RAPID RESEARCH

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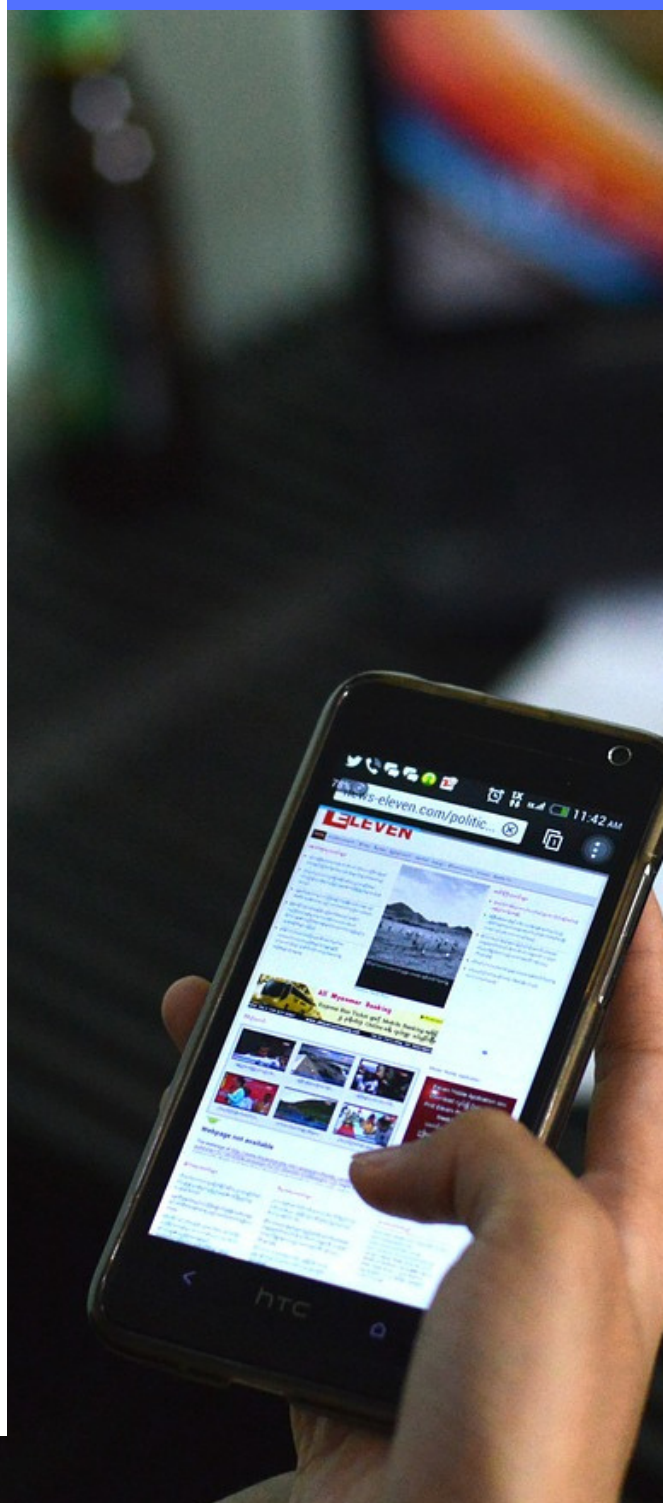
May 2021

Inside This Week:

All About Squats

- 3 Squat Types: Biomechanical Differences
- Effects of squatting at different depths on lower limb muscles
- High Bar v Low Bar Back Squat



MAY 2021

3 SQUAT TYPES: BIOMECHANICAL DIFFERENCES

This study quantified trunk and pelvis angles as well as low-back and lower extremity joint moments during back squats with straight bar, front squats with straight bar, squats with transformer bar across 4 different settings.

KEY FINDINGS

Squats with **more anteriorly placed load** significantly decreased trunk flexion and pelvis anterior tilt angles.

Squats with more anteriorly placed loads **increased low-back extension.**

Hip, knee, and ankle extension were **generally similar.**

Participants **adjusted their trunk and pelvis** to mediate the effects of load placements on low-back and lower extremity moments.

MAIN TAKEAWAYS

The transformer bar imposes similar lower extremity loading as a straight-bar back squat and can be considered as an alternative training strategy for people with upper extremity limitations.

Individuals can adjust their trunk and pelvis angles to mediate the effects of load placements on joint moments.

The straight-bar front squat has more knee loading, but less ankle and hip loading in the descending phase compared to the other squats.

Anteriorly placed loads may result in greater low-back moments.

Posteriorly placed loads may demonstrate greater trunk flexion and pelvis anterior tilt.

MAY 2021

EFECTS OF SQUATTING AT DIFFERENT DEPTHS ON LOWER LIMB MUSCLES

This study compared effects of squat training with different depths on lower limb muscle volumes to see if knee extensor, gluteus maximus, and adductor muscle use are greater with full squat training (140deg) than with half squat training (90deg).

KEY FINDINGS

The relative increase in 1 RM of full squat was significantly greater in Full Squat Training (FST) than in Half Squat Training (HST)

No difference in the relative increase in 1RM of half squat between FST and HST.

The volumes of knee extensor muscles significantly increased by 4.9% in FST and 4.6% in HST.

Rectus femoris and hamstring muscles did not change in either group.

The volumes of adductor and gluteus maximus muscles significantly increased in FST and HST.

Increases in adductor and gluteus maximus muscle volumes were significantly greater in FST than in HST.

MAIN TAKEAWAYS

Full squat training is a much better choice for **enhancing performance during sprinting and jumping.**

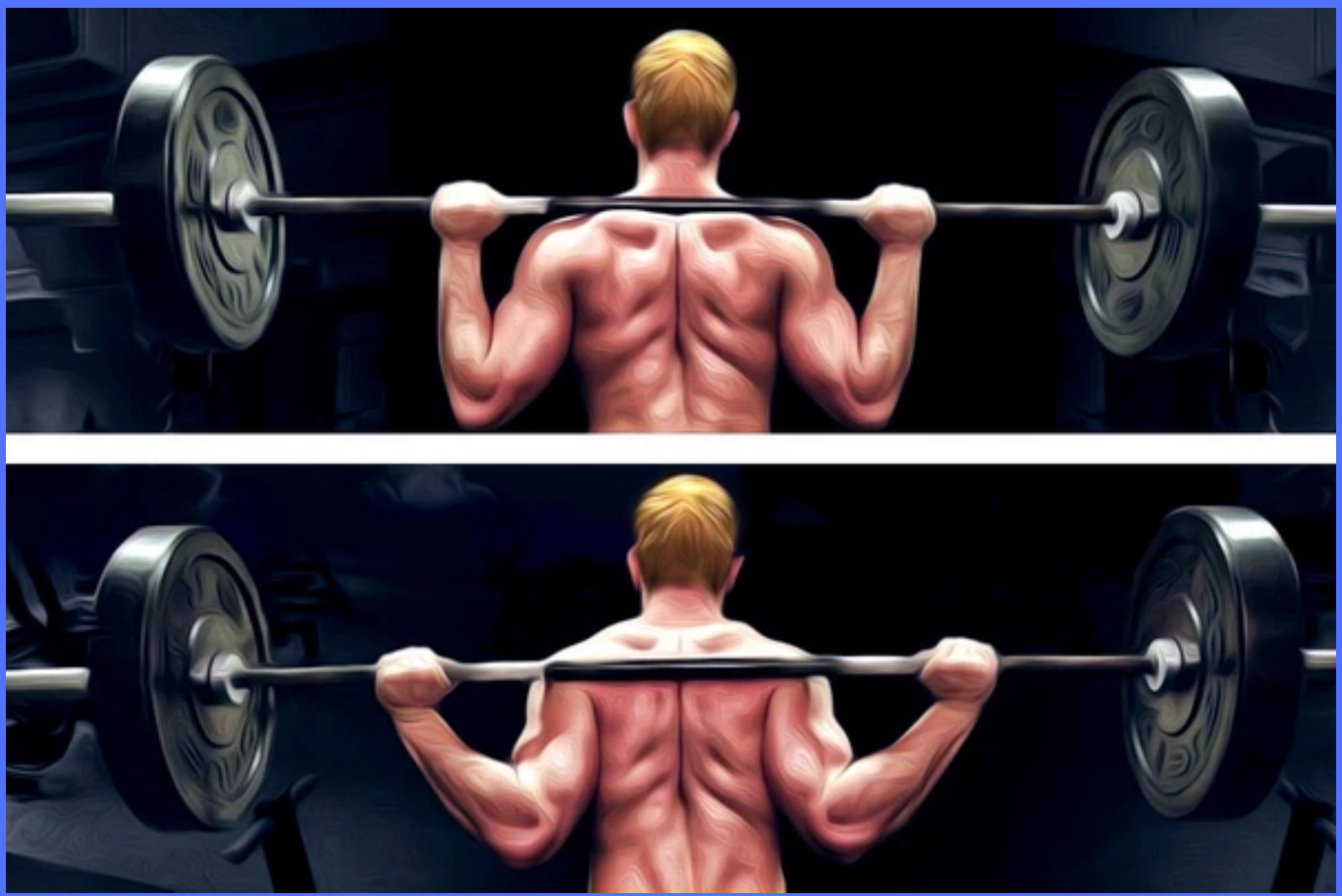
Squatting with **reduced range of motion can still be really useful** in many cases.

Full squat training is more effective for **developing the Gluteus Maximus and Adductors**, but not rectus femoris and hamstring muscles.

MAY 2021

HIGH BAR V LOW BAR BACK SQUAT

This review compared the differences in joint angles and Force of the HBBS and LBBS, up to and including maximal effort, in an effort to create a full profile of the two variations in groups both well versed and newly introduced to these movements.



KEY FINDINGS

High Bar Back Squat is characterized by:
Greater knee flexion
Lesser hip flexion
More upright torso
Deeper squat.
Greater quadriceps muscle activity. .

Low Bar Back Squat is characterized by:
Greater hip flexion and therefore a greater forward lean.
Greater muscle activity of erector spinae, adductors and gluteal muscles

Limited differences in vertical ground reaction forces between the HBBS and LBBS exist.

MAIN TAKEAWAYS

LBBS may best suit development of the posterior-chain hip musculature (i.e. gluteal, hamstring and erector muscle groups).

In comparison, those seeking to perform movements with a more upright torso, and larger quadriceps contribution, may rather seek HBBS in training.

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