



Bilateral vs. Unilateral Lower Body Training

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Questions to Consider

- Should we only be doing double leg exercises?
- Should we only be doing single leg exercises?
- What are the differences in strength/power production between bi/unilateral exercises?
- What are the differences in stabilizer function?
- What is going to improve performance for your athlete/client?
- What keeps people healthy and injury free?

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Controversy

- In 2009 Coach Mike Boyle, a well respected Strength Coach came out publicly and stated he will no longer prescribe the back squat.
- This created a firestorm in the strength/physiotherapy world where the merits/drawbacks of the lift have been debated ad nauseum.
- Some coaches have firmly taken sides, while others, such as us, have seen the benefits to both sides of the argument.

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Rationale behind no more back squats

- Back squats introduce significant shearing/translatory forces to the spine - these are the forces that increase stress on discs and surrounding tissues.
- In traditional back squats, the bar hangs on C7 with the hinging action at the hips. This long lever between the fulcrum and resistance arm can cause high shearing forces along spine.
- The more a person leans forward at the hips, the greater the resistance arm, and thus, a greater amount of stress is placed on the hamstrings and erector spinae muscle groups.

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Risk / Reward?

- If lifting heavy weights in a biomechanically weak position can lead to injury, should we continue to use that exercise?
- Is prescribing the back squat the best way to keep people healthy and injury free?



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Comparing Back Squats vs. Leg Press

- Leg press can use significantly greater loads than squats.
- This is due to the fact that the weak link (the core) is taken out of the equation because the torso is supported by the machine.
- This also demonstrates that during squats the core is what limits performance.

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Don't get us wrong...

- We are not eliminating bilateral lifts, we just choose exercises that reduce the risk of potential injury.
- Examples include: Deadlifts, Front squats, & Olympic lifts.



Bilateral Lifts

- These types of lifts make you stronger, more powerful.
- Bilateral lifts build a stronger foundation that mimic the forces involved in sports.
- Prime mover muscle function high; stabilizer muscle function low, comparatively.



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Unilateral Lifts

- Increase in stabilizer function.
- Decreases joint loading stress.
- Improved balance.
 - Most people have trouble balancing on 1-leg, let alone going through active ROM with weight!
- Improved proprioception (knowing where you are in space).
- Equal development of size and strength.
- Reduce risk of injury.



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Unilateral Lifts...cont'd

- Decrease loading ability.
 - Base of support decreases.
 - When stabilizer function increases, prime mover function decreases.
- Aren't as effective in developing strength and power as bilateral lifts.
- May not be appropriate for certain clients.
 - Ex. Rowing, Olympic lifters

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Single Leg Progressions

- Bilateral Squats →
 - Split Squats →
 - Rear Foot Elevated Split Squat (RFESS) →
 - 1 Leg Box Squats / Pistol Squats
- Side Note: In a 1 Leg Squat, should the non weight-bearing foot go in front or behind?
- When non weight-bearing leg is in front, the weight shifts more anteriorly, similar to a front squat. Most athletes will hit hip end range and lumbar flexion before they get all the way down.
 - When non weight-bearing leg is in behind, it creates a counterbalance, allowing the focus to be more on the posterior chain. This also allows the lumbar spine to better stay in a neutral position.

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Classification of Isolateral Leg Exercises

- Knee Dominant
 - Static vs. Dynamic
 - Static Unsupported vs. Static Supported
- Hip Dominant

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Knee Dominant

- Static Supported
 - Described as a single leg exercise done with some support from the other leg.
 - The non-working leg would be in contact with the floor, a bench/box...etc.
 - These type of exercises should be taught first before moving to more dynamic variations.
 - Ex. Split Squat, Rear Foot Elevated Split Squat (RFESS, Bulgarian Split Squat), Lateral Squat, Rotational Squat

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Knee Dominant

- Static Unsupported
 - Described as single leg movements performed on one leg only.
 - The other leg is not allowed to touch the ground or any other object such as a bench.
 - The only true static unsupported exercises are variations of one leg squats.
 - Ex. 1 Leg Squat, Step Ups (variations: front, side, cross over, peterson, step down),

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Knee Dominant

- Dynamic
 - Described as exercises in which the body is translated in either the:
 - Sagittal plane (vertical line separating left and right sides of the body such as a lunge),
 - Frontal plane (vertical line separating the front and back of the body such as a lateral lunge),
 - Transverse plane (horizontal line separating the upper and lower body such as a rotational lunge)
 - These type of exercises can result in a significant amount of soreness and should be implemented with great care.
 - At least 3 weeks of static supported exercises should precede dynamic versions.

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Knee Dominant

- Dynamic
 - Accelerative
 - Accelerative exercises are pulling actions that mimic the mechanics of an athlete accelerating toward an object and have high transfer capability to running.
 - Slideboard Lunges, Walking Lunges
 - » Should most accurately be Hip Dominant
 - Decelerative
 - The decelerative patterns have more application to braking and direction change skills.
 - Excellent for injury prevention
 - Conventional lunges, lateral lunges or any multi-planar version/ transverse/ rotational version.

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Hip Dominant

- Described as exercises that primarily involve the extension of the hips.
 - Ex. Glute Bridges, Kickbacks, Stiff Legged Deadlift, Good Mornings, Walking Lunges, Slideboard Lunges



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Loading Position

- Goblet position (both hands at chest level): great for maintaining neutral spine and teaching good squatting mechanics.
- Weight Vest: allows for loading with no change in body alignment.
- Bilateral Dumbbells: adds load without big change in position. Slight anterior shifting will occur.
- Unilateral Dumbbell: adds a significant anti-flexion component to the lift. This should only be used only when the emphasis of the exercise is not for intensification.

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Bios

- **Shane Pizzey MKin, CEP, CSCS**

Shane has worked alongside many of the world's best strength coaches and he has established himself as a leader in his field. Shane holds a Bachelor of Human Kinetics from UBC, and a Master's Degree in Exercise Physiology from the University of Calgary. Shane's extensive experience in the coaching field has been highlighted by stops at 2 National Sports Institutes (Canada and Malaysia) as well as being a testing specialist for the Calgary Flames and Hockey Canada. Shane's clients include Olympians, NHL and pro hockey players, junior athletes from all sports, and active lifestyle clients. Shane is currently the strength coach for the Okanagan College Coyotes Ice Hockey team, the UBC-O Heat Basketball & Volleyball teams, The Pursuit of Excellence Hockey Academy, The Pinnacle Okanagan Major Midget Rockets and the Fripp Warehousing Tier 1 Junior Rockets Midget hockey team.

Shane regularly conducts lectures on strength and conditioning around the Okanagan as he believes that the proliferation of knowledge will enable people to make more meaningful decisions regarding their health & performance.

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Bios

- **Leanne Manlove BSc, CSCS, NCCP**

Leanne specializes in performance coaching for endurance athletes. She has helped athletes of all levels, from entry level youth and age-group triathletes, to professional and national ranked cyclists, swimmers, runners, and triathletes, achieve their highest levels of performance.

Leanne received a Bachelor of Science degree from the University of British Columbia. She is a Certified Strength and Conditioning Specialist, one of the most respected certifications for strength training available, and is also a Competition Level Triathlon Coach from the National Coaching Certification Program. She recently attended the 2010 BC Summer Games as a Head Coach for the Okanagan Region.

As a competitive triathlete, Leanne has participated in a variety of triathlon events from Olympic to Ironman distance. She has placed in the top ten in her age group at the Canadian National Triathlon Championships. She is recognized as a coach who can swim, cycle, and run alongside her athletes to push them to higher levels.

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