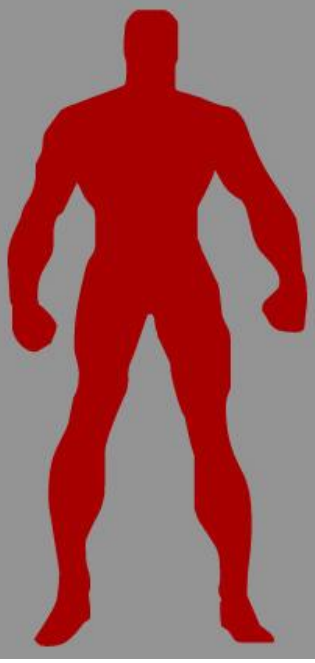
Body Fat Percentage

The Complete Guide To Evaluation and Measurement.



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Disclaimer

Before starting any new diet and exercise program please check with your doctor and clear any exercise and/or diet changes with them before beginning.

This is merely a guideline and advice manual. This manual was written to help guide the average healthy individual in the right direction towards a happier and healthier lifestyle. I am not a doctor nor do I claim to have any formal medical background. I am not liable, either expressly or in an implied manner, nor claim any responsibility for any emotional or physical problems that may occur directly or indirectly from reading this material.

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All information is intended only to help you cooperate with your doctor, in your efforts toward desirable weight levels and health. Only your doctor can determine what is right for you. In addition to regular check ups and medical supervision, from your doctor, before starting any other weight loss program, you should consult with your personal physician.

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A Federal Trade Commission (FTC) study by a panel of experts concluded the following: That proper weight loss is achieved by reducing caloric intake and/or increasing physical activity. Individuals maintaining weight losses over the long term do so by changing their diet and changing their physical activity.

Although there are common characteristics among the relevant population, there is not a single cause of overweight or obesity. In some people, the cause may be more closely linked to genetic factors while in other instances, the principal causal factor may be environmental. Moreover, it should be obvious that diets, metabolic rates, and levels of physical activity vary from one individual to another and that weight loss levels will vary. Weight loss results for one individual are not to be viewed as typical for another individual.

Rapid weight loss may also be associated with some medical problems. Individuals undergoing weight loss can experience physical changes in the body (dizziness, interruptions in the menstrual cycle, hair loss, for example) that may indicate more serious conditions. People noticing such changes should be advised to talk immediately to their primary care physician.

Children and adolescents, pregnant or breast feeding women, and people with significant health problems such as bulimia, heart disease, kidney disease, diabetes or psychiatric disorder, should not begin this program without written authorization by their primary care provider.

People under treatment for other conditions or taking medications prescribed by their health care provider should tell their providers that they have begun this diet because, in some cases, adjustments to medications or modifications to the weight loss program may be appropriate.

This is not a custom weight loss program. This is merely a program designed for discussion and educational and entertainment purposes. In no way should be used in place of a program from your doctor or registered dietitian. The information in this document is supported by research by various government and regulated organizations.

As it states by FTC regulation, all links may contain affiliate or product promotion either directly or indirectly. All opinions are my own and through personal evaluation only or creation.

Introduction

For the past few years, through various articles and videos, I have been enlightening people on the realities of body fat percentage. I am constantly surprised by people's response to the topic of body fat percentage, but also surprised by how many professionals use it wrong. Everywhere I turn, I am seeing articles that are incredibly off. I also see professionals claiming transformations and numbers which are highly misleading. These "legitimate" professionals are claiming body fat percentages which aren't possible to maintain nor have they achieved. What does this lead to? In my humble opinion, it leads to the client or reader being against unreasonable standards, or believing their false information to be true. Hopefully, this guide will help clear up any confusion you might have, or start you off on the right foot.

With this manual, you are going to learn how to read body fat on yourself or others. You will understand the best devices and empirical methods for judgment. This is an extremely useful guide that will answer all your questions about measuring and interpreting body fat percentage.

If you're looking for the abridged version with less detail, you can always check out this post => http://www.leighpeele.com/body-fat-pictures-and-percentages

What Is Body Fat Percentage?

Put simply, body fat percentage is the relation of fat mass to the lean body mass in your body. Your body is made up of various amounts of organs, water, tissue, and bone.

Body Scan Of Two Women 1-Obese/1-Target Weight

As you can see, it is evident how damaging it can get for individuals when body fat percentage starts to exceed or equal lean mass. Excess tissue weight (also accompanied with water) on your organs and bones, can cause health and mobility problems all on their own. Above, you will find an example of a woman who is near a 50% body fat mark. You can see that muscle mass has not increased significantly and organ stress and inflammation is marked.

You have to think logically about the set-up of the human structure.

Skeleton>Organs>Tissue/Water>Fat>Skin

What Body Fat Levels Are Desired And Achievable?

Very often I see people proclaim they are holding at 3% body fat having. The reality is those low levels of body fat are nearly impossible to hold, and rarely achieved. Men who usually achieve 3-4% body fat are also under the influence of anabolic steroids, as are women who achieve 8-9% body fat. Very few natural bodybuilders are able to achieve that type of leanness due to the difficulty in dropping body fat when you hit the last few percentages. Low body fat, as well as increase in muscle mass is one of the driving factors in steroid use. In fact, both my male and female pictures in this report are more than likely from steroid users. (Note: It is purely speculation based upon years of seeing this with my own eyes but is not confirmed fact in any way.)

If you move out of the realm of competition, those who achieve those body fat levels in the non-competitive world are usually in hospitals being treated for anorexia or other eating disorders. The line can also blur between the two arenas.

While there are exceptions, the chart below outlines a guideline for body fat levels. I have included the likelihood of these levels to be sustained. Going below sustainable levels for extended periods of time could lead to long term health problems, especially for females and their reproductive systems.

You will note I used the term “generally.” It is there for a reason. There are exceptions to the rule and ranges, especially for men in the area of body fat. Though it is well research, it is still just a guideline.

Female Body Fat Levels	Male Body Fat Levels
Bodybuilding Competition Levels/High Level Anorexic - 8-12% - Unsustainable	Bodybuilding Competition Levels/High Level Anorexic - 3-4% - Unsustainable
Figure Competitor/Extremely Thin Model - 13-15% - Generally Unsustainable	Very Lean/Model - 6-9% - Generally Unsustainable
Athletic/Model - 16-19% Generally Sustainable	Model/Athetic -10-15% Generally Sustainable
Athletic/Average - 20-25% Sustainable	Athletic/Average - 15-20% Sustainable
Average/Overweight - 25-35%	Average/Overweight - 20-30%
Overweight/Obese - 35%+	Overweight/Obese - 30%+

How Do We Measure Body Fat?

There are quite a few methods of measuring body fat. The most popular methods are the following:

1. Skinfold Measurement (Skin Pinch)
2. Bioelectrical impedance analysis (BIA Handheld/Scale Deviced)
3. Dual energy X-ray absorptiometry (DXA Scan)
4. Height and circumference methods (Measurement Site Collections)
5. Hydrostatic Testing (Underwater Density Test)
6. Visual Body Fat Assessments (VBFA)

Note: There are other methods from MRI body scans to 3D laser. For the purpose of brevity, research and logical application in the real world, I am focusing on the above six.

We are going to take a detailed look at how each one is performed and their overall accuracy, pros, cons, and take home recommendation. Before I began, there is an important point you must understand about these methods, and this will not be the first time I touch on this…

READ BEFORE CONTINUING

All of these methods are compared to each other in research. This is an important point because honestly, there is no base. In some research, DXA is seen as the base. In others, Hydrostatic Testing is the base. There is also MRI scans and autopsy, though very rare for the analysis of suitable body fat measurement. In pubmed, you will find over 3000 studies with reference of "body fat measurement." I have looked at over a hundred studies and reviews of body fat testing (at least). You will find the most prominent ones referenced in this document.

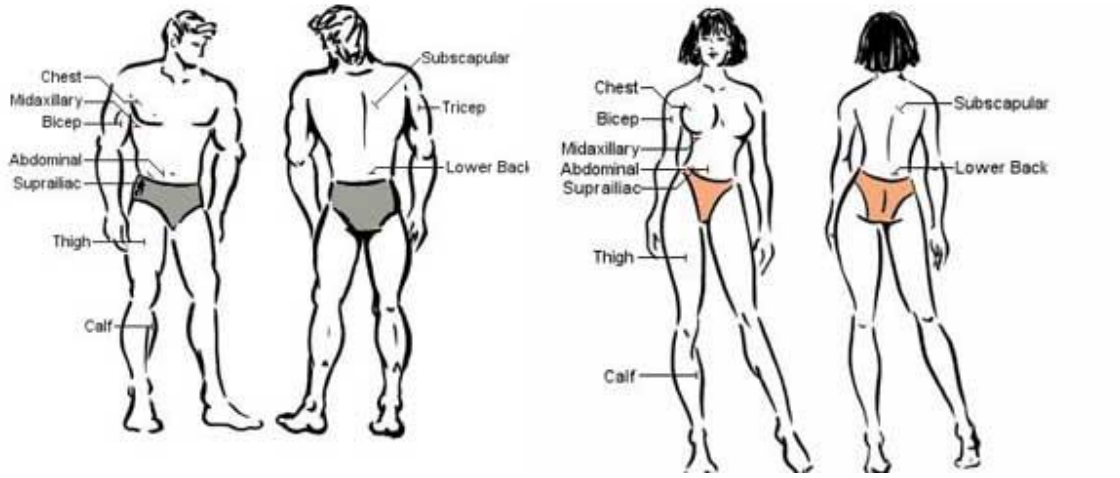
As of current research, it is of my belief via research that DXA is the most reliable and comparative model or "base." That being said, there are differences in models and use. It is acknowledged and referenced. It was best stated in this article that, "DXA body composition studies have emerged as a potential new reference standard for body studies, replacing underwater weighing. While DEXA scans have become a valued research tool, it is unclear how information regarding body composition could be used in the active medical management of the patient to improve health outcomes. A search of the literature did not identify any controlled studies in which DXA body composition measurements were actively used in patient management compared to the use of other simpler techniques of body composition assessment, i.e., bioelectrical impedance or skin-fold thickness."

1. Skinfold Measurement (Skin Pinch)

Skinfold measurements, also referred to as “calipers” is the method of assessing a person’s body fat by means of pinching the excess subcutaneous fat from the body and measuring it via a caliper device. There are various methods/sites for skinfold testing which include:

Jackson/Pollack (3/4/7 Sites)
Parrillo (9 sites)
Durnin/Womersley (4 Sites)

This site has a calculator where you can input your results from your measurements and gives you details pictures and instructions.



http://www.linear-software.com/online.html

Pros - Cheap, easy to find equipment for use

Cons - Lacks consistency, very high error with usage, takes expertise

Conclusion - Many studies have compared the usage of calipers and other methods against DXA as the gold standard of measurement. I will get to DXA in a moment. For now, I think it best sums it up to quote Katch and Mcardle - “The major drawback with the skinfold technique lies in the extensive expertise one must have in taking readings accurately and with consistency.” In most research, investigators have hundreds to thousands of case experiences, and even in those accuracy is rare.

2. Bioelectrical impedance analysis (Handheld/Scale Device)

Bioelectrical impedance analysis (BIA) is the process in which a person grabs or stands on plates (conductors) and a electric current (small) is sent through the body. The rate of travel and resistance of that current is what determines the percentage of body fat to lean mass (including water and muscle). Lean body mass is a good conductor while fat is a poor conductor of electric current. This means the slower the current, the more fat you carry.

Pros - Extremely easy to use, relatively low cost

Cons - Lacks consistency, very high error with usage

Conclusion - Over the years BIA has increased in its accuracy of readings, but it is still a “hit and miss” with reliability. Several studies have pinned BIA alongside calipers and other methods using DXA as the base. Over and over readings vary and consistency is an issue. There is also research that points to BIA consistently underestimating body fat for those who are obese. Water intake is another factor for readings and error. The best way to get consistent readings with the BIA is to take measurements at the same time of day as the previous, with the same amount of food/water intake. Best is first thing in the morning, pre-eating.

3. Dual-energy X-ray Absorptiometry (DXA Scan (previously DEXA)

DXA scans are traditionally used to evaluate bone mineral density (BMD). In more recent years, they have been used to evaluate body composition and particularly body fat percentage. The machine works by scanning your body (much like a scanner you would use for paper or pictures). It then collects the data and processes the information. From there, the computer and doctor will evaluate your bone density and (if offered) body fat percentage.

Pros - Is considered the gold standard in which everything is measured by, provides very distinct visuals

Cons - Human calculation error and estimates can occur, machine was not made for this, readings seem to be different from machine to machine and software.

Conclusion - Because DXA was not created for the purpose of body fat testing, it has been said to be flawed for conclusive readings. At the same time, of all methods it is the only one to take a “fat x-ray” and that is something. You have to take into consideration that the company of the machine will help determine the type of outcome and consistency. As is, from machine measurable methods, DXA appears to be the best out of current

body fat measurements available to the general public.

4. Height and Circumference Methods (Measurement Collections)

There are a few formulas for measurement collection, but I am going to focus on the most popular method - The US Navy formula. This formula was developed by the U.S. Navy to estimate your body fat percentage without calipers. You use a tape measure and enter your waist, hip, and neck measurements. You then combine those measurements with your height and weight and it will pop out your body fat percentage.

http://www.fitness.bizcalcs.com/Calculator.asp?Calc=Body-Fat-Navy

Pros - Extremely easy to use, relatively low cost

Cons - Accuracy depends far too much on muscle mass in subjects

Conclusion - While a very simple method, there is too much room for user error and error due to higher levels of muscle mass. A comparison would be the lack of accuracy with a BMI chart.

5. Hydrostatic Testing (Underwater Density Test)

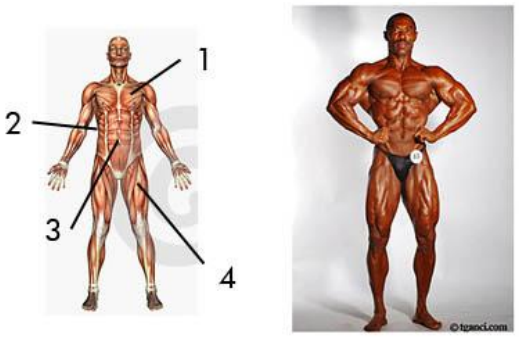
For a while, Hydrostatic Testing was seen as the gold standard in body fat estimation. The test is performed by lowering you into a tank of water and then testing your land weight vs. water weight (based on buoyancy). Simply put, fat floats and mass sinks.

Pros - Researched, generally safe

Cons - Costly, hit and miss with accuracy, often unreliable locations for repeat use

Conclusion - Since a 2010 study stated it was basically the same as BIA, and since BIA has been shown to be moderately accurate at best - save your money and go with lower cost BIA testing. There is also the issue of air and gas placement in the body, which can skew results.

6. Visual Body Fat Assessments



Muscled Skeleton VS Male Human

This technique is as old as it is new. Since the dawn of the question "What is my percentage of body fat?" man has been using visual estimates. From party jokes to pro level bodybuilding competitions, body fat analysis via the visual realm can be a science as much as it is an art. A person can stand before an evaluator or use photographs of multiple angles and is then judged on what level of body fat they carry by the way fat and muscle is distributed on the body.

Pros - Extremely easy to use, little to no cost

Cons - No research evaluation, percentage is in the eye of the beholder

Conclusion - VBFA is hardly peer supported research and should be taken with a grain of salt. It takes a skilled eye to be able to determine things properly. For example, I have tested my knowledge against DXA and other body fat readings. For the layman, it would be hard to assess small changes in body recomposition and you would need someone who is very trained with body fat readings on an electronic level in comparison level with machine. Meaning, you would want someone who takes DXA and other body fat measurements as learning for their readings.

Having said all that, seeing yourself change visually towards the positive side of body composition is a motivator and truly the most important aspect of body fat measurement and composition change.

Of all these tests, it is a general consensus that DXA scan provides the most accurate results you can achieve beyond an autopsy. That being said, DXA isn't always easy to find and it certainly can't be used on a regular basis.

What Method Do I Recommend For Consistent Use?

Visual + BIA

While I still standby the lack of consistency of BIA, if you use it properly it can help you see change. That being said, you have to understand how much these things can vary. If you are doing any kind of cycling program (which I highly recommend) you are going to get inconsistent readings with short term use. Invest in long term readings to find trends in drop/gain.

With visual, you get to see the actual change in your body as it is happening. You can see the cuts and lines develop. You can see yourself shrink and morph into the person you want to become. No machine can do that for you.

Tips For Getting The Best Pictures And Posing

1. Wear a skimpy outfit

If you can't see it, you can't see it change. For women - sport bra and shorts. For men - Board shorts or briefs.

2. Wear the same outfit

Until you can't fit in that outfit anymore and it's falling off of you, use the exact same outfit. It's a marker for change.

3. Relaxed Pictures

Don't just take flexed pictures. I always say until you like what you see standing relaxed, you still got work to do.

4. All sides

Shoot front, back, and both sides of yourself. I have looked at pictures and seen nothing from the front, but then the person turns to the side and BAM!

5. Timer

Even cell phone cameras have them, find a spot, set the time and smile.

6. Lighting

This is not the time for candle-lit pictures. Look at yourself in all your flub glory. If you like how you look in bad lighting, then you are done.

7. Posing Makes A Difference

The types of flexing you do make a difference. Two arms held upwards in a bicep flex does not highlight muscle. Great muscular poses, if you use them, should create tenseness and vascularity.

This video shows you an assortment of poses that help define muscle definition. It should be noted 85% of these guys are on steroids. 100% of them are spray tanned, excessively. 100% have manipulated water and carbohydrates for maximum definition. They know the tricks of the trade, and make training and dieting their life. My point, is don't expect to see this in the mirror by accident. It is just an example video of flexing. There are other videos on youtube that show you in detail how to do different poses.

A Deeper Look Into Visual Body Fat Percentage

Online there are very few resources that look at visual body fat percentage. As I stated before, it is an art but it is also a science. This is certainly a systematic study and collection of fact based knowledge mixed with experience. That being said, left and right message forums are popping up with the "guess my body fat!" threads and the estimates are as off as you would expect. Hopefully this will give you a better guide to go from. If you want a personal estimate, you can always join the forums at Leighpeele.com and ask for an estimate from myself personally.

Visual References By Percentage

I am going to list out various pictures and examples of body fat measurements and percentages. These measurements have not been evaluated or compared via confirmation of a DXA machine or any other body fat measuring device. These are estimates based off years of experience and seeing the visual of those measurements.

General Defining Points

Men and women carry body fat in typical patterns based on hormones and genetic makeup. In general, men tend to lose fat last in their lower abdominals and quad/IT area. Women on the other hand generally lose fat last on the back of their triceps, hamstrings and glutes. These are not hardfast rules. Stress and abnormal sexual hormone patterns can easily cause women to have long lasting abdominal fat and vice versa with males.

Notes: As body fat increases, it is much harder to determine body fat levels through visual percentage. Not only do folds and expansion in the body make things difficult, you also can't account for what could be high levels of visceral fat (internal). In fact, the only body fat measurement that seems to be reliable for those above 35-40% body fat is the DXA scan as problems have been seen in BIA use too.

Male Body Fat Estimates Via Pictures

Male at 0% Body Fat

Muscled Skeleton VS Male Human

Male at 3-4% Bodv Fat

7%

10%

14%

20%

25%

30%

40%

Female Body Fat Estimates Via Pictures

Female at 0% Body Fat

Muscled skeleton VS Female Human

Female at 8-9% Body Fat

11%

15%

18%

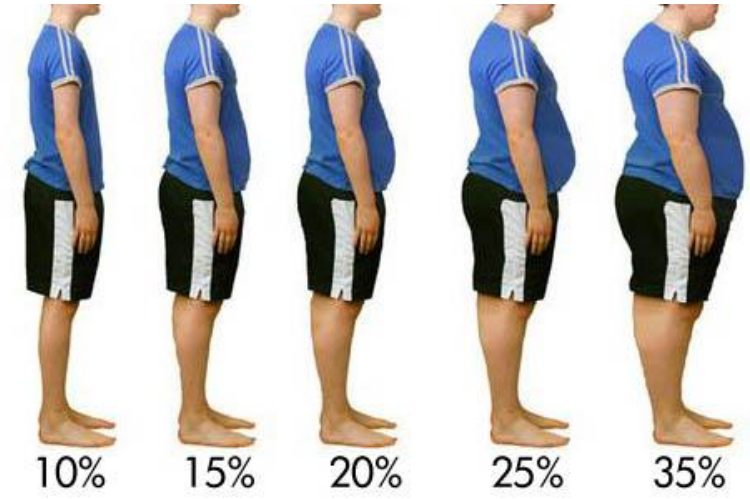
20%

25%

30%

43%

Side-by-Side Progression



Same Height, Different Body Fat

Body fat is not the only determining factor to a look. In fact, it is a very small factor in comparison to other things. Some of these things we can't control, (bone structure, natural hormone production, genetics) but there are others we can (posture, muscle mass, style). For this discussion, we are going to focus purely on muscle mass and body fat levels.

On the next page, you will find examples of females and males at the same height, but at various muscle and body fat levels.

5'11 -10% BF

5'11 - 3-4% BF

5'11 - 9% BF

5'11 - 20% BF

5'11 - 12% BF

5'2 - 14% BF

5'2 - 17-16% BF

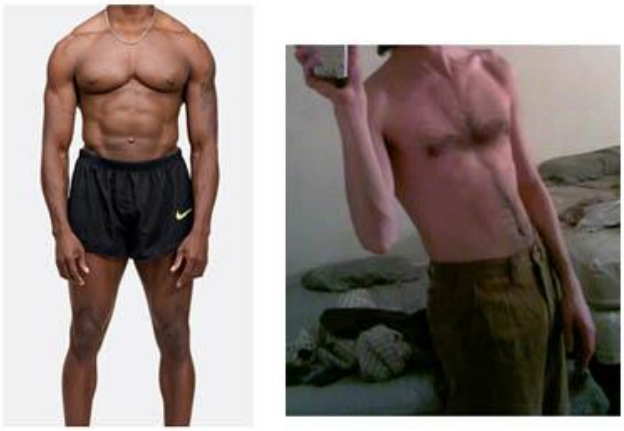
5'2 - 19-20% BF

5'2 - 28% BF

5'2 - 20% BF

5'2 - 16% BF

5'2 - 14-15% BF



10% vs 10%

15% vs 15%

The Peas, The Potatoes, and The Sheet

I have been using this example for years to explain to people how much a small amount of muscle can make to a look. Now, clear your mind and get ready for an important visualization.

1. Imagine a white bed, with a thin white sheet, in the middle of white room.

2. Lift the sheet and place one single pea underneath it.

What does it look like? Can you see the pea at all? Is the sheet wrinkled at all or flat?

3. Lift the sheet and replace the pea with 5 pounds of potatoes underneath it.

What does it look like? If the sheet was wrinkled, did it form around the potatoes?

The point of the exercise is this - a small amount of muscle makes very little difference to your look. But, even 5 pounds can make a dramatic statement. Imagine if you used 10, 15, or 20 pounds? What would have to the

sheet? The bed itself doesn't change, but the contents transformation is dramatic. That is the difference between having muscle and not. Muscle will provide you with more definition and a tighter look, even at higher body fat percentages. Meaning, you can be a 15% BF male, but if you have a strong muscle base, it will look fuller than what 10% or less can look like on an un-muscled male.

Closing

As you can see, methods of measuring body fat vary. You can also see training will greatly affect what you look like at various body fat percentages. The most important factor to note is that body fat is the topic of conversation. The amount you have is going to be the biggest factor to your appearance and a notable factor to your health. Remember at anytime you can ask me direct questions or have me analyze your body fat being a member of Leighpeele.com. If you are looking for the most logical and efficient advice on how to lose fat, grab a copy of the Fat Loss Troubleshoot.

Bonus FAQ

How Often Should I Test My Body Fat?

There is no set rule or limit to testing body fat. In my opinion, you should wait to test body fat until you are confident that change has taken place or body fat has been dropped/muscle has been gained.

Typical time frame for body fat evaluation is 4-weeks. Every 4-weeks take pictures as instructed in this document and do a 3-day BIA reading (if doing both) first thing in the morning and use the mean number. Remember, nutritional intake is going to affect both pictures and BIA readings. Everything from low-carb use to "cheat days" or refeeds will alter your numbers.

It is a good idea to get a DXA scan every few years to check out composition and bone density, especially as you age and for women.

What Rate Should I Expect To Drop Body Fat?

The rate of fat loss is going to be determined by your program, deficit, and nutritional profile. This is simply too large of a topic to answer in a FAQ. I wrote a great article that goes into a realistic look at setting fat loss goals, you can find that article here => Realistic Look A Fat Loss

Can I Gain Muscle And Lose Fat At The Same Time?

Yes, but within reason and with the right program. There are a lot of caveats and explanations needed for this topic. The short answer is - the more training experience you have, the harder this will become. If you want a more detailed look at this topic, Tom Venuto recently wrote a manual on the topic. He is one of the few experts I support and who I feel takes a research look at this topic. You can find out more information here.

What Is The Rate At Which I Can Muscle (Male/Female)?

I wrote a very detailed look about this on the blog. You can find it here => Part 1 & Part 2

What Is The Best Program To Lose Body Fat?

Fat loss programs are a dime a dozen. The key factor to all of them (no matter what the creator will make you think through word manipulation) is a deficit. How you achieve that deficit and what manner is up to you. I go

into extreme detail on this in the FLTS and other works. That being said, no matter where you go and what guru you follow, keep in mind this - No matter what, the deficit needs to be achieved.

"Energy can neither be created nor destroyed, it can only be converted from one form to another"

Where Can I Get My Picture Evaluated?

Every so often I run special things on my blog for people to submit pictures. Keep a look out for that. There are also various message boards online where people take a stab at evaluation, but as I stated earlier, be cautious. There are a lot of factors to take into consideration that go beyond lines and the things discussed here. Everything from your stomach fullness to posture will change things and most don't take that into consideration.

If you ever desire my evaluation, I have an ongoing thread on my private forums. Your privacy is protected as well, so you don't have your pictures all over the internet.

About Leigh Peele

For a complete about me you can find information here.

For help with fat loss, go here.

For help with recipes/cooking resources, go here.

For personal advice, go here.

For podcast information, go here.

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