

HOW TO SQUAT: THE DEFINITIVE GUIDE

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1) Major muscles involved and their functions:

a) Quads

- i) Knee extension mainly
- ii) Force transfer from hip to knee via rectus femoris

b) Glutes

- i) Pure hip extension

c) Adductors

- i) Mainly hip extension, especially when hips are abducted

d) Erectors

- i) Maintain spinal extension

e) Hamstrings

- i) Hip extension primarily
- ii) Force transfer from knee to hip

f) Calves

- i) Plantar flexion

2) Basic biomechanics

- a) Center of pressure over midfoot (maybe not vertical bar path with lower loads)
 - i) With heavy loads, bar approximates center of mass. Your ass plays a bigger role with lighter loads, so bar can shift forward.

- b) Knee extension

- c) Hip extension *in three dimensions*
 - i) Glute/hamstrings line of pull is identical when in straight ahead flexion, and when abducted and externally rotated

- d) Role of biarticular muscles in force transfer/resisting extension at other joints (hamstrings and rectus femoris)

i) Knee extension can aid in hip extension and vice versa

e) Injury risk? [Hartmann review](#)

i) Very low unless you seriously mess something up

f) Pelvic/femur/condyle variation; everyone's squat will look different

3) Setup

a) Bar placement

i) Difference between high bar and low bar pretty small; personal preference

b) Hand position

i) Narrow/wide hand position. Narrower for tighter upper back, and wider to take stress of wrists/elbows.

c) Wrist position

- i) Straight or cocked. Thumb wrapped or not. Pinky under bar. Not overly important if no pain.

d) Elbow position

- i) Generally squeeze in and down. Behind if low bar and tiny rear delts.

4) Walkout

a) Foot position

- i) Feet directly under versus staggered

b) Minimizing effort

- i) One step, two step, and three step walkout

5) Finding your stance

- a) Stance width - personal preference

- b) Toe angle
 - i) Based on stance width and abduction

6) Bracing

- a) Diaphragmatic breath

- b) Either arch or ribs down; try each and see (largely based on hip anatomy and how much APT you can handle; for you naturally)

squat super deep, arch helps you cut a little higher)

c) Bend bar across back

d) Spread floor or screw feet into the ground

7) Descent

a) Speed

i) Fast/slow (stretch reflex versus stability)

b) Eye/head position – personal preference

c) Maintain tension

8) Reversing

a) Drive traps back into the bar aggressively

i) Band around back of neck to teach

b) EXPLODE

9) Ascent

a) Sticking point - squat is limited not by strength through entire ROM, but strength through weakest ROM

i) Quads maxed at bottom, hips maxed at sticking point;
shift hips back forward to break through.

b) Drive back into bar and shift hips forward

c) Pitch forward? Drive traps more aggressively into the bar

10) Diagnosing weaknesses

a) Exercises to address those weaknesses

- i) Quads if you wind up in GM position, core if big discrepancy between front squat and back squat or between squat and deadlift, and hips otherwise.

b) Importance of core/torso bracing strength/skill

11) Common issues:

a) Knee pain

- i) Try sitting back more, try to get stronger glutes to reduce hamstrings contraction; go to PT

b) Butt wink

i) [Assessments](#) to see if you can get deep enough. If you can, it's a control issue.

ii) Shifting weight to one side

(1) If no pain, don't worry about it (normal). Try over-exaggerating shift to opposite side; try squatting with [band around knees](#)

c) Elbow/wrist pain

i) Check external rotation and play around with hand placement

12) How to squat without a spotter (pins and bailing; don't go over head)

13) High bar/low bar/front squat: What are the differences, and which should you do?

a) Minimal differences in general, which you'd expect (biarticular muscles; joint moments in three dimensions); hammer whichever allows you to train the hardest, most consistently; practice low bar for PL, but if you don't compete, all bar positions have similar training effect.

c) Planks/side planks (bracing)

16) Equipment

a) [Belt](#)

b) Wrist wraps

c) Knee sleeves

i) Don't do much, but potentially increase stability and confidence. Keep joint warm.

d) Knee wraps

- i) How to wrap, what they do (increase knee extension torque), and how they affect the movement (decrease quad activation, increase glute activation.)

e) Flat soles or raised heel

- i) A matter of personal preference

f) Bands/chains

g) Specialty bars