



Insurance Brokers &
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You've Been Taught the **WRONG** Way to Lift!

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Opening Poll

Past Webinars

- Oct 3, '23 – Realities of an Aging Workforce
 - Nov 7, '23 – Indoor Heat Illness Standards
 - Dec 5, '23 – This Might Hurt: An Introduction to Back Pain
 - Jan 10, '24 – Wearables: What to Watch and Watch Out For
 - Feb 6, '24 – Workplace Violence Prevention: Essential Elements & New Regulations
 - Apr 10, '24 – Sleep Smart – Work Safe: Unraveling the Impact of Tough Schedules
 - May 28, '24 – Ergonomics for Mental Health
 - Jun 18, '24 - Measuring Safety Climate (& Indoor Climate)
 - Jul 10, '24 – Psychosocial Factors – Impact on Disability (and Claims Costs)
 - **Aug 6, '24 – You've been taught the WRONG way to lift!**
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Session Overview

The low back problem

What we've been taught

The two key questions

Reasons it's wrong

Research

What to do

The Low Back Pain Problem

- Greater than 80% lifetime prevalence
 - 1 out of 4 of us experience it monthly
 - 1 of 10 of us have it now!
 - #1 cost driver for worker injuries
 - Costs US Over \$500 Billion!
 - Continues to be the #1 cause of Days Lived with Disability *worldwide*
 - Diagnosis and treatment largely ineffective, in some cases iatrogenic
 - Workplace interventions have had limited effectiveness
-

What are the most popular lifting rules - today's lifting technique paradigm?

Lifting Technique Rules that Rule

Keep a straight back,
and
Bend your knees. } = Squat Technique

Ergonomic Guidelines for Manual Material Handling DHHS (NIOSH) Publication No. 2007-131 (April 2007)



Avoid lifting from the floor whenever possible. If you must lift from the floor, do not bend at the waist. The techniques shown below help the worker to keep the spine in a safer position while lifting from the floor.



Caution:
This technique may be effective only if loads are small, light weight, and can easily fit between the knees.



Keep the load close to your body and lift by pushing up with your legs.



“Lift it right... Keep your back straight, with no curving or slouching... Lift with your legs, not your back...”

From “How to lift and carry safely,” NSC Internet Site, September 2008.



“Avoid bending, reaching and twisting when lifting. Lift with your legs bent and objects close to your body.”

From “National Safety Council Injury Facts, 2010 Edition”

5-Minute Safety Talk – Know the Facts about Backs



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- Many erroneous “Facts”
 - Emphasizes postures and fitness, rather than realities of back pain
 - 12 rules for lifting
 - Ergonomics is mentioned (good!)
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Two Critical Questions

What's wrong with what we've been taught?

Does training workers in safe lifting reduce back injuries?

What
does
tradition
say is the
right way
to lift?

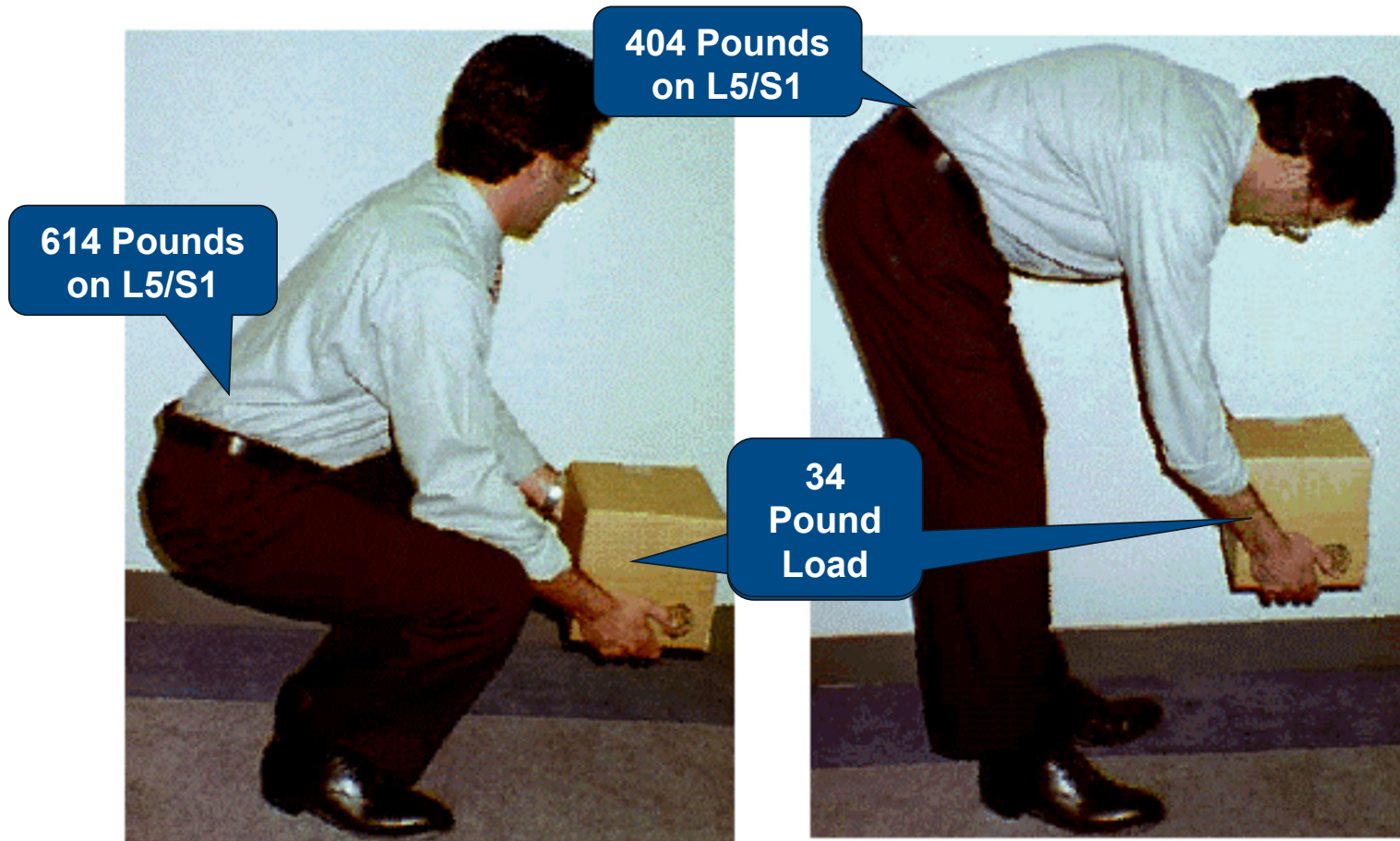


Squat?



Stoop?

Why is there **MORE** compressive force with the Squat technique?

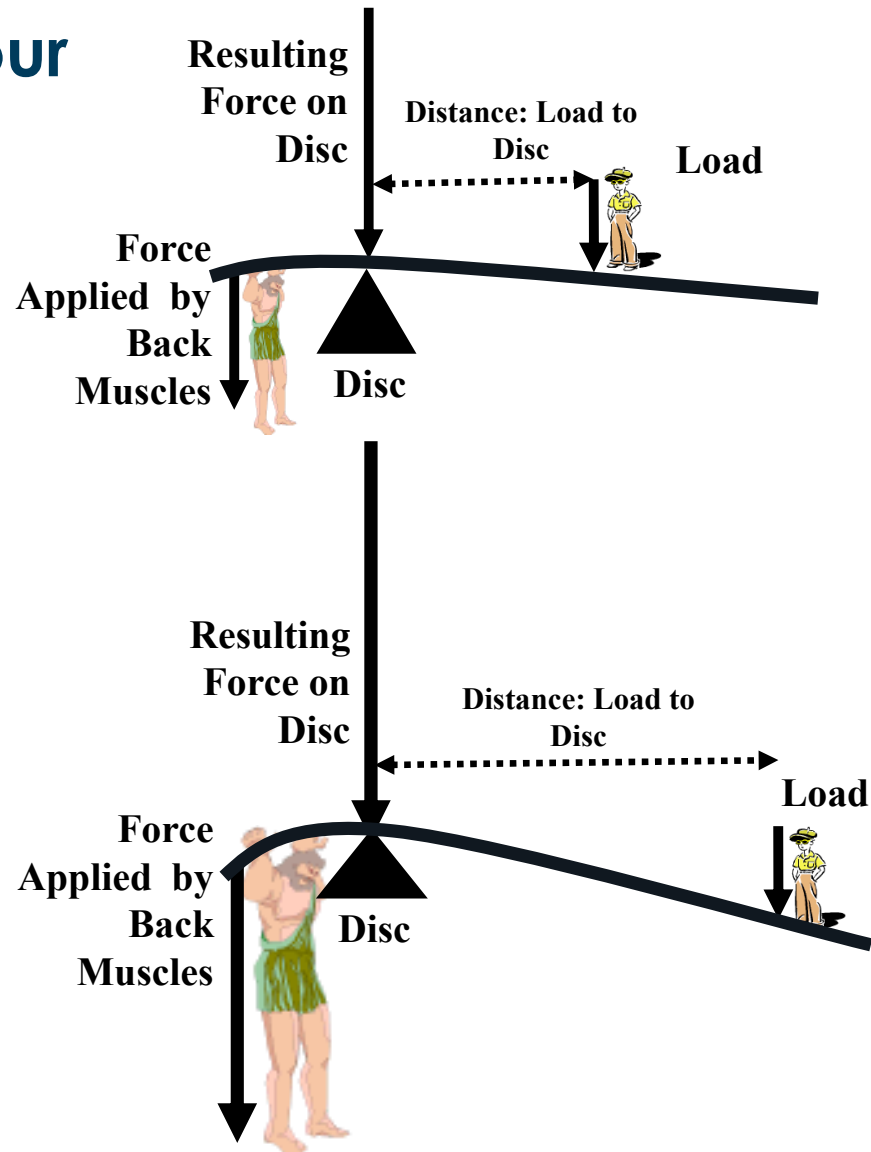


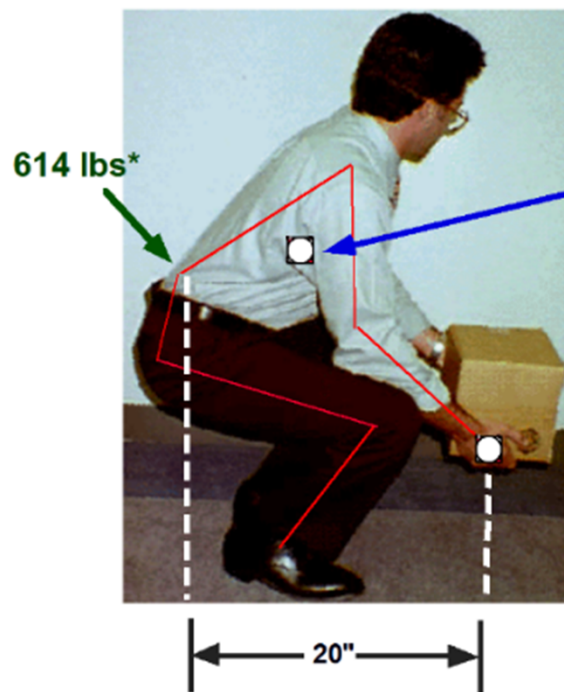
Squat

Stoop

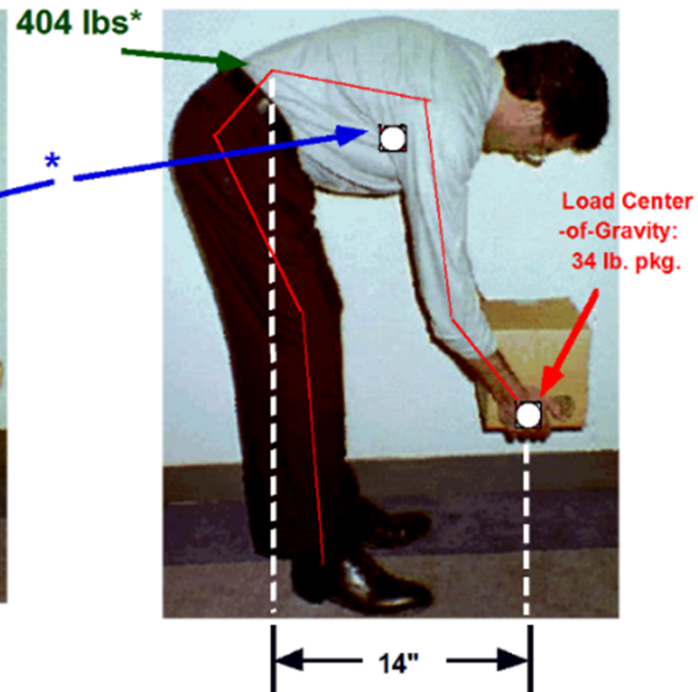
Why Distance To Your Body Matters Most

- Back is like a Teeter-Totter: Disc=Fulcrum (balance point)
- The farther away from the fulcrum (balance point), the more force has to be applied to the other end.
- Even small increases in distance from disc result in much higher forces on disc.





*** Compare the
Compression
on the L 5/S 1 Discs**

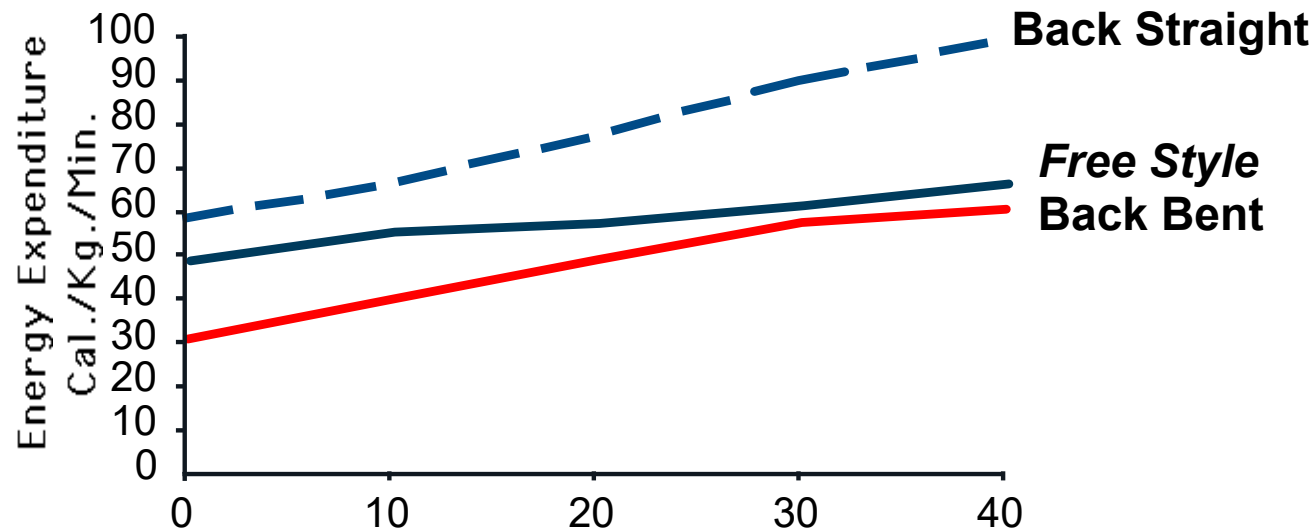


*** Compare the Body
Weight Centers-
of-Gravity**

Low Back Compression for Two Lifting Postures

(Park & Chaffin, 1974.)

Lifting Methods: Energy Expenditure



Lift and Carry Weight (K.g.)
Garg and Saxena, 1979

Problems With The Straight-Back, Bent-Knee Method

Puts more stress on your back since it forces load away from your body.

Puts more stress on hips, knees and ankles because they are at the extreme of their usable range.



Takes more energy because you lower your entire body lower and have to lift it again.

Requires extremely strong legs and knees.

Requires more horizontal space.

Puts you off balance since it forces you to rock forward on the balls of your feet.

Two Critical Questions

What's wrong
with what
we've been
taught?

**Does training
workers in safe
lifting reduce
back injuries?**

**Controlled Trial of
an Educational
Program to
Prevent Low
Back Injuries
Daltroy, et al.,
1997**

- 4,000 Postal Workers, Prospective 5.5 year study.
- 17 worker groups received extensive lifting and back injury prevention training; 17 matched worker groups received no training.
 - Two 90-minute sessions
 - Taught by Physical Therapists
 - 12 participants per class
 - Workstation observations
 - Supervisors trained to give reinforcement
 - 1-2 follow-up pamphlets/year
 - Content: Lift Technique (SB/BK), Postures, Pain Management, Stretching/Strengthening, Ergo Assessment

**Controlled Trial of
an Educational
Program to Prevent
Low Back Injuries
Daltroy, et al., 1997**

“...the education program did not reduce the rate of low back injury, the median cost per injury, the time off from work per injury, the rate of related musculoskeletal injuries, or the rate of repeated injury after return to work; only the subjects’ knowledge of safe behavior was increased by the training.”

**Stoop or squat: A
review of
biomechanical
studies on lifting
technique, Van
Dieen, et al, 1999**

- Net Moments and Compression Forces:
 - Equal or Somewhat Higher with Squat!
 - At injury threshold levels
- Only lifts between the feet => lower moments
- Shear and Bending moments lower with Squat, but **not** at injury threshold levels for either method.
- Conclusion: **“The biomedical literature does not provide support for advocating the squat technique as a means of preventing low back pain.”**

Can ... Training ... to Improve Lifting Technique Prevent ... Back Injuries?

Lavender, et al., 2007

- 2,144 Distribution Center Workers
- Control: Lifting Video
- 5, 30-min Instrumented LiftTrainer™ Sessions
- Bending, Twisting, and dynamic L5/S1 moment monitored with 3D model
- Results:
 - No Injury Rate Difference.
 - No Turnover Difference.
 - **Subjects with low twisting after 1st session: Lower Back Injury Rate.**
 - **Implication: If you naturally don't twist when lifting, you are less likely to be injured.**



**How to prevent low
back pain
Burton, 2005
(Summary of the
European Guidelines
for Prevention in Low
Back Pain)**

- Most reviews (6 of 7) “concluded that there is no effect of information, advice and instruction for preventing sick leave, episodes or costs.”
- “*Recommendation.* Traditional information/advice/instruction on biomechanics, lifting techniques, optimal postures, etc. is not recommended for prevention in LBP (level A).”

(“Level A” = “generally consistent findings provided by (a systematic review of) multiple randomized controlled trials (RCT).”

**Effect of training
and lifting
equipment for
preventing back
pain in lifting
and handling:
Systematic
Review
Martimo, et al,
2008**

- Randomized Controlled Trials and Cohort Studies
- 11 Studies met selection criteria (6 RTCs, 5 Cohorts)
- Eight studies looked at lifting and moving patients, and three studies were conducted among baggage handlers or postal workers.
- 17,720 workers covered by RTCs, 772 in Cohort studies.
- Conclusion of meta-analyses: **“There is no evidence that advice on lifting and handling with or without lifting equipment prevents back pain or consequent disability”**

**What constitutes
effective manual
handling training?
A systematic
review
Clemes, et al.,
2010**

- Peer-reviewed Manual Handling Training research 1980 to 2009
- 53 papers
- “...little evidence supporting the effectiveness of both technique- and educational-based manual handling training.”
- “*considerable evidence...that the principles learnt during training are not applied in the working environment.*”
- Conclusion:
“The evidence collected indicates that manual handling training is largely ineffective in reducing back pain and back injury.”

**Manual material
handling advice
and assistive
devices for
preventing and
treating back pain
in workers.
Verbeek, et al.,
2012**

- Update of Martimo, et al., 2008
- Nine RCTs (N=20,101), Nine CCTs - Cohort with Concurrent Control Group (N=1,280)
- “None of the included RCTs and CCTs provided evidence that training and provision of assistive devices prevented LBP when compared to no intervention or another intervention.”
- **“This review shows that training workers in proper MMH techniques and providing them with assistive devices are not effective interventions by themselves in preventing LBP.”**

**Effectiveness of
preventative
back
educational
interventions
for low back
pain - review
of RCTs.
Demoulin, et
al., 2012**

- **Nine** studies selected (out of over 1,300 potential studies) with sufficiently “high” quality
- Mean Methodological Quality – “quite low” (5.1 out of 12)
- Only one study showed increased rate of back injuries for the control group
- ***“The results of the RCTs included in this review suggest that educational interventions mainly focused on a biomechanical/biomedical model are not effective in preventing LBP.”***

To Flex or Not to Flex? Is There a Relationship Between Lumbar Spine Flexion During Lifting and Low Back Pain? A Systematic Review With Meta-analysis
Saraceni, et al., 2020



- 11 Studies included
- All Low Quality
 - **“There was low-quality evidence that greater lumbar spine flexion during lifting was not a risk factor for LBP onset/persistence or a differentiator of people with and without LBP.”**

I.e., bending at the back does not contribute to low back pain, nor does it differentiate those who have low back pain.

Exploring lumbar and lower limb kinematics and kinetics for evidence that lifting technique is associated with LBP

Saraceni, et al., 2020

- 21 subjects with LBP (>3 months chronic/recurrent); 20 without LBP (past 5 years)
- 100 lifts; 25 with empty tote (0.2kg) and 75 with 10% of subject body mass
- Subjects with LBP:
 - Slower lifts with “more squat-like” lifts during **early** lifts
 - Later lifts were similar to no-LBP group (“stoop-like and faster”)

“Common assumptions that LBP is associated with lumbar kinematics or kinetics such as greater lumbar flexion or greater forces were not observed in this study, raising questions about the current paradigm around ‘safe lifting’.”

Questioning the value of manual material handling training: a scoping and critical literature review

Denis, et al., 2020

- Leading research reviews declare training in “safe lifting” is ineffective.
- 77 studies on MMHT were reviewed
- Workplace (51), Lab (17), and Institutional (9) training environments were included
- “Straight Back, Bent Knees” had uniform emphasis “There was some surprise at the omnipresence of this standardized work technique for which there seems to be few alternatives”

“The main conclusion that can be reached is that training that is focused mainly on learning and adopting the safe handling technique has little impact in terms of prevention.”

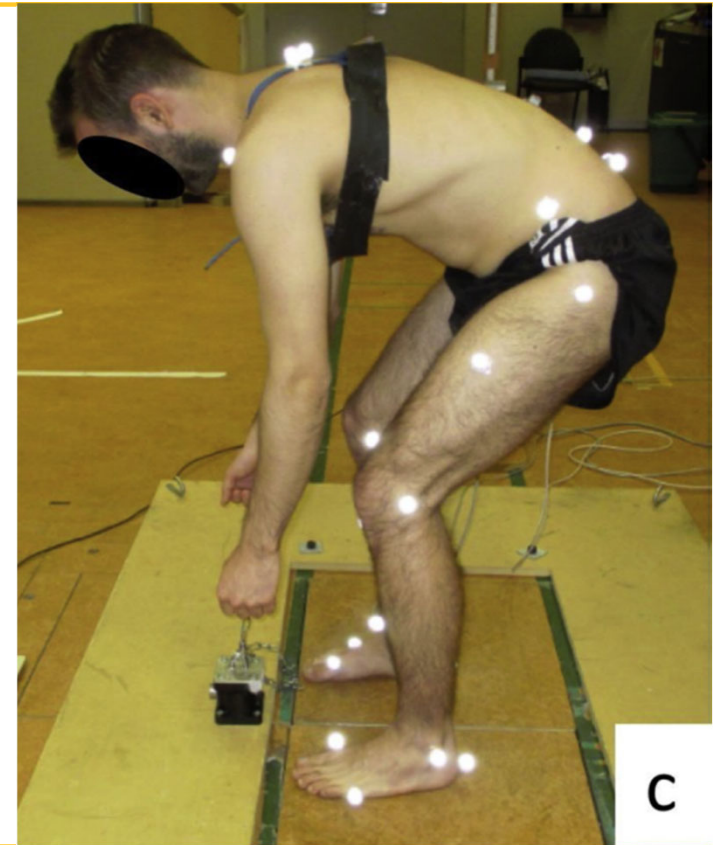
“Training should not target the individual, but rather the interactions between the individual and the work context.”

Flexed lumbar spine postures are associated with greater strength and efficiency than lordotic postures during a maximal lift in pain-free individuals

Mawston, et al., 2021

- 26 pain-free subjects
- Maximum isometric trunk extension in three postures: lordotic (natural curve), “flat-back”, and kyphotic (fully flexed).

“A flexed-back posture is associated with increased strength and efficiency of the back muscles compared to a lordotic posture. These findings further question the manual handling advice to lift with a lordotic lumbar spine.”

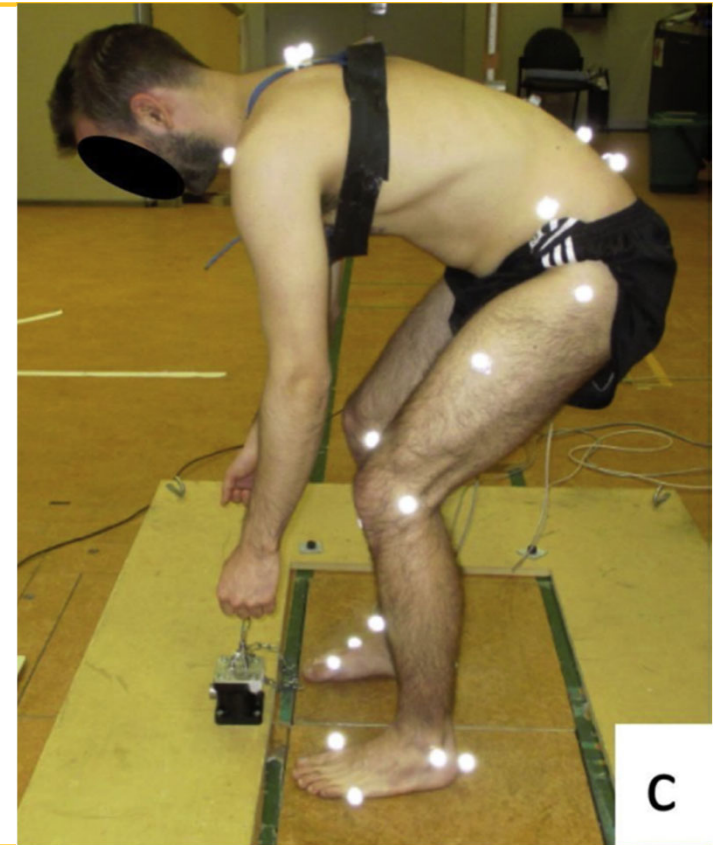


Flexed lumbar spine postures are associated with greater strength and efficiency than lordotic postures during a maximal lift in pain-free individuals

Mawston, et al., 2021

This means this stooped posture is the best way to lift!

(Just wear more clothes - please.)



Where does this leave us?

- The Straight-Back, Bent-Knee Technique For Lifting is NOT worth teaching!!!
 - Generic Training in “Safe Lifting” Technique has consistently shown to be ineffective at reducing the frequency, length of disability, or cost of low back pain. (Some unfavorable results may be due to the technique taught – straight-back/bent-knee.)
 - Keeping the box (or whatever you are handling) close to your body is BY FAR the most important principle.
 - Avoiding twisting seems good, but nearly impossible to change existing twisting behaviors.
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Should we teach anything and if so, what?

- NOT teaching anything (about lifting technique) is probably OK, but teaching the **truths about back pain** is probably helpful (e.g., favorable natural course, controlling early morning back stress...)
 - **Teach task redesign – it helps!**
 - Lifting Technique truths worth teaching:
 - Avoid heavy lifts when possible.
 - Keep the load (its center of mass) close to your body.
 - Know that LESS stress and LESS effort is with a curved back, but **the best posture is the one you feel most comfortable doing.**
 - (optional) Avoid twisting.
-

Questions?

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