



Episode 33 Transcript

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The Science of Physique Enhancement with Dr. Bill Campbell

Nick Collias: Good morning, everyone. Welcome to *The Bodybuilding.com Podcast*. Coffee's on, coffee's hot, weather's cold. I'm Nick Collias, an editor for Bodybuilding.com. Heather Eastman, also an editor...

Heather Eastman: Hello, everyone.

Nick: A physique judge, competitor. Our guest is a self-described "physique scientist". He is [Dr. Bill Campbell](#), exercise science professor at the [University of South Florida](#), and the Director of the [Performance and Physique Enhancement Lab](#), which is an actual thing.

Dr. Bill Campbell: Yes.

Nick: People may have not known, the Physique Enhancement Laboratory. They study dieting models, training frequency, the effects of pre-workouts on power performance, periodization models for powerlifters, all sorts of fun stuff.

Bill Campbell: All the fun stuff.

Heather: You actually study.

Bill Campbell: I do.

Nick: I envision a big board where you guys are cooking up all sorts of fun ideas there.

Bill Campbell: That's pretty much how it works.

Nick: I don't know if you've gotten the tour yet, we have like a protein dispenser in the gym. We've got the amino acid fountain in the cafeteria. What do you guys have that's cool?

Bill Campbell: We have post-workout protein for all of my staff and myself.

Nick: Just in a tub, or is it like-

Bill Campbell: No, just in a tub, and it's [Dymatize](#). Dymatize is kind enough to-

Nick: Oh, that's right, you guys are tied in.

Bill Campbell: Yeah, so they sponsor some of our studies and they make sure that my staff ... I have a large volunteer staff, undergraduate, graduate students. We are never short on protein.

Nick: Cool machines? Something that you see and think and go, "Oh my god, this thing's a game changer?"

Bill Campbell: Yeah, I mean it's the fun stuff like a metabolic rate machine. We use the heck out of that. My lab's really just a nice weight room. It's a weight room. Then we also use ultrasound for body composition. We have a body water machine. We just got a new machine to test fat breakdown.

Nick: Interesting.

Heather: Very cool.

Bill Campbell: Yeah, it's fun stuff.

Nick: We have a bunch of stuff we want to talk with you about while we can. Two of them in particular were protein intake for women and flexible dieting. You already wrote one great article for us last year called something along the lines of "[How much protein do women really need?](#)" If you go to Bodybuilding.com and look for Bill Campbell, you can find it pretty easily. It goes in depth and that's something that you've been studying actually is just the simple addition of protein. It's not like it's this massive change to somebody's diet, it's almost just like yeah what happens when you just take in more protein?

Bill Campbell: Yes.

Nick: Tell us what you've been studying.

Bill Campbell: What we did was we took aspiring female physique athletes and we did a simple study. We put them into two groups. We had a high-protein group and a low-protein group. If you want numbers, we told the high protein group eat about 2.5 grams of protein per kilogram of body mass. The low protein group we said eat about half that, so about 1.2 grams per kg.

Heather: Which is still higher than the recommended daily amount.

Bill Campbell: Yeah, it's still ... That's what a lot of people-

Nick: What does that translate into on the high end for how it actually plays out in somebody's diet? Is it just a couple of shakes a day more, or what is it?

Bill Campbell: Well, if you're a 125-pound female, it would be about 140 grams per day of protein. Each scoop of whey protein is about 25 grams.

Nick: Okay, so if you ate three to four solid meals, a couple of shakes-

Bill Campbell: You're easily there.

Heather: You're there.

Bill Campbell: Yes. Then the low protein group, for the same 125-pound female, it would be about 70 grams of protein per day, which is pretty low. So what we did, we told them do whatever you want with carbs and fat, I don't care. Just don't diet.

Nick: The taste.

Bill Campbell: Yes. We don't want you losing weight on this study, we want you to eat enough protein or make sure you don't eat an X amount of protein if you're in the low group, so very simple study design. We had them come to my lab four days per week for weight training, so they did two days of upper body, two days of lower body for eight weeks. So we supervised every set, every rep. They tracked their macros every day so these weren't just diet records they literally tracked every gram of carbs, protein, and fat for eight weeks. That was a big training on my staff because some people don't know how to track macros.

Nick: Even these physique competitors some of them didn't know how to track?

Bill Campbell: Yes. Now, they were aspiring so not all of them were competitors. Some were. Some had the desire to compete within that next year. They weren't all competitors at that time.

So what we did was brought them in before and after the eight week study and the results were maybe surprising, maybe not. The high-protein group gained 4-1/2 pounds of muscle mass, the low-protein group gained about 1-1/2 pounds so significant difference in muscle mass loss.

Nick: That's muscle *gain*.

Bill Campbell: Yes, yes, that's a big difference.

Heather: José Antonio was talking to us about when he did a similar study they actually had one vegetarian in their group who wasn't eating animal protein. Did you have any similar ... Because we get a lot of questions about that. "I don't eat meat. What can I do?" Did you have anyone in your group-

Bill Campbell: We did not have any vegetarians fortunately because that always complicates things.

Nick: Those vegetarians.

Heather: Those vegetarians.

Bill Campbell: In theory, I suppose we wouldn't have excluded them on that because, again, we didn't care where they got their protein from so it could've been all from supplemental sources.

Let me tell you the really intriguing part of this study and, I call it, the "protein aberration". This high-protein group they ingested about 425 extra calories every day for eight weeks because they were adding protein to their diet.

Nick: Just in terms of pure protein and calories.

Bill Campbell: Yes, there was no difference in carbs or fat between the two groups but a significant difference in total calories and protein over the eight weeks. Normally, if you look at a group and you say, "Hey, they're eating 400 more calories every day," you would say, "Well, they're probably going to gain a little more fat." They *lost* more fat than the low-protein group eating less calories. That's crazy talk.

Heather: So in addition to gaining 4 pounds of muscle, which is a lot for women in eight weeks-

Bill Campbell: Yes, 4-1/2 pounds, yes.

Heather: Wow.

Nick: They were lifting four times a week too, there's an interplay there, potentially.

Heather: We've always heard, women, that we can gain maybe a pound of muscle a month and so that's a little over 2 pounds of muscle in a four-week period.

Nick: Also, so their actual body weight stayed about the same but body composition changed then?

Bill Campbell: Yes. Weight gain went up a little bit in the high-protein group. Now, let me critique my own study. What we did *not* do at the time was we did not track water changes. I have that technology now in my lab so every study we do now we make sure, hey, was this gain all muscle? Was some of it water? It could be that some of that was more water and not pure muscle. I don't know but clearly they gained more muscle because you don't gain 4-1/2 pounds of water.

Nick: Right. I like this idea though of it's almost like free calories. People say, "Oh, calories in, calories out." This really is an arrow in the side of that.

Bill Campbell: Yes. Now, if I didn't see that in my own lab, in my own data, I wouldn't believe it. In fact, there was a study by Dr. Antonio, he did a study probably about a year prior not quite as controlled, they didn't supervise the workouts but they noticed the same thing. That study, I think it was more like 700 calories extra from protein and they lost-

Nick: Yeah, we talked about that a little bit.

Heather: They still lost fat, yeah, we mentioned that in the other podcast [episode]...

Bill Campbell: That's now two studies in a resistance-trained population that are reporting the same thing. I'm a doubter, as a scientist I don't believe a lot of things, but there's something going on here with protein.

Nick: How much do you think it matters that ... these are experienced weight training athletes who are probably portion conscious already. They probably have a history of eating fairly well or maybe not but they also have a muscular base already. How do you scale this or apply this to a group outside of aspiring physique competitors?

Bill Campbell: The fact that they were aspiring, not all of the subjects had been lifting for four and five years. I think we had a requirement of the previous three months. They also had to deadlift ... I'm trying to remember, I think it was maybe deadlift one and a half times their body weight or 1.25 times their bodyweight.

Nick: By the end or by the beginning?

Bill Campbell: No, just to get into the study. We wanted to verify. You could say you're training but show me some objective evidence that you've actually been lifting weights. I don't want to give the impression that these are seasoned competitors because I don't think we would see 4-1/2 pounds of muscle gain in competitors that have been training for three, four, five years, that have been competing for years. So this would be in the early part of a physique competitor's career, these types of gains.

Heather: Wow. Really cool.

Nick: How crucial do you think it was that they were lifting four times a week? Four times a week for a lot of women that's probably a lot. How do you think it would've been different if a) they were just lifting twice a week, or maybe if they were a cardio bunny adding all of this protein to their diet?

Bill Campbell: We limited cardio in the study. They could only do high intensity interval training and it started at like two sets per week and it got up to eight sets per week so eight sets of 30 seconds all-out sprints.

Nick: On a bike?

Bill Campbell: Their choice. Bike, sprinting, treadmill.

Nick: It's no fun either way.

Heather: No matter what you're doing, it's not going to be-

Bill Campbell: Pick your poison.

Nick: Right, exactly. It's going to suck, just do it.

Bill Campbell: But clearly, if they were lifting less than that, I don't think we would've seen near their gains. There's also something to the fact that they were being watched for eight weeks. You tend to

push yourself a lot more if you've got researchers watching you perform every rep, every set.

Heather: You've got anyone watching you, you're going to push yourself a little bit harder. Yeah, that's the training buddy effect.

Bill Campbell: You don't have the choice of not showing up. They didn't miss workouts. If they missed, I think it was, more than 15% of the scheduled workouts we withdrew them from the study. So we had adherence, we had really high levels of macro tracking. It was designed, if you're going to gain muscle, this was the environment where it would happen.

Nick: Yeah, I like that. I wonder how much ... Saying, you're not dieting from the start, you're saying that, but you are tracking macros really tightly from the start. How much does that factor in? Just that awareness of macros maybe for somebody who doesn't have that awareness?

Bill Campbell: It's a lifestyle change for sure because you're conscious of everything at that point. There's no sneaking M&Ms, well that doesn't matter. No, that needs to be tracked. Even though it wasn't a dieting study the group that had the low-protein intake they, in essence, were dieting because what we realized was they'd just cut their protein and they didn't do any compensation by increasing carbs and fat. So, interestingly, we didn't want them to diet other than to hit their protein, which they did but they reduced their calories, the low-protein group and in contrast the high-protein group did increase their calories because they had to increase their protein.

Nick: The idea of having these macros in mind regardless of what you're eating is something that you've also studied specifically in the framework of flexible dieting. Tell us about what you've been doing there.

Bill Campbell: To the best of my knowledge, we did the first study in resistance-trained individuals with this flexible dieting paradigm.

Nick: "If It Fits Your Macros", as people...

Heather: [IIFYM](#), yes.

Bill Campbell: My graduate student at the time, [Laurin Conlin](#), designed this study. She was in my lab. What we did was we had two groups of people, males and females, they were all resistance trained and we randomly assigned half of them to a macros, IIFYM group. We randomly only assigned to the other half to a meal plan group, what we called the rigid dieting group. They were given, "Here's what your breakfast should be, with a few exchanges." Eggs may be, or bacon or just different options for foods. It was a fairly limited meal plan option list so rigid foods essentially.

The macro group, the IIFYM group, "Eat whatever you want, just make sure you hit your macros." We encouraged them to get a variety of foods but we didn't track that. Both groups reduced their calories by 25% and they did that over a 10-week period. It was a 10-week diet. The other nice thing that we did was after the 10-week diet, we had a post-diet phase and what we told them was, "After the diet's over, for 10 weeks don't diet anymore. Just do whatever you want. If you want to track, track. If you don't ..." We wanted to see how people would come out of these diets. How would their bodies respond if you were previously tracking or if you were following a rigid diet?

Basically, there wasn't any significant differences in weight loss. Both groups lost about 5 pounds

over the 10-week period and remember they were resistance training. The rigid dieting group, again, not significantly different but lost a little more fat over the dieting period, not significantly so but it was more fat loss. The really intriguing part came during this post-diet phase. After the 10 weeks of not doing anything, the group that was previously in the flexible dieting group actually gained a significant amount of lean body mass as compared to the rigid group.

Nick: To repeat that, the rigid group lost a little bit more body fat you say?

Bill Campbell: During the diet.

Nick: During the diet.

Heather: But then, the flexible dieters gained a little bit more lean body mass *after* the dieting phase.

Bill Campbell: Yes.

Nick: Comparing body composition, were they primed for more long-term success, then?

Bill Campbell: That's our take away. Now, I'd like to be able to tell you here's why they gained more muscle mass over the 10-week post diet phase but I don't have an answer because we looked at calories, they were the same. Protein intake was the same. The amount of time that they spent in the weight room and doing cardio was the same. You'd like to point to one of them and say, "Oh, they did this and that's why." It bothers me as a scientist not to have a reason.

Heather: Critics of flexible dieting and If It Fits Your Macros always say, "Oh, that's just the lazy way to do it." They think you're not being strict and really what it sounds like is it's almost like you're creating a lifestyle mentality of, "Okay, I know what my macros are and as long as the food fits in with what my macros are ..." To the critics, it's almost saying, "Here's some data showing that there might be more long-term benefits. We don't know why, but in kind of thinking about it as more of a lifestyle... Interesting."

Bill Campbell: Yes. At least from our study, which is the only study we can draw from at this point. I would say my own philosophy is I like flexible dieting but it's not for everybody. Some people do much better with, "Tell me what to eat. Give me a plan," and then that's what they should do.

Nick: Right. It can also, depending on how it plays out in somebody's macros, not really be a *health* diet, necessarily. There's nothing in there telling you, "Eat your vegetables."

Bill Campbell: No.

Nick: It's macros.

Bill Campbell: It is. Now, if you are taking this ... Let's say, you're trying to get stage ready, the flexible food choices really start to get restricted on a flexible diet because there's not really room for cake when you're cutting a lot of calories. You can still plan to have a little piece of cake even getting ready for contest, but yes, it is flexible. But as calories keep getting cut, and cut, and cut that flexibility isn't quite as flexible as what it is if you're not dieting.

Heather: It's almost like it's self-selects to the point where you become just like a rigid diet competitor when you're going into competition.

Bill Campbell: Yes.

Nick: In both of these things we've talked about I feel like part of what I'm hearing is don't let the scale tell the whole story.

Bill Campbell: Yes.

Nick: Even when the goal is fat loss or anything like that. Also, gains in muscle mass are a win.

Bill Campbell: Absolutely.

Nick: Help someone who is saying, "Okay, you did these studies. Now, I could do this but I might not actually see the scale change at all." How is that a win for them?

Bill Campbell: Again, I'm biased because I'm a scientist. I would say get more data than the scale. The scale may not change at all and your physique may be drastically improving because if you're gaining muscle and losing fat, your body's changing.

Nick: For the better.

Bill Campbell: Yeah, for the better. Almost always that's going to show out in how your clothes fit. I have people that I work with just take a simple tape measurement of your waist. Let's do that in addition to the scale. The best thing to do would be to get somebody that you trust that's good with skinfold calipers and do an actual body composition assessment. Or if you go to a facility where they can use ultrasound or DEXA or BOD POD.

Nick: What do you think about the-

Bill Campbell: The handheld BIA.

Nick: We have one down in the basement here that's up from the feet and then you have out to the side the electro-impedance, right? If that's all somebody has access to-

Bill Campbell: That's great.

Nick: Should they stick with that consistently, though?

Bill Campbell: Yeah, you're one step ahead of me. Whatever you use even if it's not ideal as long as you use the same thing over and over, as long as it's consistent in its readings you're going to be able to detect changes. Anything is better than nothing. The scale plus measuring your waist, maybe a skin fold caliper, maybe those are called handheld BIA devices. Now, again, I have the luxury of in my lab having high-level ultrasound and high-level body water assessment machines so I get to cheat a little bit. I've got really good stuff but just with people that I work with something more than the scale because the scale could lead you to a false conclusion of what's happening.

Heather: Multiple points of data.

Nick: Both making you think that you have progress when it's actually negative progress but also making you think that there's no progress when there might be actually some really important and healthy body composition changes.

Bill Campbell: Yes.

Nick: This was the first study, to your knowledge, of flexible dieting. Where's it going now? It sounds too good to be true for a lot of people. There must be things that still need to be studied next.

Bill Campbell: It's the first study in a lean population. It's funny, we do dieting studies, we're about to do a diet refeed study right now. We're going to start that in January where we increase carbs two days per week. When you look at the scientific literature, 99% of all the studies on weight loss are in, not surprisingly, overweight or obese people. When I talk other scientists they look at me like I'm crazy like, "Why are you studying weight loss in people who are already thin?" My answer is, "Well, there's a certain segment of the population that wants to go from good to great and that's kind of what we're focusing on." Your question was, where are we going from-

Nick: What needs to be studied next about flexible dieting?

Bill Campbell: One thing, like I said, adherence is key, so I'm not sending a message that flexible dieting is the best thing. I don't think that's true. It is great for a lot of people. I would say though, on that note, I think everybody would benefit from doing flexible dieting and tracking your macros for like a three, maybe a six month period of their life. You learn so much about food choices, about overeating, undereating, when you're hungry. I think that would benefit-

Nick: Just the consciousness that comes with it.

Bill Campbell: Yes, it is. I've taken some people who had no concept of flexible dieting and said, "Let's go through the education of this." They will never ... For the rest of their lives they will change. At least consciously. They might not change their behavior but they'll know, "Oh, that doughnut is a lot different than that chicken sandwich." Even though the calories may be the same.

Nick: Matrix mindset all of a sudden it just spreads a part."

Bill Campbell: Yes.

Heather: It's almost like calories alone is just one data point because you're not really taking into account what those calories are made of.

Bill Campbell: Yes.

Heather: You're just adding numbers together but you're not thinking about what's going into it.

Bill Campbell: Yeah, absolutely, yes.

Heather: Very cool.

Nick: Is adherence the great strength of this aside from that consciousness of food?

Bill Campbell: I think for most people a flexible diet encourages adherence. Let's say, one day, you just blew it. You're driving by, I don't know, Chick-Fil-A and instead of getting my one chicken sandwich, I got three, and a milkshake, and french fries. A lot of people, especially if they're following a plan, "Well, I'll start next week. I just blew it this week." Whereas a flexible dieting approach would say, "Okay, yeah you overate today, but tomorrow we're going to lower our macros and we'll compensate for what you did today." It's almost self-correcting.

Nick: Not just thinking in terms of the day you can think in terms of-

Bill Campbell: The week.

Nick: Several days or the week.

Bill Campbell: Yeah. When I work with individual clients, I look ... We track the day but one of my primary markers is at the end of the week where are you at with your average carbs, protein, and fat intake? Then, it's really cool because you can start to see, I see on these two days you were really high. Now, maybe we should plan to increase your calories on days like the weekend a little bit more and we can reduce your calories on the other days where you don't struggle as much. Like a diet refeed approach. You asked, what's next? I like all these other popular dieting paradigms out there. Flexible dieting, we looked at that. The next thing is diet refeeds, so what we're looking at there is we're going to have resistance-trained people work out in my lab.

My graduate student, [Danielle Aguilar](#), is coordinating that study and we're going to have one group have the same 25% calorie reduction every day of the week. The other group is going to have two days of pretty high carbohydrates for two days out of the week and then the other five days their calories are a little bit lower than the other group. Both groups are going to be cut by 25% and what we're looking at is does the diet refeed does it have a benefit over an 8-week diet? We're going to look at resting metabolic rate, leptin, body composition.

Nick: Seeing if maybe like that protein it sounded like it ended up being almost free calories. Maybe this refeed could end up being free.

Bill Campbell: We won't be able to say that because everybody's going to have the same 25% reduction but there are going to be two days where they get more carbs but they're paying for that on the other five days because they get lower calories on the other days.

Heather: Just out of curiosity, I'm sure you're doing this, are you doing questionnaires with these individuals? Are you assessing how they're feeling when they're on these diets? That's what a lot of people when they choose flexible dieting or rigid dieting that seems to be the overriding factor is, "I just feel better," or, "I'm not as cranky with my family."

Bill Campbell: No. You make me appreciate the fact I *should* be doing that.

Nick: I'm *sure* you're doing this, she said.

Bill Campbell: I was trained as a physiologist so I'm very focused on fat, muscle, performance-

Heather: You want that data.

Bill Campbell: Yes-

Nick: Are people crying in the lab often about it? Only when they're doing cycle sprints.

Heather Eastman: The reason I bring it up is every single competition that you go to the guy's on stage, he's got the trophy in his hand, and he thinks his lovely wife and kids for putting up with how cranky he's been for the past eight weeks. A lot of these new competitors are talking about, yeah, this past competition was easy because I was flexible dieting or this past competition was easy because I was doing this diet. I'm curious about that, if you could study that in a lab setting.

Bill Campbell: We need to do more psychological measures. I don't want to get into a rabbit trail here but we tried to do that in our diet refeed study. We were going to do a POMS, a profile of mood states but the university IRB, the board that approves the study, had issues with that questionnaire that I wasn't prepared to address. We planned, and I would say, we got shot down, but for you in the next one we will incorporate a psychological questionnaire.

Nick: We're running out of time but I wanted to ask you one other question about flexible dieting, also. Similar, to the protein study, I want you to compare flexible dieting with lifting regularly to flexible dieting without that component for somebody who ... If you're just looking at YouTube, Instagram, the flexible dieting crew is often a regular training population but for somebody who just looks from the outside, maybe they're not strength training regularly how much of a difference does that make in success with these sorts of things?

Bill Campbell: I think the first question I would have, what is their goal? If their goal is to lose weight, flexible dieting as long as you reduce your calories it's going to work great. Now, are you going to change your body shape without resistance training? No. Resistance training, I always like to explain it like this, if you are just trying to go from overweight to good that's 90-95% diet. You're not going to exercise your way to a great physique. If you are already lean and you're trying to go from a good physique to a great physique that is where your resistance training program now starts to take on a much larger role in that journey.

Nick: You did another article for us about the keys to long-term weight loss. I believe one of them was lifting, also.

Bill Campbell: That's principle number three.

Nick: Right, exactly. If you're thinking just in terms of I'm trying to get from this number to this number and that's the end goal maybe that's pure diet, but if you're looking out further for how can I actually change my life, is strength training essential to that?

Bill Campbell: Yes, because, again, that's what will maintain your muscle mass during a diet and it will also help prevent your metabolism from being suppressed as much so it's got a huge metabolic advantage during a diet and it will actually change your physique. Without resistance training you lose weight so you're just a smaller, puffier version of yourself but resistance training actually changes your physique, your contours.

Nick: Pretty powerful stuff.

Bill Campbell: Yeah, I'm very biased on resistance training, if you haven't noticed.

Nick: Dr. Bill Campbell, thanks for coming and talking with us. How do people find out more about what you're up to if they want to learn about you and about this laboratory?

Bill Campbell: My Instagram is [BillCampbellPhD](#) so I'd love to have followers, they can see what I'm up to on that and if they're interested in coming to graduate school to be involved in these types of research studies, I'm at the University of South Florida and my email is bcampbell@usf.edu.

Nick Collias: Wonderful. Thank you for coming by.

Dr. Bill Campbell: Thank you.



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