Body Composition

By Nick Hanson, M.S.

So what exactly is body composition? Put simply, it is the makeup of the human body. When we look at body composition, we normally divide the body into two parts, fat mass and fat-free mass. The fat mass is the total amount of fat you have in your body, and the fat-free mass is everything else (bone, muscle, organs, etc).

While not technically measures of body composition, there are two ways that you can quickly assess your level of excess fat: body mass index (BMI) and waist to hip ratio (WHR). Body mass index is calculated by taking your body mass in kilograms divided by your height in meters squared:

\[
\text{BMI} = \frac{\text{body mass (kg)}}{\text{height (m)}^2}
\]

There are online calculators that are useful in quickly determining this value, without having to convert lbs to kg and inches to meters. Ideally, your BMI should be between 18.5 to 24.9 kg/m². If this number is over 25 you are considered to be “overweight” and if it is over 30 you are considered “obese”. Conversely, if your BMI is under 18.5 you are considered “underweight”, which can also cause major health concerns.

Waist to hip ratio (WHR) is calculated by first measuring the circumference of the waist, which is the narrowest part of your body between your umbilicus and your sternum. Second, the hip circumference is measured. This is the widest part of your body.

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\text{WHR} = \frac{\text{waist circumference (cm)}}{\text{hip circumference (cm)}}
\]

This number should be below 0.95 for males and below 0.80 for females to be considered “low risk”. Moderate risk would be 0.96 to 1.00 for males and 0.81 to 0.85 for females. High risk is over 1.00 for males and over 0.85 for females.

These two methods (BMI and WHR) are very easy to calculate and are often used in large epidemiological studies. They have their limitations, though, because they cannot differentiate between fat and fat-free mass and therefore cannot tell us body fat percentage. Plus, a person can have a high BMI but a low body fat percentage, or vice versa. This is why other, more accurate methods exist to assess body composition.

In our lab we have four main methods of testing body fat percentage – bioelectrical impedance analysis, skinfold calipers, air displacement plethysmography and hydrostatic weighing.

Bioelectrical impedance analysis, or BIA, is normally the quickest of the four methods. In our lab we have a handheld unit, but you can find them built into bathroom scales as well. After your height, weight and age are input into the machine a short undetectable current is passed through your body. Since lean mass (fat-free mass) is mostly water, it moves the current through at a faster speed. Fat mass does not have much water content and slows down the current. The unit analyzes the time the current takes to pass through and can estimate body fat percentage from this.

Skinfold calipers is another way to test body composition. The calipers we use are very precise, to the millimeter. We normally use three sites for the skinfold testing. For males we test the chest, abdomen and thigh and for females the tricep, suprailliac and the thigh. The sum of these three measurements, in millimeters, is placed into a formula and body fat percentage is calculated.

Air displacement plethysmography, also known as the Bod Pod, uses volume displacement to estimate body density. After we get a very precise body mass measurement, you step into the Bod Pod and it calculates how much volume your body takes up. The body density measurement is then placed into a formula and body fat percentage is calculated.

Hydrostatic weighing, or underwater weighing, uses the Archimedes principle to estimate body density. Since lean mass weighs more than fat mass, the more you weigh under water the lower your body fat percentage is. We compare your underwater weight with your weight “in air” or outside of the water and can get a highly accurate estimate of your body density, and then fat percentage can be calculated from this number.

Suggested ranges for body fat percentage change for gender as well as age, and are provided by the American College of Sports Medicine. If your body composition is tested in our lab we can let you know where you stand in relation to these suggested values.

So why is it important to test your body composition? Many people rely on the scale as an indicator of how well their diet or training program is progressing. This can be very deceiving, though, because you may lose five pounds of fat but gain four pounds of muscle when participating in a strength training program. This would only show a one pound loss in weight on the scale, but a much larger loss in body fat percentage. By knowing the guidelines for healthy body composition and how you compare, you can greatly decrease your risk of cardiovascular disease, diabetes, stroke, etc.
Myth Busters

By Nate Saunders, M.A.

The myth of this edition is that carbohydrate (sugar) is evil. I can’t tell you how many times I’ve heard that “my overall diet is really good, but I just can’t stop eating carbs.” Blood sugar levels fluctuate greatly depending on if you have just eaten, or are between meals. Every cell in your body needs energy to function and survive. So, the question becomes, how do your cells continue functioning when your blood sugar is low? Answer: most of your tissues are able to store energy nearby in the form of fat or glycogen. This may provide an immediate fuel source should it be needed. However, neurons (think brain tissue) are unable to store energy in this way. Therefore, the brain relies on circulating blood sugar for survival. This becomes even more critical when exercising, especially at higher intensities. Your muscles utilize the sugar in your blood to fuel any level of exercise. If you have not eaten sufficient carbohydrate you be in danger of becoming hypoglycemic (low blood sugar).

You are right, though, to have some concern of carbohydrate consumption. Simple sugars, like those found in juices, processed grains, candy, and many sports bars and beverages, are absorbed quickly into the blood stream. As a result, you may experience a spike in your blood sugar (A.K.A. a “sugar high”). You likely already know that following that “sugar high” may be a pronounced “sugar low.” These extreme fluctuations may lead to many recognizable symptoms including headaches, sluggishness, mood swings, and hunger. What may go unnoticed is the way your body reacts when chronically exposed to these extreme fluctuations in blood sugar. It may put your body’s blood sugar regulatory systems in overdrive, so to speak, and in time may be a contributing factor to the development of Type II Diabetes. I’m not saying that you will develop Type II Diabetes if you eat simple sugar, but that you should monitor how much and how often you eat it. Complex sugars (such as those found on whole grains and legumes), are absorbed in a slower and steadier fashion resulting in fewer and less extreme blood sugar spikes. Please see a nutritionist/registered dietitian or exercise physiologist for more information about the benefits of carbohydrates. If you are on OSU health insurance, you likely get three free nutrition consults per year.

http://www.buzzle.com/articles/what-are-carbohydrates.html
H³: Winter Health Happy Hour Series

By Alexander Lucas, M.S.

This Winter the department of PAES has designed and implemented a series of lectures to target key areas relating to Weight Loss and Weight Management. The lectures will progressively address topics across a wide spectrum from determining your optimum energy balance, and setting SMART goals to planning and creating a healthy tailgate (should you want to). We’ll also show you how you can spice up your workout should it start to feel too familiar and repetitive, or how to turn your office into a space that can support your diet and exercise goals. Each week a unique set of tools and tricks can be learned to aid and support your health behavior challenges. See below for a more detailed description of each week’s topics and focus areas to decide if one or all are for you. Can’t make the time and date we have scheduled for the lecture? We are sorry we could not accommodate you but the good news is that each session will be recorded and podcast so you can catch up at your own convenience. Alternatively you can speak to the GA’s in the gym during FSFP hours to get some personalized help with any topics you maybe interested in. We look forward to interacting with you over this next quarter and helping you get more out of the fantastic commitment you have already made to your health.

January

Monday 9th – Put Some Pep in Your Step

How to compute personal energy planning

What is a calorie? How does your body use these calories? How can we best manage our body’s use of these calories with both our diet and exercise? Over the next few weeks, you will be given the tools to do just that. The first step however, is to understand the actual energy requirements of your body and how this may change depending on your age, gender, fitness level, and activity type. We would like to help you use readily available information to calculate your personal energy requirements and from this point allow you to plan your next steps regarding either weight loss or weight management. If you are able on Monday to bring the information from your last fitness evaluation, this will help us to make the energy planning more accurate and specific to you.

Wednesday 18th – Map My Fitness

How goal setting can get you from point A to point B

Many people begin fitness programs with an idea of where they are and some concept of where they want to be, but struggle in the all-important middle – how to get there. Utilizing the “Map My Fitness” theme, this presentation aspires to give attendees a crash course in goal setting in order to help them navigate the complex world of behavior change. Attendees will be educated on the SMART principles – setting goals that are specific, measureable, attainable, realistic and timely in the hopes that they will gain a sense of direction on how exactly to get from point A (“where I am”) to point B (“where I want to be”). In addition, attendees will also learn about the benefits of enlisting their friends and family to help steer them in the right direction and get them back on track if they happen to run into any roadblocks or detours.

Thursday 26th – Tackle Tailgating Treats

How to plan a healthy game day feast

Super Bowl parties abound with food choices (unhealthy food choices). Through this presentation we aspire to help attendees choose healthier fare once he/she has already arrived at that party as well as help them better understand portion sizes of common party appetizers. We will also discuss how to choose healthier options to prepare at home for the big game. Recipes for these dishes will be included.
Tuesday 31st – Climbing the Corporate Ladder

How to get a leg up on Fitness and Diet at work

So we have set those diet related goals and started that exercise program. Now the real world is challenging us to keep to it! The workplace is an environment that can present one of the most significant challenges to maintaining that healthy diet and exercise plans. Is that vending machine sneaking up on you? Is that last minute deadline keeping you from that lunchtime workout? This session is aimed at dealing with these and other challenges that threaten to halt your progress. Don’t let anything keep you from this Lecture!

February
Tuesday 7th – Feeling Weighted Down

How stress affects weight gain

Many factors in our daily lives can affect the management of our health. One of the most salient and often misunderstood aspects of this complex situation is the stress we feel (or don’t feel). When we do “feel down” we typically have less cognitive tools available to us to resist temptations, making that unhealthy snack harder to resist. Alternatively we may feel tired and lethargic making that trip to the gym that much more unappealing. By recognizing when we are under stress and planning ahead we can navigate some of the obstacles that make weight gain likely and avoid further adding stress through experiencing guilt about our missed goals or skipped workouts!

Monday 13th – Office Space

How to turn your break time into a midday workout

One of the most common excuses or “barriers” to exercise is not having enough time. “I can’t get to the gym during a normal work day”. Well the good news (or bad) is that you don’t need to. This session will aim to show you that just by getting moving you can be on your way to a lunchtime workout. Walk! Walk down the halls, do a lap around your floor, around your cubicles, out to your car, around the parking lot, a block down the road, up and down the stairs…. Whatever works for you! The point here is just to get warmed up a little. You don’t want to break a sweat, after all, you have to get back to work after this!

Friday 24th – BYOB (C)

How to Build Your Own Boot Camp

Always wondered about how tough you were when push comes to shove? Heard about Boot Camp, but never had the guts to try? Seriously, it’s totally within your capacity to build your on boot camp. Using the tips and tricks that Jeff will show you, adjust the level of your own basic training. Who knows where you may find yourself next! By preplanning workouts you can avoid many of the obstacles associated with “having to decide what to do today”. Short and intense or fun and novel, this session could be just what you need to challenge yourself in a new way.

Wednesday 29th – Franks Red Hot Workout

How to Spice things up!

So by now you should have really built up your arsenal of tools to tackle you winter weight loss (maintenance) challenges. But we are not done yet. This hands on (gym equipment) get sweaty session is designed to introduce you to various types of interval cardio training (on cardio equipment) as well as supplementary weight training techniques to add that extra spice to your workout. Try some of this hot stuff and warm up this winter!

We hope you will learn from these sessions and would love to hear your feedback if you have been to any past sessions or go to any sessions in the future. Didn’t get there? Please check out the podcast and tell us how user friendly that experience was? We want to improve your experience of improving your health and hope to see you soon, if not at the sessions then at the gym or one of our group fitness classes. Happy Heath this Winter!
“running in the winter and cold weather...?”

I want to reassure all of you that your lungs will be completely fine. The air you are breathing in when running outside this time of year, while very cold in the atmosphere, is not cold at all by the time it reaches your lungs. Let me explain what happens, and why you feel that "burning" sensation.

First, know that by the time breathed in air reaches the bottom of your trachea (i.e., your wind pipe) it is warmed to body temperature (98.6 degrees F) and is 100% humidified. This is true no matter what the ambient air temperature is, and no matter what the relative humidity is in the atmosphere. So there is never cold air that reaches your lungs.

The "burning" sensation some of you are experiencing is caused by the dehydration and subsequent irritation of the cells that line the trachea.

As air is breathed in this time of year, the relative humidity of that air tends to be very low (especially when compared with the relative humidity of the air in the summer time). Remember that the air needs to be brought up to 100% humidification before it reaches your lungs.

Where does all that extra water (humidity) come from? The answer is the cells that line your trachea give up their water supply to humidify the air that is about to go into your lungs. This is not a problem if you are only outside for a short period of time in the cold weather. However, when you are outside working hard (e.g., running) and you are breathing a lot harder, those cells that line the trachea become severely dehydrated. Once dehydrated they become irritated, and you perceive this dehydration and irritation as "burning" in your throat and lungs. This sensation is not at all uncommon for those that are new to exercising outdoors in the cold weather.

There are at least two things you can do in order to minimize the feeling.

First and foremost, you must stay hydrated this time of year. I know many of you might think that it is cold out, I am not really sweating all that much, so why do I need to drink for hydration this time of year. The answer is you are sweating more than you think, and if you stay well hydrated you will go a long way toward minimizing that sensation of "burning" in your trachea. The other helpful tip is to focus on deep breathing and not "panting" as much. Short quick breaths will irritate the trachea even faster.

So keep up the great work you are all doing with your running, and enjoy the beautiful crisp weather this time of year. Remember there is no bad weather, only poor clothing choices.

Best wishes for your continued training success.

Steven T. Devor, Ph.D., FACSM

http://www.by-nature.info/running-in-cold-weather/
Getting to know: Joe Call

By Brooke Starkoff, M.Ed.

On most days at 6:25 am, you can find Joe Call patiently waiting outside of the FSFP doors. Once the doors open, he heads straight to work, getting in a full 30 minutes on the treadmill or lifting weights. If you ask Joe, he’d like to stay longer, but is here on his lunch break...at 6:30 am. Joe is an operation supervisor with Facilities Operations and Development working from 4:30 am - 3:15 pm. For a little over a year now, he has been breaking away 3-4 days per week to work on his fitness, and it shows. Since he joined FSFP in October 2010 he has lost 25 lbs, lowered his blood pressure, and improved his strength. While he attributes most of these improvements to his exercise routine, it is his improved nutrition that he believes got him where he is today. He now has more energy and is able to do things he has never done before. In fact, a few months ago he went ziplining, a feat he would have never accomplished before his lifestyle change. So what is Joe’s advice to you? Just get out of your chair and walk. Get up and do it!

### Winter Schedule

<table>
<thead>
<tr>
<th>Morning General Conditioning</th>
<th>Monday - Friday</th>
<th>6:30-8:30am</th>
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<tbody>
<tr>
<td>Noon General Conditioning</td>
<td>Monday - Friday</td>
<td>11:30-1:25pm</td>
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<tr>
<td>Evening General Conditioning</td>
<td>Monday - Thursday</td>
<td>4:30-6:30pm</td>
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<tr>
<td>Water Aerobics/Lap Swim</td>
<td>Monday, Wednesdays, and Friday</td>
<td>12:30-1:30pm</td>
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<tr>
<td>Boot Camp</td>
<td>Monday</td>
<td>1:30-2:30pm</td>
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<tr>
<td>Yoga</td>
<td>Monday/Thursday</td>
<td>Mon 12:30-1:30pm</td>
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<tr>
<td></td>
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<td>Thurs: 8:30 - 9:30am</td>
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