

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport



DANNY LENNON: Hey Reid, welcome to Sigma Nutrition Radio. Thank you so much for taking the time to do this. Hopefully we'll have a really good conversation today.

REID REALE: No problem. Thank you for having me. I'm a big fan of podcasts and yeah, it's an honor to be on.

DANNY LENNON: Yeah, and like I said, we have obviously a lot of shared interests, particularly in not only looking at things in science, nutritional science, but also a love of Brazilian jujitsu and MMA. So, before we get into today's topic that centers around a lot of the research you've done and what you're planning to look into, maybe just give people a bit of your own background first of all maybe as an athlete, your kind of role and interest in combat sports and then how that has maybe led into as well as blending into what you're doing within academia as well.

REID REALE: So as you said, my athlete background, I've always been interested in combat sports as a young child trying very stupid martial arts, going to weight training as a teenager and then in my late teens picked up Kyokushin Karate which I was pretty serious about for a few years and then Brazilian

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

jujitsu when I was about 20 years old and that is really my passion. As an athlete, aside from strength training, I've been competing in Brazilian Jujitsu for over 10 years now. I'd say I'm a black belt probably going on eighteen months ago now and I continue to compete as often as I can in Jujitsu throughout that time, but look, like many of you our listeners and yourself participating as an athlete by training and competing makes you interested in the human body in our training and also nutrition which is increasingly important for combat sports athletes is what spurred me to start to educate myself in those areas. My undergrad at university was health science, so studied both exercise science and nutrition and biochemistry. Following my undergrad, I did an honors here looking at molecular nutrition, not so much sports related but looking more at insulin resistance and inflammation response to different feeding protocols. Following that, I did a master's in dietetics, so I'm an accredited practicing dietician in Australia and also an accredited sports dietician and I've just come at the other end of a three year PhD where I was looking at acute weight loss and acute weight management strategies for combat sports athletes so it fits in nicely with my athletic interest there.

DANNY LENNON:

Yeah, and we're going to dig into some of those specifics, particularly when you say coming to weight-cutting strategies and maybe trying to advance the area because there is obviously a lot that can be done differently to what has maybe been traditionally done in martial arts. So, why don't we talk about making weight for combat sports athletes and given the fact that it's - there are interesting weight classes that someone has to bring their weight down for, at least fall into a certain weight category. There is probably - the distinction we need to start with is that there is probably two different phases of how someone can go about this so they have that kind of longer term, kind of chronic decrease in body weight from actually losing body tissue, so that might be fat mass, so a typical calorie restricted diet, but then there is this kind of acute weight drop that they can do close to competition that maybe people outside of weight

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

class based sports aren't too familiar with or at least have some confusion as to how certain athletes can have these massive weight drops and seemingly go out and perform perfectly fine due to some of the strategies we're looking at. So if we start maybe by placing our focus on that second phase or that kind of acute change or how athletes are manipulating their body weight to make weight for events, can you maybe outline just for, like I said those outside of this who maybe have no experience with it, number one how it's possible for them to hear about boxers or MMA fighters have these dramatic weight cuts and maybe how that is distinct from actual just normally what people think of as weight loss or fat loss protocols and then some of the rationale why a combat sports athlete would actually want to drop such significant weight close to an event.

REID REALE:

Yeah, you really hit the nail on the head in your opening statements there, identifying that there is two distinct different phases there, and like you said, so the first one being alterations in actual body tissue, so body fat reduction and, although it's not generally the goal; but even reductions in muscle mass, and this stuff happens over longer periods of time. So, weeks to months to years, and most people can easily wrap their heads around that concept that when we diet, calories in versus calories out, we introduce a calories deficit and we start to lose body fat. Perhaps if we're not training or we're not getting that protein or calorie deficit is too severe we also drop some muscle mass, and that is fairly easy for the average person to understand, but like you said, this acute weight loss phase is also poorly understood, so when we think about the body tissues that are manipulated chronically, so body fat and muscle mass, that is very different from what's manipulated acutely, so in terms of what can we manipulate in hours to days even, we're talking about body fluid or body water and then also gap contents, so these are going to be the biggest contributors to body weight fluctuations in the short term. One of the ways that I often explain to athletes or those that are trying to better understand this is to think about just when you're eating and drinking foods and fluids throughout the day and when

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

you're going to the toilet. So, if you have a large meal, perhaps you're having a palm sized piece of meat, a few cups of vegetables, maybe you have a glass or two of water besides that meal, you might actually ingest a kilogram or a liter of food or fluid there, and if you would have stepped on the scales before and after eating that meal, you would see this fluctuation on the scales, so it's easy for people to conceptualize how body mass or body weight can change in the acute fashion although you're not actually changing your levels of body fat or muscle mass, but that weight is going up and beyond there, so that is one easy way for people to start to wrap their heads around it, and then we can get a little bit more technical with ways to push the envelopes and really manipulate these acute changes in body mass more precisely in line with making weight for combat sport athletes. So, maybe just diving a little bit further, in terms of - so we identified that it's fluid and gut contents that we're going to manipulate acutely. Maybe we start first on fluid, so body water, depending on how lean somebody is, it could be 50-70% of your body weight is made up of water, and I like to think of, or the way I like to explain to athletes is when it comes to manipulating body water, there is three different ways we can do it. One, we can change how much fluid is coming into the system, so basically how much are you drinking? Two, we can change how much of that fluid our body is holding on to or what's bound to the body, so things like if we have more sodium within the body we're going to hold on to more water. If we have more stored carbohydrate say in the form of glycogen, we're going to hold on to more water, and even fiber hanging around in your stomach is going to burn with some water, and then three we can play around with how we're getting water out of the body. Urination is one method, also respiration, although respiratory losses are quite minimal, but sweating tactics and perspiration. That is the main one that most category sport athletes are going to play around with in terms of getting fluid out the body. And then when we're talking about gut contents, so again like how much food we have hanging around in the digestive tract, ways we can manipulate this, so one perhaps a simple way which a lot of uneducated weight

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

category sport athletes resort to is starvation. So, if you just donate for several days you are going to work that food out of your stomach because you go to the toilet and you're defecating, and if you're not replacing the food, then obviously you empty your stomach. Another way that can be done is through the use of bowel preparation formula, so again pushing that undigested food out of your stomach or hastening the exit. But number three, a more clever way and the way that I like to use with the athletes that I work with is manipulating the food that we do it. So, generally if we ate a diet that is high in fiber, fiber is not absorbed, then it passes through our intestines, but it does take hours to days before it works its way up, so if you consume a low fiber diet for several days in a row, you can actually reduce that amount of undigested food that is hanging around in your stomach and thereby reducing body mass. If there is less undigested food hanging around, then your overall body mass is going to be lower.

DANNY LENNON:

Yeah, awesome. There is plenty of us to dig into there, and I think one of the big distinctions that people are probably realizing now is that there is much more strategies available to the athletes to be able to make weight than simply through dehydrating themselves as much as possible and this is maybe where a lot of athletes run into problems is that they aren't aware of these other strategies or at least how to implement them in a smart way and simply try and lose drastic amounts of weight by going in a sauna or doing tons of activity and not realizing the specifics of a strategy to use, so maybe if we start to delve into those things one at a time to see number one what the science says and two how an athlete might practically use it, let's start with water losses first of all, because like you outlined, there is a number of different things that will influence the amount of water that is going to end up being retained in the body and we can do different things to try and influence this, and so a lot of athletes will know, yeah, if I start sweating whether it's in a sauna, I can get rid of some water. If I don't drink anything then I'll get more and more dehydrated. But one of the typical things that a lot of them may have come across or at

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

least been recommended in the past is being told to do a protocol where there is going to be a period of water loading before they start that water restriction, and this has been really interesting to see at least for me over the past few years because there is been lots of different mechanisms people suggesting might be at play or recommending that they've used this with a particular athlete, but really there is been nothing that's directly looked in a research setting at the types of protocols that athletes are actually using until I heard about what you had been doing as part of your PhD research. So, just maybe to enlighten people listening, can you talk about what you had set up with that study that you looked at in the water loading protocol and really what you were trying to address. So, what is this proposed issue with why water loading may potentially be beneficial than just restricting water alone?

REID REALE:

Like you said, it's a very interesting method which is reportedly being used by a lot of athletes, but with no actual research has looked at it. So, just to set the scene, this process of water loading involves the consumption of large volumes of fluid. Depending on who you speak to or what protocols you read, sometimes they recommend it in a per kilogram amount or volume relative to body mass and other times it's just absolute recommendation, so often you might read, drink 10 liters of water per day for four days in a row and then followed by complete cessation of water intake or maybe even a step-wards reduction, so maybe it's 10 liters per day for three or four days followed by six liters then two liters then the nothing. And the idea is that you're manipulating renal hormones and playing around with urine production and upregulating these processes so that when you finally do decrease of fluid intake, at least upregulation persists for some period of time and then you are going to get rid of more fluid via urination than you would if you simply stopped drinking water altogether. That was the a theory anyway, and a lot of body builders and power lifters and combat sport athletes have been using this for perhaps even decades or, I know body builders even in the 80s were doing this sort of thing. Again there was no real research that's

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

looked at whether it's effective or not, and the other thing that confounds any anecdotal evidence is the fact that generally when people are making weight, they're implementing various different methods concurrent to one another, so if you're manipulating your fiber intake, your sodium intake, your carbohydrate intake plus you're sitting in the sauna at the same time as doing this water loading, it's really hard to pinpoint exactly which method is having what effect. So what I decided to do as part of my PhD research which was conducted at the Australia Institute of Sport was to set up an intervention trial where we were going to control as many variables as we could and have two different groups participate in this trial where one group would do the water loading and one group would not and then have one group restrict fluid intake and then see if there was any differences.

How we did this, we recruited 21 athletes, so these were combat sport athletes, guys who had previous experience with competing and making weight, so 21 athletes. We separated them into two groups, a control group and the water loading group. The protocol we used was the water loading group consumed 100 mil per kilogram of fluid, so 90 kilo athletes, 9 liters of fluid per day for three days, and the control group consumed less than half, so it was 40 mil per kilogram. So, control group, water loading group three days and then on day four, both groups followed the same fluid intake protocol which was 15 mil per kilogram, so that represented the fluid restriction and then on day five there was no fluid ingested for the first few hours of the day which sort of represented the weigh-in day. Throughout this time we had control diets, so we had dieticians at the Australian Institute of Sport weigh-in all the food, administering the food to the participants. We even controlled the sodium intake, so we had energy prescribed based on muscle mass, which we had body composition assessed at the start of the trial. Sodium intake was set a milligram of sodium per megajoule of energy intake, and we had them measure all their fluid intake throughout the study.

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

We also measured blood sodium, because obviously people who are familiar with these sort of interventions, immediately would come to mind, they would be thinking about hyponatremia. So hyponatremia is the condition where blood sodium is diluted and this can cause problems, and in the worst case scenarios can even cause death. It's often happened with endurance events, so perhaps at marathons when guys are so preoccupied with drinking large volumes of fluid because they're trying to make up for the sweat losses that they over-ingest fluids, and actually, as I alluded to, dilute their blood sodium to the point where disastrous outcomes occur. That is why throughout the trial we measured blood sodium twice a day and we also took several blood collections to measure renal hormones, so we measured renin, aldosterone, and also vasopressin, also known as antidiuretic hormone. What we found at the conclusion of this trial was that the water loading intervention actually did work, and following fluid restriction, the water loading group actually lost double the amount of weight on that fluid restriction day than the control group.

We didn't really push it to the extremes because obviously we're thinking about safety and we just wanted to see whether there was any plausibility to this method and identifying a mechanism, but yeah, what we did find was that the control group on that fluid restriction day, the main weight loss was 0.6% of body mass in that 24 hour period and for the water loading group it was double that, so it was 1.2% of body mass. This also matched up with the urine production on that day.

DANNY LENNON:

Yeah, awesome. There is lots I want to ask about because it was, like I said, not only was this the kind of first trial that really looked at the protocols that athletes are probably actually going to be using and trying to answer this exact question of how much of an impact does water loading before restriction has, but it was also really well done when you look at how tightly you controlled a lot of things. For example you mentioned sodium, you mentioned that the

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

diets were prescribed by dieticians and that the meals were there, that people had obviously accounting for diet calorie and macronutrient intake was looked at and I think fiber intake was set, so standardized across the board, so really, really well done. One of the things that I think might be interesting is, if we look at the individual data points that came out from that, because from anecdotal experience or working with different athletes, people are kind of aware that two different athletes may respond very differently to a certain weight loss protocol number one to just how much of an impact it has on say weight loss to them in that acute phase but then secondly how they can kind of perform after a given amount of weight loss. So I'm just interested, what was the kind of spread did you see in terms of response within the people that you were looking at? Was there anything that kind of stood out immediately that there was a difference in spread or was it actually quite kind of close-knit?

REID REALE:

Yeah, there definitely was a difference between the participants. Like I said, overall there was a strategically significant difference between the means, but when we were looking at the individual data points, I don't have them in front of me at the moment but I do remember that one of the participants over the course of the five day intervention was able to lose 5% of his body mass which is quite a lot considering he wasn't doing anything extreme, and whereas some of the other guys were maybe closer to 2%, and this is both in the water loading group. So, I definitely feel that there is a respondents and non-responders, and I guess without doing some sort of genetic testing or knowing the precise mechanism which explains the individual variability, the only way athletes are going to know is to try it themselves. So I do feel like there is a case of responders and non-responders here or at least those that respond more so than others, so yeah, these worth athletes' trial in days ahead of important competitions but before they decide that this is something that they're going to bank on.

DANNY LENNON:

Yeah, sure. I think it gives a really good blueprint of here is a great starting point for everyone, and then athletes, like you

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

mentioned have to just play around and see where it suits them best. So now that that kind of question was looked at and there was quite a big difference found between the water loading versus the non-water loading group, the next kind of question would, and it maybe hasn't been able to be answered yet, but when we're trying to loosely, what exactly were the mechanism that this is happening, do you feel it is down to, again we mentioned already that a lot of people have talked before about we're trying to manipulate those renal hormones and that's how this effect is going to happen. Do we know exactly the kind of underlying mechanism that is causing this extra water loss fear, that water loading protocol, or do we have anything that might point us in that direction that it has been looked at yet?

REID REALE:

Yeah, so great question, and we do have a very plausible mechanism which makes a lot of sense and I guess it can be confirmed with future research, but what we found was, via the renal hormone measurements that we took throughout the trial, we found that renin and aldosterone, there was no difference between groups, but the vasopressin, or the antidiuretic hormone, there was a significant difference between the groups, and what we found was that the water loading group were able to suppress vasopressin throughout that water loading phase, so vasopressin went down, and this is to be expected because antidiuretic hormone, you expect it to go down when you increase food intake because you're no longer trying to conserve fluid within the body, and often what is hypothesized is that this suppression remains once you restrict fluid intake, and what we actually found was the opposite, so vasopressin was suppressed throughout the water loading, but it actually rebounded once fluid restriction was enacted. So that would lead I guess most people to think that water loading would not have an effect, and that once you restrict fluid, your body is just going to hold on to that fluid, but upon doing further reading and investigating this further, what we found was that vasopressin actually has an effect on what's known as aquaporin channels within the collecting ducts of the kidneys. So there is aquaporin channels, just to give the

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

listeners a bit of an outline, these aquaporin channels are protein channels within the collecting ducts of the kidneys that basically increase and decrease water reabsorption in the kidneys, so as vasopressin goes down, there is aquaporin channels, their appearance decreases also, so as vasopressin goes down and your body is trying to get rid of water, these aquaporin channels decrease so the water reabsorption is no longer happening and the water continues to come out, and so these aquaporin channels work in concert with vasopressin to regulate fluid maintenance in the short term. What they've shown in rat models is that these upregulation and down regulation of aquaporin channels can persist for several days following the vasopressin suppression. So, although the vasopressin may have rebounded sharply after the fluid restriction was introduced, it is quite possible that these aquaporin channels stayed suppressed also, so that is how the increased fluid losses continued.

Obviously we didn't actually measure the appearance of these aquaporin channels, so we can only speculate, but like I said, it has been shown in rat models that this persists for two to three days following manipulation of the vasopressin or the antidiuretic hormone, so that could explain it.

DANNY LENNON:

Awesome, yeah, no, that is really interesting. That is fascinating to see those things at play and I think again it sheds a bit more light on exactly what's going on particularly - I think that is a big strength again of that study that you measured these different hormones, were able to narrow down maybe the focus to place on at least for future research. So if we start pulling together back more to some of these different strategies that an athlete can use that is going to help them be able to lose weight in a most effective manner possible, we've kind of cornered off the stuff on water loading and restriction, at least we've now got an evidence-based protocol being shown to be effective. That could be a starting point. Some of the other things we mentioned earlier than can manipulate weight are obviously gut residue and things like glycogen storage within the muscle, and therefore I know a couple of other things that we can talk about, so if

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

we're talking about some of the next things on top of a water loading restriction protocol that an athlete might use, where would they go next in terms of a combat sport athlete that has a week out from weigh-in? What are some of the others that you think in practice are well supported tactics to use?

REID REALE:

I think the number one thing that athletes should be doing and it's interesting because maybe it's the number one thing that athletes don't do is play around their fiber intake. If you can reduce that gap content while still ingesting macronutrients and energy, so rather than starvation or skipping meals altogether, if you can just decrease the amount of fiber that you're ingesting and still taking carbohydrates and protein and energy, it's essentially free weight loss where it's not going to affect your performance or your energy levels at all. So I think the first thing that people should be doing is adopting a low residue or low fiber diet for one to three days depending on how much weight they need to lose, and again like we alluded to, playing around with this ahead of important competitions so you can see how you respond to it individually, and athletes could lose anywhere from 1% to 2% body mass just by emptying their gut contents through a low fiber diet, so that is the first one because it's free weight loss, it's not going to affect performance. Moving on from there, playing around with sodium intake, so again sodium intake, if you decrease sodium intake, in theory it's probably not going to affect your performance either because you're just getting rid of generally some of the extra cellular fluid, but in this day and age with the kind of diets that people eat, I do find it's harder to manipulate sodium intake than it is to manipulate fiber intake. With fiber intake, you can just not have your vegetables besides your meat and rice and dinner but as you would know, sodium is just absolutely everywhere in the food supply so I do tend to find that it's harder to manipulate sodium intake but that is another one that is sort of free weight loss I guess, and then stepping up from that carbohydrate restriction, so carbohydrate restriction is definitely going to impair performance, so that is why I would suggest the low fiber intake and the low sodium intake as the first means to acutely manipulate body

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

mass, and then if you need to lose extra weight, playing around with carbohydrate intake, and again because it is going to affect performance, it's important to replenish carbohydrate stores for long weighing. So, therefore if you're an athlete who has very limited time between weigh-in in competition, manipulating carbohydrate intake might not be your ideal. If you've got a 24 hour weigh-in, then you can completely deplete glycogen stores and you've got that 24 hours to re-carb following weighing, but if you're like a jujitsu athlete where maybe you're weighing 30 minutes before you fight, the ability to recover is going to be limited, or even if you are an amateur boxer where maybe you only have three or four hours, so again three or four hours you do have some time, so perhaps jujitsu athlete, low carb diet, probably not, boxer, maybe lower carb and then being proactive with your replenishment post-weighing, but if you're a mixed martial artist, it's likely fine to completely eliminate carbohydrate for seven to ten days prior to weigh-in to make sure that you really get as much weight loss as you can from depleted glycogen stores.

DANNY LENNON:

Yeah, and it that is key to just athletes understanding that these tools are available. Like you said, particularly things like altering fiber intake and sodium are so valuable because they are not - particularly fiber intake is not a particularly hard modification to make. You're not having to restrict your overall calories and you're not going to have a detrimental impact to performance, but if we're saying that someone could have probably very easily 1% of their body weight loss just simply by doing that for a couple of days, that is another 1% of the body weight someone now doesn't have to lose via dehydrating themselves the extra bit, and this is where people get into trouble I think having these large weight cuts that they only do via large dehydration and not looking at these tactics. One important thing you touched on was, the difference is in an athlete with say a two hour weigh-in versus a 24 hour weigh-in, and I think this is an important issue to address because a lot of questions tend to get thrown at this area, and so I think one of the big things you've already brought up Reid is understanding just how much

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

time the athlete has will dictate probably, first of all we've already mentioned carbohydrates that if you've only two hours before you are going to compete, you probably don't have a ton of time to completely replenish carbohydrates so you probably don't want to deplete those stores in the first place. We could say the first thing for water restriction in that it's going to be a case of if you only have a couple of hours between weigh-in and the event, you're not going to be able to rehydrate to the same level as someone with 24 hours plus, so is this all to say that being aware of these things gives different guidelines of what an acceptable weight cut is for these different types of athletes and for the athletes that you may work with or advise or even with yourself, what types of parameters or acceptable amounts of weight loss do you give for people in say a two hour versus a 24 hour weigh-in scenario?

REID REALE:

Really great question and everything you outlined there is spot on with the recovery time available between weigh-in and competition being the key dictator as to the magnitude of acceptable weight loss. Again it's going to vary slightly by individual, so we talked a lot about a low fiber diet there where we say that an athlete may be able to lose 1% of their body mass, maybe even more, but that is going to depend on their habitual fiber intake, so I know for myself with the jujitsu competition, I can bank on pretty much two kilograms of weight loss from a low fiber diet for three days but I eat a lot of vegetables to begin with, where somebody who doesn't probably isn't going to lose that much. So it's definitely an individual component tool, but if we do want to come up with some recommendations, the recommendations that I like to use, and which are a good starting point, we've actually had published in a few review articles will tend to say for 24 hour weigh-in, no more than 10% body mass loss. That does seem like a lot, but as you would know, a lot of these top MMA guys are doing a lot more than that, but I think a 10% body mass loss is acceptable providing that 10% is coming from a fully hydrated state to begin with. An athlete who is currently consuming adequate carbohydrates and maintain glycogen stores and an athlete who does

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

routinely consume a high fiber diet, so with all those caveats in place, I think a 10% body mass loss in the week prior to weigh-in for a 24 hour weigh-in is acceptable. For those with limited weigh-in times, so again like amateur or Olympic boxing where maybe they've got minimum of three to four hours but perhaps a little bit longer, I think a 5% body mass loss because again we're not going to be dehydrating as much as athletes with a 24 hour weigh-in, and also the fact that we're not depleting glycogen stores to the same degree. For jujitsu athletes obviously that is a keen interest of mine. I think maybe some are in that 3%-4% body mass loss. It makes sense to say less. If we're saying that you've got a 30 minute weigh-in versus a three to four hour weigh-in but I know that some athletes can perform mildly dehydrated, so although we're not going to completely rehydrate, perhaps in a grappling match, if we were to dehydrate by a 1%-2% body mass and not fully rehydrate, it might not affect performance given that the type of physical requirements of the sport are not affected by a small degree of body mass loss via dehydration.

DANNY LENNON:

Basing that kind of the last kind of step then is once they've successfully made weight for their competition and whatever, that varies, it's going to be based on their own context. Once they've made weight and now they start that rehydration or refueling process before they're going to go and compete, based on some of the things we've touched on there is going to be some degree of dehydration, possibly some carbohydrate or glycogen depletion and then obviously going alongside that water restriction dehydration changes in their electrolytes, particularly if they've use something like low sodium diet for a day or two. So that becomes fairly obvious that okay, in that refueling process we need to prioritize water, carbohydrates and electrolytes, but in practicality, what would that actually look like, or what should the athlete be aware of, because in terms of dosing of those different things and the timing of consuming them after they've gone in and weighed in, is there presumably some sort of limits or weight limiting numbers on consuming the water and carbohydrates and electrolytes that they

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

should be aware of or how they should space that out? So what ways do you think about that with the athletes you work with or advice to of how should we think about an approach that refueling period post weigh-in?

REID REALE:

Yeah, great question again. I think the first thing that I like to think about, and it's an interesting point because combat sports differ in many ways to many other sports, and one of the key things, I think one of the key considerations is thinking about athlete comfort and the perception of how the athlete feels, so I think there is no use in trying cram liters and liters of fluid and all this extra sodium and extra carbohydrates to try and address these deficits that we've created if that means the athlete is going to feel full and bloated when it comes time to compete. So it's really about weighing up these priorities of recovery, refueling and rehydration versus gut comfort and how the athlete feels. So, obviously for an athlete with a 24 hour weigh-in, this becomes a lot easier, and so for the athlete with a 24 hour weigh-in who is weighing in a day before competition, I would advise the athlete and the sportsman professional working with these athletes to address as much of if not all of these recovery needs the day before competition so that when the athlete wakes up the morning of competition it's just status quo and I can eat and drink as I normally would prior to any training session or any competition had they not made weight. In terms of putting some numbers around this, if we have completely depleted glycogen stores, then following some sort of carbohydrate loading protocol or at least some of the guidelines in that ballpark makes sense, so anywhere from sort of maybe 7 to 10 grams of carbohydrate per kilogram, again the day before competition, so it ends up being a lot of carbohydrate which actually fits in quite nicely with most of these guys who like to go for a large meal after weighing, but again like think about stomach comfort and gut comfort and making sure that you can comfortably get this amount of carbohydrate in. It makes sense to go for lower fat, lower fiber options that aren't going to bloat the athlete, and then if we're thinking that we're trying to address some of the fluid needs as well, you can do a lot of

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

this with the fluid and sports drinks and things like that so you're getting some carbohydrate along with the fluid. In terms of addressing the fluid deficit, as has been established for many years you need to drink more fluid than the deficit itself, and that is to compensate for the ongoing urine losses, so probably 150% is a good number to aim for. So if you end up dehydrating 3% body mass then you've got to be drinking 4.5% body mass spread out. In a practical sense, it's probably going to be in a longer time possible, so if you've weighed in at 5:00 pm the day before competition and you are going to go to bed at 10:00 pm that night, then it makes sense to spread out that fluid prescription over those five hours. Probably no more than 1.5 to 2 liters per hour, just be in line with what we know about gastric emptying, and again what you alluded to, adding some electrolytes, so some extra sodium to that fluid is going to make more of it retained as well. Really good food and fluid options are going to be sports drinks or rehydration solutions and then also some salty snacks and things. So, often we'll have an athlete step off the scales, they'll have a sports drink in one hand and maybe some salty chips or some pretzels or some other salty snack that they like in their other hand and that while you're addressing the fluid carbohydrates and sodium needs all at once. For the athlete that is weighting in the day of competition, the whole process becomes a lot trickier. You have to identify some sort of cutoff point where the priorities switch from refilling and rehydration to competition preparation and so for some athletes, they might be able to keep eating and drinking into one hour before competition, but for other athletes, this might be two or three hours before competition where they don't want anything to be touching their stomach because it's going to make them feel sick and if they're getting anxious and nervous and feeling in any way unwell, that is likely to impact performance greater than any deficit in fluid or carbohydrate status, so it becomes really hard with athletes that are weighing in the day of competition if they're dropping large amounts of weight and therefore have to ingest large volumes of food and fluid, which again is in line with what we're talking about with that

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

magnitude of appropriate weight loss for those weighing in the day of competition.

DANNY LENNON:

Yeah, and I like that you highlight that variable and also how the individual athlete is likely going to feel and how that is such an important consideration and probably something that can only be worked out with experience either from the athlete doing practice workouts themselves or for their performance nutritionist or dietician that works with them working through other number of different people, a number of different weight cut protocols and seeing all these things from experience to figure out, okay, getting that blend of what is actually going to make that athlete feel good and they're actually going to be able to do versus theoretically what's the best kind of macronutrients and water for them to be consuming afterwards. I think that is a big distinction that really ties into the practicality and pragmatism in this, so I'm really glad you brought it up Reid.

Before we finish, maybe we can talk as well a bit about future directions for this stuff. So, first of all for yourself, where is your current work taking you right now? I know you've told me you're now based in Florida and you've got some exciting stuff coming up for that, so maybe you can let people know what that's all about and then in this field in general, what are you hoping are the next few things that we can start to tease apart for this class of athletes?

REID REALE:

Yeah, so as you just mentioned, I have relocated from Australia to Florida, so having finished my PhD at the Australian Institute of Sport, and also through the University of Sunshine Coast, but I've recently taken on a role with Gatorade Sports Science Institute in Florida, so that is exciting news. I've literally just started in the past couple of weeks, so we don't know exactly what direction the research is headed but they've got a really great facility here and I'm excited to get sucked into some of this research. Luckily and hopefully we're going to be looking at some RMR stuff, so metabolic rate and obviously that ties in quite nicely with the whole weight marking issues that they we're talking about but more on the chronic side of things, so yeah, I'm excited

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

to see where that goes, although the focus isn't going to be combat sports but we can pull out some really good findings which can be applied to combat sports.

In terms of overall where the weight cutting research is going and where I would like to see it go, it's a really interesting field and it's a hot topic at the moment and quite controversial as well because there is been a lot of disaster stories keep coming out in the press about athletes dying from cutting too much weight and things like that so it's really interesting to see where it's going to go. I know a lot of people are arguing for the complete evolution of weight cutting from combat sports and that would be interesting to see if that could ever be done, but being pragmatic, I can't see how you can really eliminate this altogether. My take on the whole thing is we need to find ways to better educate athletes and be able to reach athletes, so obviously we don't want guys dehydrating 10% of their body mass because that's going to lead to disastrous outcomes, but like we've alluded to here, if you can use a combination of strategies to get that weight down so you're not resorting to extreme dehydration, I think that is a better way to do it, and so being able to educate athletes. So perhaps some research looking at not so much physiological interventions but maybe assessing different education approaches like they've done in other nutrition research, like what are the best ways to educate athletes into influenced behavior I think is a way to do it. So yeah, it will be exciting to see, like I think we know how to do it. I think our science nerds that understand the physiology, we can safely do this stuff and pragmatically approach it but how do we bridge the gap between the sort of academic fields and what athletes are actually doing? How can we reach these athletes and change behavior, because that is the hardest thing I think with most nutrition research which is we know the underlying mechanism, we know how to manipulate diet and body composition, all of this stuff, and how to get people to do it I think is the hard thing.

DANNY LENNON:

Yeah, I completely agree and I think that is where the gold really lies in this area. If people are really able to effectively

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

bring this and make these practices more well-known and the typical conventional way that athletes are going to make weight rather than resorting to the types of strategies that we see them using now purely out of not understanding that there is a better way to do things and conflating the amounts of weight loss we're talking with purely that amount from dehydration for example and just thinking that okay, this is the way it's done and this is part of the job as opposed to like you say having a real understanding of accurate information that can allow them to effectively put this into practice. So yeah, I completely agree that there needs to be a focus on education, just making these message a bit more widespread and I suppose embedded within these sports is going to be key.

Before I wrap up on the final question Reid, for anyone that wants to hear more about your work or get in contact with you on social media or find out about more of the stuff you've got going on, what's the best place for them to find you online and where can they get in touch?

REID REALE:

Sure, so I've got a website which I periodically maintain which is just www.combatsportsnutrition.com. I've also got an eBook which sells through that but that's got a different website which is combatsportsnutritionebook.com. People can reach me on my Facebook page, so [Facebook.com/combatsportsnutrition](https://www.facebook.com/combatsportsnutrition), or even reach out to me on my personal Facebook page. I'm happy for that. I've got a ResearchGate profile for people that are on ResearchGate. I don't use twitter, I've got an account but no one's ever shown me how to use it so I think I need to learn how to use twitter, so any of those channels are good.

DANNY LENNON:

Awesome, and I will link up to all of that in the show notes for this episode for everyone listening, so please do go and check that stuff out if you want to see more of Reid's work and get more of his information. I will link up to that in the show notes. So, Reid that brings us to the final question that we always end the show on, and this can be to do with literally anything completely out of today's topic, and it's simply if you could advise people to do one thing each day

Reid Reale, PhD - Research on Water Loading & Making Weight Practices in Combat Sport

that would have a positive benefit on any aspect of their life, what would that one thing be?

REID REALE:

I think just improving their critical thinking faculties and thinking more critically about things day to day. Like a lot of people just take things for granted and often appeal to authority thinking that “Well, this guy is an expert in this field. I’ll just listen to whatever he says and don’t question it,” or, “This athlete does this and he’s a world champion so I have to do this.” But I think just being skeptical, increasing critically your critical thinking and just questioning everything. Really work on just critically appraising all the information that is coming in and make up your own mind about things.

DANNY LENNON:

Awesome, I really liked the answer and I think yeah, if people take note of that would be on a better position. So, with that Reid, I want to say thanks so much for, again your time for coming on and doing this. I know it’s extremely valuable so thank you for doing that, and then second for the great information that you’ve given today as well. I think people will really find this information interesting and useful, so thanks so much man.

REID REALE:

No problem. Thank you very much for having me. It’s been an absolute honor to be on and I’ll keep listening to the podcast. It’s good stuff. Thank you very much.

DANNY LENNON:

Good to hear it. It’s been my pleasure man and I’ll talk to you soon.

REID REALE:

Great, thanks.

Interested in all the details of scientific weight cutting?

Sigma Weight Cutting System for MMA & Boxing:

<http://sigmanutrition.com/weightcut/>

