Back Safety: Return To Work Programs and Safe Lifting Techniques

Section 3: A Review of Safe Lifting Techniques

[learner name]



Introduction

After a brief review of safe lifting techniques and signs that a patient is exerting themself, you will watch a number of videos that also review safe lifting techniques.

Because our patients are so unique, and each will have their own demands and deficits, it is important to take your existing knowledge with any learned in this course and apply it to each individual patient.

Correct Neutral Posture

OSHA (Occupational Safety and Health Administration) defines correct neutral posture as follows:

"(The correct) postures where the body is aligned and balanced while sitting or standing: the head is kept upright and is not turned to either side more than 30 degrees or tilted forward or backward more than about 15 degrees.

When the worker is standing, the torso is not bent more than 10 to 20 degrees from the vertical position and the natural curves of the spine are maintained.

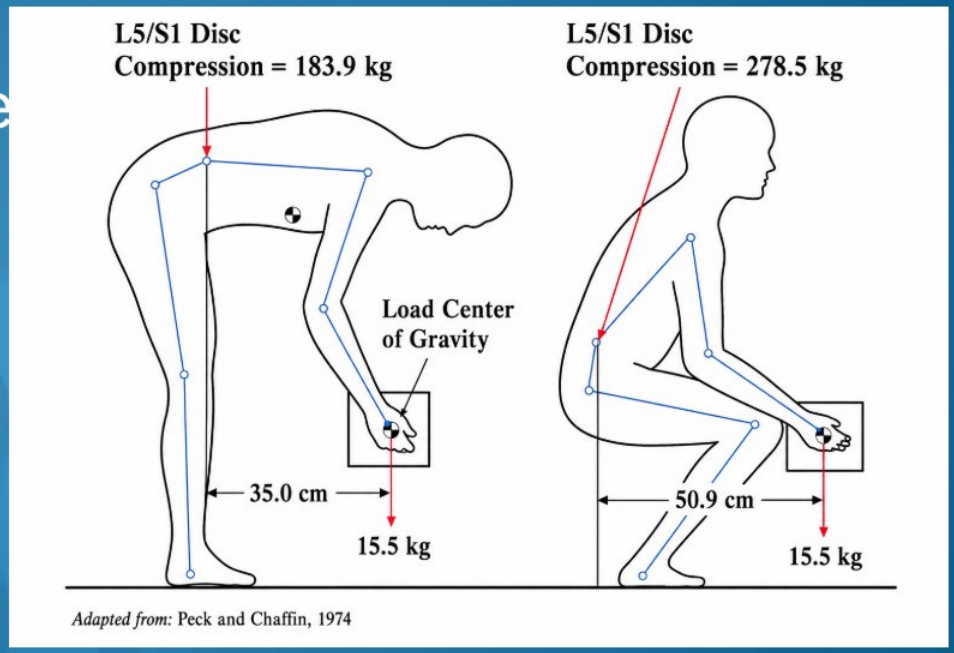
The pelvis and shoulders should face straight ahead to avoid twisting the torso.

The shoulders are relaxed and knees slightly bent.

The arms hang normally at the side, with elbows close to the body. "

OSHA Definition (cont.)

"The elbows are not bent more than about 90 degree and the palms face in toward each other and the center line of the body.



The wrists are in line with the forearms and are not bent sideways, forward (towards the palm), or backward (towards the back of the hand.)

When the worker is seated, the buttocks and feet are firmly supported."

OSHA Ergonomic Principles Index (Lifting)

Planning a Lift

Safe lifting requires PLANNING:

- Assess the load and check overall condition;
- Check route for obstacles and a clear path (be careful in a busy setting--this can change quickly);
- Use mechanical aids when possible;
- Break down large and heavy loads (avoid the “lazy-man-load,” where you try to carry as much as possible to decrease the number of trips you have to make);
- Know your limits;
- Seek help if necessary; and
- Use extra caution with awkward loads/lifts.

Safe-Lifting Leverage

The optimum safe lifting zone is close to the body, between mid-thigh to mid-chest height.

This is the safest area for lifts, because this is where a person's upper body and back muscles can lift the most with the least amount of effort.

Keep the object as close to the body as you are able to (decreasing torque on the body).



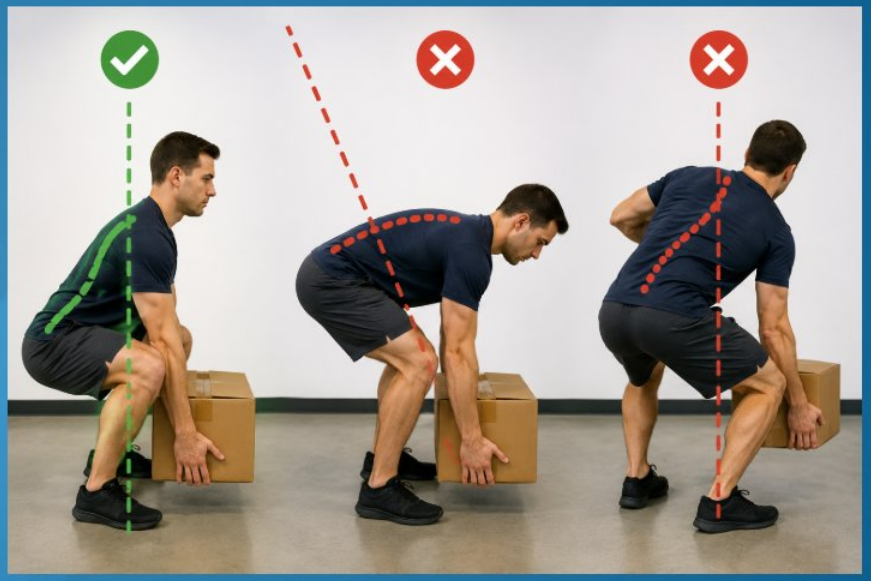
Safe Lifting - Trunk Alignment

For safe lifting, the vertical trunk alignment should be within 10 degrees of vertical.

The spine should be straight (normal curvature of the spine).

Vertical trunk alignment is not always possible, and when it isn't, make sure the spine is straight.

If possible, do not rotate the trunk.



Safe Lifting - Speed

Excessive speeds with lifting should be avoided due to increased **peak spinal compressive force.**

These forces are most noted at the L5/S1 vertebral segment, aka the lumbosacral joint (*Greenland, 2013*).

Lifts that are too slow can also be dangerous.

Cumulative spinal compressive loading forces are much greater with slower lifting tasks.

Some research suggests that faster lifting of heavy objects would reduce the exposure time, and is likely less hazardous than slow lifting (*Greenland, 2013*).

However, most feel that a moderate pace is best when performing a dynamic lift.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Safe Lifting - Lower Legs

For safe lifting, bend at the hips and knees as much as possible.

Place feet shoulder width apart, with one foot beside and the other foot behind the object that is being lifted, strongest leg in back.

The knee that has the least ROM should be beside the box. (The knee beside the box only has to bend to about 90 degrees, and if the hip is abducted even further, it can alter the lift so the knee will bend even less.)

Pivot and weight shift as appropriate.

Do not “plant” the feet; this can cause shearing stress on the knees, hips, and ankles, causing ligament or cartilage tears or sprains.

Dynamic Lifts

The following are the types of dynamic lifts:

- Floor to waist;
- Waist to overhead;
- Push/pull; and
- Bilateral or unilateral carry.



Physical Effort

There are believed to be certain signs of **physical effort** that can be utilized to determine lifting performance. Therapists should watch for these signs of physical effort during a persons lift to determine when the lift is becoming unsafe.

The number of signs of physical effort present during a lift does not determine if the lift is safe or not.

For example, if a person's face reddens, he uses accessory muscles for the lift, and comes up on tip toes to reach the shelf with the object, it does not mean that the lift is unsafe.

It is the therapist's job to determine when a lift should be stopped.

Education should be given as well so the patient is better able to determine when he/she should stop a task and/or seek assistance for the lift.

Assistance can be via a tool or another person.

Signs of Physical Effort

The following are the dynamic strength signs of physical effort:

- Use of accessory muscles;
- Elbow extension;
- Posterior trunk lean;
- Loss or inability to maintain trunk in vertical alignment;
- Difficulty holding/grasping box/controlling box;
- Increased blood pressure or heart rate;
- Shoulder girdle position;
- Throwing box/object in an uncontrolled manner;
- Speed of lift;
- Shaking or quivering of muscles; and
- Pain

Use of Accessory Muscles (Signs of Physical Effort cont.)

Excessive use of shoulder girdle muscles, arm muscles, neck muscles, or even calf muscles during a lift.



Elbow Extension (Signs of Physical Effort cont.)

Arms are too weak to maintain elbow flexion and the patient is relying on ligaments and bones to assist in holding an object.



Posterior Trunk Lean (Signs of Physical Effort cont.)

Throwing the body weight back, trying to use momentum to lift an object.

This puts excessive pressure on the vertebral column in the lumbar area.



Maintaining Trunk In Vertical Alignment (Signs of Physical Effort cont.)

The loss or inability to maintain vertical trunk alignment may occur when a person is unable to assume a full squat when reaching for an item. Weakness of leg or back muscles can also make it difficult to maintain vertical trunk alignment.

Vertical trunk alignment is important for determining a “safe” vs. “unsafe” lift.

Many therapists feel that this is the single most important factor for determining if a lift is safe or not.

Trunk Posture Study (Signs of Physical Effort cont.)

One study focused on static trunk postures during a typical workday of workers in a school for children with severe handicaps and its relationship to LBP.

Although there were some weaknesses in the study, such as a relatively small subject group of 33 participants, the findings suggest that subjects with LBP, spent a significantly longer time in static trunk postures when compared to normal, and they also spent a longer time in trunk flexion of more than 10 degrees *(Wong, Lee & Yeung, 2009)*.

Difficulty Holding/Grasping/Controlling Box (Signs of Physical Effort cont.)

Handles are not available or the box is too wide to get a decent grip, which makes the task unsafe.



Increased Blood Pressure or Heart Rate (Signs of Physical Effort cont.)

The patient should consider wearing a heart rate monitor.

People often unintentionally or unknowingly use the "Valsalva Maneuver" to provide stability for heavy lifting tasks.

However, this is dangerous because it can increase intra-abdominal pressure, and thus increase blood pressures causing dizziness and a potential to pass out upon standing, aka orthostatic hypertension.

Shoulder Girdle Position (Signs of Physical Effort cont.)

Although some shoulder depression is expected, too much or excessive shoulder movement with heavy lifting can cause musculoskeletal disorders.

Poor shoulder stabilization can cause damage to the shoulder girdle.

With lifting, scapular depression, protraction, or a combination may occur, and should be monitored.

Uncontrolled Throwing of Object (Signs of Physical Effort cont.)

The person may be attempting to use momentum to assist in the lift, making the task unsafe.

Muscles and ligaments are more likely to be damaged in high-speed lifts than slower controlled lifts.

When patients use momentum to assist in the lift, they can cause an injury before they even feel the pain.

Speed of Lift (Signs of Physical Effort cont.)

As mentioned earlier, excessive speeds with lifting should also be avoided due to increased peak back compressive force.

These forces are most noted at the L5/S1 vertebral joint *(Greenland, 2013)*.

Lifts that are too slow can also be dangerous due to cumulative spinal compression *(Greenland, 2013)*.

Shaking or Quivering of Muscles (Signs of Physical Effort cont.)

This is most likely due to weakness or muscles reaching near maximum effort and fatigue.



Pain and Perceived Exertion

Signs of pain and perceived exertion should be monitored during dynamic lifting tasks.

Use Visual Analog Scale and Rate of Perceived Exertion Scale.

Best Lifting Techniques

Remember, that because each person is different we cannot always teach our patients the same lift and may have to alter a lift to the “safest lift” a person can do.

An individual may have the following:

- Limited knee flexion due to Osteoarthritis (OA) or a TKR;
- Limited hip flexion due to OA or a THR;
- Limited hip abduction due to OA or joint pathology;
- Limited elbow flexion/extension; and/or
- Weakness in one extremity more than others.


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Correct Technique: Key points for a floor to waist lift

The key points to remember when teaching the “ideal” lift are as follows:

- Have a wide base of support with feet close to the object being lifted
- Place strong leg in back or leg with least flexion on the side of object
- Keep object close to your body and center of gravity (this decreases the torque on upper extremities and lower spine)
- Most people will keep object close to body as they stand from squat but will then reach with the box as they are placing it on a table versus moving feet and stepping with the box on the shelf
- No cervical flexion or extension greater than 15 degrees, when possible
- Maintain a vertical trunk alignment of no more than 10 to 20 degrees of flexion (this is not always possible, especially for those that are unable to assume a full squat)


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Overhead Lifting Signs of Physical Effort

The following are signs of physical effo
when lifting overhead:

- Raising on tip toes;
- Excessive posterior trunk lean;
- Scapular protraction;
- Decreased or difficulty controlling box; and
- Resting box on body or shoulder.

Lifts overhead should generally stay at or under 25 lbs. if possible.




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Positional Tolerance

The following are things to consider and document when developing an RTW program:

- Time they can tolerate or safely perform while sustaining position;
- Document how many times an adjustment was required;
- Did their position deviate from the normally expected position; and
- Did they demonstrate poor standing posture, standing on their hip ligaments, or excessively leaning on one side?



Positional Tolerance (cont.)

- Was the person weight bearing equally or shifting weight equally?
- Was he or she standing up straight or did he or she have to lean on a shelf;
- If working while kneeling, was it necessary to “sit on heels” to continue working; and
- Was pain present?

Mobility

The following should be considered regarding mobility when developing RTW programs:

- Distance or number of repetitions performed;
- Heart rate, RPE, visual signs of cardiac or respiratory distress (aka pallor, sweating, SOB);
- Did they perform the task with expected patterns of movement, or was there compensation; and
- Pain score.

Pushing And Pulling

The PT should consider the following when developing RTW programs for pushing and pulling:

- Pushing is generally preferable to pulling;
- Pushing allows the employee to use large muscle groups and apply more force to the load;
- Pulling carries a greater risk of strain and injury; and
- Pulling objects while walking backwards is generally frowned upon in the work place, because it is unsafe and easy to trip over unseen objects.

Pushing and Pulling Examples

The photos shown here demonstrate the pushing and pulling process.








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“My Boss Won’t Like That”

Often, patients will state that their boss will not like it if they stop the task they are working on and ask for help.

Therapists should remind the patient that an injured worker means lost money and productivity, and it is important, not only for their own well-being, but for that of the company, not to get hurt on or off the job.

Inform them that OSHA recommends that they seek help when:

- A load is too bulky or heavy to safely grasp or lift it;
- They cannot see around or over a load; or
- They cannot safely handle a load.

http://ohsonline.com/Articles/2005/07/Reduce-Injuries-with-Proper-Technique.aspx

Summary

Safe lifting requires planning, proper trunk and leg alignment and postures, proper strength, and appropriate speeds.

Therapists should be constantly observing their patients for signs of physical effort and correcting any mistakes or compensations a person may be doing during a dynamic lift.

PT's/PTA's should also be observing for signs of safe and proper positions, positional tolerance, and mobility during the rehabilitation process.

Treatments need to be all-inclusive, and often require a multi-discipline effort.

Congratulations

That completes the coursework for this section.

Please close this section and return to your course outline, where you will determine the next step in your training.

Where is the optimum safe lifting zone located?

- Far from the body, at waist level
- At arm’s length, below the knees
- Above shoulder height, near the head
- Close to the body, between mid-thigh and mid-chest height

What alignment helps avoid twisting the torso during a lift?

- The shoulders should turn while the pelvis stays fixed
- The torso should twist as needed to improve reach
- The pelvis should rotate while the shoulders stay square
- The pelvis and shoulders should face straight ahead

Which lower-body movement is recommended for safe lifting?

- Bend at the hips and knees as much as possible
- Keep the legs straight and bend only at the waist
- Shift the weight onto the toes only
- Lock the knees and hinge backward

When developing return-to-work programs for moving loads, which approach is generally preferred?

- Pulling is generally preferable to pushing
- Pushing and pulling have the same risk
- Pulling is safer when walking backward
- Pushing is generally preferable to pulling

Which action is listed as a sign of physical effort during overhead lifting?

- Bending the knees during the lift
- Resting the box on the body or shoulder
- Keeping the box close to the body
- Maintaining vertical trunk alignment

What does uncontrolled throwing of an object during a lift usually suggest?

- The person is keeping the load close to the body
- The person is using a moderate pace with control
- The person may be using momentum to assist the lift
- The person is lifting with vertical trunk alignment

Which tools are used to monitor pain and perceived exertion during dynamic lifting tasks?

- Pain map and gait index
- Visual Analog Scale and Rate of Perceived Exertion Scale
- Body mass index and grip strength scale
- Heart rate monitor and blood pressure cuff

When possible, what load limit should overhead lifting generally stay at or under?

- At or under 50 lbs.
- At or under 25 lbs.
- At or under 35 lbs.
- At or under 15 lbs.

The wrists should stay in line with the forearms and should not bend sideways, forward, or backward during correct neutral posture.

- ○ True
- ○ False

In safe lifting, it is best to plant the feet firmly and avoid pivoting or weight shifting.

- ○ True
- ○ False