







Young sub Kwon,
Registered Clinical Exercise Physiologist® (ACSM),
Certified Strength and Conditioning Specialist® (NSCA)

Exercise Physiology Laboratory
The University of New Mexico
Albuquerque, NM, USA

Introduction

- Any activity selected for an exercise program should have some underlying value (e.g., improve flexibility, strength, cardiovascular fitness)
- However, even some exercises that have und erlying value might have elements that can m ake them inappropriate or even contraindicat ed if done incorrectly.

(e.g., lack flexibility, weak abdominal muscles)

Purpose

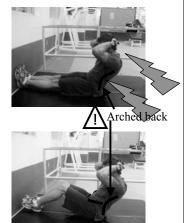
- 1. To describe how some exercises can cau se harm (flexibility, weight training).
- 2. To provide alternatives that are safer.

Straight leg or bent knee full sit-ups wi th hands behind neck

- Stress on low b ack
- High compress ional force on spinal discs
- Loaded neck fl exion can sprai n cervical liga ments and dam age discs

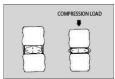






Anyway, does it target abdominal muscles?

High compressional force on spinal discs





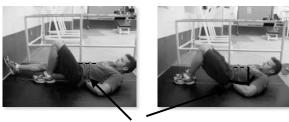








Alternative Exercise



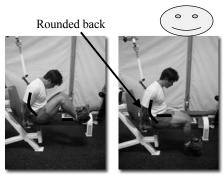
- Rounded back
- •Curls, Hands under lumbar region
- •Lift shoulder blades but not low back off floor

How about psoas muscle (hip flexor)?



Leg Raise

Rounded back can limit you r abdominal movement



Double Leg Raises

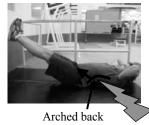


Hyperextends low back due to utilization of hip flexors with origin in the lumbar spine

Alternative Exercise

Single leg raises opposite knee f lexed







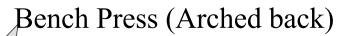


Arched back or rounded back?

- Without Vertebral problem, arched back is not risky
- Squat or deadlift, arching the back can prevent injur y.
- Some people, arched back can be dangerous
- 1. Congenital spondylolysis
- 2. Adolescent or people experiencing osteoporosid



It may cause serious nerve compression and lead to sciatica

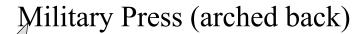




- •Power-lifter style
- •Improper lumbar hyperextension (arche d back)
- •Buttocks do not place on the bench
- •People with back problems should not p erform this style



- •Buttocks firmly and evenly placed o n the bench
- •Performing the movement with raise d legs helps prevent excessive archin g, which can cause low back pain









- •Improper lumbar hyperextension (arch ed back)
- •People with back problems should not perform this style
- •Spondylolysis risk

•Prevent hyperextension

Squat (rounded back)





Most lumbar spine injury (herniated discs)



Hamstring muscle injury



- •Expanding the chest and holding a deep breath fills the lungs
- •Contracting the abdominal muscle
- •Arcing the low back by contracting the lumbar muscles "Blocking"







Uncontrolled, ballistic hyperextension of the lumbar spi ne can damage the vertebrae and spinal discs

Controlled lumbar extension to normal standing lumbar lordosi s

Knee Instability

Knee in extension





Knee in flexion

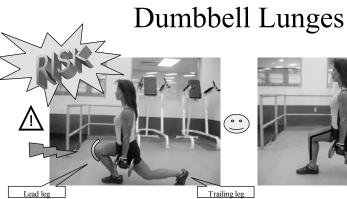


When the knee is extended, the medial and late ral collateral ligaments are stretched and preve nt rotation of the joint.

No need for muscle tension to stabilize the join t

When the knee is flexed, the lateral ligaments are rela xed. Rotation of the joint is possible.

* With the lunge, control the speed and the form of th e movement to protect the knee.



Extremes of knee flexion causes load to only the lead leg (knee) It causes patellar compression



- •Knee should be behind the foot •Leading knee less flex than trailing
- •Lunge depth depends on hip joint fl exibility (the iliopsoas muscles)



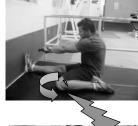
- •Potentially damaging tibiofemoral shear forces are great during the last 5° to 10 ° of extension and hyperextended knee
- •The extremes of knee flexion can increase patellar compression



- •Avoid hyperextension and hyperfle
- •Personal trainer should notice range of motion

Hurdler's Stretch for Hamstrings

Knee Nexion at end range of motion with rotational forces on hinge joint may stress the medial collateral ligarent and menisci



Seated Hamstring stretch, back fla t with one knee flexed, arms behin d back





Hyrdler's Stretch for Quadriceps

nee flexion at end range of motion with rotational forces on hinge joint may stress the medial collateral ligament and menisci, also hyperext ension of lumbar spine



Standing quadriceps stretch,
With torso upright; hold ankle, not fo
ot, with opposite hand; avoid hip abd
uction



Deep Squat





- •The thighs are parallel to the floor or lower
- •An excessive amount of shear load
- •Power lifter needs this position (cartilage damage risk)
- -Flexible ankles
- -Short femur

- •Avoid deep squat
- •Avoid hyperflexion as well as hyperextensi

Plough

Loaded neck flexion can sprain ce rvical ligaments and damage disc s, especially in those with spinal o steoporosis and arthritis

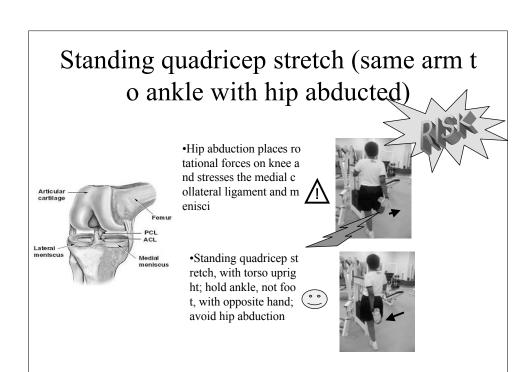


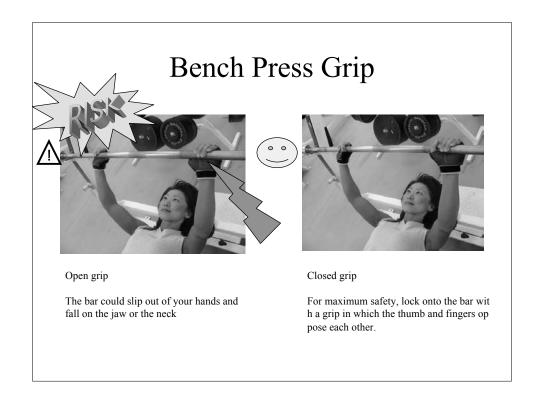
Double knee to chest











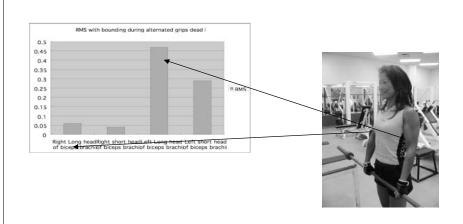
Biceps brachii tendon tear Alternated grip (Reverse power grip)





- •It simply improves one's ability to grasp the bar durin g heavier lifting (e.g., Barbell shrug, Dead Lifting) •This injury occurs at the distal attachment because as the arms hang next to the body, the proximal tension is divided between the short and long heads of the biceps brachii whereas, distally, only one tendinous insertion supports the tension.
- •The supinated elbow should extend and relax
- •Use a two-handed pronated grip with straps
- ·Back extension machine
- •Dumbbell shrug

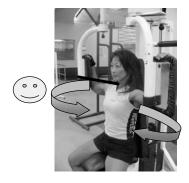
EMG measurement during barbell shrug



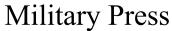




- •Hyperextension of the shoulders places the pectoralis muscles at a mechanical di sadvantage,
- •It contributes to glenohumeral instabilit y through repetitive shoulder capsule tra uma, and places excessive traction on the acromioclavicular joints



•The preferred way to perform the exercises is to adjust the exercise machine or starting posit ion so that the elbows are even with or above t he frontal plane when beginning the lift and d uring repetitions.





- •Extreme shoulder external rotation and abduction
- •Stress the shoulder capsule and inferior glenohume ral ligament
- •Extreme cervical flexion cause spinous process fra cture and neck strains



Lift the weight in front of the neck

Loaded Spinal Flexion with Rotation



Loaded spinal flexion with rotation increa se pressure and shear forces on spinal dis cs, common cause of low back injuries





Crunches with flexion followed by rotatio

Latissimus Dorsi Pull-Down behind neck

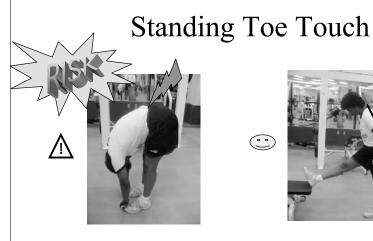


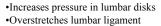
When the weight is lowered behind t he neck, this exercise excessively fle •Lean back slightly at the hips •Slightly wider shoulder width grip xes the cervical spine and loads the s •Pull it down in front of head houlders at the extreme of external r otation.





·Seated rowing minimizes shear f orce at the shoulder level •Never round back when perform ing seated rows with heavy weig









•Standing hamstring stretch with foot at maintenance of flat back as hip is flexed, arms behind back.

Full neck rolls





- •Compression of nerves and vessels
- •Dizziness
- •Disc damage





•Slow, controlled lateral and extension n eck stretches performed separately

Summary

- Certain exercises that are appropriate for some individuals may be totally i nappropriate for others.
- The quality of the exerciser's movements is a most critical variable when e valuating exercises for inclusion in a conditioning program
- The personal trainer should consider the following criteria
- 1. Does the exercise have an underlying value that is apt to benefit the target p opulation?
- 2. Does the exercise present an element that could make it inappropriate for s ome individuals?
- 3. Do the benefits of doing the exercise outweigh the drawbacks?
- 4. Do the exercisers do the exercise in a manner that makes it beneficial?

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