

Menno Henselmans – 2016 Keto Summit

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Christopher: Hello! Welcome back to the Key-Test Summit. My name is Christopher Kelly, I am here with Menno Henselmans. Menno is an online physique coach, a fitness model and a scientific author. The image that you're looking at right now is Menno. I think it's the strawberry image for maybe reason we'll get into it a bit.

Menno is a certified personal trainer with the institute of Sports Science association. He has degrees from University of Warrick in the UK. He's a fitness model and the director of Bayesian Body-Building which is a fantastic website if anybody wants to check it out.

So Menno, thank you and welcome for the Keto Summit. Tell me about this image. Is this a level of body composition that you're able to achieve for any length of time?

Menno: Uh yeah. It is, at least for about a couple of weeks on hand. But yeah, this would be my photo-shoot conversion. So I don't walk around like this year-round but it's achievable for decent period of times. It's not a one day.

Christopher: I've never seen anything like it. Look at this... so I'm not, I don't know anything about anatomy, the creations on your shoulders. Have you seen that on another fitness models quite like that?

Menno: Yeah I have good shoulders. I'm lucky in that regards. But yeah, yeah of course, I'm not the only one with a physique like this. Muscle striations and of course you're looking at, for a photo-shoot, you're looking at the moment when you're pumped, the lighting's good and you know, it's the best old-school photo.

Christopher: Right. Is it possible to achieve a physique like this on a ketogenic diet?

Menno: Yes. I'd say so. I think that ketogenic diet is highly offered or under-rated for my body-building point of view. It's highly stigmatized as fat-intake isn't general in the body-building community. The traditional body-building guide is basically super-high protein, super-high carbs, almost 0-fat especially during contest-prep. And I'd say that's very misguided and there is definitely for many people, a place for a ketogenic diet.

Uh especially during contests prep, even because all will get into this more... in a bit I guess, but because it's so appetite-depressing. At least for many people,

ketogenic diet results in very high level of appetite depression once you've reached uh, quite deep level of nutritional ketosis.

And during contest prep that is basically the enemy- your hunger level. So if you can manage that with a ketogenic diet that is uh... then you're half-way there.

Christopher: That's a path for all. Wow okay, so maybe I should stop sharing my screen then and then we could get into your... you've had slides for us here. I'm going to talk about ketogenic diet for maximum strength and muscle and I think this is a really interesting topic.

For the ketogenic diet, I think it's useful to consider your applications. So for me, I'm an endurance guy and mountain biker and the ketogenic diet has been wonderful for me or my performance. Or maybe wonderful for me and my performance both on and off the bike is somewhat specific.

But when I think about what you do or why the look on the image that we've been looking at, I'm not sure I can say the same thing about ketogenic diet. So I'm really looking forward to, the talk that you have prepared today.

Menno: Sure yeah, we can hone in on performance right. So this is a section from my P.T. Course. My personal Trainer Specification Program. And I think it's good to deal into sectional ketosis, ketogenic guide and performance and basically it's the myth that ketogenic guide kills your performance in the gym because you don't have any carbs. That's the first concern most people have right, for a ketogenic diet.

For a body-builder, you know you can't do it because you can't perform in a gym. You don't have carbs, you don't have energy. We'll be able to get the work on him.

Christopher: Right. I assume you're lifting heavy things and presumably glucose is the primary substance when you're lifting energy and heavy things so there is some basis to that claim.

Menno: Yes. There is. Theoretically, there is root cause for concern. So we can look at studies. And the first thing you should know is that the body has several ways to replenish your glycogen levels which are basically the primary substrate or an important substrate when you're talking about carbohydrates for strength training.

Well, it's not like your body uses all of the carbohydrates that you are earlier on. Most of what your body uses during strength training is the glycogen which is basically a stored form of glucose that's already inside your muscles. And part of it on your liver about 80-100 grams as well.

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So basically, it's not what you are right before, it's what your glycogen level is before the workout which determines how long... basically how much falling you can do.

Christopher: Right.

Menno: And you should know that, many people think that workout, it will exhaust your glycogen levels. Truth is a lie for that, for strength training... some of the studies have looked at this, and I think the highest value that's ever been found is the division level of 40% from pure strength training.

And they've worked that body-builders performing 40-60 sets of workouts. So that's serious level, that's very, very serious high-level body-builder. And even a workout like that, only delinks about 40% of the glycogen in the muscle. So that means that even if you don't... you haven't had any carbs at all and basically do 2 or 4 workouts.

And even in the scenario where there wouldn't be any kind of new symphonies of any kind of glycogen, you can basically do 2-4 workouts and probably not have glycogen as a factor that actually limits your performance.

So the idea that you need these carbs very acutely is not really true. And moreover, your body has, now we can get to the PDF. Your body has several pathways by which it can restore your glycogen levels without needing exhaustion of carbs basically carbs from your diet.

So your body replenishes these sugar levels in your muscles results... you have to eat carbohydrates. So what of these pathways is the coring cycle I won't go into that chemistry bit too much. But the coring cycle provides the body on of the important pathways to maintain adequate glycogen muscle levels, revolves glucose from the diet.

The liver affectively recycles the lactate reduced during anaerobic exercise like strength training back into glucose. The energy in this process can be derived as fetid-acid oxidation- recipe of burning fat.

So indirectly your body can use the energy from the fat you eat and use that to recycle the lactate that's produced which is part of what's responsible for the burn that you feel during exercise. And the glucose is back into glycogen.

Christopher: Wow so pretty much it's using the lactate, the energy while still working out is actually, there's enough to recycle resynthesizing glycogen.

Menno: Yes so, many people, or earlier on researchers thought that lactate was basically a waste product. But the body actually has very good use for it like this recycling process. So that's one way and you can see that in the picture here the coring cycle for people that like to dig-in to chemistry...

A second pathway is the glycerol backbone of fats which, it's a far off, the fat that you eat in your diet as a glycerol backbone of triglyceride. And this can be converted to glucose. And for the contribution of glycerol to glucose production, although the contribution of glycerol to glucose production is only modest, while it's capable of directing a significant percentage of glucose needs for glycerol the limits of this is not inadequately tested.

And this is an area where we basically have a gap in the research. Because we know that normally it's only a few percent of glucose needs that are actually derived from glycerol. However, we simply don't know to what extent the body is capable of regulating this process. And it would make sense that in nutritional ketosis especially for a strength trainee this process will be extremely off-regulated.

There's a second mechanism that you're at, and of course a fourth-mechanism we should really want is that your body takes the protein, the amino acid significantly. Glucogenic amino acids which is both of them and those are converted to glucose. But you don't want your body to use the protein and dissolves to something that your body only does basically as a last resort.

So normally with these 2 pathways especially with enough time, that's plenty to keep your body fueled for your strength-training sessions. Again, noting that strength-training in contrast to many sports which is very important to note simply doesn't need that much glycogen. It doesn't burn that much glycogen.

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If compared to say, sprinting or soccer matches even more so, something like high-intensity intro-ball training on an ergo-meter or a bicycle, then you're looking at glycogen obliteration levels that are far outside what you're looking at with strength training.

Christopher: Interesting.

Menno: Yeah. It's really the two ends basically of the strength-endurance continuum that are very adequately fueled by high-fat diets. So if you're looking at the real endurance end and the strength training end those are fine. The problems arise where you're basically in the middle.

So you're looking at something that is quite endurance-oriented require sprinting for example. But it also requires a high level of endurance. Like a soccer match. Cause then you're in the scenario where glycogen levels are extremely high. And the soccer match has been found to lead to 90% of your glycogen levels. So that's a different ball game.

Christopher: Right and so that would apply to a variety of sports. One thing I was thinking about was martial arts. So I've had lots of questions about Brazilian Jiu-Jitsu for example. I guess that would fall into not knowing too much about that particulars of the martial arts. I guess it would fall into that same kind of scenario why potentially you're totally depleting glycogen because the session goes for quite a long time.

Menno: Yup. We've got an interesting study on Tae-Kwondo athletes that I'll show in a moment.

Christopher: Okay.

Menno: So this segment summarizes that pathways that you have. So you have the glycerol backbone here, the amino acids from you gnosis which you don't want. But it dwells on the pathway and is basically the last resort.

There's also always some called wider in sublime even when you're in ketogenic diet. I mean, you should be eating some carbs at least. It's the idea that ketogenic diet is all about minimizing carbohydrate intake to me is very misguided. At least you want the fiber intake from carbohydrates. We seldom eat some vegetables because they are extremely healthy, so...

Christopher: Maybe this is a good time to ask about your diet. Is your just... is it a bit of ketogenic diet or are you in ketosis all the time or how do you do it personally?

Menno: Oh I'm not in ketosis at the moment. During heavy travelling periods I don't use ketogenic diet because they can be very restricting.

Christopher: Right.

Menno: But when I'm in ketosis when I do ketogenic diet it's basically a form of targeted ketogenic diet. Which means that it's... some people won't call it targeted because I'll be in ketosis the whole, the whole part of the diet basically. But I do like to shift some of the carbs to pre-imposed workouts.

Not strictly because you actually need the carbs at that time but because I found that if you shift the carbs to that period you can maintain a higher carbohydrate intake while still being at certain levels of ketosis.

Christopher: Right. I think that's a really good recommendation for anyone right so whether you're a fitness model or a body-builder, a power lifter and you know, if you're

going to conceive carbs, consuming them around the time that you need those makes a lot of sense to me.

Menno: Yes. Exactly. So, because your body is going to be using them.

Christopher: Right.

Menno: And I'd go as far as to say that during the ketogenic diet you want to maximize your carbohydrate intake while still being at your desired level of ketosis. But all about minimizing carbohydrates at all. It's basically about getting in as many as you can while still getting to the level of ketosis that you want.

Christopher: And are you measuring blood-ketones?

Menno: Yes. All depends on the client because not everyone has that ability to incorporate that. So ideally yes, you look at blood ketones, breath-analyzers also, pretty reliable. And worst case scenario basically you should be looking at least at your urine uh, some ketones in your urine.

Christopher: Right.

Menno: The problem with that is that it's stops being reliable as your level of ketosis progresses.

Christopher: Right. Right. Right.

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Menno: It's good to, in the initial weeks, to establish what level of carbohydrate intake you need to be at. And then stops being reliable. And hopefully, when your diet is already set up well then, you also don't need to monitor your ketone anymore.

So in that respected should be adequate but it's very nice to be able to monitor them with ketone meter. Especially the new modern kinds which only requires you know, just a prick of your finger. And you got instant reading.

It's very nice to have especially while those people, they get fluctuations in the energy level, their mental energy level at least. I want to know, you know, how this relates to their level of ketosis.

Christopher: That's a really good idea actually. Like assessing the way that you feel and seeing that you can correlate that to something that you can measure in your blood I think is a useful exercise.

Menno: Yeah, for sure. And it's also I think is a primary way to see how well a ketogenic diet works for you because ketogenic diet more so even more than other diets.

There is very high level of inter-individual variability. Not everyone reacts to ketosis in the same way at all.

Some people basically get a level of mental clarity that they don't get from any other diet and it's basically a mental ergo-genic diet. Whereas other people, even if you optimize everything at best, they'll feel normal on a ketogenic diet. So it's definitely not for everyone, for some people it's like magic but for a lot of people, it's not a good diet at all. You want to find this out.

Uh I think it's something that everyone should find out and should attempt. There are so many people that hate on the ketogenic diet but have never tried it. In fact I go as far as to say that probably most of them have never tried it. And so they've not implemented it in their clients, cause then they would have seen how well they can work.

So there's a couple of some actual studies... this is a nice study. Ketogenic dieting with only 32 grams of carbs a day has been found to have no impact on strength performance in international level of gymnast, failing on average, 4.3 hours a day.

Christopher: This is true.

Menno: Yes. So that's very, very high training volume. And also the kind of training where you would expect ketosis to potentially interfere with performance. You've cycled on those study like a little too earlier. Ketogenic dieting has no effect on performance in Taekwondo athletes training 5 hours a day, 6 days a week.

And the daily pounds of program consists of 1 hour low-intensity abdominal exercise, two hours of morning exercise mostly for physical strength improvements and 2 hours of afternoon exercise mostly for Tae-Kwando skills training.

This post has been probably pushing the limits of non-glucose energy supply however. But it's clear the low-carb dieting is not the performance skill that it's all made out to be. So if you look at the trends in this study, you'll find that even though that statistical significance were not reached, there were trends showing that the ketogenic diet was interfering with performance.

So I'd say this is, you know, the limit that you're all should be looking at. It's not really a major obstacle, 5 hours of Tae-Kwando training 6 days a week, most people aren't looking at that kind of training volume.

Christopher: I didn't do that much on the bike. I don't know, not even close. Not even close.

Menno: Exactly. So this is an extreme training volume. And even then, you know, it wasn't statistically significant. Right. Moving on.

This is, also a nice one. Soon to be, public research from the University of Tampa, again shows detrimental effect on ketogenic dieting or strength performance... **[0:19:15] [inaudible]** with that. I should know that this study has been rejected in fare view, and it hasn't been published yet. So something to take into account...

Christopher: Does this have something to do with Dominic D'Agostino in that study?

Menno: Uh, not studying where Jacob Wilson was involved.

Christopher: Okay, okay.

Menno: Also the abstract on my site, at least the initial version of it... for those who want to check it out. Uh, another interesting study, one of my favorites because it's about body-builders. Yeah unpublished research from Pollex confirms to find from Tampa that a ketogenic diet in body-builders and power-lifters has hindered power outputs. Though, anaerobic cycling endurance was predictably impaired. Again showing that if you're looking at pure strength training ketogenic diet is not an issue.

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But when you're looking at cycling sprints, that kind of exercise... them are ketogenic diet. At least during initial weeks may not adequately fuel your workouts.

Christopher: Right.

Menno: I can adhere as discussed in **[0:20:30] [inaudible]** well you didn't see that but it's crucial to differentiate between strength training and other forms of physical activity when assessing the need for glycogen and dietary carbohydrates.

And this is also what I need to earlier when intensity is low enough however, ketogenic dieting again does not appear to reduce performance as the body starts using fat instead of glycogen as the primary fuel source.

So general law basically it's the body that the higher the intensity of their exercise the less fatty acid that your body uses and the more glycogen. Because your body doesn't have the time to use anaerobic process whereby oxygen is used. It's not fast enough to produce energy so it has basically get into work with glycogen levels because that's very easy energy.

And this is very interesting to note, several studies have found that ketogenic dieting does not in parallel intense to neuro-straining performance. So we are looking at you know, running marathons. That's not an issue on a ketogenic diet.

Christopher: Oh yeah. I can absolutely testify to that. It is more the kind of strength stuff that I was more concerned about.

Menno: Yeah. So conclusion specifically highly anaerobic endurance training basically being in the requiring both forms being endurance oriented also, having a very high volume of training that you're looking. That will be perished during ketogenic diet.

And I should note that we don't really have research on people that have been in ketosis for months and then these kind of tests. So it's possible that the key to adaptation, fat adaptation which we know is a true process that this may enable you to reach the same level of performance in keto as you have otherwise yet on a high carbohydrate diet.

So it's still possible that even this kind of training maybe doable, and doable optimally in ketosis. But we don't know that yet.

Christopher: Right.

Menno: Right. So that basically sums up ketogenic guide for performance. Uh, want me to continue?

Christopher: Go.

Menno: Right. So I think in the next section, my PT course that's interesting to look at here is ketosis for body building. Because we've looked at performance and we looked at you know, what's really interesting for body building point of view or anyone looking to lose fat, gain muscle, zone however you want to call that.

They want body re-composition. And some myth that ketogenic diet is inherently catabolic and bad for muscle growth. The truth is that ketogenic diet supports at least as much muscle growth as higher carb diets and may even be superior.

Now if you look at the research, keto dieters are always quick to point out Johnson and all at 2006. They found that when control for calorie and protein intake, overweight individuals lose just as much fat and adds little muscle in ketone diet compared to a high-carb diet.

However, this research surface some older mistakes you make, can make only to ketogenic diet. There are some food choices that was discussed earlier in the course, but basically, it's that people also... I've spoken earlier, people trying to minimize carbohydrates. They forgo essential nutrients. They don't consume any vegetables, which was also the case basically in this study. They're consuming their oil from, or their fat intakes from oils and other not very nutritious sources.

Basically if anyone can do that, ketogenic diet is not a magic tool that allows them to eat all the vast kinds of fats they out of all could at least. It's all fine because you're keto. Now which is, you know, fortune obligations, still be eating healthy fruits, things like avocado, eggs, some grapes.

Fruits that we eat in ketosis, coconut oils kind of special case. Probably you've heard some of those in the summit. Eating ginger glycerides. But anyway to the study, these are the mistakes that you don't want to be making.

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And for this study in particular, the lack of significance between different groups isn't hunger, cholesterol and tri-glycerides also suggest sufficient statistical power. Basically, we talked to you earlier that ketogenic diet is usually extremely appetite depressing. And that this has been confirmed by a meta-analysis as of old. And this study didn't find any difference between roots. So that suggests that they probably weren't even in ketosis, we'll get to that.

Same for cholesterol levels usually is improved on high fat diets and tri-glycerides. More importantly, in spite of what the title suggests, this was not a true keto study. If you actually look at the blunt keto-concentrations, you'll see that the subjects are only in barely in ketosis in week 2 and no longer at the end of the study.

In fact at the end of the study, there wasn't even a significant difference in blocking keto levels between these 2 study groups. Most likely the subjects were incapable of sticking to the foolish implementations of these ketogenic diets. So this whole study which is often used as the keto-debunking study isn't really a keto-study at all. It's just a study of a really bad low-carb, but not keto-genic low-carb diet.

So I'd say that this is not a study that we would put a lot of stalking and instead we want to look at studies like these ones. Right, as you see in the section of protein balance which you haven't seen but okay. Longer study involving considerably more total weight-loss found that degree of ketosis was past the fluid related to fat-loss and leading body-mass retention.

It was a very small study that measured for under-water weighing, body-circumference measurements, skin-fold thicknesses hence blood-trick imbalance. So I only had a few subjects and it's quite an old study. But they used very... they used old these measurement technics and they were all consistent and they all pointed towards this trend that the deeper the subjects were in ketosis, more muscle they maintained, and the more fat they lost at a certain choleric intake.

Showing the best few neutron partitioning was better. Which what you want during a diet. You don't want weight-loss, you want fat-loss. And ideally, this is something I experienced with a lot of clients. They'll say, "Okay, now my weight circumference is going down. I look better in the mirror." I ask calipers or notice scaled bioelectrical in penile analysis skill at the gym.

Whatever they have available to measure their body composition they say, "It's turning in the right direction, but my weight is not decreasing". So I feel like the diet is not working. And women in particular has this issue.

Basically, as long as all of these measures will look good, the less weight you lose, the better. Because in the ideal scenario, you gain just as much muscle as you lose fat and your weight stays exactly the same. For at least... assuming that is a goal. Body re-composition is always preferable to only fat-loss.

Because you're building muscle at the same time as you're losing fat. And I know some people will think that that's not possible, I have a very extensive article on my site, "Can you gain muscle and lose fat at the same time?" That's also the title of the article where I highly and elaborately showed that it is indeed possible.

And also in the gymnast study, that I have mentioned earlier, we solved this as well. Even these subjects, they gained a little muscle mass while they lose fat on a ketogenic diet. So it's possible and it's also responsible in ketosis.

Alright, so moving on. There are several reasons why ketogenic could be particularly effective in combination with strength training. Let us discuss the topic on fat-intake that we haven't. One of the main benefits of a high fat diet is increased anabolic hormone production.

Like testosterone, but also, sex hormone, estrogen is contrast to what many people think for both genders actually a very beneficial hormone to have for strength training... you can read about that in a lot of detail on my article about gender differences, I think that's the title. The natural muscular potential of a woman.

And this was effective in strength trainees the effect that it will increase your anabolic hormone levels and sanitary individuals like to do, to do higher activities of these hormones.

Right, second point. Ketogenic diets are particularly effective at reducing chronic inflammation which may increase muscle growth here at the inflammatory signal for muscle repair. So as assuming, we'll go into too much detail about Ares. A lot of research showing that chronic inflammation can impair muscle growth because it basically blunts out the signal.

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I like to think of inflammation and muscle growth as a signal to noise theory for those who are familiar with that theory from physics. If you have very high chronic inflammation levels it blunts out the signal of the inflammation that is caused by your strength training. So during strength training you're basically breaking down muscle at least in part which results in inflammation.

The inflammation is a signal on your body to start repairing the tissue. And when there is a lot of chronic inflammation, this small signal relatively small from your strength training doesn't have all of impact. So it's very weak signal.

Christopher: Right. It's a lot in the noise.

Menno: Right, it's a lot in the noise. So in that scenario, and we have few studies indicating this as well. You don't get the same level of muscle growth. So if the ketogenic diet helps you to get rid of the chronic inflammation, there is good reason to believe it will so increase your potential for muscle growth.

Going free, strength training may instruct with the altitude of amino acid metabolism and ketosis. It scraps the idea the ketogenic guide is protein sparing. Which is of course always good if your body doesn't burn a lot of protein, amino acids... more of it can be used to build muscle mass.

Right. Any, which is also went for any protein sparing effect of ketosis will be extra beneficial during strength training so it means that the total protein turnover is higher. Your body is constantly rebuilding your muscle tissue which is also wiring you to higher protein intake. And that's also why a protein sparing effect in this scenario is more irrelevant than it is for sedentary individuals.

Christopher: Right. And do you think this quite protein sparing effect outweighs the gluconeogenesis that we saw on the previous slide?

Menno: I think so, yes. If you're... as long as you stay in scenarios where gluconeogenesis isn't required. So probably, when you're in that strength-endurance zone that we talked about, like soccer matches? In that scenario where fatty acids, more, your glycogen storage levels inadequately fuel your workouts. Then probably your body will also be oxidizing a lot of amino acids as well as protein.

And then probably you'll lose out on this in a fit. But as long as that's not the case, this will probably be a benefit. A lesser known exercise may benefit from the increased production of adrenaline and neuro-adrenaline that you get during ketogenic diet. And these hormones are off of you as catabolic but actually they increase protein right now. So mechanism whereby a ketogenic can be anti-catabolic basically.

Right, looking at the actual study, new published research from the University of Tampa that I mentioned earlier just a clear benefit in terms of muscle growth, fat-loss in favor of the ketogenic diet for potential higher growth diets. But again, that's been rejected once, hasn't been published yet. So...

Christopher: Yeah why was it rejected?

Menno: Uh, no. I don't know why the journal rejected it. But there are a lot of concern about the philosophy of the data. And I know that I saw the initial presentation of it and then I posted the abstract from the international Sport Sciences Association or another JAI at the summits.

A conference of my website and the data was a little bit different and then later it was different again so I'm not sure if there was additional data processing or new subjects or, you know, something. But I know that there were a lot of concerns about the quality of the data.

Christopher: Okay.

Menno: So, not sure but let's go to a concept of a particular study and look at these other studies. We'll focus on these studies more basically. Someone who researched in endurance training like ketosis also show superior body re-composition than a non-ketogenic diet to same amount of calories.

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So, interestingly the ketogenic diet contains 5% less protein as well. And the researchers attributed the superior body re-composition through ketogenic diets, higher amount of phony and saturated fats. As faultless as also improved favorably in the keto-group and this group has more resistance to muscle damage.

So that's really interesting just regardless of mechanism. If it's actually the increased fat-intake that is something, you know that's an inherent benefit of a ketogenic diet. So couples of the exact mechanism... this is another study suggesting that least form of endurance training, ketogenic diet may actually be better at... from a body-builder point of view at least.

Because we also know that for endurance we get basically the same level of performance.

Christopher: Right.

Menno: Right. So going back to the gymnast study, it also found more beneficial to the body compositional changes in the keto-group but was extent than in a research with Tampa. And this study was compiled by higher protein intake in the keto-

group. So we can't really say that this was a benefit of a ketogenic diet and may have simply been a higher protein intake.

So that's another... if you want then we'll have the Tae-Kwondo athlete study and the Polish body-builder impoverished study and big ball found nobody for composition benefits. But also, know the first effects of the ketogenic diet. And these studies used bioelectrical penile analysis. And at the scales in your gym, that I mentioned earlier to measure your body composition.

Ketogenic diet results in a high amount of water walls compared to higher carb diets which means that if you're looking at... if you're using a binate skill like that this can show up muscle lost because it's new.

So that means that these studies were actually methodologically biased to keto-group. Which means that... even in that scenario there was no at first effect of the ketogenic diet from a body-building point of view or a body re-composition point of view. And if you take that into a contest, methodological concern combines with the earlier studies... in the Tampa data for what it's worth and the endurance training studies.

Then you know, you can make a good case that ketogenic diet actually maybe not advantageous compared to non-ketogenic diets for body-building and power-lifting.

Christopher: Can I interrupt you there and ask you, so for you physique modeling... does it make a difference for the muscles to be... do you think they're not glycogen depleted at all or if they are, does that make a difference on the physical appearance of your muscles?

Menno: Yes absolutely. What we know is that glycogen storage needs regular process that we talked about earlier. You still got a very high level of glycogen re-syntheses definitely enough to feel strength training. And some of Volek's research I believe found that glycogen levels stabilized at 60-70% of normal... on a higher carb diet.

Christopher: Right.

Menno: Though, it's not like you're walking around for a very low glycogen levels at all but that difference is enough to make a substantial difference in your physical appearance. Which is also what most people notice when they... they're on a ketogenic diet. Basically they look dryer which is good so look cleaner. But they also look a bit flatter. And they literally are because the muscles aren't as... full of glycogen for water.

Christopher: So which do you prefer when you go to a photo shoot? Does it depend on the client, the one who's asking for or do you have a preference?

Menno: Uh well, unfortunately you don't have to pick for a photo shoot because in some magic you're in the peek-week, you can get both. But, that's beyond...

Christopher: Beyond the scope?

Menno: Yeah. Especially, what you do is you first go on a very low-carb to deplete glycogen levels and then you do a carb-up whereby you massively show in high amount of carbohydrates to fully fill your glycogen levels. And then afterwards, you basically take off all the water again.

And you get the physical appearance which you saw on the photos earlier whereby muscles are very full. You can get very full pump. But you're also dry. And that final touch, that is not maintainable which is why I say, no I don't look around like that year round.

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So, you don't have to pick but the nice thing for... it's interesting worth mentioning for power lifters and the liken, athletes why you have weight losses, ketogenic diet is very beneficial because your body weight is a lot lower when you're in keto compared to when you're not.

So if you can maintain your performance level, it's a very good strategy to go low-carb or you can be fully ketogenic. As a power lifter for example before a show. Because you lose a lot of weight which means that you can have a higher amount of muscle mass and you just depend to the maximum weight of your weight-class using the ketogenic diet for example.

And that means that you can get a significant amount of pounds that you can carry often a two-extra kilo of muscle into your weight class.

Christopher: Interesting.

Menno: Yup so, as conclusion, ketogenic for body-building section combined with the short nature of all these studies and effect of the benefits of ketogenic diets are only expected to manifest full over the course of weeks or months. Root case can be made for the superior arch of the keto-diets of body builders.

However anecdotal, evidence isn't that promising, and personally though, a ketogenic guide has many adequate compared to diet fat or the lowest recommended fat intake that we've ran about this course.

So basically what it means is that, if you're already on a low-carb high-fat diet, and you're not one of those individuals that responds exceedingly well to ketogenic diet. It's likely the case that there's no major advantage to being ketosis from a body-building point of view.

So where did proposal strengths developments increasing your level of muscle mass or your performance in the gym.

Christopher: Let me elaborate on that. So if you I was one of your clients and you suspected that I wasn't responding well to a ketogenic type. Can you describe what you see that would make you think that?

Menno: Uh yeah, it's normally simply, sulfur port in that case. Because people will, they vary for one, in their... there are level of appetite depression. So people that respond well to ketosis one of those measures of how well they'll respond is how much their appetite goes down.

So on average I think studies have linked to the studies that we have, found that most people's hunger levels are actually lower at the end of a ketogenic diet than they were earlier on. That's the best we start our appetite suppressing, proper TV goes.

Normally, the leaner you get the more your appetite increases. It's a mechanism from your body to maintain homeostasis.

Christopher: Right.

Menno: So, ketogenic diet is basically stronger that this mechanism for many people. And of course, depending on how much weight you lose in the end. But I'll never **[0:43:02] [inaudible]** currently. It is. However, some people they don't get this benefit or they get very little appetite suppressing effect from the ketogenic diet.

Same is true, I can skip to this I think, I'm not sure where it is. But there are also variability in how people respond in terms of their mental energy level so we talked about physical performance and energy needs. But in terms of your mental energy level, not that you're copied to functioning...

There are 2 studies showing improved well-being and improved cognitive function. But a lot of studies find no differences. And I know for sure that some people they actually get detrimental effect from the ketogenic diet. Although in many cases is because they try to go keto and then they get the keto flu in the first few days and then they immediately give up.

Uh, well, I'd say that's definitely true that some people shouldn't be undergoing in ketogenic diet. Although everyone should be... should try it for this two weeks. Uh, for sure... but people vary in that and other terms, although they respond, and in terms of physical performance and body re-compositions, it's quite likely that these things correlates to some degree.

Some people respond well mentally and internal appetites that could... it's quite likely that they also respond better. Physically, because we know from a lot of

research work, at least from a health point of view, that's subjected well-being in your health are surprisingly well-correlated. Even though there's no obvious mechanism linking these two things.

How healthy you are and how well your body is functioning from a medical point of view. But even for this subjected measures alone of the mental effects, most people won't go into ketogenic diets for a potential increase in body re-composition effects if you know, they feel terrible and they're hungry all the time.

So I'd say that the appetite suppressing effect is actually one of the major benefits of ketogenic diet. So if you reacted well to that, that's a huge stimulus or incentive to go on a ketogenic diet.

Christopher: Right. Let's take a step back for just a second and just I get a feel for how you're using the diet as a tool for your clients, is it very much individualize or would you have go through cycles of people where... okay so from this month you know, one through whatever you want to do ketogenic diet or is there a shorter block or how does it work?

[0:45:50]

Menno: Yeah by generally... start people off on a non-ketogenic diet and then if they want to try it we go into fully ketogenic diet, cause then they have a reference. So you have tried oats basically on the very similar setup in terms of straining program and the like. And then they can make a good decision. And sometimes you do that again if you're not sure. But you should be having the cycles of a length that's at least 2 weeks.

Just like I said you want to get rid of the keto flu if you get it at all. And you want to let some fat adaptation take place. The ketogenic diet is not like a higher carb intake which is why I think many people prefer high carb diets in body building. If you consume a lot of carbs, you instantly get that full muscle effect and you instantly, as the world makes it better, pumps in the gym. And if it doesn't correlate with your performance at all it's simply you know, make people feel good. Men in particular.

It also increases your body weight very rapidly without fat-gain which is simply guide continuance, only their for few days and that stabilizes but still, when men step on the scale they like to have more buff. So... whereas on the ketogenic diet, the benefits are a lot more long term. These benefits all fed adaptation and the protein sparing effect.

The increased anabolic hormonal production, all these things they can take weeks or even months to manifest.

Christopher: Right.

Menno: So, a ketogenic diet is not the kind of diet that you try and in instantly feels right.

Christopher: Of course.

Menno: It's something that you really have to dive into.

Christopher: Right. Yeah absolutely so I can tell for my experience that I think it took me 2 years to get back to where I was using a high-carb diet on the mountain bike. And that might be because I'm an idiot. And I just do it longer because I was executing the time quality. I agree, there's no way that you get back. If you're performing a high level eating a high-carb diet it's not going to happen overnight when you switch to a ketogenic diet, that's for sure.

And 2 weeks seems like the absolutely minimum to even get over it. When you say an increase in anabolic hormones, is this a general recommendation you've seen from reading studies or is this some kind of clients lab work?

Menno: Yeah I've seen it in a lab work. Especially when people are they are very low on anabolic hormonal levels and every individuals and in the effect is more pronounced in my experience.

Most research shows that the effect is quite modest but significant. So it's not the case that you're going into a ketogenic diet and you're testosterone goes off the chart it's like you're on steroids. You know it's a modest increase in...

Christopher: Right. And then you... let's say you have a client which started in a ketogenic diet. What resources do you point them at I mean what if they've never heard of the diet before or maybe they just didn't trust their name or something they've heard on something... what resources do you point them at? In that they have to choose something in a Monday morning, where do you point them?

Menno: I provide all the information to my client on myself but people that are watching, I say that the keto summit this year is a very great place to start. Yeah, there aren't that many resources to my knowledge about evidence-based education to ketogenic guide. There's the ketogains site and Facebook group.

Christopher: Oh that's really good. It's been mentioned in several of the interviews. It's an amazing resource. Someone mentioned before the, some of the before and after pictures I've seen, it just totally blew-up my mind. Yeah absolutely incredible that you have this resource. I'm thinking are there any cook books or anything you like? There's really not that many on the market is there?

Menno: No, not that I know of. It's interesting you mentioned cook book but yeah. One of the reasons alone on that sufficient to why you should try ketogenic diet is

because it will completely revitalize you might say your cooking skills or your whole idea of how you set meals and everything.

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For me at least the first time that I tried the ketogenic diet, one of the major highlights was that all of the meals, I loved cooking them and I was like there's no way I can eat this. Green peas, salmon and all these eggs and all the traditional keto-food you know, bake them. I was like "There's no way I can eat this".

So your meals are required also, even if they're sometimes smaller but of course, and you have to like fatty fruits. They're awesome. In terms of taste I think, ketogenic might surpass.

Christopher: yeah I know. It took me a while to get pas that actually before I started on the diet I was taking very, very high carbohydrate diet. And I didn't like the mouth feel of fat. I couldn't eat an avocado for example because I didn't like the mouth-feel.

But it took me about 25 minutes to get over that you know. It tasted wrong but you think that you know something. But you don't. You just need to try it 6 times before you make a decision.

Menno: Yeah.

Christopher: Are there any other common mistake that you actually mention, not eating vegetables... are there any other pitfalls you look forward to your clients when they switch to kenotized diet, is it something that they're going to do wrong? Where off the back?

Menno: Oh like I said the idea of minimizing carbs. One other thing I see is that it's not only carbs they're trying to minimize but also protein as well. An article from the optimum protein for body builder's online website, basically the very short version is that most people should be consuming about 1.8 grams of protein per kilogram per bodyweight per day.

Christopher: Which is a lot. That's a lot.

Menno: Yeah. That depends on...

Christopher: It depends. Yeah it depends. How I can say a lot, I'm thinking with respect to the amount of protein that I that is quite... that's a generous allowance.

Menno: Yeah. For endurance training would be close to 1.4 – 1.5.

Christopher: Okay.

Menno: You don't need as much. And if you combined them you might need a little more adrenaline training with very high volumes. But let's commonly accept that in commonly body-building circle of these commonly accept the 1 gram per pounds. Which is even more.

You should be getting that. You know in a minimum basically. For once, if you're looking for a maximum muscle retention or muscle growth so even during fat loss because if you're losing muscle mass that means you're losing less fat. And the muscle mass that you lose is energy that could have been lost as fat mass.

We both know, woman in particular that aren't interested in strength training that kind of thing, they underestimate how important it is to maintain their level of muscle mass.

So yeah you should be getting, you should be keeping your protein intake up. Although for some people you can housekeep it as the same level as you otherwise. I would have it if you normally have a very high protein intake. Because high protein diets can keep you out of ketosis.

Christopher: Right. That was to be my next question, what to do in that situation?

Menno: Of almost... this is interesting because what you'd expect theoretically is that the level at which... or protein intake which you are no longer in ketosis because of that protein intake, that's basically your maximally beneficial protein intake. Because by definition, your body is now no longer using those protein...

Christopher: Oh yeah. That's a good point!

Menno: Right. So it's not using those proteins to build muscle anymore. It's turning them into carbohydrates. So it's basically the excess. So that's another reason to try ketogenic diet. It gives an extra tool to measure how much protein you need.

Christopher: Interesting. That's a really interesting viewpoint I've never thought about before. Menno this has been fantastic. I think you're an interesting guy for many reasons. But one of them is, I know that you're becoming increasingly difficult to get a hold of, 1 to 1 basis and then you come up with a new tool, cyberneticfitness.com. Why don't you tell us about that?

Menno: Yup that's the project I'm working on together with Bernie Faggony, a strength coach from Norway. And we're working on it a long time. Hopefully it will launch this year. We've been working on, and I'm not going to make any promises. But what we basically do is we make artificial intelligence that can take over our jobs as personal trainers.

So we've created an artificial intelligence system software on a website that can now basically fully do the job of a personal trainer. So we'd ask you a lot of

questions with the intake form and then create your program and of course we're going to be looking at a ketogenic diet that's connected to this.

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And it will calculate your macros, your training program and your everything. And it will update everything based on the results you input. So your weight, whatever measures your fat-loss you're using, your strength progression. It also gives you a full-meal plan from an extremely large recipe database based on your macros. So you don't have to figure it around anymore. Where's my fitness bar or anything?

That's all taken care by the app as well. And like I said, we'll update everything based on everything you input and whereby, make my job redundant.

Christopher: You got beaten by someone!

Menno: I outsource myself! Hahaha.

Christopher: Be careful what you wish for! Is there anything else that you want people to know about? I know you do seminars and some of the things you showed today was from a training course.

Menno: Well open up and check my website, Facebook, Twitter and they'll see.

Christopher: Excellent. Menno this has been fantastic! Really, really helpful I really appreciate you and your evidence based approach. And then of course also your experience. Not least of all your own personal experience. So yeah, thank you very much! This has been really, really great.

Menno: My pleasure!

Christopher: Thank you!

[0:56:32] -End of Record-