

A highly muscular man is the central focus, wearing a black baseball cap and black athletic shorts with white stripes on the side. He is posed with his hands on his hips, showcasing his well-defined chest, shoulders, and abdominal muscles. The background is a gradient of dark red and orange, with a subtle lens flare effect.

TRI-PHASE TRAINING

SPECIALIZED HYPERTROPHY PROGRAM

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T R I - P H A S E T R A I N I N G
S p e c i a l i z e d H y p e r t r o p h y P r o g r a m

B y : D e r e k C h a r l e b o i s B . S . C P T

T e a m S c i v a t i o n

W W W . S C I V A T I O N . C O M

W W W . T R I P H A S E T R A I N I N G . C O M

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Introduction

Triphase Training is a 3-phase workout program designed to add overall mass to your body. Each phase is three weeks long and targets a specific training variable. In addition, Triphase Training contains workouts created specifically to bring up lagging muscle groups, which are to be used after completing the 9-week Triphase Program.

The workout routines in this book are based on data from scientific literature as well as anecdotal feedback and results. These routines have not only been validated by science, but they have also been notarized by myself and many of my clients who have added quality mass to their bodies and made their former “weak points” into one of their most bragged about body parts.

As bodybuilders and physique enthusiasts, we strive to create a symmetrical, proportional physique. During the quest of building such a physique, it is common to have muscles that are lagging in development compared to the rest of the body. In order to bring these lagging muscles’ development up to match the rest of the body’s development, they must receive focused, intense training. This book will lay out training routines specifically created to bring up lagging muscle development. In the quest for a ripped, striated and balanced physique, this book is what you have been waiting for to receive expert tips on training and supplementation strategies to obtain the perfect physique.

I recommend doing Triphase Training while consuming a hypercaloric a.k.a. bulking diet. Once you have completed the Triphase Training program, you can either start back over at Phase 1 or move on into the muscle group specialized routines to bring up lagging muscle groups. These routines are not meant to all be done at once, rather you should pick one or two of the muscle groups to focus on while adjusting or leaving the workouts for the other muscle groups the same to allow for adequate recovery of the muscles you are focusing on increasing in size. That is not to say that one cannot increase the size of all the muscles groups at the same time, but these routines are specifically designed to bring up lagging muscle groups. Also, prioritizing too many muscle groups may lead to fatigue and overtraining. With that said, on to **HYPERTROPHY!**

Chapter 1

What is Skeletal Muscle Hypertrophy?

Skeletal muscle hypertrophy is an increase in a muscle's cross-sectional area (CSA). Skeletal muscle hypertrophy is governed by a host of hormones and growth factors, including satellite cells, testosterone, IGF-I, IL-1 & IL-6, to name just a few. An increase in muscle CSA is accomplished by:

- Increase in the size of myofibrils
 - Incorporation of new contractile proteins into the Actin and Myosin filaments
 - Incorporation of new proteins to the structural filaments
- Increase in Sarcoplasm
- Increase in the connective tissues surrounding the muscle, myofibrils, and muscle fibers.

An increase in CSA can be accomplished by two forms of hypertrophy: sarcomere and sarcoplasmic.

Sarcomere Hypertrophy—Incorporate of New Proteins in Actin and Myosin

Sarcomere hypertrophy is an enlargement of a muscle fiber as a result of an increase in sarcomere number and size. Sarcomeres, which contain the contractile proteins actin and myosin are the “functional units” of myofibrils. The incorporation of new contractile proteins into Actin and Myosin filaments increases a muscle fiber's size and ability to produce force, commonly referred to as strength. These new proteins must be created through the process of protein synthesis.

Sarcoplasmic Hypertrophy—Increase in Sarcoplasm and Connective Tissue

Sarcoplasmic hypertrophy is an increase of the sarcoplasm (muscle fiber semifluid cytoplasm) and noncontractile proteins. The fiber's ability to produce force does not increase from sarcoplasmic hypertrophy.

The emerging theory behind skeletal muscle hypertrophy is that a bout of exercise causes protein degradation or damage (myotrauma), which leads to a period of enhanced protein synthesis or supercompensation when the bout ceases (Zatsiorsky, 1995). This increase in protein synthesis not only repairs the damage from the bout of exercise, but also makes the muscle stronger and therefore more resistant to future damage.

Mechanical Stimuli → Cell Damage → Cell 'Clean Up' → Cell Repair → Cell Growth

We are not doing to discuss the steps involved in skeletal muscle hypertrophy, just how to stimulate it with weight training workouts. This book will first outline a 9-week workout program designed to add overall mass and then go into muscle specific hypertrophy workouts.

Chapter 2

Triphase Training Program

In my opinion, consistently adding weight to the bar—lifting heavier weights and/or completing more reps—is the most effective way to add muscle and grow and should be your primary concern. The number of exercises, sets, rep ranges, etc. you use should be secondary to progressing with the loads you lift. With that said, it is impossible to add weight to the bar EVERY workout. If it were, everyone would be benching 800 pounds and squatting over 1,000. Therefore one must adjust their workouts in order to keep progressing.

When designing a weight training routine there are three main variables that can be altered in order to change the type of growth stimuli you get from the routine. These variables are volume, intensity, and frequency.

- Volume = sets * reps
 - The more sets and reps the greater the volume of a given workout
- Intensity = percentage of your 1-RM max
 - If your max bench is 315 then lifting 295 is more intense than 225 because it is a greater percentage of your 1-RM
- Frequency = number of times you work a muscle in a given time span
 - Most people use 1 week as the time span

These variables must be balanced in order to keep you progressing. If you do too much you will not be able to recover sufficiently and then your strength and muscle gains will slow. I am also going to throw another term out there—training density. The density of a workout is the sets * reps * load. You should strive to increase the density of each workout by increasing the load lifted, which should be done for every phase of training.

It is helpful to break your training up into phases, which is called periodization. One phase might focus on increasing the volume of your routine while the next phase might focus on increasing the frequency of your routine. The idea is to stimulate your muscular system in a different way with each phase in order to promote more growth. As I said in the beginning of this section, no matter what variable you are focusing on during a given training phase, your primary focus should be progressing each and every workout by lifting a greater load. If you deadlifted 315 for 8 reps for your last workout you want to beat that the next workout. This can be done by adding weight to the bar (i.e. 10 lbs.) or completing more reps (i.e. 10 reps since you got 8 last time). You must progress in order to grow!

With this information in mind, I have created a 3-phase mass program. Each phase is three weeks long and focuses on one of the three training stimuli variables and is designed to promote a steady state of progression. Let's get into the program.

Chapter 3

Specialized Hypertrophy Workouts

Phase 1—Volume

The goal of Phase 1 is to increase the volume (number of sets) each week. In addition to adding sets each week you should always strive to lift a greater load each workout.

- Week 1 = 3 sets per exercise
- Week 2 = 4 sets per exercise
- Week 3 = 5 sets per exercise

Rest time = 90 seconds between sets.

Workout 1 Chest+Shoulders
Workout 2 Back+Traps
Workout 3 Legs
Workout 4 Arms

Chest+Shoulder

Bench Press	3-5 X 6-10
Incline DB Press	3-5 X 6-10
Dips	3-5 X 6-10
Military or DB Press	3-5 X 6-10
DB Side Lateral	3-5 X 6-10

Back+Traps

Rack Deadlift	3-5 X 6-10
Pull-Up	3-5 X 6-10
Bent Over Row	3-5 X 6-10
BB Shrug	3-5 X 6-10
DB Shrug	3-5 X 6-10

Legs

Squats	3-5 X 6-10
Stiff Leg Deadlift	3-5 X 6-10
Leg Extension	3-5 X 6-10
Leg Curl	3-5 X 6-10
Lunges	3-5 X 6-10

Arms+Calves

BB Curl	3-5 X 6-10
Close Grip Bench	3-5 X 6-10
Skull Crusher	3-5 X 6-10
DB Curl	3-5 X 6-10
Standing Calf Raise	3-5 X 6-10
Seated Calf Raise	3-5 X 6-10

The rep range for Phase 1 is 6-10, which means you want to get at least 6 reps but no more than 10 reps. If you cannot get 6 reps then the weight is too heavy. If you can get more than 10 reps then the weight is too light. Once you can complete 10 reps with a given weight you should increase the weight for the next set. For example, if you can squat 225 lbs. for 10 reps the increase the weight to 235 lbs.

Phase 2—Intensity

The Goal of Phase 2 is to lift a near maximal load for low reps. There will be no changes in the number of sets you complete, just the load you lift.

- Week 1 = 6-RM
- Week 2 = 4-RM
- Week 3 = 2-RM

Rest time = 2-3 minutes between sets.

Workout 1 Upper Body A
 Workout 2 Lower Body A
 Workout 3 Upper Body B
 Workout 4 Lower Body B

Upper Body A		Upper Body B	
Bench Press	3 X 2-6	Incline Press	3 X 2-6
Bent Over Row	3 X 2-6	Pull-Up	3 X 2-6
Military Press	3 X 2-6	DB Shoulder Press	3 X 2-6
BB Shrug	3 X 2-6	DB Shrug	3 X 2-6
Close Grip Bench	3 X 2-6	Skull Crusher	3 X 2-6
BB Curl	3 X 2-6	DB Curl	3 X 2-6
Lower Body A		Lower Body B	
Squats	3 X 2-6	Deadlift	3 X 2-6
Stiff Leg Deadlift	3 X 2-6	Leg Press	3 X 2-6
Seated Calf Raise	3 X 2-6	Standing Calf Raise	3 X 2-6

The rep range for Phase 2 is 2-6, but unlike Phase 1, you are going to shoot for a given rep number for each workout. The goal for week one is to use a weight that allows you to complete 3 sets of 6 reps; week two is to complete 3 sets of 4 reps; week three is to complete 3 sets of 2 reps. Each week you will be lifting a heavier load. For Deadlift it may be something like:

- Week 1 = 315 for 3 X 6
- Week 2 = 335 for 3 X 4
- Week 3 = 355 for 3 X 2

If you prefer, you can do arms after legs on the lower body day since the volume is lower on leg day. Some people may prefer to do all of the upper body in one workout because they find leg training more taxing or just because of personal preference. I leave it up to each individual to decide whether they prefer to train arms in the upper body workouts or the lower body workouts.

Phase 3—Frequency

The goal of Phase 3 is to hit each muscle more frequently than Phase 1 & 2.

Workout 1	Whole Body A	2 X 4-6	Rest = 2 mins
Workout 2	Whole Body B	2 X 6-10	Rest = 90 sec
Workout 3	Whole Body C	2 X 10-12	Rest = 30 sec
Workout 4	Weak Point		

Each workout uses different exercises and different rep ranges, though the same exercises could be used for each workout if one prefers. The goal is to do two sets of an exercise for each muscle group. Here is an example of how this workout could be set up:

<u>Muscle</u>	<u>Workout A (Mon)</u>	<u>Workout B (Wed)</u>	<u>Workout C (Fri)</u>
Quad	Squats	Leg Press	Leg Extension
Ham	Stiff Leg Deadlift	Lying Leg Curl	Seated Leg Curl
Calf	Seated Calf Raise	Standing Calf Raise	Donkey Calf Raise
Chest	Flat Press	Incline Press	Decline Press or Dips
Back	Bent Over Row	Pull-up	Rack Deadlift
Delt	Military Press	DB Side Lateral	Cable Lateral
Trap	Barbell Shrug	DB Shrug	Low-Pulley High Row
Tris	Close Grip Bench	Skull Crusher	Tricep Pressdown
Bis	Barbell Curl	DB Curl	Cable Curl

Weak Point Training (Saturday)

The weak point training day is here so each individual person can pick what they need to work on. If you need to bring up your back and calves, then work your back and calves. If you need to bring up your chest and biceps, then work your chest and biceps. An example Weak Point day for chest and biceps would be:

Incline BB Press	3 X 4,8,12
Flat DB Press	3 X 4,8,12
DB Curls	3 X 4,8,12
Hammer Curls	3 X 4,8,12

It is common for people to have underdeveloped calves, forearms, and posterior (rear) delts. The weak point training day would be perfect to workout on these muscles. An example routine for these weak points would be:

Calves	Standing Calf Raise	3 X 4,8,12
	Seated Calf Raise	3 X 4,8,12
Forearms	BB Forearm Curl	3 X 4,8,12
	DB Forearm Curl	3 X 4,8,12
Rear Delts	DB Rear Lateral	3 X 4,8,12
	Reverse Pec Dec	3 X 4,8,12

At this point in your training you should have an idea of what exercises you need to do in order to bring up your weak points. Because of the low volume of training during the week (a total of 6 sets per muscle group), there should be a low chance for overtraining to occur even though you are hitting your weak muscle group very frequently.

Week 10

After nine weeks of intense training your body may be pretty “beat up.” Therefore, week 10 should be a recovery week meaning no training. This off time will help your body recover and refresh you for your upcoming training weeks. After your week off, you can either restart the Triphase Training Program at phase-1 or you can begin a specialized hypertrophy workout.

We will be taking an in-depth look into the anatomy and function of each muscle group and then detailing a workout routine focusing on that muscle group. We will then discuss how to implement these muscle specific workouts into a full routine.

Chapter 4

Specialized Chest Hypertrophy Workout

Structure and Function: Muscles of the Chest

Pectoralis Major (Pecs)

The pectoralis major is the large fan-shaped muscle covering the anterior rib cage. Some people are confused about this muscle as they believe there is an “outer” and “inner” pectoralis muscle. This classification is anatomically incorrect. But there is an “upper” and “lower” portion of the pectoralis major. The larger sternal head of the pectoralis major, which originates from the sternum, is the “lower” portion of the pectoralis major and the smaller clavicular head, which originates from the clavicle, is the “upper” portion. This separation is anatomically correct since each of these two heads has a distinct action. Both heads insert on the humerus.

The action of the pectoralis major as a whole (both heads working together) is to adduct the arm and bring it medially across the chest (like when you are hugging someone) as well as medially rotate the arm. The clavicular head flexes the arm and the sternal head extends it. Extension of the arm by the sternal head can only occur if the arm is flexed; the sternal head cannot hyperextend the arm.

Pectoralis Minor

The pectoralis minor is a small, triangular muscle, which lies deep to the pectoralis major. It originates from the anterior surface of the 3-5 ribs and inserts on the coracoid process of the scapula. The pectoralis minor’s actions include depression and downward rotation of the scapula.

The Program

Chest Workout (Done two days a week, i.e. Monday and Thursday)

1. Bench Press 3 X 3-5
2. Incline Bench 3 X 6-10
3. Flies/Crossovers 3-6* X 10-12

*Depending on your recovery needs, you should do 1 or 2 sets for each angle.

Total Sets: 9-12

**All sets are stopped 1 rep shy of failure. Training just shy of failure will improve your recovery time and allow you to train your chest more frequently

Bench Press

I never really focused on bench press until this past year. Everyone always said, “If your chest won’t grow, focus on dumbbell presses.” Well I did that and still did not see the progress I would have liked. I began bench pressing in the 3-5 rep range and suddenly my chest started to grow. Why? Because I was pressing much more weight than I could when using dumbbells. I also started to use a little wider grip than before, which

helps to increase the recruitment of my chest while decreasing the recruitment of my deltoids and triceps. This simple change in grip width completely changed the stimulus I received from bench pressing. I had actually only changed my grip because my left elbow was bothering me when I used my grip width I normally did. So I widened it and BOOM, my chest loved it. in my opinion, heavy bench pressing is vital for building a massive chest.



The question my clients ask me the most is “when should I increase the weight for the exercise?” I do not increase the weight on my bench press until I complete 3 sets of 5 reps for two consecutive workouts. For example, today I benched 365 for 3 sets of 3 reps. Once I can bench 365 for 3 sets of 5 reps on two consecutive workouts, I will increase the weight to 375. The reason I wait until I can complete the given reps during two workouts instead of just one workout is it pretty much ensures consistent progress. In the past when I would increase the weight I used more frequently, I would often get stuck at a weight for weeks. For example, when I was trying to work my way up to 315 for 3 sets of 3 reps, I was increasing the weight I used when I could complete the first set of 5 reps, the second set of 4 reps, and the first set of 3 reps. I was aiming for 3-5 reps, so when I could complete all sets as just stated, I upped my weight. While doing this I had a hard time progressing. Not progressing for weeks can be disheartening and frustrating. Thus far, this method of weight progression, waiting until I complete 3 sets of 5 reps for two consecutive workouts, has worked well.



Incline Bench Press

The incline bench press targets the often underdeveloped clavicular head of the pecs. Some may feel that you cannot really target the clavicular head of the pecs, but the difference in the origin (sternum vs. clavicle) of the muscle fibers makes it possible. When doing incline bench, you should lower the bar to the top of your clavicle and really focus on pushing your chest up and stretching your pecs. One thing that I have found to help the development of my upper chest is to pause (I pause for 3 seconds) when you are in the fully stretched position, but not resting the bar on your chest. This isometric contraction targets the clavicular fibers and allows you to fully recruit them.

During the concentric portion of the lift, you want to focus on using the clavicular fibers of the pecs and not your deltoids or triceps. In order to fully accomplish this, I would recommend using a lighter load than you would normally press. Say you can normally do 225 lbs for 6 reps. Drop the weight down to 185 lbs, go for 6 reps, and really focus on the execution of each rep and add in the isometric pause. Unlike bench press where the goal is to use a heavy load and to stimulate the entire chest, incline bench presses focuses on targeting the clavicular fibers of the chest, which are often hard for people to train correctly.

Flies/Cable Crossovers

The final exercise for this routine is DB flies, cable flies, or cable crossovers. If you choose to do DB or cable flies, I recommend doing 1-2 sets of flat flies, 1-2 sets of incline flies, and 1-2 sets of decline. If you choose to do cable crossovers, I recommend doing 1-2 sets of high pulley crossovers, 1-2 sets with the pulleys set at shoulder height, and 1-2 sets of low-pulley crossovers. I do not like the term “shaping exercise”, so I will just say this setup allows you to hit the pecs for all angles.



These exercises allow you to fully bring your arms medially across your body, leading to a hard contraction of the pecs. These isolation exercises are done in a higher rep range because ROM and a solid contraction are of prime importance.



Chapter 5

Specialized Arm Hypertrophy Workout

Structure and Function: Muscles of the Upper Arm

The biceps are the muscle most commonly requested to be flexed. Though the triceps are equally impressed, these posterior muscles do not get the same attention. Despite the triceps often being “ignored,” working both the anterior and posterior muscles of the upper arm is a must.

Anterior Muscles

Biceps Brachii (Bis)

As its name implies, the biceps brachii is the two-headed muscle, long and short heads, of the upper arm. The long head of the biceps brachii originates from the supraglenoid tubercle of the scapula. The short head originates from the coracoid process of the scapula. The two heads unite to form one tendon, which inserts on the radial tuberosity.

The biceps have two functions: flexion at the elbow and supination of the proximal radial-ulnar joint. The reason the biceps also supinate the arm is due to the radial tuberosity is on the ulnar side of the radius. The long head of the biceps can also assist in abduction of the arm if the deltoid is paralyzed.

Brachialis

A well-developed brachialis is not often seen in those who do not specifically target the muscle. The brachialis, which is deep to the biceps brachii, originates at the distal anterior humerus and inserts on the ulnar tuberosity.

The brachialis is an elbow flexor; it does not participate in supination or pronation of the radial-ulnar joint. When the palms are supinator, both the biceps brachii and brachialis are strong flexors. When the forearm is pronated, the effectiveness of the biceps brachii is reduced, as it tries to supinate while it flexes, while the brachialis still functions fully.

Posterior Muscles

Triceps Brachii (Tris)

The triceps brachii is the three-headed muscle of the upper arm. This muscle group consists of a long, lateral, and medial head. The lateral head originates from the infraglenoid tubercle of the scapula; the lateral head originates from the posteriolateral humerus; the medial head originates from the distal posteromedial humerus. All three heads combine and insert on the olecranon process (elbow) of the ulna.

The primary function of the triceps brachii is extension of the elbow. The long head also assists in extension at the glenohumeral joint.

The Program

Workout A (Monday)

1. Barbell Curl 5 X 4-6
1. Close Grip Bench Press 5 X 4-6

2. Cable Barbell Curl 4 X 8-12 (followed by partials*)
 - 2 sets with Supinated Wrists
 - 2 sets with Pronated Wrists aka Reverse Curl
2. Cable Triceps Pressdown 4 X 8-12 (followed by partials*)
 - 2 sets with Supinated Wrists
 - 2 sets with Pronated Wrists aka Reverse Pressdown

Note: Alternate exercises with the same number, resting 1-2 minutes between each exercise.

*Partials—perform the targeted 8-10 reps then perform 5-8 partial reps focusing on contracting the muscle and the end of the concentric portion of the exercise.

Main Focus: Increasing the weight lifting on barbell curls and close grip bench press

Barbell Curl

The barbell curl is perhaps the most productive biceps exercise due to the fact one can curl a much greater load during barbell curls than other exercises. People have differing philosophies with regards to barbell curl form. Some say you have to do every rep as strict as possible while others advocate using some momentum or “cheating” during the exercise in order to use a greater load. My belief is that one should use strict form and control the weight during every rep. Now a little “cheating” on the last rep or two is not a bad thing so long as you are still doing these reps in a controlled fashion and not straining your back.



Grip width should be shoulder width. Elbows should be locked at your sides as you flex your elbow and contract your biceps. Try not to flex at the shoulder joint because this will move your elbows forward and take some tension off your biceps and placing it on your delts.



Close Grip Bench Press

Like barbell curls for biceps, close grip bench press always you to lift a greater load with your triceps compared to other exercises. When done correctly, you should be

able to place the greatest tension on your triceps and not on your pecs or delts, though they will still get stimulated some as this is a compound movement.



Grip width should be shoulder width or slightly narrower with a neutral grip. With your elbows close to your sides, not flared out, flex your elbows and lower the bar until your arms are parallel to the floor, this will keep the tension on the triceps. Powerfully push the bar up by extending your elbows and contracting your triceps.

Cable Barbell Curls and Triceps Pressdowns

The goal of these higher rep sets is to (1) increase blood flow to the muscles, creating a more intense pump and (2) provide a more metabolic than mechanical stimuli. Adding partials at the end of each set intensifies the metabolic stimuli of each set. These exercises should be done using very strict form.



Workout B (Thursday)

1. Preacher Curl 3 X 6-10

- 1 set narrow grip, 1 set mid-range grip, 1 set wide grip

1. Skull Crusher 3 X 6-10

- 1 set narrow grip, 1 set mid-range grip, 1 set wide grip

2. Supinating DB Curl 3 X 6-10

Super-setted with
High Pulley Cable Curl 3 X 6-10

2. DB Kickback 3 X 6-10

Super-setted with
1-Arm Cable Kickback 3 X 6-10

3. Cross Body Hammer Curl 3 X 6-10

3. Overhead DB Extension 3 X 6-10

Note: Alternate exercises with the same number, resting 1-2 minutes between each exercise.

Note: There is no rest between the exercises in the supersets.

Workout B is setup to hit the muscles of the upper arm from all angles. Now some people might say it is not necessary to do so and to just stick to the main compound lifts (barbell curls, close grip bench press, skull crusher) and be done with it, but this is a specialized routine for someone who has tried that and still cannot get their arms to grow. Remember, the biceps are made up of two muscles, the triceps is made up of three muscles, and the brachialis needs to be stimulated as well. Changing up the grip you use

on these exercises will hit all of the muscles of the upper arm, allowing for greater growth.

Explanation on each exercise is not needed. Simply change your grip for the #1 exercises, perform the #2 exercises with no rest between sets, and then hit the #3 exercises hard at the end.

Chapter 6

Specialized Back Hypertrophy Program

Structure and Function: Muscles of the Back

There are two very large muscles that cover almost the entire back. They are the trapezius and latissimus dorsi. These two prominent superficial muscles together extend from the skull all the way down to the sacrum and ilium. There are also three smaller muscles, which lie deep to the trapezius and latissimus dorsi, which assist these larger muscles.

Superficial Muscles

Trapezius (Traps)

The trapezius is the easily distinguishable muscle superior muscle of the neck/back, is divided into three different groups: the superior fibers, middle fibers, and inferior fibers. Because of the many origins of the trapezius, each of these areas of fibers performs a different action. The trapezius as a whole originates from the external occipital protuberance, ligamentum nuchae (the ligament of the back of the neck), and spinous processes of the last cervical and all thoracic vertebrae. All of these fibers insert on the lateral third of the clavicle, acromion process and spine of the scapula.

As a whole, the trapezius upwardly rotates the scapula. Individually, the superior elevation the scapula, the middle fibers retraction the scapula, and the inferior fibers depress the scapula. The trapezius will be targeted with the deltoids.

Latissimus Dorsi (Lats)

This large muscle of the back originates from the lower six and all the lumbar vertebrae as well as the iliac crest via the thoracolumbar fascia. All of the fibers insert on the medial lip of the intertubercular groove of the humerus. The actions of this muscle are to extend, adduction, and medially rotate the arm. Unlike the pectoralis major, the latissimus dorsi can hyperextend the arm.

Deep Muscles

Levator Scapulae, Rhomboids Minor and Major

The three muscles deep to the trapezius and latissimus dorsi share a similar function and will therefore be considered together.

The most superior of the three deep muscles to the back is levator scapulae. The levator scapulae originates from the transverse processes of the first four cervical vertebrae and inserts on the superior angle of the scapula.

The next muscle, inferior to the levator scapulae, is the rhomboids minor. It originates from the last (7th) cervical vertebrae and first thoracic vertebrae and inserts on the medial border of the scapula.

The last, and most inferior muscles of the three is the rhomboids major. It originates from the spinous processes of the 2-5 thoracic vertebrae and inserts on the medial border of the scapula, below the rhomboids minor.

The primary functions of these muscles are elevation and downward rotation of the scapula. The rhomboids also retract the scapula.

Workout A

1. Rack Deadlifts 3 X 3-5

2. Lat-Pulldown 3 X 6-10
2. Seated Cable Row 3 X 6-10

3. 1-Arm Lat Pulldown 3 X 6-10
3. 1-Arm Cable Row 3 X 6-10

***Note:** Alternate exercises with the same number, resting 1-2 minutes between each exercise.*

Rack Deadlift

Rack deadlifts are partial deadlifts done with bar starting at around knee height instead of on the ground. The full deadlift is a total body movement that hits every muscle in the body. By starting with the bar at knee height, you decrease the amount of lower body (the legs) involvement in the movement because your knees and hips are not flexed as much in the starting position. The muscles in the legs will still be stressed during rack deadlifts, just not to the degree they would be from full deadlifts, which allows you to lift a HEAVY load with more tension on the muscle of the upper body, including ALL the muscles of the back.



Lat Pulldown and Seated Cable Row

These exercises are viewed as the “supporting cast” to deadlifts. Form should be relatively strict and you should pull with your lats, not your arms. The 1-Arm variations of these exercises hit the muscles of the back a little differently and add to the development of the back.



Workout B

1. Pull-Ups 5 X 4-6
2. Bent Over Row 5 X 4-6

Note: Alternate exercises with the same number, resting 1-2 minutes between each exercise.

Main Focus: Increasing the weight lifting on squats and stiff leg deadlifts

Pull-Ups

Pull-ups (not chin-ups) are a great exercise for developing the lats, specifically back “width”. As you execute each rep, you should focus on pulling your body up by using your lats NOT by using your arms. Often times people will swing their body and use momentum to complete their pull-ups, which requires heavy recruitment of the biceps and decreases the recruitment of the lats. The goal is to keep the tension on your lats.



One way to limit bicep involvement is to think of your hands as hooks. You are not pulling from your hands, but rather from your lats. Think of the tension from the weight starting deep in your lats and moving “up” the lats to where they insert into the humerus (bone of the upper arm) as you pull yourself up. As you pull your body up, your elbows should come to your sides and you should contract the muscles of the back, squeezing them together.

Bent Over Rows

Bent over rows are used to add “thickness” to the back. Just as with pull-ups, you must focus on pulling the weight with your lats and not your arms. If you feel your form is sloppy or your arms are being heavily recruited, try decreasing the weight on the bar.

As you pull the bar up, you can pull it to your lower chest, mid-stomach, or lower stomach. Where you pull to the bar to will depend on which spots allows you personally to hit the lats the hardest.

Chapter 7

Specialized Leg Hypertrophy Program

Structure and Function: Muscles of the Thigh

The Quadriceps (Quads)

The quadriceps are the muscles of the anterior (front) leg. As the name implies, the quadriceps are made up of four muscles: the rectus femoris, vastus medialis, vastus lateralis, and vastus intermedius. All four muscles insert into the patella and tibial tuberosity via the patellar ligament and function in extension of the knee.

Rectus Femoris

The rectus femoris lies deep to the other three muscles of the quadriceps. It is unique to this group because it is the only muscle of the four that crosses the hip. The rectus femoris originates at the anterior inferior iliac spine (part of the pelvis) and inserts on the patella (knee bone) and tibial tuberosity via the patellar ligament. Due to this orientation, spanning the hip and knee, the rectus femoris functions in hip flexion as well as knee extension.

Vasti Muscles- Medial, Lateral, and Intermedius

The three vasti all function together in knee flexion. The vastus medialis originates from the medial lip of the linea aspera (which means it originates mostly on the posterior femur and somewhat on the anterior aspect).

The vastus lateralis originates from the lateral lip of the linea aspera and therefore has a mostly posterior origin. This is why someone with a well-developed vastus lateralis is said to have a good “outer quad sweep.”

The vastus lateralis originates from the anterior and lateral surfaces of the femur. This muscle blocks the vastus medialis from being in contact with the medial surface of the femur.

As mentioned, all four muscles of the quadriceps function in knee extension, but the last 15 degrees of extension are accomplished by only the three vasti muscles.

The Hamstrings (Hams)

The hamstrings are made up of three muscles on the posterior aspect of the thigh; they include: the semimembranosus, semitendinosus, and the two-headed biceps femoris. These muscles are often underdeveloped compared to the quadriceps. This muscle imbalance can lead to injury now and later on in life. A bodybuilder with well-developed hamstrings stands out to the judges, at least at amateur shows where athletes usually lack this development.

All three hamstring muscles, except for the short head of the biceps femoris originate at the ischial tuberosity of the pelvis. Due to this common origin and relatively common insertions, all three of the muscles of the hamstrings, again except for the short

head of the biceps femoris, function as hip extensors and weak abductors. All three muscles, including the short head of the biceps femoris, function as knee flexors.

Semimembranosus

The semimembranosus is one of the two medially inserting hamstring muscles. This muscle lies just deep to the semitendinosus, but can be clearly distinguished from the semitendinosus on a cadaver or very lean athlete. The semimembranosus inserts on the posteromedial aspect of the tibia.

Semitendinosus

The semitendinosus, the other medial hamstring muscle, inserts on the tibial medial, just inferior to the tibial tuberosity.

Biceps Femoris- Long and Short Heads

The long head of the biceps femoris originates in common with the semitendinosus and is joined above the knee by the short head of the biceps femoris, which originates from the linea aspera on the posterior femur. These lateral muscles unite into one tendon, which inserts on the head of the fibula.

Along with extension of the hip and flexion of the knee, the semimembranosus and semitendinosus are weak medial rotators of the thigh and knee when the leg is flexed. Both heads of the biceps femoris laterally rotate the knee when it is flexed. An interesting point is that both of these heads participate in flexion of the knee, but the long head may only participate in the beginning of the action and relax when the leg is semiflexed.

Workout A (Monday)

1. Squats 3 X 4-6

 2. Stiff Leg Deadlift 3 X 4-6

 3. DB Lunges 3 X 12-15
- OR**
3. 1-Leg Extension 2 X 12-15
 3. 1-Leg Curl 2 X 12-15

Main Focus: Increasing the weight lifting on squats and stiff leg deadlifts

Squats

Heavy squats build big legs. Have you ever seen someone with small legs squat 500 pounds? Like I have been saying throughout the book, exercises that allow you to place the greatest load on a muscle often lead to the greatest growth. One can squat a whole lot more than they can leg extension. The squat targets primarily the quads, but also hits the glutes and hams.

It is my opinion that you should place your feet at the width apart that feels most sturdy and comfortable for you. For me, placing my feet about shoulder width apart is most comfortable and allows me to target the quads the most. When executing the squat,

emphasis should be placed on keeping your back straight and not leaning forward or backward as this can place undue stress on your lower back.



Stiff Leg Deadlift

Stiff leg deadlifts allow you to use a heavy load to target the hamstrings. Some people have trouble targeting the hamstrings with this exercise and say they feel it more in their lower back. In order to increase hamstring recruitment you should bend your knees slightly and during the eccentric portion of the lift, push your butt backwards to stretch the hamstrings. As you transition into the concentric phase of the lift you want to concentrate on contracting the hamstrings and not just pulling the bar up with your lower back.

Lunges/1-Leg Extensions and Curl

Basically these exercises are done to hit each leg individually. One could simply do more squats and stiff leg deadlifts, but those exercises are very taxing and these exercises hit the legs differently. Leg extensions and leg curls are single joint movements, which allow you to isolate the muscles of the quads and hams respectively.

Workout B (Thursday)

1. Leg Press 3 X 6-10
2. Leg Extension 3 X 6-10
3. Leg Curl 3 X 6-10
4. Hack Squat 1 X 20 **OR** 1 X 6-10 dropset consisting of 3 decrements in weight

No real explanation is needed for this routine. It is a “lighter” routine done between the heavy squat and stiff leg deadlift workout. This workout will allow you to create another stimulus for growth without overly hampering recovery. Focus should be

placed on using a full range of motion (ROM) on all exercises. Instead of loading up the leg press with plate after plate and performing ½ reps, decrease the weight you put on the press and use a full ROM.



Chapter 8

Specialized Deltoid/Trapezoid Hypertrophy Routine

Structure and Function: Muscles of the Shoulder and Scapula

Nothing stands out on something like a nice pair of deltoids (shoulders). Whether the shoulders are large and wide or tight and toned, they are an eye catcher. More important to the integrity of the shoulder joint itself is the muscle deep to the shoulders, collectively called the rotator cuff muscles. The trapezius also plays a role in shoulder stability. We discussion will begin with the superficial deltoid

Deltoid

Like many other muscles in the body, the deltoid is divided into distinct fiber portions. The anterior deltoid originates from the lateral third of the clavicle, the middle deltoid from the acromion process, and the posterior deltoid from the spine of the scapula. All three portions of the deltoid muscle insert on the deltoid tuberosity of the humerus.

Because the three portions of the deltoid each pass over a different part of the glenohumeral joint (shoulder), they each have a distinct action. The anterior fibers flex and medially rotate the arm, the middle fibers abduction the arm, and the posterior fibers extend and laterally rotate the arm.

Rotator Cuff Muscles- Supraspinatus, Infraspinatus, Teres Minor, and Subscapularis

The rotator cuff aids in stabilizes the shoulder joint by holding the head of the humerus in the glenoid fossa of the scapula. It is made up of four muscles, all of which assist in the movements of the deltoid. Three of the four muscles originate posteriorly, with only one originating anteriorly.

Posterior Muscles—Supraspinatus, Infraspinatus, and Teres Minor

The most superior of the three posterior rotator cuff muscles is the supraspinatus. It originates from the supraspinous fossa of the scapula. The infraspinatus originates from the infraspinous fossa of the scapula. Finally, the teres minor originates from the lateral border of the scapula. All three muscles insert on the greater tubercle of the humerus.

The supraspinatus acts alone and assists in shoulder abduction. The infraspinatus and teres minor on the other hand, work together as lateral rotators of the arms. They also maintain the position of the head of the humerus during other arm movements.

Teres Major

Though the teres major originates near the teres minor, its function is more closely paired with latissimus dorsi due to its insertion. The teres major originates from the inferior angle of the scapula and inserts on the medial lip of the intertubercular groove of the humerus. The teres major assist the latissimus dorsi in extension, adduction, and

medial rotation of the arm, but only when there is resistance against these movements, such as during weight training.

Anterior Muscles

Subscapularis

The only anterior muscle of the rotator cuff is the subscapularis. The subscapularis originates from the subscapular fossa of the scapula and inserts on the lesser tubercle of the humerus. It is a medial rotator of the arm. Of even greater concern is the subscapularis' job of preventing anterior dislocation of the head of the humerus.

Trapezius

The trapezius is the easily distinguishable muscle superior muscle of the neck/back, is divided into three different groups: the superior fibers, middle fibers, and inferior fibers. Because of the many origins of the trapezius, each of these areas of fibers performs a different action. The trapezius as a whole originates from the external occipital protuberance, ligamentum nuchae (the ligament of the back of the neck), and spinous processes of the last cervical and all thoracic vertebrae. All of these fibers insert on the lateral third of the clavicle, acromion process and spine of the scapula.

As a whole, the trapezius upwardly rotates the scapula. Individually, the superior elevation the scapula, the middle fibers retraction the scapula, and the inferior fibers depress the scapula.

Workout A

1. Military Press 5 X 4-6
2. Barbell Shrug 5 X 4-6
3. DB Rear Delt Lateral 3 X 10
4. DB Shrug 3 X 10

Note: Alternate exercises with the same number, resting 1-2 minutes between each exercise.

Main Focus: Increasing the weight lifting on military press and barbell shrug

Military Press

The military press is great for overall deltoid development, though it hits the anterior delts the hardest. How far you bring the bar down is a personal preference in my opinion. Some people will recommend stopping at your nose, chin, and bringing the bar all the way down to your upper chest. I say find what feels most comfortable for you.

Barbell Shrug

Heavy barbell shrugs are great for trap growth. While emphasis should be placed on lifting a heavy load, the load should not be so heavy that your form and ROM suffers. As you shrug, think of trying to touch your traps to your ears. This is how high up you should strive to shrug the bar.

Rear Deltoid Lateral

The reason why I included rear delt laterals in this program is the posterior head of the deltoid is often underdeveloped in bodybuilders and this stems from not directly working it. The posterior delts can be hit by doing bent over DB lateral raises, bent over cable lateral raises, or rear delt flies on the reverse pec dec.

The main thing to focus on when trying to hit the rear delts is actually USING the rear delts. You should be able to feel the rear delts contracted with each rep. If you cannot, you are most likely using too much weight and need to decrease it and increase your ROM. Using too much momentum on bent over DB laterals will also cause you not to use the rear delts to the full extent.

DB Shrug

DB shrugs allow you to use a greater ROM than barbell shrugs, which can lead to the stimulation of more muscle fibers.

Workout B

1. DB shoulder Press 3 X 6-10
2. Behind the Back Barbell Shrug 3 X 6-10
3. DB Side Lateral 3 X 6-10
Super-setted with
1-Arm Cable Lateral 3 X 6-10
4. DB Shrugs done lying Prone on Incline Bench 3 X 6-10

DB Shoulder Press

Like the military press, the DB shoulder press is great for overall shoulder development. This exercise is executed just like the military press except the use of DBs makes each arm work independently.

Behind the Back Shrugs

Behind the back shrugs are done just like standard barbell shrugs but with the barbell behind you. This change in position of the bar increases the recruitment of the middle and lower fibers of the traps.

DB Side Lateral and 1-Arm Cable Lateral

These lateral raises target the middle delts. Increasing the size on the medial delts will give your shoulders a round, full look. The key to these exercises is not using momentum or your traps to lift the DBs and pull the cables. You want to keep the tension on the medial delts. This can be done by bending the elbows slightly and rotating your wrist so your pinky is higher than your thumb (a trick used by Arnold Schwarzenegger).



Prone DB Shrugs

Prone DB shrugs done lying on an incline bench allow you to hit the middle and lower fibers of the traps to a greater degree than the standard shrug. Instead of shrugging the weight straight up when standing, you want to squeeze the mid-back/traps together to lift the DBs on this exercise.

Chapter 9

Specialized Calves Hypertrophy Routine

Structure and Function: Muscles of the Lower Leg

Before starting on the muscles of the lower leg, there are a few bones that should be known: The femur (large bone of the upper leg), the tibia (medial, weight bearing bone of the lower leg), the fibula (smaller, lateral bone of the lower leg), and calcaneus (the “heel” bone).

Each group of lower leg muscles performed as specific task. The anterior muscles are dorsiflexors at the ankle (bringing the top of the foot towards the leg) and extensors of the toes (lifting the toes off the ground). The lateral muscles evert the foot (lift the lateral side off the ground). The posterior muscles are primarily plantar flexors (lift the heel of the foot off of the ground) and flexors of the toes (curl toes). Inversion of the foot (lifting the medial aspect) is accomplished by specific anterior and posterior muscles, which will be discussed individually.

The muscles of the calf (posterior) can be further divided into superficial (near the surface) and deep (near the center) muscles. The superficial muscles include the gastrocnemius, plantaris, and soleus. The deep muscles include the flexor digitorum longus, flexor hallucis longus, and tibialis posterior.

By gaining an understanding of the anatomical structure and function of the muscles of the lower leg, it will become clear as to how to properly exercise and target these muscles. Our discussion of the lower leg muscles will start with the prominent superficial posterior calf muscles.

Superficial Muscles of the Calf

Gastrocnemius

The gastrocnemius is the most prominent and superficial muscle of the calves. This large posterior muscle has two heads: medial and lateral. The medial head of the gastrocnemius originates on the posterior distal femur, near the medial condyle. The lateral head originates on the posterior distal femur, near the lateral condyle. Both of the heads unite at about midway point of the lower leg into the calcaneal tendon. The calcaneal tendon, commonly referred to as the Achilles tendon, then inserts into the calcaneus bone.

The primary function of the gastrocnemius is plantar flexion of the foot. It also assisted in flexing the knee when the leg is not bearing weight. When the leg is bearing weight, flexion cannot occur at the knee unless dorsiflexion at the ankle accompanies it. Therefore, extension of the knee is assisted by the gastrocnemius.

Plantaris

The plantaris is a small muscle, with a muscle belly only 2-4 inches long, but has a very long tendon. It originates at the lateral epicondyle of the femur, just above the origin of the lateral head of the gastrocnemius. The long tendon of the plantaris passes between the gastrocnemius and soleus and inserts into the calcaneus, anteromedial to the calcaneal tendon.

The plantaris has two functions: assist in knee flexion and ankle plantarflexion. Because of the size and structure of this muscle, these actions are weak. In animals, especially the cat, the plantaris is much larger and inserts onto the bottom of the foot. This setup allows for animals to be able to run faster and jump higher than humans.

Soleus

The soleus lies deep (right under) to the gastrocnemius. The soleus also has two heads, though not as pronounced as the gastrocnemius' heads. The medial head originates on the posterior tibia and the lateral head on the posterior fibula. These two heads unite and insert into the calcaneal tendon. The primary function of the soleus is plantar flexion of the foot. Unlike the gastrocnemius, the soleus does not cross the knee and has no action at that joint. Because of this, when the knee is flexed, the gastrocnemius is at a mechanical disadvantage and the soleus must perform complete plantar flexion.

Anterior Lower Leg Muscles

Tibialis Anterior

The final muscle of the lower leg we will examine is the tibialis anterior. The tibialis anterior originates at the lateral tibia and interosseous membrane (between tibia and fibula) and inserts on the medial cuneiform and base of 1st metatarsal. The tibialis anterior is a strong invertor and dorsiflexor of the foot.

Workout A

Seated Calf Raise 5 X 4-10

Standing Calf Raise 3 X 20-40 (Complete 20 reps for the 1st set, decrease load for the 2nd set and do 30 reps, decrease load again for the 3rd set and get 40 reps... it is going to burn!)

Toes Raises 2 X 6-15

Workout B

Standing Calf Raise 5 X 4-10

Seated Calf Raise 3 X 20-40 (Complete 20 reps for the 1st set, decrease load for the 2nd set and do 30 reps, decrease load again for the 3rd set and get 40 reps... it is going to burn!)

Toes Raises 2 X 6-15

If there is one muscle group that is often the most difficult for someone to develop, it is the calves. One of the reasons I think the calves are hard to develop is due to improper training of them. By improper training I mean using a poor range of motion (ROM). Often times you will see someone load up the seated calf raise machine and perform calf raises bouncing each rep and using about a 2" ROM.

Now you may look at this program and think “there is nothing special to that.” And you would be correct in saying so. The basis of this program is to pound the calves heavily with a heavy weight and low reps then follow that up with HIGH rep sets. The gastrocnemius is targeted more when the knees are straight compared to when flexed while the opposite holds true for the soleus. Here are some simple tips to incorporate with this program to help your calves grow:

- Decrease the weight you use and focus on a full stretch and contraction during EVERY rep
- Do not bounce the weight. Instead, pause for 2-3 seconds at the bottom of the movement before beginning the concentric phase of the lift.
- Perform for a VARIETY of rep ranges as the calves are composed of both fast-twitch (primarily found in the gastrocnemius) and slow-twitch (primarily found in the soleus) muscle fibers
- Try performing slow eccentrics
- Try performing your calf raises without shoes on (A popular method used by

It is easy to become discouraged when it comes to bringing up your calves as they are often the hardest muscle group for people to bring up. It can be done though. Arnold used to try to hide his calves in pictures, sometimes even standing in water. But Arnold brought his calves up and they became one of his best muscle groups. You can do the same if you put forth the effort.

Chapter 10

Setting up a Full Specialized Hypertrophy Routine Schedule

Here are some example schedules you can use with the specialized hypertrophy routines:

Chest

Chest Specialization Option #1

Monday	Chest A + Tris
Tuesday	Back + Traps + Delts
Wednesday	Off
Thursday	Chest B + Tris
Friday	Legs
Saturday	Off
Sunday	Off

Chest Specialization Option #2

Monday	Chest A
Tuesday	Back + Traps
Wednesday	Off
Thursday	Chest B
Friday	Legs
Saturday	Delts + Arms
Sunday	Off

Back

Back Specialization Option #1

Monday	Back A + Traps
Tuesday	Chest + Tris
Wednesday	Off
Thursday	Back B + Bis
Friday	Legs
Saturday	Off
Sunday	Off

Back Specialization Option #2

Monday	Back A + Traps
Tuesday	Chest + Delts
Wednesday	Off
Thursday	Back B + Traps
Friday	Legs
Saturday	Arms
Sunday	Off

Legs

Leg Specialization Option #1

Monday	Legs A + Calves A
Tuesday	Chest + Delts + Tris
Wednesday	Off
Thursday	Legs B + Calves B
Friday	Back + Traps + Bis
Saturday	Off
Sunday	Off

Chest Specialization Option #2

Monday	Legs A + Calves A
Tuesday	Chest + Delts
Wednesday	Off
Thursday	Back B + Traps
Friday	Legs B + Calves B
Saturday	Arms
Sunday	Off

Arms

Arm Specialization Option #1

Monday	Arms A
Tuesday	Chest + Back
Wednesday	Off
Thursday	Arms B
Friday	Legs + Delts + Traps
Saturday	Off
Sunday	Off

Arm Specialization Option #2

Monday	Arms A
Tuesday	Chest + Delts
Wednesday	Off
Thursday	Arms B
Friday	Back + Traps
Saturday	Legs
Sunday	Off

Delts/Traps

Delt/Trap Specialization Option #1

Monday	Delts/Traps A
Tuesday	Chest + Back
Wednesday	Off
Thursday	Delts/Traps B
Friday	Legs + Arms
Saturday	Off
Sunday	Off

Delt/Trap Specialization Option #2

Monday	Delts/Traps A
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Tuesday	Chest + Tris
Wednesday	Off
Thursday	Delts/Traps B
Friday	Back + Bis
Saturday	Legs
Sunday	Off

The above are sample schedules you can use to incorporate the muscle specialization routines in this book. For the muscles that you are not focusing on, you should use a moderate volume (i.e. 6-8 reps per muscle).

Chapter 11

Workout Nutrition for GROWTH!

Weight training causes metabolic changes that decrease protein synthesis and increase protein breakdown. As bodybuilders, we want to INCREASE protein synthesis and DECREASE protein breakdown. This can be accomplished with a sound “Workout Nutrition” plan A.K.A. pre/during/post-workout nutrition. This way as we blast our targeted muscles, we can make sure we delivery the fuel they need for growth when we need it most, around the workout! The best part is that it does not require fat-producing, high-glycemic carbs.

Pre-Workout Meal

Dextrose, dextrose, DEXTROSE! NO!!! I do not recommend dextrose to bodybuilders. As bodybuilders, we want to add muscle and loss fat. I do not think one should gain a large amount of fat for the sake of gaining muscle. Ingesting a large amount of high GI sugar is not necessary or healthy in my opinion. Instead, I recommend getting a solid food meal 60-90 minutes pre-workout, consisting of a low-glycemic carb source such as oatmeal and a fast acting protein such as whey protein. My current pre-workout meal is:

- 1 Cup Oatmeal
- 1 Cup Skim Milk
- 1 Scoop Chocolate Primaforce Substance WPI
- 2 TBSP Smucker’s Natural Peanut Butter

I mix all of this together in a bowl (the oatmeal is uncooked) then eat it. It tastes similar to those no-bake chocolate oatmeal cookies, obviously not as sweet though.

Pre/During/Post Workout Shake

Here, again, no dextrose and actually no carbs. The carbs from your last meal with be enough to provide the needed muscle and blood glucose for your workout. Here we opt for whey protein and free-form BCAA. There are a number of BCAA supplements on the market, but I use Scivation Xtend. For my whey protein I use Primaforce Substance WPI. Both Xtend and Substance come in grape and watermelon flavors, which compliment each other very well. I recommend 0.5 scoops Substance per 75 pounds and 1 scoop of Xtend per 20 pounds bodyweight. In order to save money, you can only use Xtend during your workouts and none on off days. My workout nutrition is:

- 1.5 Scoops Grape Substance WPI
- 10 Scoops Grape Xtend
- ½ gallon water

Xtend also contains L-glutamine and citrulline-malate, both of which are beneficial to performance and recovery.

Post Workout Meal

Finally we have post-workout nutrition. I recommend waiting 30 minutes after your workout and eating another solid food meal. Finish up whatever Substance + Xtend (if any) you have left over. If your main goal is to add mass, this meal should contain protein, carbs, and fat. An example meal would be:

- 1 Chicken Breast
- Sweet Potatoes (50-75 grams of carbs)
- Almond Butter (Can put this on the sweet potatoes)
- 1 Cup Green Vegetables

Or you could repeat your pre-workout oatmeal meal (this is what I do). This is just one strategy for Workout Nutrition. Some people may use dextrose and get great results. I myself would rather eat a solid food meal than drink sugar.

Chapter 12

Supplementation to Decrease Fatigue during Exercise

Fatigue is defined as “The decreased capacity or complete inability of an organism to function normally because of excessive stimulation or prolonged exertion (dictionary.com).” With regards to exercise, fatigue could be considered the point where your performance has decreased or you can no longer perform. Examples of fatigue in relation to exercise would be:

- Inability to perform another rep during a set of bench press
- Inability to continue running during a 5k race
- Inability to maintain peak velocity during a 100m sprint

One can prolong the time until fatigue by giving their body substrates/nutrients pre-workout. We are going to examine the metabolic causes of fatigue during exercise and discuss how precise supplementation can decrease the onset of fatigue during exercise, allowing you to train more intensely.

Causes of Fatigue during exercise

Newsholme et al. (1992) proposed that there are at least five metabolic factors that can cause fatigue during exercise:

- Increase in plasma tryptophan:BCAA concentrations
- Decrease in muscle phosphocreatine levels
- Hypoglycemia (low blood glucose levels)
- Muscle glycogen depletion
- Proton (H⁺) accumulation in muscles

Reference: Newsholme, 1992

Anyone of these metabolic factors of fatigue can cause your workout performance to suffer. We will examine each of these metabolic factors and then address how to overcome them through supplementation.

Plasma Ratio of Tryptophan:BCAA

5-hydroxytryptamine (5-HT) levels in the brain are believed to be a contributing factor to fatigue. Transport of the amino acid tryptophan, the precursor for 5-HT, across the blood brain barrier (BBB) is the rate limiting step in 5-HT synthesis. Therefore, increased plasma tryptophan levels can lead to fatigue. The Branch-Chained-Amino-Acids (BCAA) are transported across the BBB by the same carrier as tryptophan.

During exercise the plasma ratio of Tryptophan:BCAA increases (tryptophan increases and BCAA decreases), leading to fatigue.

Muscle Phosphocreatine Levels

The body needs a continuous supply of energy to both perform and survive. All of the body’s energy requiring processes use the potential energy stored within the bonds of adenosine triphosphate (ATP). The phosphocreatine (PCr) system is an anaerobic (does

not require oxygen), alactic (does not produce lactic acid) system that rapidly restores ATP levels.

While this reaction is very rapid, it has a low capacity, meaning it cannot produce a tremendous amount of energy. Therefore, it is in greatest demand during high-intensity, short duration exercise, such as resistance training and sprints. The maximum energy able to be yielded from this reaction occurs after about 10 seconds. After those 10 seconds, energy for ATP resynthesis must be obtained from stored nutrients. Because resistance training heavily relies on the PCr system for energy production, depletion of phosphocreatine levels can decrease performance (i.e. the number of reps you can complete).

Hypoglycemia

Hypoglycemia is low blood glucose levels caused by a low carbohydrate intake or excessive insulin secretion (insulin causes glucose [carbs] in the blood to be stored) and is commonly experienced during exercise. When blood glucose levels drop below normal levels during exercise one often becomes fatigued. This is due to glucose being a primary fuel during exercise, especially high-intensity exercise. Hypoglycemia can be overcome by consuming adequate dietary carbohydrates and maintaining stable insulin/blood sugar levels both before you workout and while you workout.

Muscle Glycogen Depletion

Glycogen is glucose stored in the body in the form of glucose chains. These chains can contain hundreds to thousands of glucose molecules. The glycogen in our bodies is created from the glucose and other nutrients we consume in our diets. This glucose becomes “trapped” in the liver and muscles, where it is synthesized and stored for later use. The liver can hold around 100 grams of glycogen, while muscle can store around 325 grams. The amount of unstored glucose circulating in the blood is only around 15 to 20 grams (Katch and McArdle, 1988) (Powers and Howley, 2001).

The glycogen stored in the liver is released, when needed, to be used in the production of ATP. The glycogen stored in skeletal muscle is used to produce ATP for that muscle to use. Low glycogen levels have been shown to cause decreased intensity, mental focus, and performance during endurance exercise while endurance performance increases when sufficient glycogen is present (Pizza, 1995). Like hypoglycemia, muscle glycogen levels can remain elevated by consuming adequate dietary carbohydrates and maintaining stable insulin/blood sugar levels.

Proton (H⁺) accumulation in Muscle

During exercise, blood and skeletal muscle pH levels may become acidic due to hydrogen ion (H⁺) accumulation, which is termed metabolic acidosis. In order to stabilize an acidic pH level the body must neutralize the excess acids. The two main ways the body does this is by taking calcium (and other minerals) from bones and glutamine from skeletal muscle. Both of these corrective mechanisms have negative consequences for the body.

Skeletal muscle contains the body's greatest glutamine stores. Glutamine binds to H⁺ to create ammonium, which is excreted from the body. In the face of metabolic acidosis and elevated H⁺ levels, breakdown of skeletal muscle and glutamine release is increased and can lead to muscle protein loss in addition to causing fatigue. The build-up of H⁺ in the blood and skeletal muscle is the cause of the burning sensation you feel during exercise (i.e. high rep leg extensions).

Now that we have a basic understanding of the metabolic factors causing fatigue during exercise we can discuss which supplements can be used to delay the onset of fatigue and improve performance.

Supplementing to Decrease Fatigue during Exercise

The most important thing one can do to decrease fatigue during exercise is consume adequate dietary macronutrients (protein, carbs, and fat) and get enough rest/recovery time. Once this is done, supplementation of the following supplements can be used to delay fatigue and enhance performance.

- BCAA
- Creatine
- Citrulline Malate
- Beta-Alanine

***Note there are other viable supplements that could be used, but this article will focus on these four supplements.

Branch Chained Amino Acids (BCAA)

The BCAA (leucine, isoleucine, and valine) are different from the other 17 amino acids in that they are primarily metabolized in skeletal muscle (Layman, 2003) and metabolized at a much lower rate in the liver (Norton, 2005). Studies show that BCAA ingestion during exercise delays fatigue due to limiting the amount of tryptophan that can cross the BBB (Bromstrand, 2006). In addition to dietary intervention, BCAA supplementation has been shown to spare muscle glycogen during exercise (Bromstrand, 2006).

Fatigue and protein loss can be diminished by supplementing with BCAA, which increases de novo synthesis of glutamine inside skeletal muscle, allowing H⁺ to be removed from the muscle (Houston, 2001). We see that BCAA supplementation can delay the onset of fatigue by overcoming three of the five metabolic causes of fatigue: increase in plasma tryptophan:BCAA concentrations, muscle glycogen depletion, and proton (H⁺) accumulation in muscles.

Creatine

Creatine supplementation is used to supply the body with more creatine, increasing the body's capacity for phosphocreatine and ATP resynthesize through the PCr system. Phosphocreatine depletion is one of the metabolic factors leading to fatigue. If you can increase the amount in creatine in your muscles, your muscles should have more creatine to use in the resynthesis of phosphocreatine, delaying the onset of fatigue.

Research has shown creatine monohydrate supplement to decrease ATP loss during intense anaerobic performance while at the same time increasing work performed. This enhancement in anaerobic performance from creatine monohydrate supplementation has been shown in both men and women (Tarnopolsky, 2000). Skeletal muscle has a limited storage of creatine. Therefore supplementing with creatine increases your ability to form ATP and therefore increases the available energy for exercise (Casey et al. 1996 & 2000).

Citrulline-Malate

Citrulline-Malate has been shown to increase the rate of oxidative ATP production during exercise and the rate of phosphocreatine replenishment post exercise (Bendahan, 2002). Increasing the rate of ATP production and phosphocreatine production would aid in delaying fatigue.

Citrulline-Malate also has anti-fatigue properties due to its ability to decrease ammonia/H⁺ levels and prevent against metabolic acidosis (Callis, 1991). Decreasing the sensation of fatigue (i.e. burning sensation) would allow one to workout harder and push out additional reps.

Beta-Alanine

Beta-alanine is one of the two amino acids (histidine being the other) that make up the protein carnosine. Carnosine is an important metabolic buffer in skeletal muscle (Suzuki, 2002), which means it helps maintain the acid-base balance in the presence of high H⁺ (hydrogen ion) concentrations. Beta-Alanine availability is the limiting factor in muscle carnosine synthesis (Hill, 2007). Beta-alanine supplementation increases muscle carnosine levels and aids decreasing muscle H⁺ levels. Beta-Alanine supplementation has directly been shown to decrease neuromuscular fatigue (Stout, 2006).

Putting It All Together

There are at least five metabolic factors that can cause fatigue during exercise:

- Increase in plasma tryptophan:BCAA concentrations
- Decrease in muscle phosphocreatine levels
- Hypoglycemia (low blood glucose levels)
- Muscle glycogen depletion
- Proton (H⁺) accumulation in muscles

Reference: Newsholme, 1992

Once you have your dietary needs met, you can incorporate specific supplements to delay fatigue and enhance performance by fighting against the above metabolic factors. In this article we learned that the recommended supplements delay fatigue and improve performance by:

- BCAA—decreasing blood tryptophan levels, sparing muscle glycogen, increasing de novo glutamine production to shuttle H⁺ out of skeletal muscle.
- Creatine—increasing phosphocreatine and ATP resynthesis
- Citrulline Malate—increasing ATP production and phosphocreatine replenishment, delaying fatigue by decreasing ammonia/H⁺ concentrations
- Beta-Alanine—decreasing muscle H⁺ levels, delaying neuromuscular fatigue

Combining these supplements with a well-structured diet can allow you to workout more intensely by delaying fatigue and enhancing performance.

Pre-Workout Supplementation Recommendation

- 5-10 grams BCAA
- 2-5 grams Creatine Monohydrate
- 3 grams Citrulline-Malate
- 2 grams Beta-Alanine

My Current Pre-Workout Supplementation Regime

- 1 serving Scivation VasoXplode
 - Takes care of the creatine, citrulline-malate, and beta-alanine recommendation
- 2 servings Scivation Xtend
 - Takes care of the BCAA recommendation



Xtend+VasoXplode = Pre-workout nutrition + Performance Enhancers

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Conclusion

The workouts laid out in this book and routines that my clients and I myself have seen good results with when it comes to bringing up lagging muscles and adding overall mass. Remember to always train smart and safe. It takes time to gain muscle, so do not become discouraged. Bodybuilding is a sport of dedication. If you put the effort forth, you can bring up those lagging muscles and soon people will be asking, “What do you do for your arms!?”



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