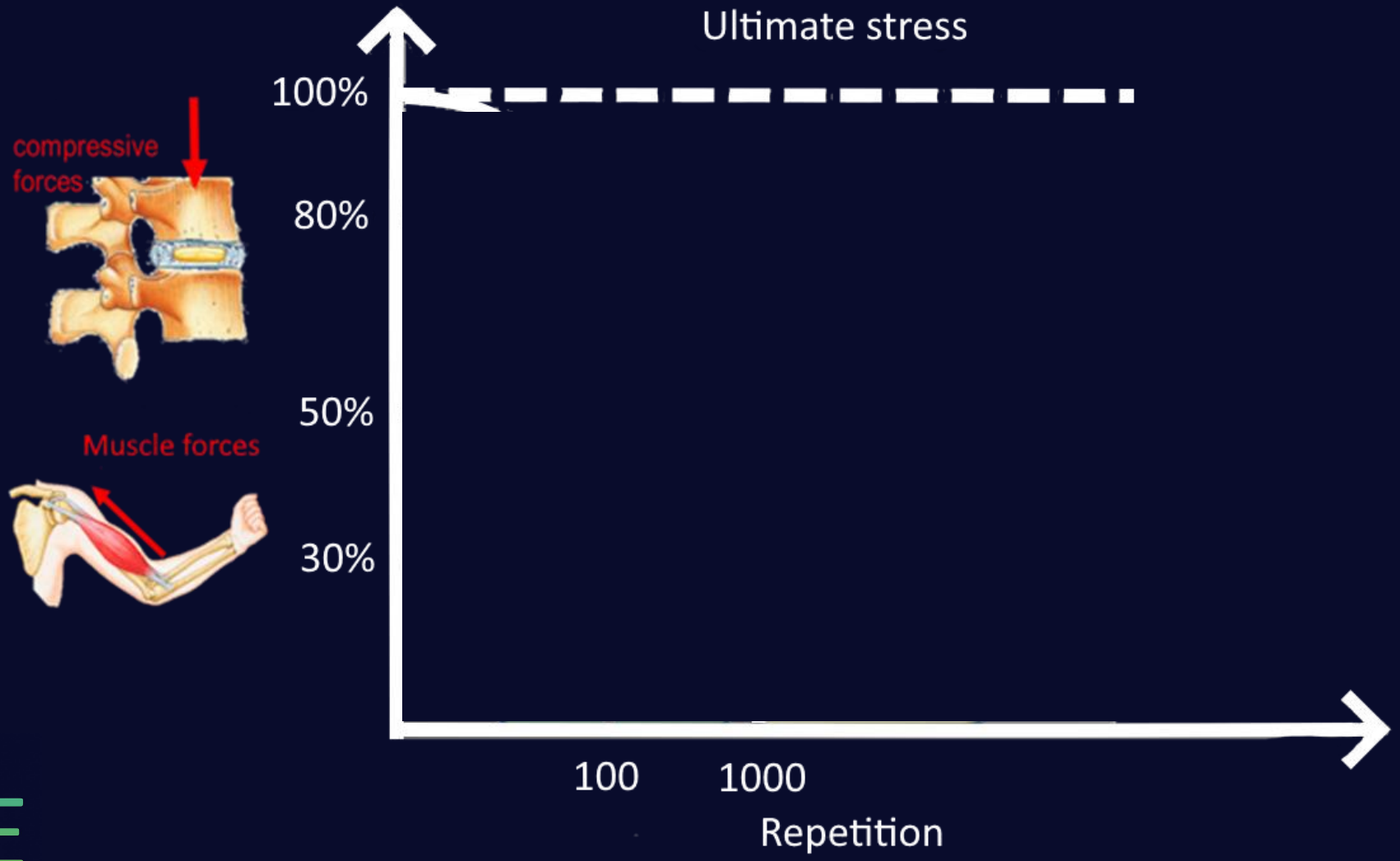

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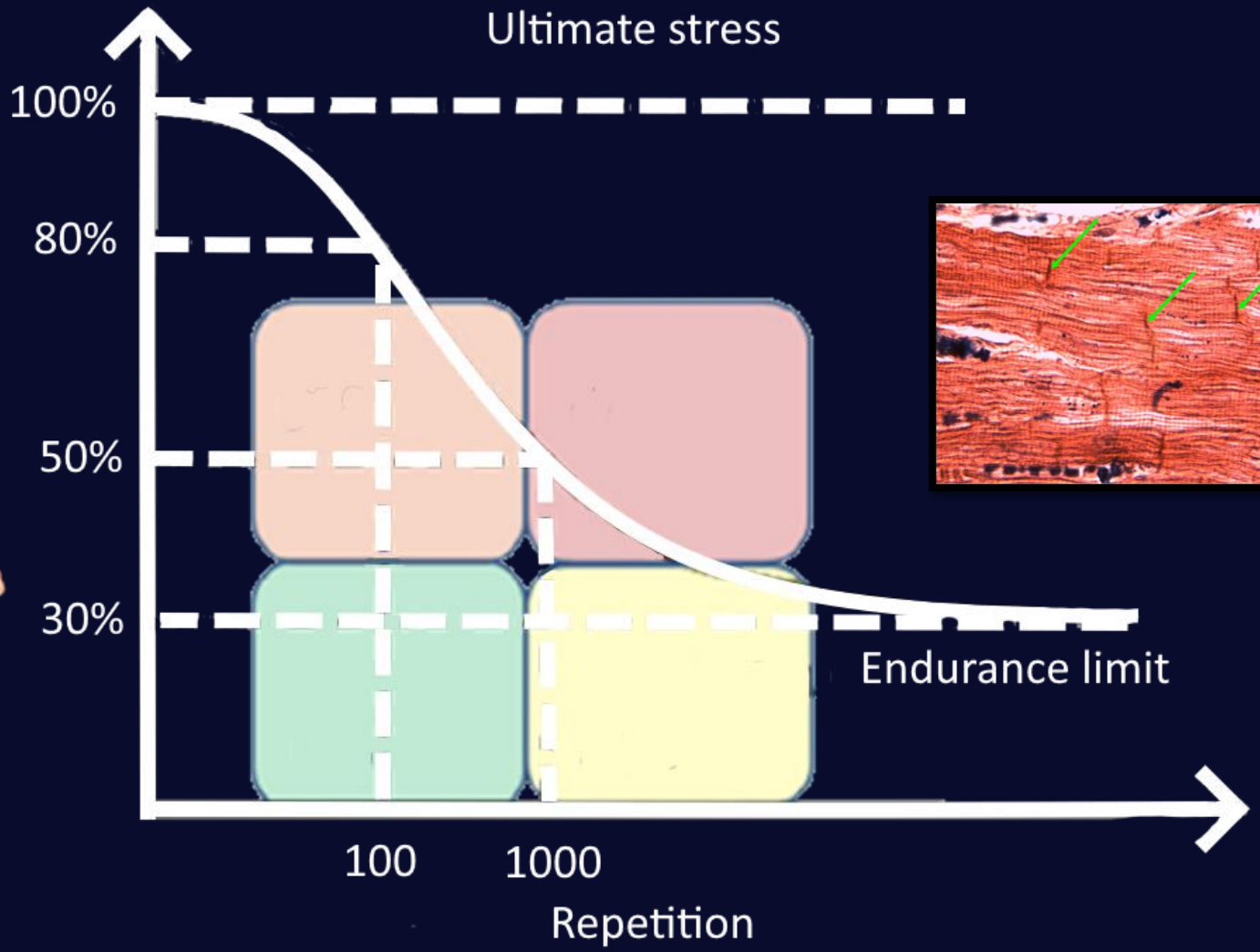

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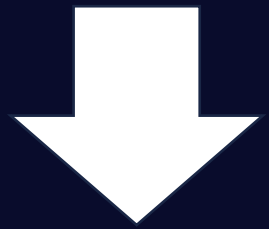

Can we use that information to prevent these injuries?

Existing ergonomic risk assessments neglect multiple factors

1. Focus on the spine
2. Static postures
3. Worker-specific characteristics
4. Assistive devices

+ Subjective

+ Every task, different ergonomic risk assessment

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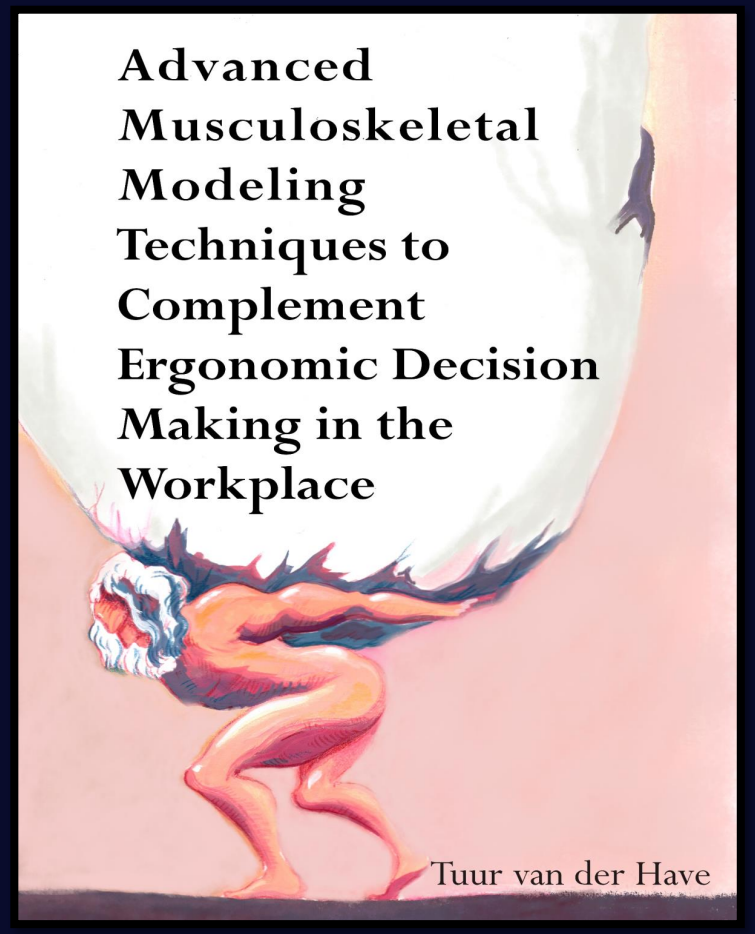

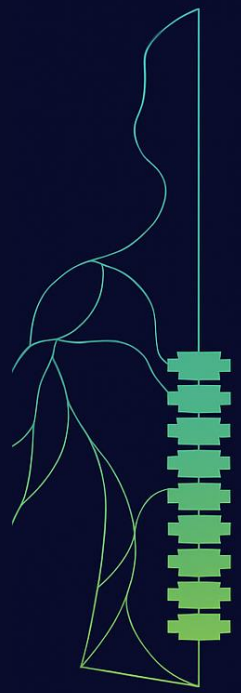

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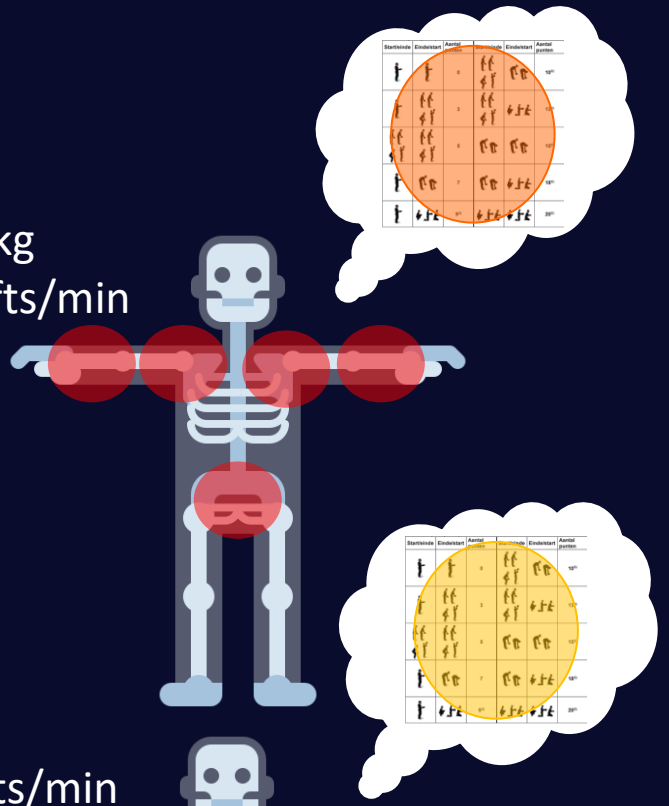
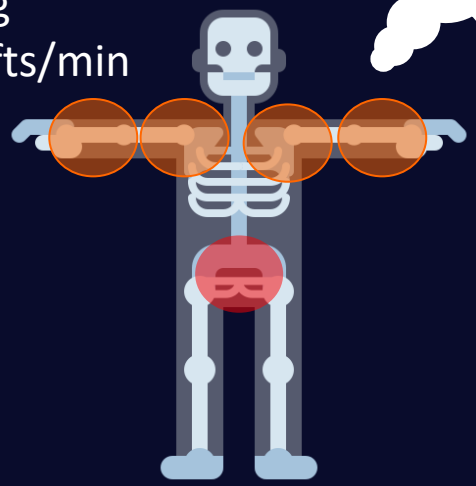
Reducing the weight or the handling frequency?

10 kg
3 lifts/min

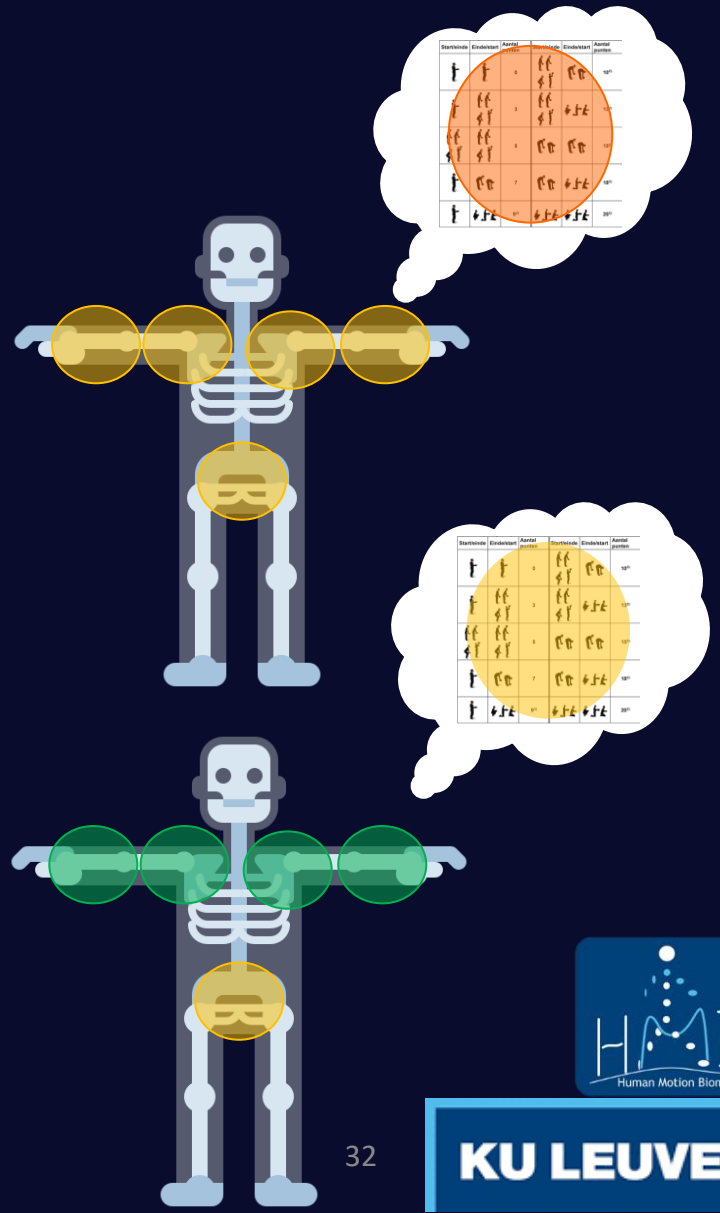


3 kg
3 lifts/min



Reduce lifting frequency

Reduce lifting frequency



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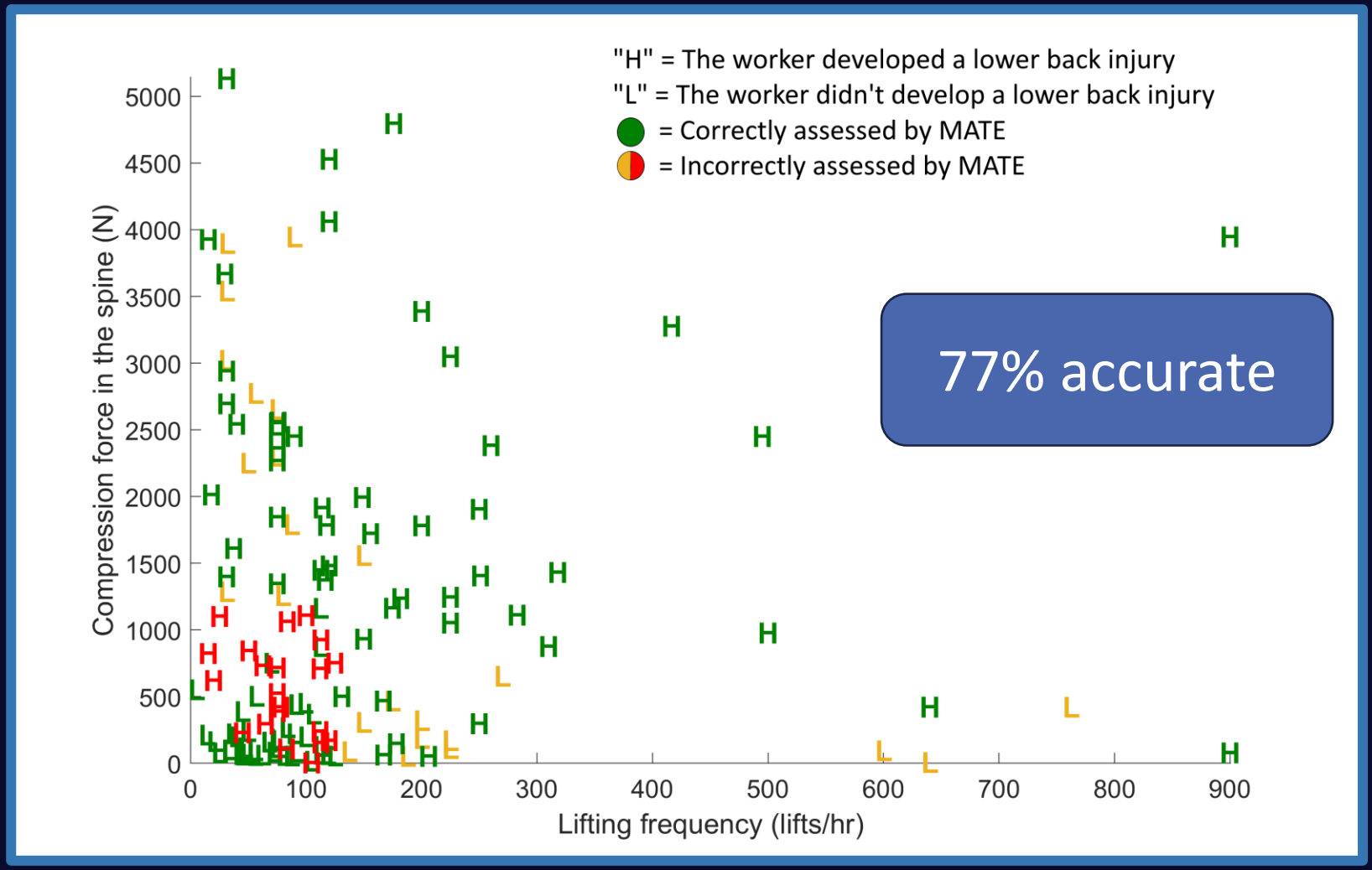
MATE = evidence-based estimation of overloading



NIOSH = 9% accurate on the same database

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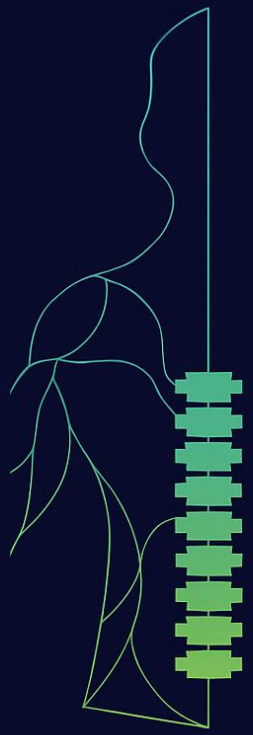

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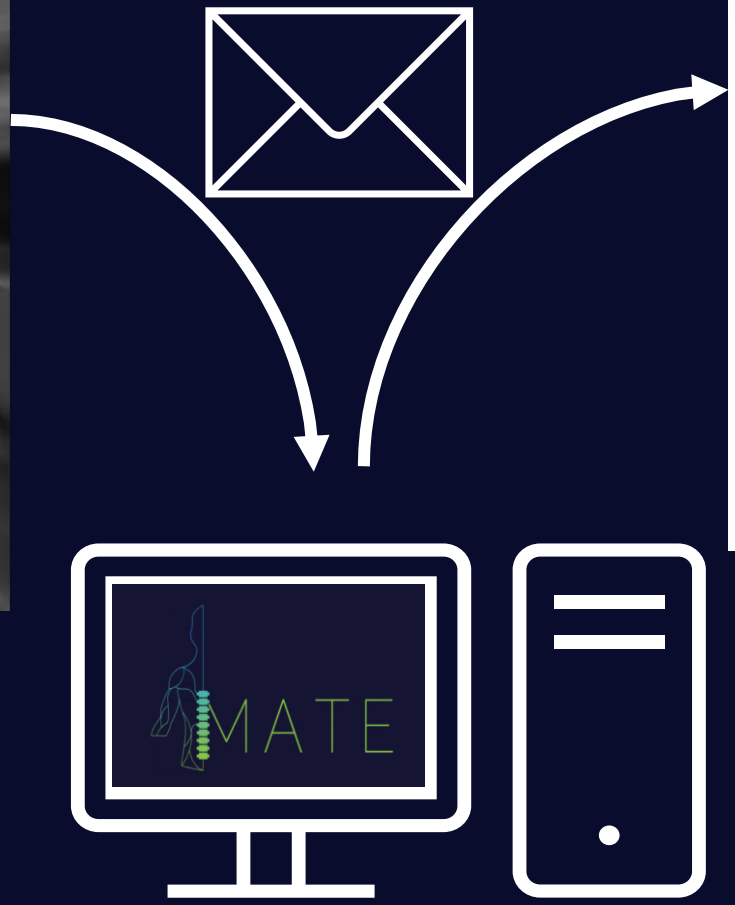

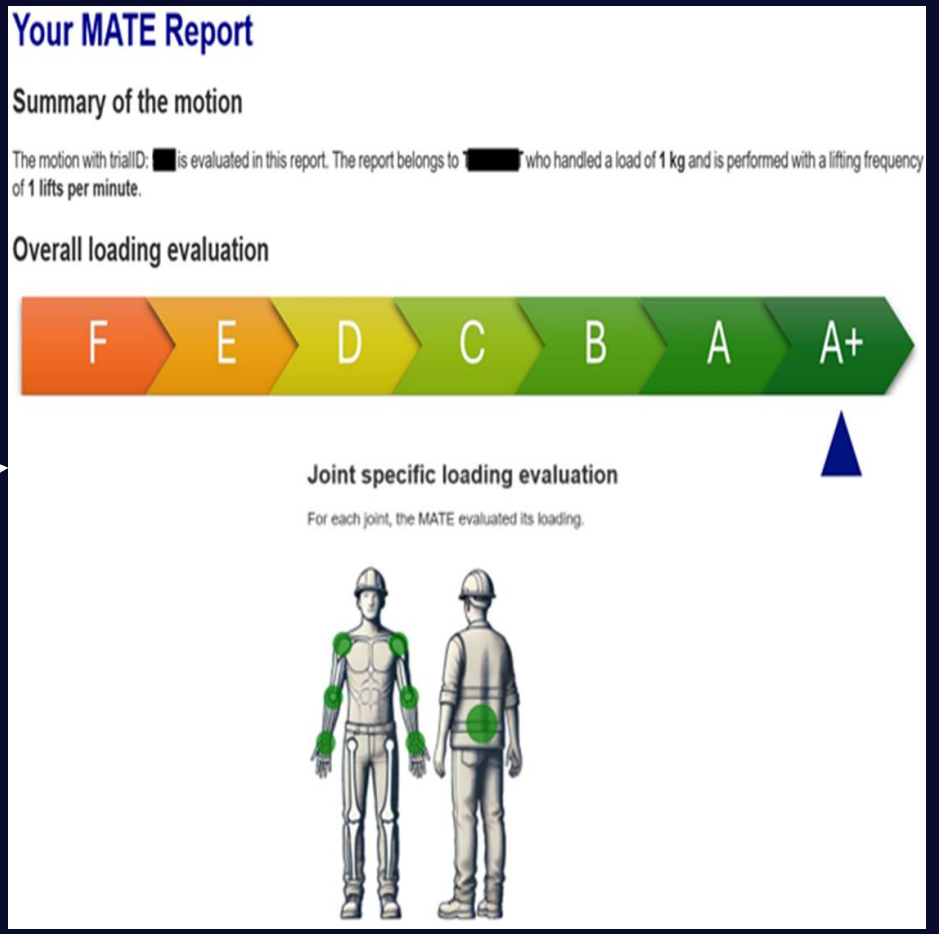

+RULA
+REBA
+KIM

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HAMB Human Motion Biomechanics

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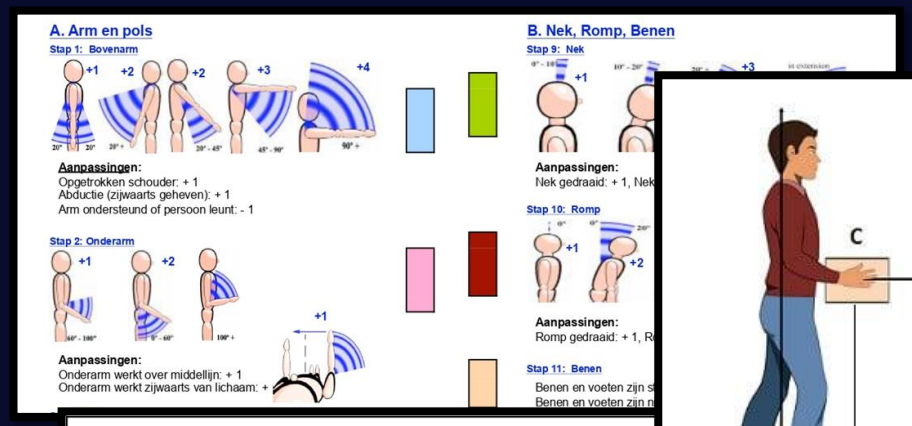
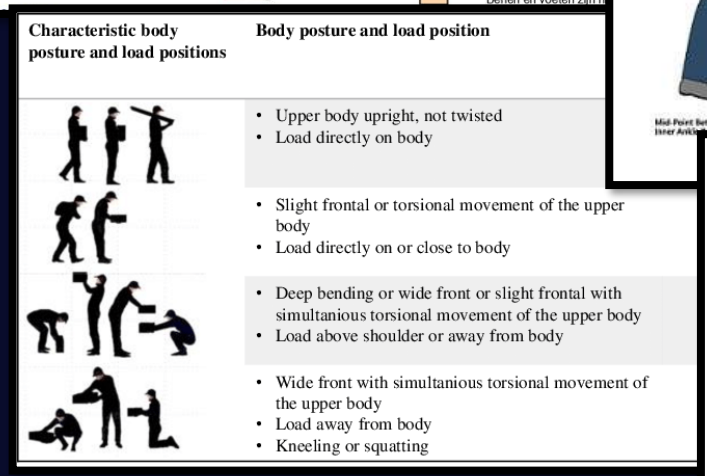
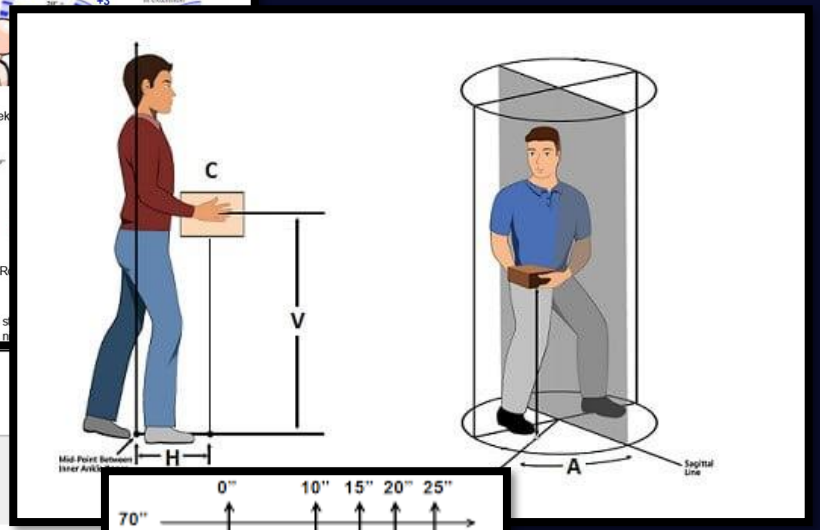
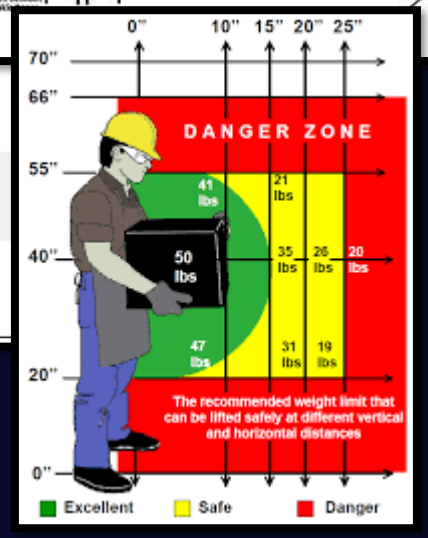
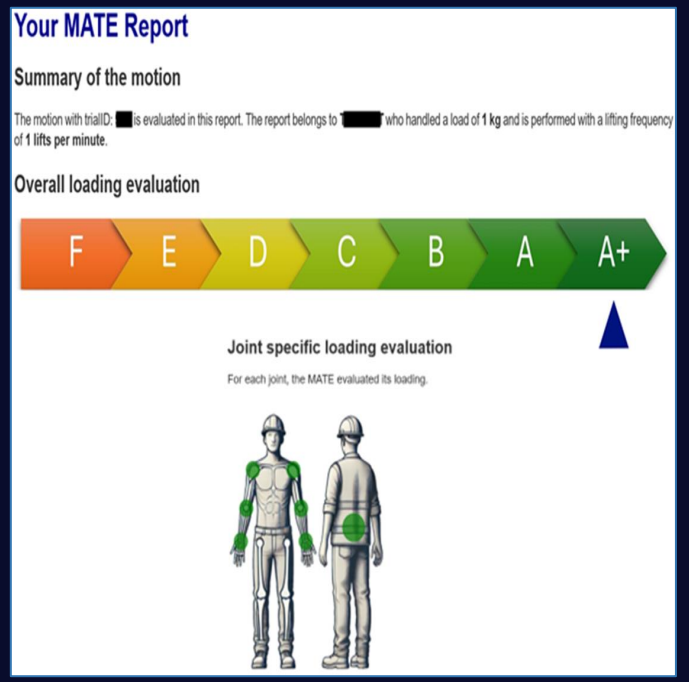
MATE replaces all risk assessments











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Human Motion Biomechanics

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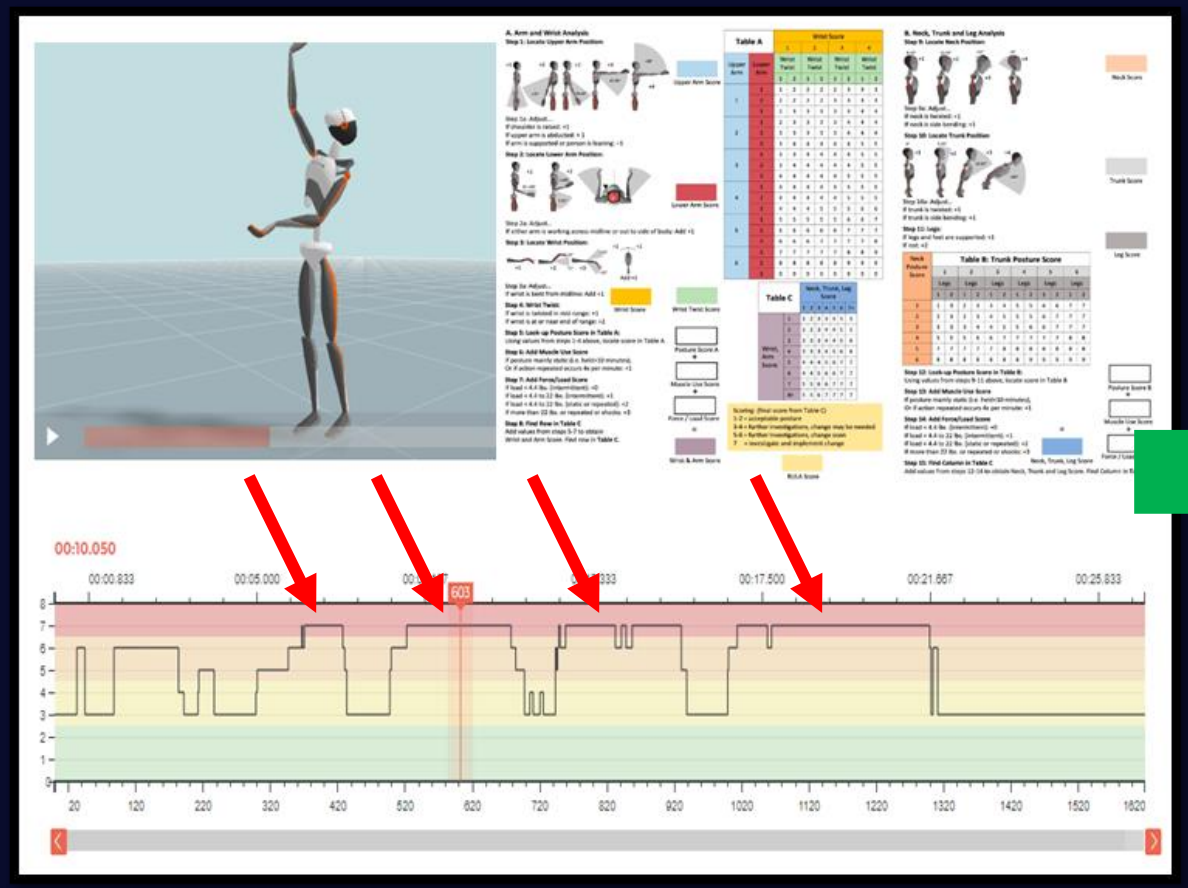
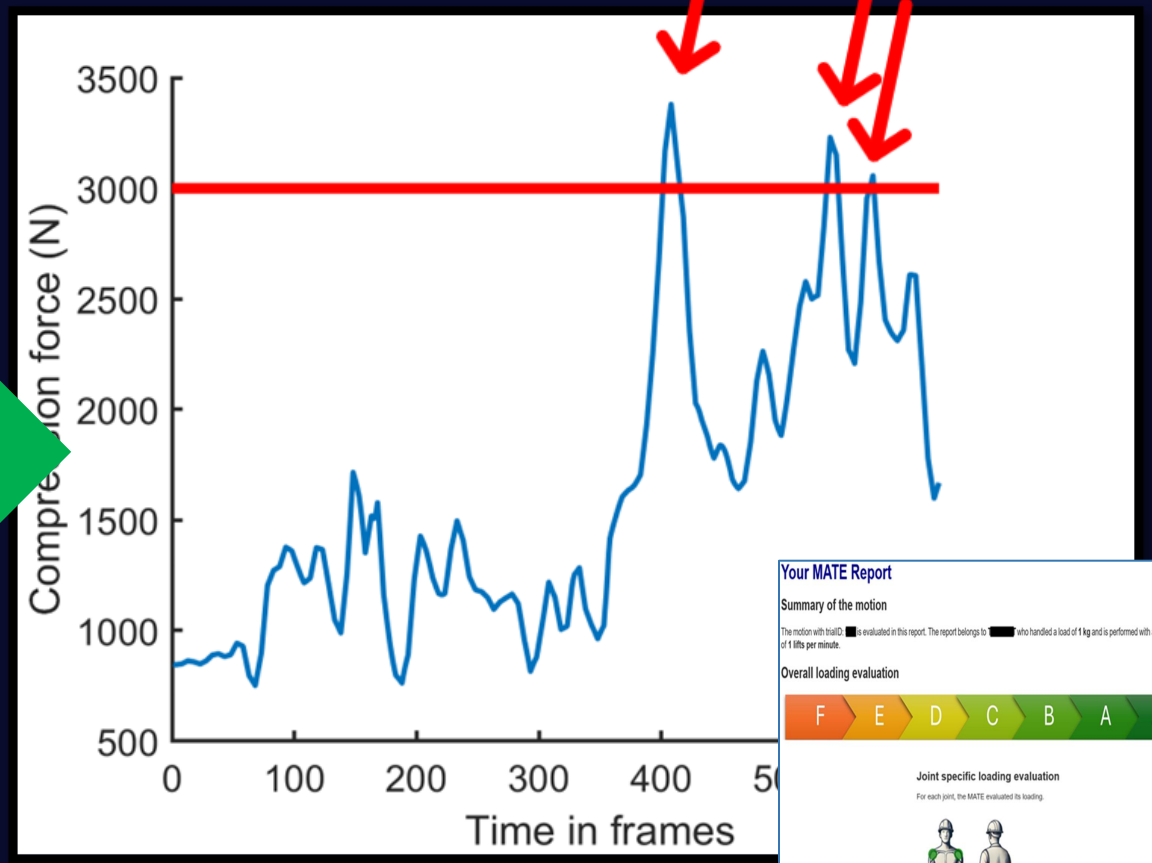
MATE moves away from the traditional risk estimation





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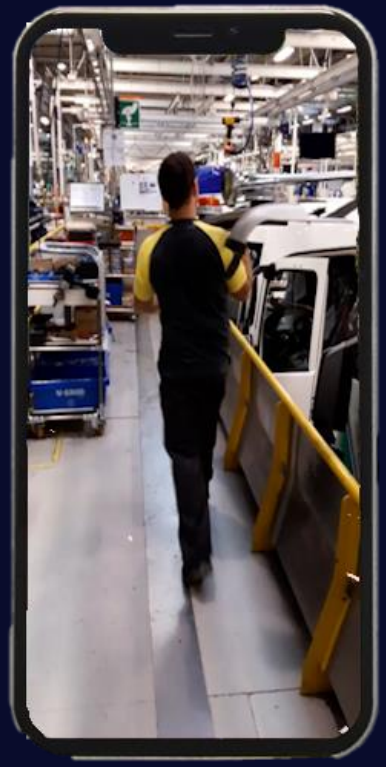
Stop using sensors and use video analysis

Stanford University



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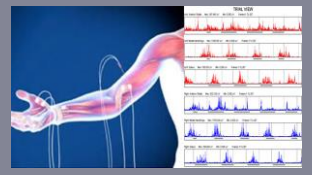
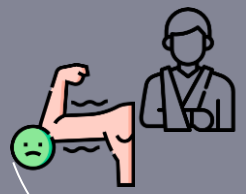
With prior knowledge

EMG analysis



Considering personal limitations



Development required

Predictive analysis

To improve the reintegration of workers

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HMB Human Motion Biomechanics

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Combination is possible

License user

Unlimited use of the tool

Use the latest versions of tool

Customer service

+ additional risk assessments (RULA, REBA, KIM)

Mini partner

Develop and suggest new features

First access and testing of cutting-edge additional features

Following development, transferred to licensed user

➔ Pre-order payment

➔ Intense help during iterative design

Consultancy projects

Help with measuring IMU data
Assistance in any project where MATE could possibly fit

Your MATE in ergonomics

HAMB Human Motion Biomechanics

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Precision in Prediction, Prevention in Practice

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