Step 2.

CELL VOLUMISING; FULL BAG THEORY OF MUSCLE GROWTH
EXPANDED SECTION WITH THEORY AND MORE IN DEPTH GUIDELINES

What you do; Creatine / glutamine / glycerol loading;

How you train; maximum pump repetitions, deep fascia stretching and isometric contractions following each set of exercises.

Why, what, how…….
Full bag theory of muscle growth
Creatine supplementation
Glutamine supplementation

You'll have been following phase 1 now for 2 weeks. Now it's time to increase your progress some more. The steps in this section are simple. You begin supplementing with creatine, glutamine and glycerol. Follow the directions below.

In addition to this you'll need to change your training to assist in the cell volumising aspects of this phase. In short this will mean slightly higher repetitions, slightly quicker movements, and each exercise will be followed with a deep stretch and then a peak contraction. An example might be;

Deep squats, 4 sets of 15 reps with 30 seconds rest in between. After each set do a deep stretch on your quads for 30 seconds, and then contract both quads as hard as possible for 45 seconds.

In addition to this you will need to begin supplementation with creatine, glutamine and glycerol.

Load on these for 5 days, and then follow a maintenance dose after that.

For the creatine and glutamine loading dose, divide your desired body weight by 8. Take this much over the course of a day, ideally in 2 divided doses one in your post workout shake after your training session and 1 with the meal following that.

For the creatine and glutamine maintenance dose, divide your desired body weight in kg by 16. Take that much in grams each day either with your biggest meal or in the biggest sugar hit you eat that day (post workout). For a 100kg athlete that means 6.25g each day or 1 ¼ metric teaspoons of **each powder** in your recovery drink every day.

Remember that's each powder, so you'll be taking 12.5g of the mixture of creatine and glutamine.

Please note we do not advocate creatine loading whilst in season. The additional weight gain may be too fast to accommodate the huge forces which are inflicted on the body through training for and participating in competitive events.

For those of you out of season or in pre season, or if it just don't matter if you gain a few kg suddenly, then you'll need to 'load on those nutrients. To do this you simply take 4 times the amount described above, so 1/8 of your weight in kg, in grams.

Take this in 2 divided doses. So for a 100kg person, 13g at breakfast, the same post workout. On on training days take it in 4 divided doses, breakfast, lunch, snack and then with dinner so you spread out your intake in 6.25g doses.

For the glycerol you'll need to load once each week with 1.5ml per kg diluted in 10 times the water, so a 100kg athlete needs 150ml glycerol diluted into 1.5 litres of water.

It's very important that you consume an additional 1.5 litres of plain water on the day that you glycerol load,

FAILURE TO DO THIS CAN RESULT IN DEHYDRATION.

So if you've taken 1.5ml of glycerol in 1.5 litres of water. Drink anther 1.5 litres of water throughout the day.

You'll do glycerol loading every other day for the first week, then every 3rd day for the second week. Then you can do it just once per week for the rest of the programme.

New Action	**Creatine Loading**	**Glycerol Loading**	**Glutamine Loading**
Sunday	☺	☺	☺
Monday	☺	X	☺
Tuesday	☺	☺	☺
Wednesday	☺	X	☺
Thursday	☺	☺	☺
Friday	Maintenance	X	Maintenance
Saturday	Maintenance	X	Maintenance
Sunday	Maintenance	☺	Maintenance
Monday	Maintenance	X	Maintenance

Tuesday	Maintenance	X	Maintenance
Wednesday	Maintenance	☺	Maintenance
Thursday	Maintenance	X	Maintenance
Friday	Maintenance	X	Maintenance
Saturday	Maintenance	☺	Maintenance

Key;

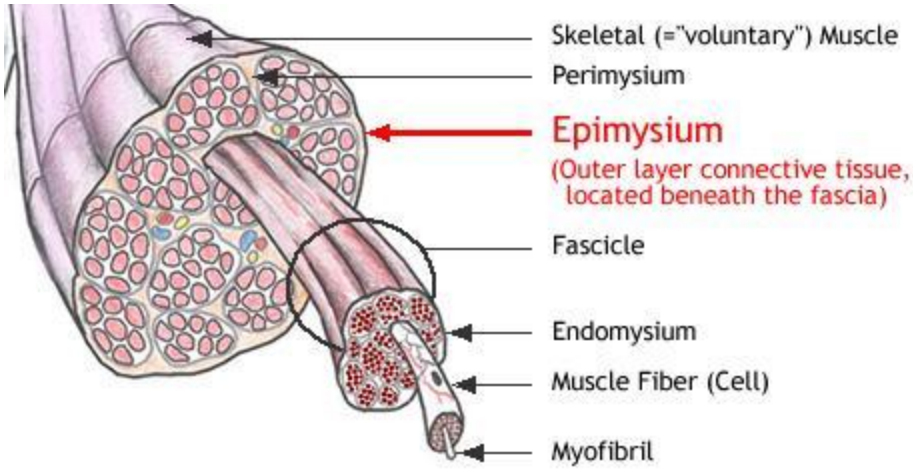
☺ = yes do it today
X = no don't do this today

Theory and Practise Regarding Stretch Aided Hypertrophy

It has been suggested that of the many influences limiting the growth of muscular hypertrophy from training, one of the most important is the constraining influence of connective surroundings of muscle tissue, specifically the Fascia. What follows now is the evidence that explains examples of extraordinary muscle gains possible, in the context of relieving the constraint of the fascia. Resistance training routines that incorporate stretching are likely to reduce this prohibition to muscle-gain, and when combined with suitable nutritional (including supplemental), hydration and recovery strategies can bring about incredibly accelerated muscular hypertrophy.

Muscle structure

Muscle exists as long actomyosin fibres within cellular confines that are then grouped into larger bundles or fascicles, in turn being combined into whole muscles. Muscle fibres, fascicles and muscles are compartmentalised by sheaths of connective tissue and cortex, specifically named the endomysium, perimysium, epimysium and fascia (below).



- Sarcolemma is the cell membrane that encloses each muscle cell (also known as a muscle fibre).
- Endomysium is connective tissue that wraps each individual muscle fibre.
- Perimysium is connective tissue that wraps bundles of muscle fibres - the "bundles" being known as fascicles.
- Epimysium is connective tissue that wraps the whole muscle.
- Fascia (or "deep fascia") covers the entire muscle and is located over the layer of epimysium.

There are many limitations to muscular growth. The body seems initially reluctant to invest so much energy in hypertrophy and factors such as limited nutrition, elevated inflammatory hormones and the inhibitory growth-factor myostatin, all conspire to oppose muscle gain. Evidence is currently accumulating to suggest that a major limiting factor to hypertrophy is the volumetric constraint imposed by the fascia that surrounds the muscle (Millward 1995). It literally resists the increases in volume and size strived for by athletes such as body builders.

The basic premise of stretch-aided hypertrophy is to stretch the fascia, thus increasing the volume of the muscle and allowing your body to import the various nutrients needed, as well as to start building structural components, to increase the size of the muscle.

Stretch-induced hypertrophy

Throughout natural growth, it has been shown that the continual passive mechanical stretch imposed by growing bone on muscle is responsible for muscular adaptations in length and size (Gajdosik 2001). These results have been replicated by subjecting animals to a continual stretch from a weight (Winchester et al. 1991). Studies have been conducted that show that adolescents undergoing their growth spurt increase in lean body mass in a manner directly proportional to the growth of the skeleton (Millward 1995). In addition, local hormonal changes are initiated by the stretching to facilitate these gains. For example during the growth spurt in puberty, age-triggered elevations in testosterone and growth hormone, coupled with increased intracellular triglycerides and increased energy intake increase

insulin levels as well as stimulating bone formation. The continual stretch imposed by growing bone on the muscle, combined with that of increased cellular uptake following insulin release causes the influx of water and local release of insulin-like growth factor (IGF1). This hormonal shift has been seen as a response to stretching in animals and to increase the recruitment of muscle-cell precursors or “satellite cells” in animals (Winchester et al. 1991). Growth during puberty can then temporarily be a self perpetuating process. The evidence would seem to suggest a theoretical relationship between continual stretching and increased muscular mass.

Examples of stretch induced hypertrophy can be found in a more relevant context if we consider the phenomenon of “muscle memory” in body-builders. This is where an athlete who had previously reached certain standards in strength and achieved great gains in size is able to regain these attributes following loss from detraining. Size and strength can often be regained close to original levels after relatively short periods of training. This can be partly explained by the fact that strength gains are greatly dependent on neural adaptations and these are retained, even after detraining and atrophy. Resumption of training will mean that the athlete can start from a greater base of initial strength due to the original neural adaptations (Kraemer, Deschenes, & Fleck 1988), thus allowing an accelerated hypertrophy phase. However, the gains in muscle size and mass may be more fully accounted for if we also consider “bag theory”, or the effect of stretch-induced hypertrophy. It is likely that the initial size gains stretched the fascia so when the detrained (and atrophied) athlete resumes training, the fascia (or “bag”) is more compliant, thus allowing a greater influx of nutrients as well as cellular construction.

In addition to the mechanical stretch imposed in a workout, the anabolic state of the muscle fiber also depend on its state of hydration, which is secondary to the amount of osmotic [the ability to attract water] substances in the cells, such as sodium, potassium, creatine, proteins, glycogen, and free amino acids like glutamine. Anything that aids in muscle water retention will have a general positive effect from this induced stretch. This could be an alternative explanation for the effective use of creatine and carbohydrate loading prior to a workout. As well as both being sources of rapidly available energy (essential for the phosphocreatine and anaerobic systems respectively), enabling higher intensity exercise, their osmotic potential may enhance fascial stretching (Haussinger 1996). Stretching also initiates relaxation of the muscle, or the “stretch response” which may further add to compliance and influx into the muscle.

Eccentric contractions (ie resisting/being stretched by an external load , such as the “down movement” when doing squats) have been associated with increases in muscular power, or “speed strength” as they take advantage of the stretch-shortening cycle and prior storing of elastic energy before a rapid, explosive movement(Hue et al. 2008;Miyaguchi & Demura 2008). These improvements may also be linked with the fact that eccentric exercise is more damaging to the muscle than a regular, concentric contraction (the “up phase” of a squat) and so could induce greater regeneration. Indeed, stretching of muscle cells damages the connective tissue and will stimulate membrane-bound enzyme complexes, triggering a release of growth factors such as TGF-beta, FGF, and IGF-1 from the muscle(Gessin et al. 1993), meaning it could possibly enhance growth by counteracting the constriction from the fascia.

Nutrition

Nutrition to enhance the stretching of the “muscular bags” must take into account:

- Energy for syntheses and exercise needed for hypertrophy
- Osmotic potential for a continual stretch stimulus
- Syntheses of connective tissues such as collagen

    - ➢ Vitamin C is vital for collagen synthesis and can easily be at suboptimal levels if you fruit and veg intake is low. It may be worth supplementing to achieve 2-3 grams a day, but be careful as this nutrient can cause gastrointestinal discomfort of you overdo it!

    - ➢ CHO intake should be increased in post workout window for optimal glycogen repletion and associated water intake, as well as for energy expenditure involved with hypertrophy. You’ll get this from the vitargo and the carbs in the meal following the recovery shake

    - ➢ Creatine should be taken to aid training intensity as well as to increase osmotic potential. Start at the amounts we recommend per day, but if you’re a habitual user or already well on your way to increasing your mass, you’ll need more. You can contact the team to help you if this is the case.

Example Workout Routine

Example: dumbbell bench presses.

Perform a set of 12 repetitions, followed by a drop set of 12 repetitions so that the pectorals should be so full of blood, they are at their maximal “pump”. It’s important to understand that the connective tissue is not only increased in temperature, but also being stretched extremely by this process!

Now you need to find a stretch that expands the fascia of the pectorals to a maximum. A great stretch would be to simply extend your arms straight out to your sides as wide as possible and then extend your arms backwards, as if you were performing the negative on dumbbell flys. Now, when performing a “facial stretch” you will need to stretch with applied pressure to the area. You need this, because the stretch has to be applied past the point of comfort in order to expand the connective tissue surrounding the muscle. Therefore you have a few options. Firstly you can have your partner grab your arms and pull backwards, secondly you can use a wall and apply your own body weight as resistance.

Lastly simply choose an exercise that stretches the muscle and hold it in the stretched position (eg dumbbell flys and held in the bottom position of the exercise). Complete the procedure while the muscle is fully pumped. First slightly stretch the muscle. Do this by slowly extending your arms until you have reached a maximum stretch. It should feel almost soothing. Hold this for 10 seconds. Rest for about 5 seconds and then extend your arms all the way back until they are stretched to a maximum. This is a very painful and intense stretch. Hold this for a total of 30 seconds. You are getting a double stretching effect, not only manually but with influx of blood.

Thought you could relax! Unfortunately that is not an option! While the connective tissue is pliable, get

one final influx of blood into the target muscle to assist in the expansion process by tensing the target muscle group as hard as possible for 30-60 seconds.

Week One: Apply deep fascial stretching after every exercise.

Week Two: Only use this technique once in the workout and do it on the set in which you are most "pumped". This will be enough to continue the process of hypertrophy, but also relieve the stress placed on the body.

Week Three: Use Deep Fascial Stretching within each section of the workout.

Week Four: Allow your connective tissue to recover fully.

Week Five: Repeat

EXAMPLE DAY OF AN ATHLETE ON PHASE II

Immediately on waking;

Drink 1 pint of water with ½ a teaspoon of mineral salts and a capful of organic cider vinegar in it. This is a good idea for hydration and cider vinegar has a number of health benefits as well as assisting digestive health.

Take a protein shake pre training. Take 1 scoop of protein, mixed with a handful of berries, 50g of oats, goat's milk, 1 teaspoon of honey and blend until desired consistency.

Take this before weights in the morning if you have time to digest it's better to allow 90 minutes before training.

Taking the pre training protein mix with carbs allows for a better 'pump' in the workout.

TRAINING

As this is week 1 we'll be stretching after each exercise, it's intense – you can use a double expresso to fuel the intensity if you wish.

Chest and shoulders;

Incline Dumbell Press; Reps; 15 x 4 sets
After each set; either partner assisted chest stretch putting both hands behind head and getting training partner to pull elbows back. Communicate properly when you do this, hold for 20-30 seconds, then go straight into a chest contraction exercise such as pushing both hands together as hard as you can for 45 seconds. Then you get to rest while your partner does the exercise, or you rest for 60-90 seconds.

Dips, with 2 second pause at bottom of movement. Watch your shoulders on this one and do not go into full stretch at bottom of movement, don't relax your shoulders keep tight. Repeat stretch and contraction exercise, but do a different contraction. Do 5 sets of as many as you can manage with body weight. Add weight if you can do more than 15 reps.

Shoulders;
Arnold press; Reps 15 x 4 sets
Stretch hands on lower back and partner pushes elbow together
Go into maximum weight isometric military presses
Contraction exercise, double biceps reverse, or reaching up as high as you can for 45 – 60 seconds.

Standing single arm cable laterals; 5 sets of 12 reps – insert link to exercise.
Stretch as above
Stretch in bottom of lying single arm rear delt dumbbell flyes
Contraction exercise; grip both hands together and try to pull apart from by your waist.

Rear delt machine or flyes; 5 sets of 12
Stretch; hugging yourself (remember that one when you pretended to be having a snog at schools? If not just try to wrap both hands around yourself and grip your back)
Tricep dips stretch
Contraction; grip both hand and pull but this time from the horizontal plain.

RECOVERY MEALS

Keep these the same and use the recovery matrix to adjust the level of nutrients you need according to the session you've just done.

After this nasty session you'd want (for your 100kg athlete);

Protein pulse @ 80g
28g of vitargo
Half your daily creatine loading dose (12.5g)
Half you daily glutamine dose (12.5g)

RECOVERY BREAKFAST – drinking grapefruit juice or eating ½ a grapefruit before each main meal may assist with body fat loss

GET BREAKFAST RIGHT

Research shows trying to balance blood sugar and brain chemistry after a poor breakfast is like chasing your tail.

Make sure your breakfast sets you up for the day.

- Add coconut oil and / or linseeds to your porridge and use quinoa flakes as well as or instead of oats
- Cooked meats and vegetables would be an excellent way for you to begin your day; choose the heavier meats and darker fish as choices; burgers and nuts, sardines and broccoli, chicken and coconut milk
- For a quick start make a smoothie with protein powder, lecithin granules, coconut oil, full fat milk (goats) and other goodies

LUNCH – take the second half of your creatine and glutamine dose with lunch.

- Lean ham, artichoke hearts, avocado, non wheat breads and raw vegetables should make up the majority of your afternoon snacks
- Remember when eating chicken to choose the darker meats, use barley cous cous (Belazu)
- Sardines, pilchards and other oily fish are great choices, have these with a big mixed salad

DINNER

Use your diet plan to choose suitable foods – use the fine tuning guidelines to tighten up here.
Make sure 50% of this meal is from vegetables, 50% from proteins and fat and if you are still hungry then add starchy carbohydrates, try to keep these to a minimum ideally

SNACK

- Tuna mix with celery
- Mackerel pate with raw carrots
- Smoothie – you can get it ready for breakfast time

Take all your EFA's and mineral support in the evening

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