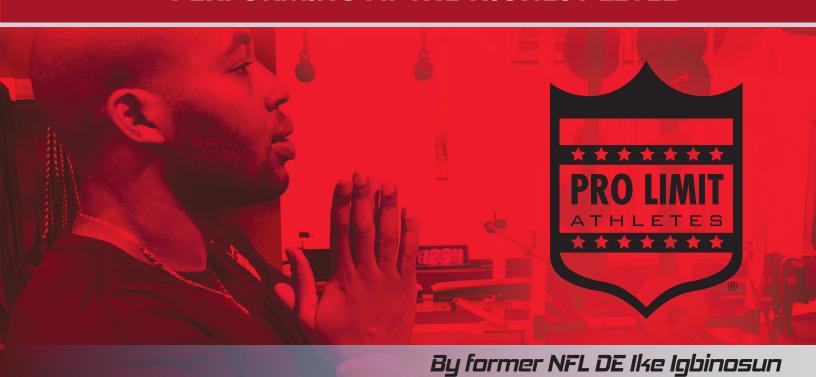


**WORKOUTS USED BY** 

# NFL ATHLETES

PERFORMING AT THE HIGHEST LEVEL



## Pro Limit Athletes Blueprint To Maximum Athletic Success

## STRENGTH PHASE 1

#### PLAYING AT THE HIGHEST LEVEL IS NO EASY TASK.

Playing in the NFL was a blessing. It has taught me a lot about athletes and what it takes to play at the highest level. It's certainly no easy task, but it is possible. In order to reach the highest level you must first focus on where you are at now, and then plan how to separate yourself from the pack.

## WHAT ARE THE CHANCES OF A HIGH SCHOOL ATHLETE MAKING THE TRANSITION TO THE COLLEGE LEVEL, THEN THE PROFESSIONAL LEVEL?

Who cares about the odds of a high school / college athlete going on to play professionally! The truth of the matter is that the odds are very low. What Matters? What really matters is putting the best product on the field / court every time you step foot on it. And here is your blueprint to doing so.

#### THE 6 PILLARS OF ATHLETIC TRAINING

- 1. Strength Training
- 2. Power Training
- 3. Speed Training
- 4. Agility Training
- 5. Flexibility / Mobility
- 6. Conditioning

#### DIFFERENCE BETWEEN A GOOD ATHLETE & A GREAT ATHLETE

- 1. Mental Toughness
- 2. Nutrition

IN THIS E-BOOK WE WILL BE FOCUSING ON PILLAR 1 STRENGTH TRAINING

## Pro Limit Athletes Strength Training

WHAT: Exercise with barbells, dumbbells, machines, etc. that provide an overload on the body.

**WHY:** To develop strength in the muscle groups of the body that are used to play. Increased strength will help improve performance (power, agility, and speed) and help to protect the areas of the body that are susceptible to injury.

**HOW:** We will use a combination of free weights, machines, and body weight movements to develop strength.

#### **KEY POINTS:**

- 1. Warm-up properly prior to each exercise. This means doing a general warm up to raise the core body temperature and specific warm-up sets on each exercise.
- 2. Do all exercises correctly. This means to control the weights up and down! Don't cheat for the sake of handling more weight!
- 3. Utilize the concept of compensatory acceleration on the bench press and squat lift. This means trying to accelerate the bar from the bottom of the lift to just before the lockout. Think EXPLOSIVE!
- 4. Workout with great intensity and concentration. You will reap what you sow in this area!
- 5. Be consistent. Once a workout is missed, it cannot be made up!
- 6. Eat well and get enough rest. Training breaks the body down. Without proper nutrition and rest, your body will not be able to adapt and recover from your workout.
- 7. Stretch and cool-down after each workout. This will ensure that you don't lose flexibility and it will enhance your recovery.

We will break down our strength program into four (4) phases to ensure variety and continual development. Lifting will be incorporated into the entire program.

## Pro Limit Athletes Blueprint To Maximum Athletic Success

## STRENGTH PHASE 1 - OVERVIEW

	PHASE ONE: WORKOUTS   OFF SEASON						
	MON	TUE	WED	THUR	FRI	SAT	SUN
WEEK 1	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	Low Intensity Conditioning & Footwork
WEEK 2	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	Low Intensity Conditioning & Footwork
WEEK 3	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	Low Intensity Conditioning & Footwork
WEEK 4	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	Low Intensity Conditioning & Footwork

## Pro Limit Athletes Blueprint To Maximum Athletic Success

## STRENGTH PHASE 1 - OVERVIEW

	PHASE ONE: WORKOUTS   OFF SEASON						
	MON	TUE	WED	THUR	FRI	SAT	SUN
WEEK 5	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills  Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	Low Intensity Conditioning & Footwork
WEEK 6	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	Low Intensity Conditioning & Footwork
WEEK 7	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	Low Intensity Conditioning & Footwork
WEEK 8	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	High Intensity Speed  Lift-Lower  Roll Out  Mobility	Low Intensity Conditioning & Footwork Drills Lift-Upper Roll Out Mobility	Active Recovery Yoga/ Swimming/ Boxing Roll Out Mobility	Low Intensity Conditioning & Footwork

	LOWER BOI	DY - PHASE ONE:	MONDAY
SUPER SET	EXERCISE	SETS & REPS	NOTES: Write down the weight you finish with
1a	Squat	4 x 5	
1b	Hip Circle (Forwards, Backwards)	3 x 8	
1c	Reverse Crunch Knee to Elbow	2 x 15	
<b>2</b> a	RDL's	3 x 8	
2b	Groin Machine	3 x 12 (2 Sec Hold)	
<b>2</b> c	Side Plank Twist	2 x 8 Each Side	
3a	Calf Raises	3 x 8	
3b	Neck (Left side, Right Side)	2 x 8 Each Way	
3c	Back-Ups	2 x 10	
4a	Pistol Squats	3 x 5 Each Leg	
4b			
4c	Transverse Criss Cross (Bicycles)	2 x 20	

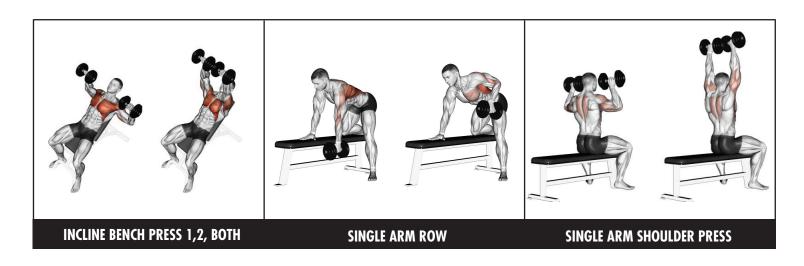
	LOWER BOI	DY - PHASE ONE:	THURSDAY
SUPER SET	EXERCISE	SETS & REPS	NOTES: Write down the weight you finish with
la	Bulgarian Split Squat	3 x 5	
1b	Side Lying Leg Lift	3 x 8	
1c	Reverse Crunch Knee to Elbow	2 x 15	
<b>2</b> a	Hamstring Curls (Single Leg)	3 x 8 Each Leg	
2b	Groin Machine	3 x 8	
2c	Side Plank Twist	2 x 8 Each Side	
3a	Isolated Calf Raises	3 x 8 Each Leg	
3b	Neck (Left Side, Right Side)	2 x 8 Each Way	
3c	Good Mornings	2 x 8	
4a	Box Jumps	3 x 5	
4b			
4c	Transverse Criss Cross (Bicycles)	2 x 20	

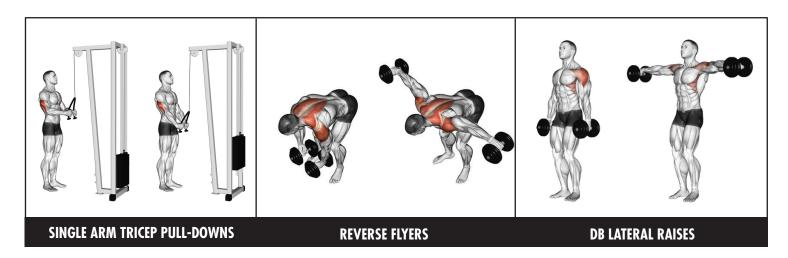
	UPPER BOD	DY - PHASE ONE:	TUESDAY
SUPER SET	EXERCISE	SETS & REPS	NOTES: Write down the weight you finish with
1a	Bench Press	4 x 5	
1b	Front Pull-Downs/Pull-Ups (alt grip)	3 x 8	
1c	Box Sit-Ups	2 x 15	
<b>2</b> a	Shoulder Press	3 x 8	
2b	Bicep 21's (7,7,7)	3 x 21	
<b>2</b> c	Russian Twist	2 x 20	
3a	DB Shrugs	3 x 8	
3b	Tricep Pull-Downs	3 x 10	
3c	Side Crunch	2 x 8 Each Way	
4a	Explosive Push-Up	3 x 8	
4b	Neck Front, Back	2 x 8 Each Way	
<b>4</b> c	Supermans	2 x 10	

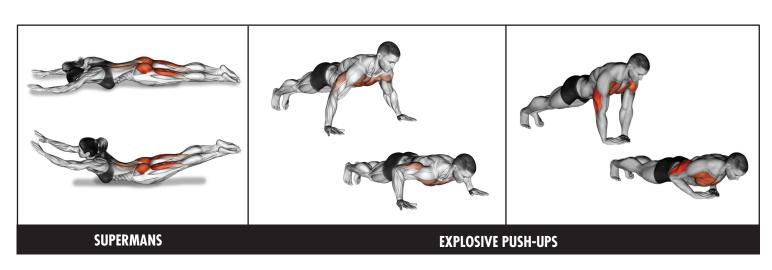
	UPPER BODY - PHASE ONE: FRIDAY					
SUPER SET	EXERCISE	SETS & REPS	NOTES: Write down the weight you finish with			
la	Incline Bench Press 1, 2, Both = 1 Rep	3 x 4				
1b	Single Arm Rows	3 x 8 Each Arm				
1c	Box Sit-Ups	2 x 15				
<b>2</b> a	Single Arm Shoulder Press	3 x 8				
<b>2</b> b	Single Arm Triceps Pull downs	3 x 8				
<b>2</b> c	Russian Twist	2 x 20				
3a	Reverse Flyers	3 x 10				
3b	DB Lateral Raises	3 x 10				
Зс	Side Crunches	2 x 8 Each Way				
4a	Explosive Push-Up	3 x 8				
4b	Neck Front, Back	2 x 8 Each Way				
4c	Supermans	2 x 10				

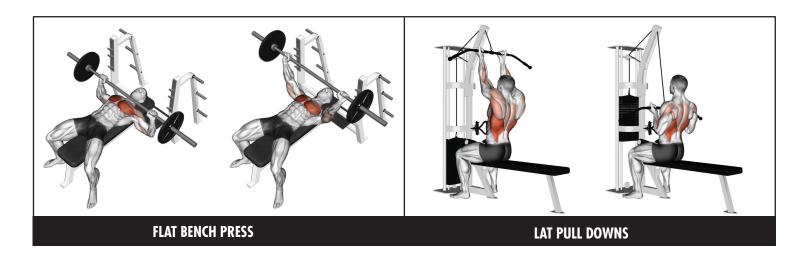
## GOAL SETTING

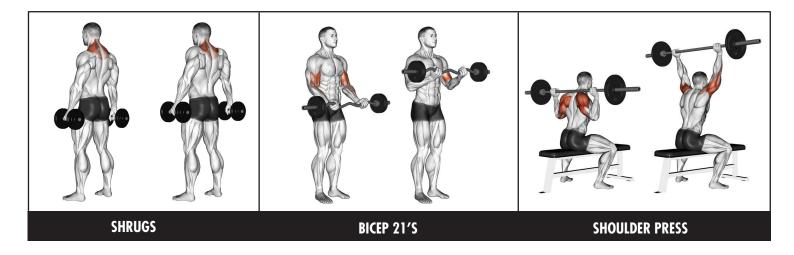
PRODUCT GOALS: Something we can improve/achieve in the next 12 months. PROCESS GOALS: Things we can do daily to reach the product goal. 1. What are the three greatest priorities in your life? (please list them in order of importance) 2. What is your ultimate goal in Fitness/Sports 3. List one product goal you want to accomplish 365 days from today and two process goals needed to accomplish it. Product goals: 4. List a second product goal that you want to accomplish 365 days from today, and two process goals needed to accomplish it. Product goals: 5. List the sacrifices it will take on your part for you to achieve your ultimate fitness / sport goal 6. List your character traits that show proof that you have what it takes to achieve your ultimate sport goal 7. Name a coach or mentor who will review your goal progress by the fifth of every month

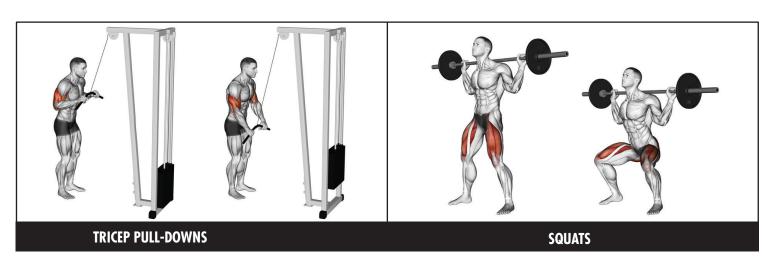


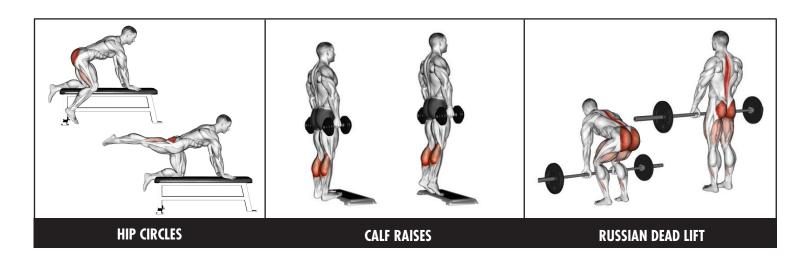


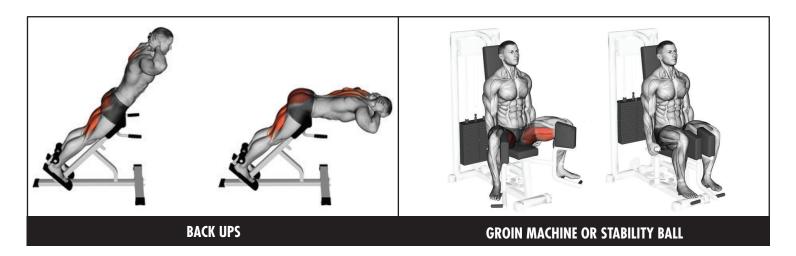


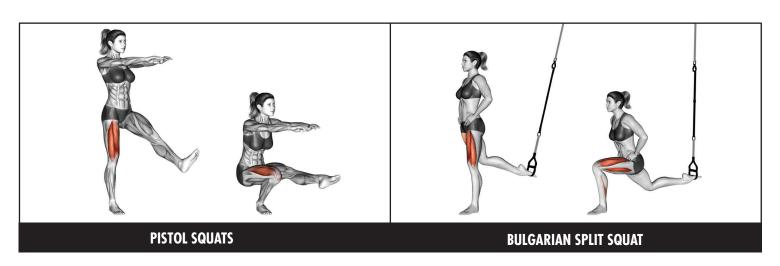


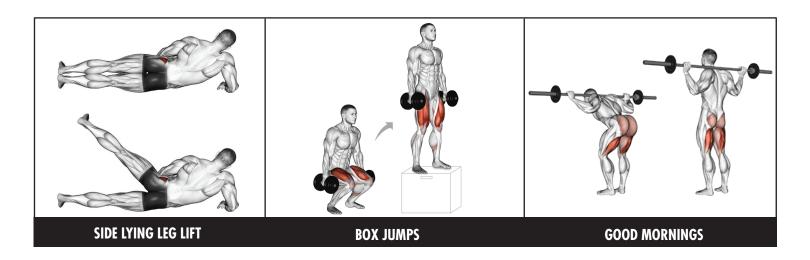








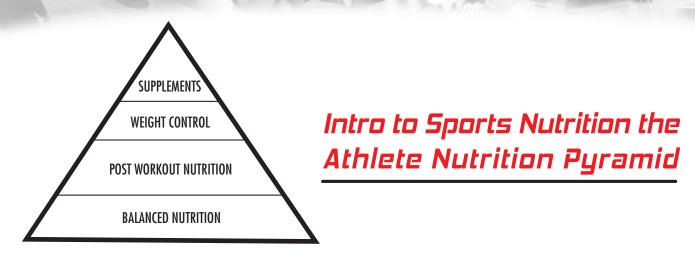






## prolimitathletes.com

This picture glossary does not include abdominal workouts. Visit prolimitathletes.com to see the video.



#### WHEN CONSIDERING THE ATHLETES DIET, WE NEED TO CONSIDER 4 QUESTIONS:

- 1. What we are eating?
- 2. When we are eating?
- 3. Why we are eating?
- 4. How much we are eating?

For sports nutrition purposes we can divide food into 4 categories based on what nutrients they provide, and how much they contribute to athletic performance.

Athletes need Energy to perform (Carbs), Nutrients to recover (Protein, Fruits, Vegetables, and Fluid) The WHEN (nutrient timing in relation to activity) and HOW MUCH. A balanced nutrition plan takes all three factors into account daily. By ignoring any one part you are ultimately sacrificing performance.

Remember what you eat today effects not only how you perform today, but how well prepared you are for tomorrow.

#### **GENERAL GUIDELINES**

- Match your Calories to your activity
- · Stay Hydrated! if you are thirsty, you are already dehydrated
- · Plan Ahead
- Eat Breakfast
- Eat More Frequently
- Listen to your body
- Limit night time eating
- Enjoy your food

#### WHAT: BALANCED NUTRITION CARBOHYDRATES

WHY: Carbohydrates provide the body with the energy it needs to do quality work. Both starches and sugar are considered carbohydrates. Your body eventually breaks all carbs down into sugar in our blood. HOW QUICKLY the sugar gets in our blood is measured by the GLYCEMIC INDEX (0-100, with 0 taking the longest)

When carb levels are low in the blood, & your body stores (AKA GLYCOGEN) you will fatigue faster and lose a step. Muscles that are naturally slow to relax between contraction are those most likely to become fatigued. These muscles become tight and are more vulnerable to cramping or pulling, over time, slight pulls and tears can lead to scar tissue build up in the muscle which can lead to an increased risk of that muscle becoming a chronic problem.

Pre-Workout /Competition: We generally eat slow digesting (Glycemic index 0-70) Carbs about 2-4 hours pre-competition. (Usually about ½ of your plate).

During & Immediately After Workout/ Competition: We use simple sugars (usually in a sports drink) to avoid cramping and get the carbs back into our muscles.

On Inactive Days: You will not be burning nearly as many calories as during a training day. Therefore, you need to CUT FAST DIGESTING CARBS and eat smaller portions of SLOW DIGESTING CARBS (usually about 1/4 of your plate).

High blood sugar (too much carbs in diet) can promote the accumulation of body fat and the host of problems associated with TYPE II DIABETES. Kidney damage, high blood pressure, and decreased ability of anti-oxidants to cope with stress are all effects of high blood sugar.

COMMON SLOW DIGESTING CARBS	MODERATE DIGESTING CARBS	COMMON FAST DIGESTING CARBS
Active & Inactive Days	Active Days	Pre/Post Work Out
Carrots	Pasta	Hash Browns
Sweet Potatoes	Special K, frosted Flakes etc.	Mashed/Baked Potatoes
Boiled Potatoes with skin	Apples	Graham Crackers
Lentils	Plums	Pretzels
Kidney Beans	Peaches	White Rice
Black Beans	Oranges	Pop tarts
Whole Wheat Pasta	Grapes	Bagels
Ravioli (with cheese or meat)	Bananas	Breakfast Bars
Brown Rice	Mango	English Muffins
Wild Rice	Papaya	Baguettes
Rice Pilaf	Cantaloupe	Waffles
Couscous	Pineapples	Pancakes
Whole Wheat Bread	Snickers	Sugar Cereal
Multi Grain Bread	Pudding	Sweetened Soft Drinks
Pumpernickel	Granola bars	Watermelon
Pita Bread	Angel food cake	Keep Intake

<sup>\*</sup> Keep Intake of high Glycemic foods limited to the 2 hours before and after exercises. This allows the body to use the sugar in these foods for energy before they get stored as fat.

#### WHAT: BALANCED NUTRITION PROTEIN & CALCIUM

WHY: Protein breaks down into Amino Acids, which are the building blocks of muscle. We need to established a good mix of proteins in order to minimize our muscle soreness while improving recovery time.

Spreading protein intake out throughout the day, is important to improve our efficiency or rate of recovery as well as promoting tissue remodeling after your workout

Your rate of PROTEIN SYNTHESIS is at its peak about 2 hours after activity, and again at night. This is why we try to get athletes protein right after activity and again before bed.

We keep our amount of protein the same between ACTIVE DAYS & INACTIVE DAYS however we have a little more room for medium and high fat meat on active days since we are burning more calories.

If you are always choosing lean protein, even on ACTIVE DAYS you have more room to utilize the healthy fats (VIT E FOODS) that contain antioxidants.

COMMON LEAN PROTEINS	COMMON MEDIUM FAT PROTEINS	COMMON HIGH FAT PROTEINS
Active & Inactive Days	Active Days	Active Days (Limited)
ANIMAL SOURCES:	ANIMAL SOURCES:	ANIMAL SOURCES:
Egg Whites	Egg Whites	75% Lean Ground beef
95% Lean Ground beef	85% Lean Ground beef	Beef ribs
Ground Rounds	Prime rib	Spare ribs
Sirloin/ Flank Steak	Rib eye	Bacon
Veal/Buffalo	Corned beef	Hot Dog/ sausage/ bologna
Ham/ Pork Tenderloins	Hot Dog/ sausage/ bologna	(6g fat/ serving or more)
Chicken/ Turkey	(3-5g fat/ serving)	Salami
Ostrich	Poultry- dark meat with skin	Kielbasa
Salmon	Fried chicken	DAIRY:
White fish	Fried fish/ shellfish	Whole milk
Tuna	DAIRY:	Yellow cheeses (American/Velveeta
Scallops / Shrimp	2% milk	Monterey Jack
DAIRY:	Cottage cheese	American Cheddar
Skim milk	White cheeses (Mozz.	Swiss
Fat free cottage cheese	Provolone etc.)	VEGGIES:
Parmesan cheese	Plain yogurt	Peanut Butter
Low-fat yogurt	VEGGIËS:	Soy cheese
VEGGIES:	Tofu	,
Peas/ Lentils/ Beans	Soy yogurt	
Soy Protein Shakes	Soy milk	

## WHAT: Balanced Nutrition Fluids & Hydration

WHY: Hydration is a major issue for athletes. Dehydration is a major issue and can lead to many medical issues including death. Do not wait until you are thirsty to drink. If you feel thirsty you are already partially dehydrated.

Athletes are at risk for dehydration given the high sweat losses during practice/conditioning especially in the heat or during double sessions.

Dehydration can lead to heat stroke-symptoms are headaches, nausea, dizziness, clumsiness and even loss of consciousness.

SEE YOUR PEE: One way to monitor your hydration status is to observe the color of your urine. A well-hydrated athlete will have light to clear urine. Dark, concentrated urine is the sign of dehydration and/or heavy supplement use.

Our thirst and drive to drink do not match the rate at which we lose fluids. Being WELL HYDRATED BEFORE A WORKOUT or competition is the best way to prevent dehydration.

DURING ACTIVITY you need about 1-2 cups of water or a sport drink every 15 minutes or more. SPORT DRINKS help stimulate the drive to drink due to the sodium in the formulas. WATER can often diminish our drive to drink. Most sport drinks also contain a dilute source of fast digesting carbs to help prevent blood sugars from falling to a dangerous level.

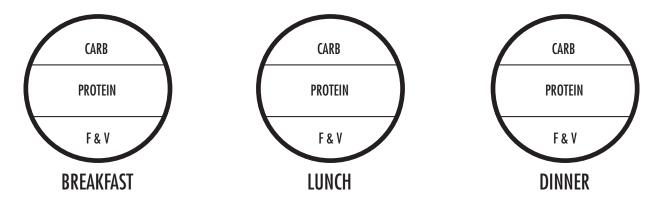
If you don't take in fluids as you sweat, your blood actually thickens. This makes your heart pump harder and slows oxygen and nutrient delivery to exercising muscles. Result: your body suffers.

Electrolytes are necessary for maintaining fluid levels in the body, muscle contraction, and nerve impulse transmission. Electrolytes are lost in our urine and during periods of high sweat loss. If we do not replace the electrolytes lost, we become dehydrated and our blood levels can drop to dangerous levels. Sodium and potassium are needed to contract your muscles (including your heart). By replacing electrolytes, we prevent muscle cramping and heat stroke due to dehydration.

During periods of high fluid losses AVOID CAFFEINE products, as they can decease your short-term ability to reclaim fluids. CAUTION: Many liquid supplements contain LARGE amounts of caffeine. CHECK THE LABELS for caffeine. Be especially aware of products that contain the word "ENERGY" "FAT BURNING" or "THERMOGENIC".

#### WHEN: OFF DAYS

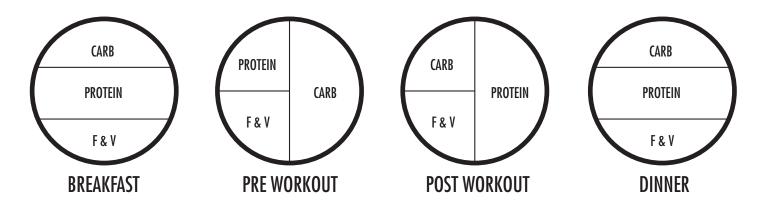
On off days you're eating pattern will be drastically different than on a day with any level of activity. Since your muscles and body are not being shocked by workout or practice, you can eat a general balanced meal plan. Choose equal parts of carbs, protein, fruits, and veggies at each meal. If you are prone to gain unwanted weight, these are the days you really need to be careful. Choose moderate to slow digesting carbs as a rule. If possible, try to incorporate mid-morning and mid-afternoon snacks to help your metabolism.



#### WHEN: WORKOUT DAYS

On light workout days you need to fuel your workouts with plenty of glycogen and recover from your workouts with plenty of protein. You have some room for fast digesting carbs pre-work out and immediately post workout. If you are trying to lean up, limit medium fat meats here. Avoid high fat meats.

On heavy workout days, you need the same breakdown of food at each meal, but since you are burning more energy, you need more fuel. Use your heaviest work day to fit in any high fat or dessert type items. On these days your metabolism is running at its highest, and you are less likely to store these extra calories as fat.



#### WHAT: POST WORK OUT NUTRITION

What you eat and drink in the first two hours after a workout is just as important as what you do in the workout itself. Nutrition is the primary determinant of the outcome of this critical short- term muscle recovery process. Athletes who consistently take in the right nutrients in the right amount during the "muscle recovery window" will recovery faster, adapt more fully, and eventually wind up far ahead of those who consistently do not.

Poor post workout nutrition can lead to: increased soreness and fatigue, decreased performance, a decrease in muscle gains despite training, increased fatigue in your next work out. When you work out, your body continues to break down even after the exercise has stopped. You deplete your energy and increase muscle break down. You will continue these negative effects until your body receives signals to stop. Your post work out feed provides these signals.

Under normal conditions, your body responds to a meal by sending the nutrients you just took in all over the body to provide the energy you need to survive, some of the nutrients end up in the muscles. After intense workouts, you have essentially traumatized your muscles (your body doesn't know you are doing this on purpose). When we eat immediately (20 minuets to 2 hours) after a heavy work out, your body senses this "trauma" and sends much more of the nutrients to the muscles.

Remember, it is these nutrients that head to the muscles that will provide the energy for tomorrow's work out. Proper nutrition today, gives you the edge tomorrow!

There are four categories of nutrients you need to consume as soon as possible after every work out: water and electrolytes, carbohydrates, protein, and antioxidants

**Water and electrolytes:** During exercises, body fluid comprising water and electrolytes is lost. It is not possible to restore water and electrolytes as quickly as they are lost during moderate- to high-intensity exercise. So, even athletes who are conscientious about hydration always complete their workouts in a state of fluid deficit. This phenomenon is known as "involuntary dehydration". Dehydration causes blood volume to stay low which in turn slows the delivery of vital nutrients to the muscles and the removal of metabolic wastes from the muscles.

**Replenishing Glycogen (Carbohydrates):** The primary fuel sources for moderate- to high-intensity exercise is glycogen that is stored in the muscles and comes from dietary carbohydrates. After exercises, the sooner you begin to replenish muscle glycogen by consuming carbs, the better. This is because, following exercise, the muscles cells are much more receptive to insulin, the hormone responsible for transporting glucose through the blood stream to the liver and muscles, where it can be stored as glycogen. The body can synthesize glycogen two to three times as fast during the first two hours after exercise than it can at other times.

Studies have shown that taking in a small amount of carbs and protein in the first 20 minutes after a workout can drastically improve recovery and decrease muscle soreness. The most effective mix of carbs and protein seem to be 4gm of carbs for every 1 gram of protein. This mixture in the first 20 minutes, appears to help stimulate the muscles to begin the recovery

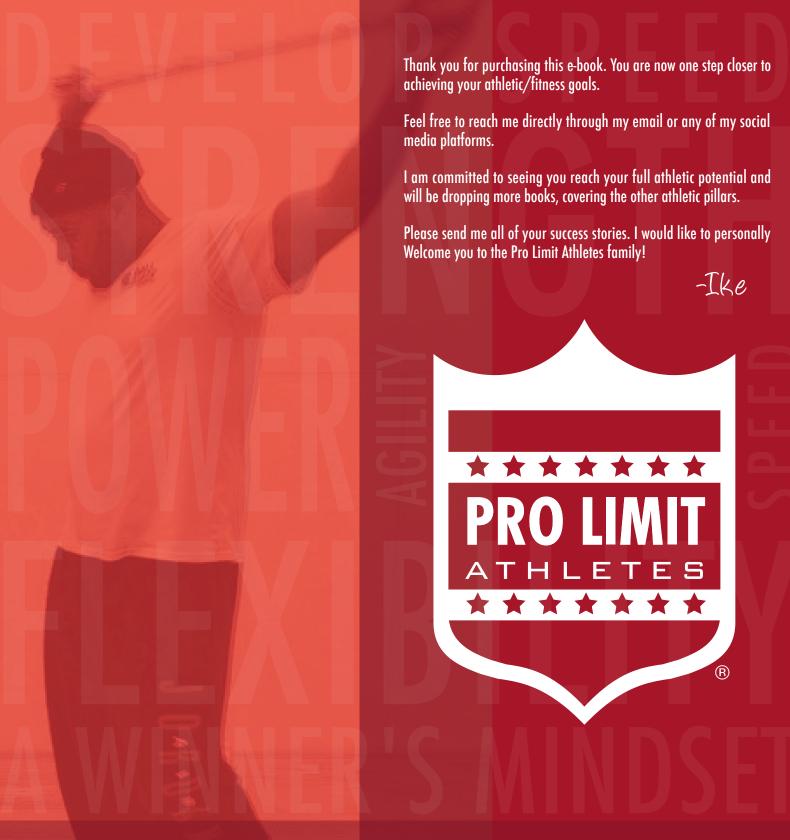
## WHAT: POST WORK OUT NUTRITION (CONTINUED)

process as well as stimulating the insulin response, which drives the carbs into the muscles. Some examples of foods with close to the 4 to 1 carb to protein ratio are: Chocolate Milk, Gatorade Shakes, Ensure, Cliff Bars, and Myoplex Shakes with Milk.

How much carbohydrate is needed? As a general guideline, athletes should try to consume about one gram of carbs per pound of body weight during the first two hours of exercise. Most or all of this carb should be high-glycemic, because high-glycemic carbs stimulate greater insulin release and are therefore delivered to the muscles and liver more quickly than their low-glycemic counterparts. Many athletes find it most convenient to get their post exercise carbs simply to continue using a sports drink following workouts. A majority of sports drinks provide the water, electrolytes, and carbs the body needs to recovery. Also, its often easier to drink than it is to eat a full meal soon after exercise.

**Protein:** Protein is used to produce some energy during strenuous workouts when carb fuel runs low. Also, the normal process of protein building is virtually shut off during workouts because protein is an important structural element of muscle. Protein breakdown during exercises leaves the muscles in a weakened state afterwards. In order to properly recover from and adapt to this particular training stress, athletes must act quickly to rebuild muscle protein. Timing is as important for protein rebuilding as it is for glycogen replenishment, and for the same reason. Insulin is responsible for delivering both glucose and protein to muscle cells. Again, the muscle cells are extraordinarily sensitive to insulin during the first two hours after exercise.

**Antioxidants:** A major cause of post-exercise muscle soreness and weakness is oxidative stress, or free radical damage. Oxygen is a high reactive type of molecule- a free radical. During intense exercise, an athlete's rates of oxygen consumption increases dramatically. Fortunately, antioxidants such as vitamin E are able to protect body tissues by neutralizing free radicals. Research has shown that athletes who take in healthy doses of antioxidants after exercise experience much less free radical damage than those who do not. Antioxidants are plentiful in many fruits and vegetables, and a growing number of sport drinks and performance recovery drinks contain them.



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