

Dr. Doug McGuff's
**Ultimate-Exercise
Bulletin #1**

A Critical Analysis

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TRAINING

An Ideal Prescription

In the Ultimate-Exercise Bulletin #1, McGuff suggests that training should be treated as a stimulus in the same way as a drug is seen as a stimulus in medicine. In drug development a specific process is used in order to determine the optimum drug concentration, dosage and frequency with which the drug is delivered. A similar process should be used to determine the ideal intensity (drug concentration), volume (dosage) and frequency of exercise. McGuff attempts to show how this process logically applied to exercise and connected with other premises will lead to the following program:

- Training with a frequency of once a week or less.
- Training with 3-5 compound movements per training session, for one set to failure for each exercise.
- The length of the sets should reflect the ideal time under loads (TULs) for each individual for each lift.
- The exercises and method of execution should never be varied (barring changes in TUL as one gets more advanced).
- The SuperSlow® Protocol should be used all of the time, i.e., a cadence of 10/5.
- When strength stagnates (this is defined as the failure to increase strength in all exercises in a given workout) volume and/or frequency should be reduced.
- In the realm of exercise, stoicism is a virtue i.e. one should refrain from grimacing, vocalization or excessive gripping.

I am going to show that this program is NOT the logical result when the process to determine the ideal drug amount is applied to exercise.

The Dose-Response Relationship

McGuff states that exercise is parallel to drugs, in that they are both stimuli acting upon an organism being administered to cause a response. In order to elicit the desired response to exercise, an optimum dose concentration (intensity), an optimum dosage (volume) and an optimum frequency of administration should be determined and delivered. This process is essentially the same that is used in drug development. Such a process should be able to produce a prescription for exercise that would be appropriate for the vast majority of the population. The same process can then be used to adjust dosage and frequency for subjects that have unusually weak or strong tolerance to the exercise stimulus. (summary page 21f.)

Essentially it is true that exercise should be viewed as a branch of medical science and that an exercise program is a stimulus that should elicit a desired response. But there are so many factors such as:

- Stress tolerance (as per some of the factors below, people have different rates of recovery and tolerance, partly reflective of their goals, needs, limitations & abilities, and power of concentration, i.e., desire to succeed and the quality of training underlying that desire);
- Muscle fiber differences (something McGuff acknowledges since he believes in individual ideal TULs; some muscles require more or fewer sets to elicit an optimum response);
- Neurological efficiency (this aspect has a relationship with muscle fiber differences);
- Stress levels (what else is going on in that person's life on a regular basis or on an intermittent basis, i.e., crisis?);

- Differences in metabolism (some people recover much faster than others, or have greater endurance and require more sets and possibly frequency to elicit an optimum response);
- Adaptation to the method of stimulus (the less often you change your routine, the more you adapt and results can change directions, i.e., building mass to building lifting proficiency; some people also take longer to adapt, as per the factors above);
- Goals (i.e., hypertrophy [and even the magnitude of desired hypertrophy], strength, endurance, flexibility);
- Motivation (would a preferred program that deviates from McGuff's recommendations serve as greater motivation for the individual?);
- Pain tolerance (inability to sustain muscle burn and pain results in the inability to train to muscular failure, thus requiring deviation [more sets and possibly frequency than McGuff contends is ideal]);
- Power of concentration (intensity of effort is governed by the mind; muscles push as hard as the mind tells them to push), etc.

...all have a bearing on the ideal amount of exercise. And since people vary greatly in all these factors, it is very unlikely that there exists an amount that is appropriate for the majority. The same is true for medicine. People who want to elicit the same response often need different drug concentrations or amounts, or often different drugs which are supposed to elicit the same response.

Essentially, the less known about a disease, and the higher the number of the factors that influence the course of the disease and of the recovery process (and the less is known about those factors), the higher the chances that the patient will have to try several different drug dosages, different drugs (and often different doctors) before succeeding. And since there is still a lot that is speculative and unknown in the field of exercise science, one should not expect that there is an amount of stimulus that is appropriate for the majority.

Moreover McGuff does not take into account the time factor in determining an appropriate amount of exercise. An amount that is appropriate long-term does not have to be appropriate short-term (the stimulus might not be strong enough) and conversely an amount that is appropriate short-term does not have to be appropriate long-term (it might cause overtraining and/or overuse injuries).

The cycling of intensity of effort, volume and frequency of training is common with athletes around the world; people attempting to overreach past accomplishments by integrating short periods of more intense training. The same scenario holds for drugs. There are amounts of drugs that will do little harm when administered short-term but which might kill you if taken for the next 40 years. That won't stop doctors from prescribing them because they know they will reduce the dosage of the prescription before problems arise.

McGuff's application to finding the appropriate dosage (intensity), amount (volume) and frequency

INTENSITY: McGuff suggests training to failure on every set. He gives two reasons for this:

- a) "Since our capability with regard to intensity changes on a moment by moment basis, the only accurate recording of intensity we can record is 0% or 100%. Anything else would be guesswork. Therefore we must standardize 100% intensity... that is, we will train to failure." (p.23)*

Although I agree in regards to accuracy of measurement, it has to be stated that not everybody can train with 100 percent intensity (at least not all the time). And not everybody can do so from the beginning of a lifting career and onward. (I am not speaking of the initial phase of technique learning, during which nobody should train to failure.)

I have instructed several people (mostly women) that now thrive on training to failure, but who would have given up on training if I had forced them (beyond persistently challenging them) to do so from the beginning. Nor does McGuff take into account select groups, such as heart rehab patients or those who do not want to train to failure! Training to failure (at least every workout) does not have to be ideal or necessary for everyone. Altering volume (and possibly frequency) certainly increases training demands to counter the effects of reduced intensity, but this factor is ignored.

b) “Essentially reaching momentary dyskinesia under a given load, sends a strong signal to the organism to synthesize more muscle and concomitant metabolic capabilities, so that if a conflict of this magnitude is encountered again, the organism will have some reserve muscular ability to crawl off.” (p.13)

I am not aware that such a signal has ever been identified. It has merely been ‘assumed’ that reaching muscular failure is the catalyst each and every time. Moreover, I don’t think that it is true. If it were, growth could be stimulated every time dyskinesia was reached under a given load no matter how short the set, how sloppy the form or how long you have already been applying a certain method of stimulus. Nor does it account for the countless numbers who do not train to failure (or at least often) and who do gain muscular size.

VOLUME: In McGuff’s approach, volume is the equivalent to the dosage of the drug. He begins the process of finding the ideal volume by pointing out that in drug research one generally starts with the lowest dosage expected to produce some results. He continues by explaining why he thinks most trainees use a training volume that is too high and suggests performing 3-5 compound exercises per workout, which should be leg press, pulldown, and chest press, (and possibly the compound row and shoulder press). (summary p.23 f.)

When McGuff explains the dose-response relationship, as it pertains to drugs, he mentions that in order to find an optimum amount and to guard against toxicity one has to begin with the lowest dosage expected to produce some results and build up slowly. When applying this to training, he begins with the lowest dosage (that he expects to produce some results) but NEVER moves on from there. Finding the optimum dosage means beginning with the lowest

dosage then raising it and evaluating and comparing the data and results. It doesn't mean beginning with the minimum dosage then staying with it and pronouncing it to be the optimum dosage.

***FREQUENCY:** McGuff analyzes frequency and proposes that the data he collected at his facility shows a slight response at 48 to 72 hours, adequate at about 4 days and very good for most at seven days, suggesting that anything more frequent than working out more than once a week will constitute overtraining for about 95% of the population. (summary p.23)*

The method used to determine this is questionable. McGuff uses strength gains as the measuring stick to discover the ideal frequency. But since most people train for muscular size (to alter their body composition) and since it is possible that the frequency that results in the best strength gains is different from the frequency that yields the best size gains, McGuff's findings might be irrelevant for the majority.

Also, the frequency prescription is based on people training to failure with a very slow cadence (which places an excess burden on the nervous system), on specific machines, performing only multi-joint exercises. Other combinations or tools are not considered or experimented with.

Moreover he confuses local recovery and systemic recovery (which he doesn't seem to take into account because he seems to believe that a workout has to be a full body workout). Even if the best gains (abandoning the argument of size vs. strength for a moment, and for the sake of the argument) for a certain body part could be made with frequency 'X', that doesn't mean that one could not train (an)other bodypart(s) in between.

Therefore, the conclusion that 95 % of the population will overtrain if they train more often than once every seven days is a non-sequitur. Furthermore, one would again have to consider the time factor. After what period of time does training more often than once a week lead to overtraining (if at all), and what constitutes more frequently, i.e., every 7 days (training on the same day every week constitutes once every 8 days), every 6 days, etc.?

Another point is that one could overtrain in spite of concurrent strength gains (at least for a while) with the strength gains being due to extreme motivation and lifting proficiency (see the *Metamorphose Optimus* and *Stress & Recovery* bulletins).

Compound Movements Only

McGuff advocates the use of compound movements only. He gives several reasons for this.

Recovery ability is limited for everyone. In order to make progress, the demands of a program have to stay within the restraints of recovery ability. Moreover, as one grows stronger, the demands increase due to greater energy expenditure etc. One can get in a workout for the whole body with the leg press, pulldown and chest press. But if you had to do isolation exercises for every muscle group that these three exercises cover, you would end up doing so many movements that the accumulated workload would quickly exceed your recovery ability. (summary p.72f.)

Although recovery ability is limited for everyone, there are many who can recover from more than 3 sets per week with a few being able to exceed this amount by far. Moreover, McGuff's line of reasoning is flawed because it is based on two wrong assumptions:

- a) The workout has to be a full body workout (this is not mentioned explicitly but it is implicit in his reasoning). There is neither evidence nor a compelling argument for the superiority of full body workouts.
- b) Either one uses compound movements for all muscle groups or one uses isolation exercises for all muscle groups.

Based on these two assumptions, compound movements are superior to isolation movements because many would have a hard time recovering from full body workouts that are exclusively comprised of isolation exercises for all muscle groups (though the ability to recover from such a workout also depends on the intensity, the frequency and the duration for which this strategy is applied). But this is a false dilemma. One can use split routines and one can use a mix of isolation and compound movements.

Moreover, if the need for isolation exercises (to produce an optimum response, depending on one's goals and needs) exceeds the recovery ability of the muscle (localized tolerance) or the individual as a whole (generalized tolerance), those movements can be employed in a cyclic fashion.

Isolation exercises don't really isolate a muscle. Other muscles are involved too, and this involvement takes a toll on recovery but has very little contribution to muscle growth. (summary p.72)

Any exercise that is done beyond the amount that is necessary to stimulate maximum growth (or any other goal) is superfluous. In practice, of course, this is not measurable because we have no means to determine the point in a workout (or in a set) in which maximum growth is stimulated. If an isolation exercise is necessary to achieve a better growth stimulus in the target muscle, it doesn't matter whether other muscles are involved too (so long as the additional toll doesn't lead to overtraining) because, than, this toll is NECESSARY. Moreover if you do a compound movement, there is a good chance that you also don't stimulate growth in all contributing muscles (not all of them will reach a point of muscular failure). And this might take an even greater toll on recovery.

Some muscle groups react better to indirect stimuli in many individuals, such as calves and arms. The pulldown is superior for biceps work because there is rotation around the shoulder joint and since the biceps crosses both the elbow and shoulder joint movement around both joints will produce more involvement in that muscle. (summary p.72).

It is true that if you do a compound movement, there is a good chance that you also will not stimulate growth in all contributing muscles. In fact, often the weakest link ONLY reaches a point of muscular failure. If the supposed and necessary catalyst to produce results is reaching the point of muscular failure, according to McGuff, then how do the other muscles, which do not reach muscular failure, grow?

And is there a case of extreme muscle imbalance between extremely hypertrophied weak links (small muscle groups) versus strong links (large muscle groups)? Obviously not. Moreover, if reaching failure is the catalyst to muscular growth (and, of course, effort is an important part of the equation), how can a single-joint exercise (which targets the muscle in question) carried to muscular failure NOT contribute to muscle growth?

Furthermore, many have experienced the opposite with their arm muscles, biceps and triceps shrinking while on a consolidation routine (so there seems to be at least conflicting data in this case). Regarding the pulldown, just because the arm is moving from full extension to full flexion doesn't mean the biceps are working hard while going through the movement. Biceps involvement does not only depend on whether movement is around two joints or one joint, but largely depends on the intensity with which the muscle has to work throughout the full ROM and the specificity of inroad, a la the SAID Principle.

“Compound movements, because they mimic natural movements of the body, are much easier to learn than single-joint movements. As such, beginning subjects can become skilled at their exercises relatively quickly, and advanced subjects can dedicate their attention more to intense effort rather than form nuances.” (p.74)

When learning a movement, it is not only important to go through the movement but to learn how to do a movement productively i.e. how to optimally fatigue the participating muscle groups. It is not uncommon for beginners to go through the motions of a compound movement without being able to feel the relevant muscles working. Therefore, it is often of great value to learn the functions of the important contributing muscles by teaching isolation exercises for those muscles. Hence, high quality instruction does not consist of avoiding isolation exercises but often consists of learning them partly because they have value in themselves – and partly because of their importance in learning how to get the most out of compound movements.

Regardless, a few other points do not make sense. First, how is it that a leg press mimics natural movement but a leg extension or a leg curl does not? If it does not, then what are those exercises mimicking? Second, how can a squat, leg press, deadlift, etc. be easier to learn than a leg extension, leg curl, or hyperextension wherein there are far greater skills involved in the former? Last, an advanced trainee should not need to focus on the nuances of exercises, which is what the 'beginner' stage is for. Performing a chest press or leg press is not brain surgery and should be mastered in the course of a few weeks at most... not months... particularly if using machines as McGuff recommends.

Regarding advanced trainees, there is no intrinsic value in being able to dedicate more attention to intense effort. Intensity of effort can only be as high as 100%. And all factors being equal, a more intense effort (up to 100%) will result in greater inroads than if less than 100%.

But often being able to concentrate more on the effort is the result of being highly adapted to the method of stimulus. In that case, all factors are no longer equal. Being highly adapted to a method of stimulus means that the body has found a way to do a task with less fiber recruitment within the target muscles, which in turn results in less inroad... the contrary of what you want to achieve.

Ideal Inroad and TUL

McGuff states that inroad is a key stimulus to growth. Inroad is the depth of momentary fatigue attained due to exercise.

He then goes on challenging the notion that the deeper the inroad, the greater the growth stimulus. Accordingly, this is wrong since the inroad of a set taken to failure mainly depends on the level of resistance chosen in an exercise. This means the lower the resistance in a set taken to failure the deeper the inroad. Therefore, in order to get an increasingly deeper inroad (and greater growth stimulus) we would have to train with decreasing poundages (from one session to the next).

But since we know from experience that weight progression is necessary for muscle growth, this can't be true. Therefore, there must be an ideal level of inroad and an inroad beyond that level is counterproductive. Furthermore (and as a consequence), the main reason for weight progression is to protect one's self from excessive inroad as one gets stronger. He continues by claiming that the ideal amount of inroad is contextual.

The purpose of exercise is to maximally recruit the fibers of a muscle without retracing already recruited motor units (retracing should be avoided because it is counterproductive). Motor units are recruited sequentially beginning with the slowest twitch fibers with faster twitch fibers kicking in as the others fatigue. But if the slowest twitch fibers recover before the faster twitch fibers have kicked in you might never get to the fastest twitch fibers (and if so then only after retracing some motor units and this is counterproductive).

Therefore you should choose a weight that rapidly enough fatigues all the motor units. Since the level of resistance determines the depth of inroad (when sets are taken to failure and method of execution is equal), the ideal inroad is the inroad you achieve with a weight that rapidly enough fatigues all the motor units. Since every fiber type has a specific endurance, and different muscles have different fiber make-ups, there is an individual ideal TUL for every exercise. You don't have to find this ideal TUL because it will find you (by failing several times [in different workouts with different workloads] within a narrow time frame).

Moreover you should only train with straight sets since using super high-intensity techniques such as pre-exhaustion, forced reps or drop sets allow retracing of motor units and this is counterproductive.

Concluding it can be said that you should train only with straight sets to failure with a TUL that has found you and the inroad that is achieved with this technique automatically is the ideal inroad. (summary p.54-63)

There are several mistakes in this line of reasoning.

- a) To work with increasingly lighter weights (in successive sessions) to muscular failure is not detrimental to hypertrophy because it causes (supposedly) too much inroad. It is detrimental because the time you need to reach muscular failure becomes increasingly longer, thus promoting more muscular endurance than hypertrophy. There might even be fiber atrophy to conserve contractile energy in order to enable the muscles to cope better with the adaptation of a long duration stimuli. This is especially true for fast twitch fibers since their different myosin isoenzymes are able to hydrolyze ATP faster than the myosin isoenzymes of the slow twitch fibers.
- b) To suggest that the main reason for weight progression is to protect oneself against too much inroad is somewhat ridiculous. On the contrary. As we become stronger, we increase weights to increase (sustain) the intensity of effort and, therefore, the inroad while staying within non-endurance-based boundaries (or at least without focusing on endurance as the prime goal).
- c) McGuff's statement that ideal inroad is the inroad you achieve with a resistance, which allows the rapid recruitment of all muscle fibers (within one set) without retracing any motor units, is unsupported by any evidence. Why should one *not* retrace motor units? Because it is counterproductive? Why is it counterproductive? No answer. It has also been proven that not all motor units or muscle fibers are activated even if reaching a point of muscular failure (this is a basic method of survival; why should ALL fibers work to exhaustion?).

Moreover, and even if his views about ideal inroad were true, his application of training would hardly achieve this goal. In order to do so, using his suggestions (compound movements only; one set per muscle group for most people), all muscle groups involved in a lift would have to work with the same intensity throughout the whole ROM. But as mentioned earlier, just because a muscle contributes to a movement doesn't mean that it works hard throughout the whole movement... or enough to elicit a growth response.

Further, all the muscles contributing to an exercise would have to fail at the same time. But since the time that it takes for a muscle to fail with a certain resistance depends on neuromuscular factors and tolerances, all muscles contributing to the movement would have to have the same characteristics, (i.e., fiber make-up) should they fail at the same time. Since McGuff recommends different signature TULs for different exercises for different people, he seems to be aware that there generally are differences in the fiber make-up of different muscles in different individuals.

This, however, leaves out the argument (as stated by McGuff elsewhere, not in his book) that although there might be differences in the fiber make-up of the legs and the chest for example, it would be "evolutionary illogical" if there were differences between muscles working together in a compound movement, e.g., triceps, shoulders, and pectorals. But McGuff's own data contradicts this argument.

The shoulders participate in both the lat pulldown and the chest press. If all muscle groups participating in a compound movement had the same fiber make-up (and since the shoulders participate in both) then all upper body muscles that contribute to the lat pulldown or the chest press should have the same fiber make-up. If they had the same fiber make-up, the lat pulldown and the chest press should have the same (or at least a very similar) signature TUL. Yet McGuff's own ideal TUL for chest press is 1:21 to 1:23 (p.56) and his ideal TUL for pulldown is 2:10 to 2:20 (p.56). (Even more significant – because there are essentially the same muscle groups involved – is the difference of the ideal TUL for his chest press [1:21-1:23] and shoulder press [1:54-2:00].)

So even if he were right about the ideal inroad, his application of using compound movements only would achieve it merely in a few muscle groups and not all muscle groups.

- d) Considering that McGuff's method to find an ideal TUL for every exercise results in his ideal TUL for the leg press being 2:54-3:00 minutes, and for the pulldown 2:10-2:20 minutes, I am a bit skeptical about the validity of his method. This is so because sets that employ continuous tension and exceed a TUL of 120 seconds (approximately) are suboptimum at best when applied long-term (if the goal is hypertrophy and force production versus endurance, as per the SAID Principle). After about two minutes of tension (work) time, the body prefers aerobic metabolism, using fatty acids and amino acids (muscle catabolism) for energy. Moreover, the longer the TUL of a set employing constant tension, the greater the chances that the set will not terminate because of optimum inroad, but because of ischemia, excess muscle burn and the mental inability to continue, etc.

Non variation of the exercises

McGuff recommends choosing three to five compound exercises and remaining with those exercises (barring reductions in volume). He gives two arguments for this:

- A) Variation is not required... there is no value one can derive from varying workouts.
- B) Standardization is absolutely necessary.

VARIATION IS NOT REQUIRED.

In order to stimulate growth, we want maximum fiber recruitment in all muscle groups. To achieve this we need to select exercises that properly track muscle and joint functions in all the areas in which we want to induce growth. We should then select an appropriate resistance for those exercises, i.e., a resistance that allows a TUL to failure that causes maximum fiber recruitment without retracing motor units. Once a motor unit has been fatigued it doesn't have to be recruited again. There is no value in retracing motor units. And since different exercises for the same muscle group recruit the same motor units in the same order, doing different exercises for one muscle group in one workout serves no purpose. Furthermore, and for the same reason, it makes no sense to change between different exercises in different training sessions. (summary p.57-60)

This view is flawed. I will concentrate on two arguments that could be distilled from this line of reasoning (and with which the whole line stands and falls).

a) Different exercises for the same muscle group recruit the same motor units.

When you perform an exercise, the body distributes the force from one muscle (and even a segment within the same muscle) to another. Thus, the contributing muscles load and unload. At what points during an exercise they do so depends on the neurological pattern of the movement. Since different exercises for the same muscle group have different neurological patterns (a basic motor skill fundamental), one can conclude that muscles load and unload differently, which would mean differences in fiber and motor unit recruitment.

b) Retracing motor units (as with intensity variables) is superfluous

I have always experienced superior results using intensity variables (in my own training as well as in the training of clients) if the variables were used properly, i.e., the extent and length of application accommodating individual recovery ability. Of course this is just anecdotal, but so are McGuff's statements. Moreover, the term intensity variable is a misnomer. Intensity can only reach 100%. Training variables, such as forced reps or strip sets, increase the demands (inroading) of exercise – changing the nature of the set and the metabolic requirements as a result. Hence, if variables increase inroading, and McGuff contends that you *want* maximum inroading, then training variables should be included.

Moreover if different exercises and intensity variables recruit exactly the same motor units, and if there is no value in retracing the same motor units, how can the superior results (superior in comparison to the off-season program of the same trainees) achieved during Blitz cycles (which employ intensity variables and multiple exercises) be explained? If that were true, all one could hope for would be equal results (which would only be possible if the higher demands for recovery resources would not have any detrimental effect on the rate of growth). For more information on Blitz training, see the I.A.R.T. manual Apex.

NON VARIATION (STANDARDIZATION) IS ESSENTIAL

McGuff's argument for standardization is as follows:

Most people want to increase the size of their muscles. But this is a change too gross to measure. Moreover, it happens sporadically and delayed. But a muscle's strength is directly related to it's size. Therefore, if a muscle becomes stronger it will also become larger. For this reason, and because it has been empirically noted that the strength gains precede the size gains, we should keep track of strength gains. So long as we gain strength, we will also gain size. And extreme standardization (non-variation of exercises and method of execution) is the only possibility to judge after EVERY session whether somebody is gaining strength (and is, therefore, on the right track for size gains to come in the future) or not. Moreover, and since we have to standardize everything, we also have to standardize the way we do our reps. Because the SuperSlow® Protocol is the safest method, we should always do our repetitions superslow. (summary p24.f.)

There are several problems with this argument, analyzed point by point.

“Ultimately most people’s desired response is increased muscularity and this is what they would like to measure. Unfortunately, this is a fairly gross change, and the units to measure are too large to allow us to make the fine adjustments of optimizing volume and frequency. Also, empirical evidence shows that muscle growth can be delayed and sporadic.” (p.25)

If one has no tool that is fine enough to measure muscle growth as it happens, how can one know that muscle growth is delayed and sporadic? And if one can measure it as it happens, how can one know that it happens in a delayed manner? How is it that it is the effect of the strength gains of all the preceding workouts, and not the direct effect of ONE (or several) of the preceding workouts? There is simply no way that one could establish this cause-effect relationship (size as a consequence of a series of strength gains).

“Fortunately such a marker has been found. We know that a muscle’s strength is directly related to it’s cross sectional area. In a given individual, if a muscle becomes stronger, it will also become larger; or if a muscle is noted to become larger we will find that it’s stronger.” (p.25)

It is true that a larger muscle is a stronger muscle due to an increase in the cross sectional area. But there are several factors that can cause or contribute to an improved performance. A greater cross sectional area in one or several of the contributing muscles is only one of them. Greater lifting proficiency (skill based) or a higher motivation are others (see *Metamorphose Optimus*).

Therefore, it is a non sequitur to conclude that every improved performance results in a greater cross sectional area (if this were true, why are there so many thin, yet strong individuals, and if we keep getting stronger over the course of twenty years, for example, why is it we don't keep getting larger as a result – to keep up with all these strength increases?).

It is then impossible to establish a relationship between an improved performance and a size gain (present or future). The improved performance has no power to predict a size gain. Moreover, and regarding strength preceding size, nobody was able to counterargue one argument given by Brian D. Johnston: If strength always precedes size, then why do beginners gain strength and size concurrently? And why do people undergoing a two-week blitz experience immediate size gains during that time?

So if an improved performance can not predict a size surge, then super-standardization is unnecessary. (Keeping track of strength, as explained in Chaos Training™ [Apex] can still be important since it can be used as one tool [among others] to track overtraining.) And since variation is necessary to avoid adaptation to the stimulus, super-standardization is not only unnecessary but can be detrimental to progress.

“We are trying to dupe the body’s protective mechanism into producing desired physical adaptations. Through the use of the SuperSlow Training Protocol we can produce this perceived threat to survival in the safest manner possible.” (p. 14)

Either a method is safe or it is not safe. If it is not safe, it can be so to varying degrees. But if something is safe (i.e., free from harm or damage) there are no degrees because there can not be safer than 'safe'. So, to claim that the SuperSlow Protocol is the safest protocol means either to claim that it is the only protocol that is safe (which is ridiculous since one has to show that even the slightest deviation would make the protocol unsafe; something that has never been done) or to claim that although the SuperSlow Protocol is unsafe, every other protocol is even more so... a claim for which there exists not the slightest evidence.

The narrow therapeutic window and the reduction of volume and frequency

“The problems with most drugs is that there is a narrow window between an amount of stimulation that produces the desired response, and the amount of stimulation which produces a toxic effect. As you become stronger you will become capable of delivering a more severe stimulus, and a more severe stimulus will be required to encourage further strength adaptation The same relationship exists with training, but with training your increased strength causes the dose concentration to be higher at each encounter, thus increasing the risk of toxicity. The only choice is to decrease the dose amount and frequency to compensate for this fact.” (P.27 f.)

At this point McGuff makes a big mistake when comparing exercise to drugs. He equates intensity with the dose concentration and states that as one grows stronger the dose concentration increases. But since he defines intensity the way Arthur Jones did (the percentage of possible momentary muscular effort exerted), and since he always recommends training to failure (p.23), there can be no increase in intensity. There is no higher percentage than 100 percent (training to muscular failure). One could very loosely speak of an increase in intensity (as per demands) if one uses intensity (training) variables such as forced reps since there is a longer time one spends exerting maximum effort. But since he recommends straight sets only, it is a big mistake to speak of an increase in dose concentration (intensity).

McGuff's mistake has consequences. If he were right, in that the dose concentration would increase, the stimulus would in fact be stronger (as he suggests). But since only the weight load increases, that scenario is not necessarily the case. The stimulus for muscle growth could be stronger, but it could also stagnate or decrease in strength. This can happen because as you continue to train with the same method, the body finds more effective (energy sparing) neurological patterns. That means learning to do a task while recruiting less muscle fibers in the target muscle(s). Less muscle fibers recruited means less inroad and, therefore, a weaker stimulus. If you now concurrently reduce volume and/or frequency, the stimulus becomes weaker still and it might not even be strong enough (long-term) to maintain the momentary level of adaptation in the form of muscular size (see *Metamorphose Optimus* for further details on this aspect).

Training success depends on both a stimulus that causes growth, and on the stimulus staying within the restraints of recovery ability. We already know how the stimulus must be designed for muscle growth, and we also know that muscle growth happens sporadically and in a delayed fashion... it is always preceded by strength gains. Therefore, so long as we see strength gains, size gains will follow. Hence, we must be sure to constantly gain strength. When we design the stimulus as it has to be designed, to cause growth and we nevertheless don't gain strength from one session to the other (that means not gaining strength on all exercises in a given workout), we know that we haven't stayed within the constraints of recovery ability. We must then adjust (reduce) volume and/or frequency accordingly. (summary p.67 f.)

Currently, we still don't have exhaustive knowledge about the growth mechanism. We know some aspects and there are hypotheses, but not full knowledge. But when we don't have this knowledge, we also can not be certain that a stimulus we have designed will in any case lead to muscular growth if recovery and nutrition are sufficient. Therefore, McGuff's model breaks down.

But there still remains the argument that a lack of strength gains is evidence that we haven't stayed within the constraints of recovery ability (regardless whether growth is stimulated or not). There are problems with this argument, too.

- a) McGuff is not taking into account the differences in energy loss due to preceding sets in different training sessions. You might, for example, show great improvement in the first exercise(s) of a workout, but this improved performance might have caused so much of an energy loss (due to extreme mental focus and physical output) that you are unable to improve upon the following set(s), in spite of NOT being overtrained
- b) McGuff is not taking into account systemic vs. localized overtraining. It might very well be the case that the ideal frequency for different body parts is different. One muscle group might show best results if trained every seven days (numbers chosen for the sake of the argument) while another muscle group might show best results if trained once every 14 days. Lack of strength gains in an exercise, even if correctly indicating overtraining for the muscle group(s) involved in the movement, don't indicate that you have to reduce the frequency for all body parts. Moreover, lack of strength gain can be the result of insufficient frequency and volume of training (i.e., underuse atrophy).

- c) You might just have a bad day and regulation of volume and/or frequency is unnecessary and counterproductive.

Even if the stagnation correctly indicates overtraining, a sole reduction of volume and/or frequency is not always the answer. McGuff acknowledges in his bulletin *“The body is a very efficient homeostatic organism which is very resistant to change and very protective of the status quo. In order to encourage a desired physiologic change, a fairly severe stimulus is required...”*(p.27). A reduction in volume and frequency, although necessary to stay within the constraint’s of one’s recovery ability (if the current prescription exceeds recovery ability), actually reduces the severity of the stimulus and, thus, its potential to stimulate growth.

One has to bear in mind that a certain prescription of exercise rarely causes overtraining after a one time application (although it could), but after employment for a certain period of time. Hence, one has to reduce volume and/or frequency (and intensity, which should not be viewed as taboo, either) to stay within the constraints of one’s recovery ability. But one also has to regularly insert blocks of training with a stimulus that is strong enough to cause further adaptation, but which is not applied long enough to cause overtraining (see *Apex* for cycling methods for peak performance). This is vital for advanced, long-term trainees who have developed highly-adapted bodies to exercise stress.

Stoicism

McGuff recommends absolute stoicism in connection with training on the basis that grimacing, vocalization and excessive gripping will make you fail sooner. This is so because the massive neural discharge (considering how much of the motor strip is devoted to the face, hand and vocalization) that is necessary for grimacing, vocalization and excessive gripping will wash over the signal that should cause muscular contraction. (p.90)

Concentrating hard on absolute stoicism can interfere with an appropriate level of arousal. Arousal is extremely important since it is the perceived exertion that determines the number of fibers recruited, which will then, in turn, decide the level of inroading you can achieve with an exercise. (see *Apex* and *Metamorphose Optimus*).

Moreover, you will find that the slower you train, the easier it is to train stoically since the slow reps, in various zones of different exercises, allow for a repose. The faster you train, to the point of being explosive, the harder it is (downright impossible) to train stoically. Consequently, in order to train stoically, you must train Super Slow.

NUTRITION AND SUPPLEMENTATION

McGuff's Views on Nutrition

"If there is a strong stimulus for muscle growth, your body will take whatever nutrients it gets and turn them into required substrates." and... "Your body can take almost any substance you eat and convert it into exactly the substance that it needs." and... "The simple fact is that most people's diets possess an abundant source of substrate for muscle growth, if stimulated, to occur." Further... "If you want the most from your nutrition then provide your body with a stimulus that will shunt your nutritional substrate in the desired direction. If the stimulus is of high-intensity and your recovery adequate, you could almost make good gains on a diet of Skittles®." and... "In general, I advise people to eat three meals and two snacks per day. A meal can be 3-4 servings, and snacks 1-2 servings. Servings can be from any food group, but a combination is best."(p.107 ff.)

This view is oversimplified to the point of being misleading. There are a few important points about nutrition that you wouldn't get from reading the above:

- Different people have different needs relating to the best macronutrient ratio.
- Different situations require different, specific dietary actions in order to optimize results. Such as carb loading (explained in Apex) after a training session. (And, no, taking in all protein is not the same in spite of the body's ability to manufacture glucose from protein.)

- Not all food groups are of equal value. Some are pushed more for economical reasons (government intervention in the pushing of dairy, grains and soy) than for their nutritional value. In order to stay healthy long-term, you have to consume sufficient amounts of vitamins, minerals and phytochemicals. Not every variable combination of servings from the food groups will offer what you require.

McGuff also speaks out against supplementation:

“Remember that we said that the exercise stimulus consumes a lot of metabolic resources, and that the adaptive response is metabolically expensive. It is natural to assume that extra substrate would be required in this circumstance, but in actuality we almost have more than adequate resources available to be shunted in the appropriate direction for muscle growth.

Now imagine your body trying to do it’s job, when all of a sudden you dump in 80 or 90 grams of protein, 5 grams of creatine, some HMB, 500 mg vitamin C, 500 IU of vitamin E in addition to your normal diet. All this crap you have dumped into your system has to be dealt with. Resources that could have been used to recover from the workout and to synthesize the adaptive responses are instead used to shunt all this nutritional flotsam this way and that... Many of the metabolic manipulations that occur in the body are carried out by the liver and kidney. If these organs are tied up by the overflow of supplements, they are thus less available to assist with the metabolic needs of muscle growth.” (p. 109 f.)

Supplements (at least some of them) have specific effects. They can help in actualizing stimulated growth and in recovering from workouts. Some supplements are not pure crap without any beneficial influence that have to be dealt with, and which will, therefore, only take away urgently needed resources. Ribose, for example, is used up by intense training and takes rather long to replenish since food sources don't offer sufficient amounts to accommodate the (unnatural) event of a high-intensity workout. The faster you replenish, the sooner you can train again (of course this depends on a host of other factors, too) or function normally in other activities of daily living.

Prohormones can have a beneficial effect on recovery and protein synthesis. If it were true that the drawbacks of taking in a substance (that it has to be dealt with by the body, thus taking away resources that are needed for growth and recovery) would automatically outweigh any potential effects, then why bother taking anabolic steroids to optimize muscle growth? After all, they will also just take away important resources and occupy organ functions, thus hampering muscle growth and recovery.

And considering the lower quality foods many of us eat (including McGuff's suggestion that Skittles® could find their way into a healthy diet), and compared to 100 years ago, are we really obtaining all the vitamins, minerals and (particularly) phytochemicals we need to sustain the magnitude of stress (work, relationships, pollution, exercise, etc.) we incur each day compared to five decades ago? Plus, consider the added stress of regular, intense exercise.

(Regular, intense exercise is not the same as the endurance-based activity of farmers and factory workers of years past [comprising of a small percentage of the population]. These people exerted only enough energy in order to sustain activity for 8+ hour work days. Brief, intense exercise is more demanding on the body and mind as a whole, with demands constantly increasing, versus the constant and sustained demands of farming and factory work).

Moreover this is just the refutation of an argument and not the endorsement to take (a) supplement(s), because as Brian D. Johnston observed in *Apex*, one will always have to consider need and adaptation, cost and benefit when deciding whether to take a supplement or not.