PUBLISHED 03-24-00 01:00

Get Buffed!
How many sets should I do per exercise?
by Ian King

King, I., 2000, How many sets should I do per exercise?, t-mag.com 23 March 2000

The following is an excerpt from Ian King's "Get Buffed!" This great new book is fairly unique in that it teaches trainees how to construct their own extremely effective, extremely logical training programs. While other books dwell mostly on theory and the merits of one exercise over the other, "Get Buffed!" practically turns readers into coaches.

You may find that, after reading this chapter, the whole concept of training theory starts to click together in your brain like a series of tumblers in a combination lock. If that's the case, and you like the idea of being able to design killer programs for yourself or for clients, you'll probably want to pick up a copy of Ian's book.

"Get Buffed!" is available for $39.95 at our Online Store or by calling 800-525-1940.

There should be an inverse relationship between the number of exercises and the number of sets. The more *exercises* that you want to perform, the less the number of *sets per exercise* you can afford to do. If you're specializing in the maximal strength of a particular exercise, you'll benefit from doing a number of exercises at that exercise. If, however, you're simply attempting to create muscle breakdown, as you may in hypertrophy training, the number of exercises may be more important than the number of sets per exercise.

Rationale of the inverse relationship between number of exercises and number of sets
(there are only six sets available for the particular muscle group in this example)

Exercise/muscle group	Sets per exercise	Rationale
6	1	Allows for the greatest variety in overloading various lines of movement and joint angles, but doesn't specialize in the skill of any one exercise.
3	2	A balance of the above and below, provides a mixture of variety in lines of movement, joint angles, and specialization.
1	6	Provides for the greatest skill

development and/or specialization in one exercise, but provides no variety in exercise line or joint angle overload.

Note that variations on the above are available. For example, you may use four sets on one exercise and two sets on a second. This would provide specialization on the first exercise and variety in lines of movement and joint angles on the second exercise.

If you hold the total number of sets per workout as a constant or fixed number, the more exercises that you select, the lower the number of sets per exercise you'll be able to do. Note that this is only a generalization — don't be afraid to work outside of these boundaries.

Example of the inverse relationship between number of exercises and number of sets per exercise (total number of sets for the training session ranges from 18 to 24)

Exercises	Total sets per exercise possible	Most-suited training methods
1	10-20	Maximal strength, explosive power, and quickness/SSC
2	5-10	
3	4-8	
4	3-6	
5	2-4	General strength and hypertrophy
6	2-4	
7	1-3	
8	1-3	Stability/control and general fitness
9-12	1-2	
13-20	1	

There's an incredible trend in strength training to do three sets of every exercise. Why three (or more) sets at the same weight on the same exercise (most commonly, three sets of ten)? I asked myself that question many times, and the only answer that I can come up with is the power of tradition.

You see, these magic numbers were "validated" way back in the late 1940s and early 1950s by De Lorme, an American army surgeon, when he presented research evidence supporting the use of three sets of ten reps. De Lorme deserves all of the credit for his contribution to the science of sport training, but that was 50 years ago. Yet, almost every time you look at a training program, you see 3x10 (or 15, 12, 8, 6, etc.)! What do you see every time you browse — I say browse, because invariably there's not much that warrants reading — through a mainstream bodybuilding magazine? You see 3x10!

Subsequent research data from American sports scientists and strength-training habits of those with influence further burned this standard set mentality into the psyche of American (read the rest of the world, such is the influence of the American culture) strength training. Do I believe that the use of "standard sets" is warranted? On occasion, yes:

- When the athlete/trainee requires sub-maximal intensity for rehearsal (this is not uncommon in the strength sports of weightlifting and powerlifting).

- Where volume is required, and the quality of this volume is less relevant.

To understand why I'm critical of standard sets (three or more sets of the same reps and load), let's take a street-language look at the "anatomy of multiple sets."

The First Work Set

The primary effect of the first work set is shock. The body, subject to the laws of homeostasis and innate protective mechanisms, rarely functions optimally during the first work set. Psychologically, you may be shocked by the apparent "heaviness" of the load. The exposure to this load is, to some extent, unfamiliar — depending, of course, on how long it's been since this load was last applied.

You may struggle a bit on this set. You may even question your current strength levels. Don't panic — the first set is really a settler. The message is that this first set may not be an appropriate time for attempting to achieve your highest load of the workout. Sure, you're at your freshest, but neurally you aren't at your most efficient. This point shouldn't be ignored.

A second message that we can take from the analysis of the first set is to not go too close to fatigue in the first set. Any residual fatigue may negate the neural benefits from the first set that augment the next set.

The Second Work Set

This is potentially the "best" set. The second work set benefits from the first work set in what can be described as "neural arousal," or greater neuromuscular innervation. Provided that the rest periods between sets have been adequate (relative to your training goal), the nervous system is "woken up" by the exposure to load in the first work set. The neural inhibition level (the loading level at which the body automatically shuts down to prevent injury) is raised.

Psychologically, you've benefited from the exposure to the load of the first set. Now you're ready, anticipating the load. There will be no surprises. Because of the shock that the first set presented, you may be more emotionally/psychologically aroused. In most cases, I find this second set to be potentially your best set. If it isn't, you either went too heavy in the first set, didn't rest long enough, or suffer from overtraining.

The Third and Subsequent Work Sets

How you respond to the third and subsequent work sets may be influenced by many factors, including your entry-level recovery (as reflected by your resting stores of metabolic and neural substrates), your level of specific conditioning (ability to tolerate this volume), and the nutritional/ergogenic effects on your rate of substrate/neural chemical replacement. These factors aside, I believe that, in most cases, the application of a third or more work sets of the same load are affected by residual fatigue. And, therefore, perhaps they're not the most efficient method of overload.

In a nutshell, if you're lifting the same load for, say, three sets of ten, it's unlikely that this was your maximum in the first set. In fact, if you're able to complete three sets of ten at the same load, even if you reach exhaustion on the tenth rep of the third set, it's unlikely that even the second set is at or near your maximum. Probably the only time you're at your maximum is on the third set — and even then, that may be more of a metabolic maximum than a neural maximum.

I know that this seems contentious. And I realize that one of the most influential textbooks in American strength and conditioning states:

> "...sets at the same ten-rep maximum load can be repeated using the same resistance...."

Let me clarify. I'm not talking about whether it's possible, I'm questioning whether it's the most efficient! In my opinion, it's difficult to do more than two sets at the same reps and load if the effort is maximal. In most cases of standard sets, I feel that each set is performed either sub-maximally from a load or fatigue perspective. The table below illustrates my point with estimations.

Maximal neural and metabolic work expressed in standard sets
(percentages are only estimates or generalizations)

Loading parameters	Set 1	Set 2	Set 3
Reps	10	10	10
Load	100 kg	100 kg	100 kg
Percentage of 10RM neuromuscular work capacity in each set	80%	75%	80%
Percentage of 10RM metabolic work capacity in each set	80%	90%	100%
Average percentage of work capacity in each set	80%	82%	90%

A final point on why I immediately lose faith in a program upon sighting "3x" is that unless you don't plan on doing many exercises in the workout (e.g. six or less), this protocol locks you into overtraining — at least, from my perspective.

Generally speaking, any number of work sets exceeding a total of 12 for the workout (yes, that's right, 12 sets for the total workout, not per muscle group!) should only be contemplated by those with optimal lifestyles and recovery conditions. If you have a day job and/or consider your recovery to be average, this rules you out. So, when you put together your program, choosing eight or more exercises for the workout and combining them with the old "3x" standard, you automatically have a number of sets equaling 24 or more for the workout.

Once again, Ian's "Get Buffed!" book is available for $39.95 at our Online Store or by calling 800-525-1940.