

## Does how you lift matter when it comes to building muscle?



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## SUMMARY

To put it simply, concentrate on both motions because both motions are important for both growth and function. But if you look at the details there is a difference where the lengthening motion is key. The possible reason for this is that during the lengthening (eccentric) motion the muscle can generate more force compared to concentric motions, while there is more stress put on individual muscle cells since less muscle cells are engaged in eccentric motions in general. These factors combine end in more tissue damage with eccentric motions compared to concentric motions. During recovery from this muscle damage the tissue becomes stronger and thicker and therefore gains size (hypertrophy). This type of overload, as in bringing the muscle to momentary failure mentioned as previously mentioned, is what is needed to induce muscle growth. So perform both motions when training, but instead of going through the motions when lowering the weight (lengthening) really think about engaging the muscle versus just concentrating on the shortening (concentric) motion, which most people concentrate on since it is harder motion to do and it gives more of a pump. I literally see people almost dropping the weight during the eccentric motion and not caring. I call this type of lifting momentum driven motion. This is wasted motion, which can cause an injury since a lot of tension is placed on tendons. Leave those motions for strength and power athletes, which will find benefit in that type of training since they are looking for strength, power, speed, and improved performance. For the rest of us performing momentum driven motions decrease the work a muscle does thereby decreasing the effectiveness of the exercise. What is worse, it is dangerous to the joints and spinal cord, since it overloads these areas, causing unnecessary wear and tear.

**RESEARCH DETAILS:** Skeletal muscle contracts either by shortening or lengthening (concentrically or eccentrically respectively) or not moving at all (isometrics); however, the contractions substantially differ from one another in terms of mechanisms of force generation, maximum force production and energy cost (review). It is generally known that eccentric actions generate greater force than isometric and concentric contractions and at a lower metabolic cost and that less muscle cells are engaged. It would stand from this that eccentrics would be superior at building muscle. But which type of contraction shows gains in muscle mass is still an open issue, with some studies reporting greater hypertrophy with eccentric, some with concentric and some with both training modes. Recent observations suggest that such hypertrophic responses to lengthening vs. shortening contractions are achieved by different adaptations in muscle architecture. Reviewers found that similar increase in muscle size is found between eccentric (ECC) and concentric (CON) resistance training (RT). However, the reviewers suggest that such hypertrophic changes appear to be achieved through distinct structural adaptations, which may be regulated by different myogenic and molecular responses observed between lengthening and shortening contractions. Other studies have found that resistance training with the same activation parameters in isometric, shortening, or lengthening modes led to essentially equivalent levels of muscle hypertrophy. Within these training bouts, the integrated torque varied significantly such that lengthening LMT > isometric IMT > shortening SMT. These findings support previous studies that have reported that measures of work production during resistance training do not directly scale with the adaptation responses seen in skeletal muscle. (Study). Another study found that lowering the weight is very beneficial to muscle building. It found those who only lowered a weight saw the same improvements as those who raised and lowered weights -- despite only performing half the number of repetitions. These researchers suggest that eccentrics is more important to increasing strength and size of muscles, rather than the volume. Most interestingly, despite the eccentric-only group doing half as many reps as those lifting and lowering weights, the gains in strength were very similar and the eccentric-only group also saw a greater improvement in muscle thickness, an indicator of muscle hypertrophy: 7.2 per cent compared to the concentric-eccentric group's 5.4 per cent. So this study indicated that eccentrics is the most impotent phase in muscle building.

The debate goes on. Beardsley suggests that strength training using only the lifting phase, when muscle fibers are shortening (concentric-only training) and strength training using only the lowering phase, when fibers are lengthening (eccentric-only strength training) lead to similar increases in muscle fiber volume, but different effects on fiber length and diameter. Eccentric-only strength training causes greater gains in fiber length, as well as greater increases in the size in the distal region of the muscle. Concentric-only strength training causes greater increases in fiber diameter, as well as greater increases in the middle region of the muscle. It seems likely that these specific adaptations arise in response to the deformations of the fibers in different directions that occur during each type of training, and which lead to different anabolic signals after the workout. Additionally, eccentric-only training might permit preferential increases in fast twitch muscle fiber size, because an element of the mechanical loading during eccentric contractions is produced by the passive element titin, and fast twitch fibers tend to display greater titin-based stiffness than slow twitch muscle fibers.