

Written Transcript
On The Line Episode 2.4 “Jose’s Bag”

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Charlie Palmer: Welcome back On The Line episode 4 season two. Joined again by Dr Chuck Dumke from the University of Montana. Chuck has been teaching Sport Nutrition for about 20 years, doing research on sport nutrition related topics for about the same period of time. So I can't think of a better person to have in here for today's topic. And then we're also joined by Jose Pena. Jose is one of our graduate students. This is kind of a bittersweet episode for us. Jose has been vital to The Black project for the last couple of years and his thumbprint is kind of all over some of the things that we've done, but unfortunately we're losing him back to his home country of Chile. Jose got his masters from us this past semester and he is headed back home for great things, whatever those might be. So like I said, kind of a bittersweet episode. We're calling this one Jose's bag, so we're gonna kind of ruffle through Jose's bag and just pull things out and just see what he is carrying with him and then we're going to just have a little free form. Make Sense.

Jose Pena: Sounds good.

Charlie Palmer: Jose, what do you got in your bag, man?

Jose Pena: Alright, so my background a little bit. I played soccer in college when I was getting my degree in exercise science and uh, after I finished my exercise science degree I wanted to do something a little more meaningful and get into something that actually made a difference out there in the world. And when I came into the community health masters here at the University of Montana, uh, had the opportunity to jump in this project with wildland firefighters, which is the perfect connection between athletic performance and something that actually makes a difference. And so Charlie asked me to, to put together a bag of things that might be relevant to firefighters and that I use when I was an athlete myself. I just came up with, a couple items that, that might do. Just that.

Charlie Palmer: And you were a goalie man. I totally screwed you on your intro. You were a goalie college soccer player. You helped this past spring. Assistant coach with the University of Montana, women's soccer team.

Jose Pena: That's right, yeah.

Charlie Palmer: Sorry, I kind of like shortchanged on your intro.

Jose Pena: It's good.

Charlie Palmer: All right man, what do you got?

Jose Pena: All right, so the first thing I'm pulling out is the C4.

Charlie Palmer: Explosive?

Jose Pena: No, quite no. This is a pre workout powder. Okay. And so this is something that me and other soccer players back in the team used to take before practices and before you know, going into the gym just to give us a little edge, maybe get an extra rep in there.

Charlie Palmer: Okay. So it's was a workout supplement?

Jose Pena: Yup. It's a pre workout supplement just to get you pumped up.

Charlie Palmer: All right Chuck, what do you know about this stuff?

Chuck Dumke: So c four is one example of a pre workout supplement. Like Jose said, you know, there's several other examples like explode, craze, jacked and these are basically a supplements that stimulate your central nervous system. Right. And specifically your sympathetic nervous system. And because of that they contain what we call in the field, sympathomimetics and that's gonna come up again with other Jose's bag items but...

Charlie Palmer: how do you know what's in his bag?

Chuck Dumke: Well ... (Laughing mischievously) These sympathomimetics are basically stimulating our central nervous system, like I said, and you know, so there it's caffeine, it's guarana, it's cola nut, it's a ephedra, DMAA even and these are not always FDA regulated and so we, I don't want to go down the rabbit hole of dietary supplement regulation, but it's controlled by something called the DSHEA, the Dietary Supplement Health Education Act. So the items are not FDA regulated so they don't necessarily contain what they're supposed to contain or even say what they contain. They have ingredients that may not work or might actually be illegal. And DMAA is one of those dimethylamylamine, and that's an amphetamine and actually stimulant that has caused deaths in military. It's been implicated in indeed some wildland firefighter deaths. So these pre workout supplements have ingredients within them that basically make you feel like one of the names of the products jacked. Right? And it stimulates you. You might get a couple more reps out of that third set of your bench press, you know, before spring break and they often contain Niacin, which creates a sort of flushing effect where skin blood flow goes out to your skin, you get a red face and you get tingly, right? And that's because you're, you're jacked, right? You're getting ready to work out. They're really high in B6, and B12, and then you know, they're often what we call pixie dusted, right? Where they throw a bunch

of things in them like creatine and Beta alanine and all these other things that might trigger some sort of like somebody heard something about creatine one time and they say, oh, that's good when I'm going to go work out. So how do these relate to the wild land firefighter? Well, one, you know when they're on the line during their 14 day shifts, they are often exhausted, right? And they're looking for a little bit more of a stimulus, right? But a lot of times it's in their pre season training when they're trying to get as jacked as all the other weightlifter types that are using this or athletes getting ready for a competition. And a number of people have gone down and died as a result of this. Not to be a downer...

Charlie Palmer: I think it's too late, man. No. All right. Jose, what else you got in the bag?

Jose Pena: So one more thing that I used to consume back in my collegiate soccer days pretty often is red bull. And you know, you have a late exam, you have to stay up at night and you have practice the next day and you have to be ready to go. And so he just opened up a red bull.

Charlie Palmer: Gives you wings.

Jose Pena: That's right.

Charlie Palmer: All right. Chuck, does it give you wings?

Chuck Dumke: Oh yeah. It can give you wings. Red Bull saved me one time when I was in a three day adventure race and I was falling apart and I show up to do a 300 foot repel and the red bull truck was there and I had red potatoes rolled in salt and washed it down with a red bull and I was good to go for another two hours. Point is right. Similar to pre workout supplements. They've got the sympathomimetics, these stimulants, right. And again, they try to mask their names by sounding like a herb like Ma Huang, right? Ma Huang is ephedra. Again Guarana, Kola Nut. Okay. Caffeine is currently not required to be put on dietary labels. So again, these are stimulants to stimulate the central nervous system. And then besides that they've got high sugar content and so they taste like a soda. A lot of people don't know the origination of red bull. Do you know how it started?

Charlie Palmer: With Taurine or something?

Chuck Dumke: Well, it's got Taurine in it, right? Which is a conditionally essential amino acid that has some proposed effects, but that's one of the things I was referring to with Pixie dusting. Right. They throw things in there that just kind of sound cool. But what I'm talking about is red bull is actually a rip off of a, I think it's southeastern Asian drink and was used as a rave drink in Europe in Germany, right where red bull was originated, so people who wanted to stay up late and party and dance all night add a little vodka to it even better. And that was the original energy drink was for dancing, not athletic performance and then

people. Some people started saying, well shoot, I'm going to use this tomorrow when I go skiing in and hang gliding and all these other things. So these energy drinks and of course red bull is just the maybe the most popular one, right? Monster Energy Drink, Jones's whoop ass. You know, there's a lot of cool names behind these things and makes teenagers want to drink them. I just read an article where a teenage girl who drank two monster energy drinks. I had to go to the ER because the heart palpitations, so energy drinks, right, like your morning coffee, have these stimulants in them, but oftentimes they can contain things that have sort of synergistic effects. Caffeine along with ephedra is a lot different than either one of those alone. And they can be not just additive but synergistic in creating even more affects on your heart rate, your blood flow, and your otherwise sort of central nervous system. So do they work in sort of that effect? Yeah, they can kind of make you jittery and sort of, you know, excited. But exercise does that too. So there's a synergism there as well and oftentimes the sort of risks are accompanied with taking these things and then doing about of exercise or even importantly in heat because of the way that they work on the nervous system. They can actually cause a redirection of blood flow that is disallowing you to dissipate heat and causing vasoconstriction to the skin. Which basically disallows you from dissipating heat and allows you to get hotter and has been implicated in a number of heat related injuries both in military and in wild land firefighters. And so oftentimes the combined effects are more dangerous than each other, but is it dangerous to take a little bit of caffeine with a lot of sugar? I'm not going to try to argue against people having a morning coffee, right, or those sorts of things, but when taken along in combination with some other events could actually be a little bit risky. Again, the Downer guy...

Charlie Palmer: Well and to be fair, I think you're talking some cost benefit here, right? I mean that red bull is getting you something that monster is getting you something. There is some benefit to taking it, whether it be taste good, it gives you some energy, it helps you feel good. It helps you feel alert at the same time. What you're talking about is potential costs.

Chuck Dumke: Right, and I am talking about potential cost, but it's often misused and that phrase gives you energy and gives you wings. Basically that's artificial because it's stimulating your central nervous system to think you have more energy, but energy is in the form of proteins, fat and carbohydrate. That's what your body really uses for energy. Basically, you're just being stimulated to think you have more energy and so in essence you're going to crash, right? You're going to crash. It's kind of like a diabetic that you give a bunch of sugar to. If you don't have insulin around, you better be really careful in what you deliver, right? If you take that energy, you're going to end up crashing. So time your crash well okay, so you know, taking a red bull in the morning, you're going to be hurting, right? Mid Day when you don't have access to anything. So it's the same sort of thing. You know, cyclists and other athletes will often take in coke, right? Simple coke to get a little bit of shot of caffeine at the end of a race, but you take it too early and you're not at the end of the race yet. You're going to crash, right? You're going to Bonk, you're going to hit a wall and that can be kind of the

misuse of them. The other misuse comes, you know, you always hear about like the teenagers in some parents basement who have a monster energy drinking competition and then have heart palpitations and have to go to the ER. Like the news report I just referred to almost every year I read about a cross country running race where somebody collapses and maybe some have even died and it's often implicated with pre competition energy drink intake.

Charlie Palmer: All right Jose, what else you got in that bag?

Jose Pena: All right, so the next item is not only used by athletes these days, I guess pretty popular. It's a blue gatorade. And I say blue because it's my favorite one. Class A, year and a soccer game halfway there. So, so hot day. Only one is just a cool blue gatorade down the sideline. And uh, we, we used to chug a good 12 to 20 ounces of Gatorade at once.

Charlie Palmer: Okay. The blue kind. There's a lot of gatorade options nowadays from what I can tell. Chuck, what do you got an a gatorade or any of these powerades...

Chuck Dumke: Right. So this is definitely something wild land firefighters partake in, right?

Charlie Palmer: It's provided. Yeah.

Chuck Dumke: Exactly. Drinking gatorade and it's often in the truck when they get back to the truck after a shift and things like that. And that's not a bad provision, you know, it's, it's basically a soda that's non-carbonated. Right. And without caffeine there are a bunch of different gatorade products. You know, you've got G2, you got gatorade, you've got gatorade endurance. The one I think Jose referring to is actually specifically called gatorade thirst quencher and it's a during exercise sport drink. It's one of those things that has been shown to increase performance during longer duration bouts of work when it's compared to something that doesn't provide sugar. Okay. Because one of the things that can result in fatigue in athletics and on the wildland firefighter line is lowered blood glucose, right? You get hypoglycemic, the mistakes, kind of what Jose was kind of referring to is again, in its use, okay. Like if you're drinking it with your lunch, you don't really need it then because you got your sandwich and you've got salt and some other things and in your chips and so you're. You're kind of wasting your gatorade. Then right when you really need it is in between your meals on the line when your blood glucose might be in jeopardy of dipping down. Jose, talked about chugging a whole bunch of it at a time. Now in soccer it can be your only opportunity like at halftime or you know, a short little drink break. Ideally you can do it kind of more intermittently, you know, in spaced out. The body's response to getting a huge bolus of fluid is to just pee it out and so that's kind of one of the challenges, but you're limited in sort of the application. You're using it, your brakes on the line or your breaks and athletics, but it can be important in avoiding that dip in blood glucose that can in the big time periods in between getting food. And by having a little bit of sodium that does enhance some retention of that fluid, so water always follows sodium, so whenever you

have a little bit of sodium in your drink, you're better able to kind of keep it in your system and then avoid any kind of negative effects of dehydration.

Charlie Palmer: Jose, what else you got?

Jose Pena: So one more thing that we would take somewhere at some point during the game when we're playing soccer was an electrolyte supplements and that was supposed to be sort of a cure for somebody cramping. So anybody we get a cramp, they will go to the sideline, go to the athletic trainer, just pop an Enduralight. That's what I got right here.

Charlie Palmer: All right. What do we know about those things?

Chuck Dumke: So Enduralites are one example of electrolyte supplementation. So they usually come in capsules or tablets, you know, succeed, Enduralites, thermo tabs, S caps, you know, there's a number of other brands out there and they all differ tremendously in what they contain based on their own theories of what you're losing. We just spoke about gatorade conveniently because you know their whole marketing ploy is, is it in you or you know, are you replacing what you lose when you sweat? Okay, and everybody knows when you sweat, you sweat sodium, it's salty, your sweat is salty, yet gatorade is not as salty as your sweat. So over time you can be losing more sodium than you can replace. Now, a lot of people think electrolytes and they think potassium. Potassium is actually an intracellular electrolyte, so you don't lose that in a significant manner when you sweat it's very important in your diet. Right? And in fact, adequate intake for potassium is higher than sodium in your overall diet, but people typically get more sodium they need and insufficient potassium in their overall diet, not in their drinks or electrolytes. Point being, those are some of the electrolytes in these supplements. Magnesium is often in their calcium is often in there, so over time if you're sweating and you're not taking in anything, right, you're losing electrolytes. A lot of people associate heat related cramps with differences in electrolytes. Turns out the research on that is relatively weak. It's really hard to research cramps, so it ends up being kind of experimentation, try them. See if it works for you. We do know like I made the reference with the sports drinks that you will retain fluids better when you take these electrolytes, so if you experiment with them, you got to take a bunch of water with it. You don't just swallow an electrolyte tablet, you take it with a bunch of water. You know the origination. Thermo tabs is one of the original ones and you can find it at walgreens is in the recovery from the dehydrating effects of diarrhea, so that's kind of one of the ways that they started right, it's take an electrolyte with water and that will help you recover from the dehydrating effects of diarrhea. Now, of course, and with exercise, you're dehydrating yourself through sweating and losing electrolytes that way, so when doing this over a longer period of time, like in a 90 minute soccer match, you might actually become a little bit of electrolyte deficient. Even more so in kind of ultra distance type situations. Now in my sport nutrition class, we define ultra distance, not in just running examples but in time. So anything longer than four hours and that certainly describes a 12 hour wildland firefighter shift. Right. Another thing that

we know from the literature that's really kind of frustrating and making blanket recommendations is that everybody loses different amounts of electrolytes in their sweat. It's a very individualized thing and people probably even noticed that like as they become more heat acclimated, their sweat becomes less salty and so acclimatization race, body size, and even genetics, right? You probably all know about this really salty sweater types. Okay. And they need more electrolytes and so it's kind of something that people need to figure out, do I need to supplement with electrolytes and by the end of the day, right? Am I dehydrated and electrolyte deficient and do I need to consider those sorts of things. And that's something that the ultra distance running crowd, the ultra distance cycling crowd and the wild land firefighter need to maybe consider.

Charlie Palmer: So Jose, would you take them because you had cramps or would you take them kind of prophylactically with the idea that they would keep you from getting cramps or in teammates or others? How did they view those things?

Jose Pena: Yeah. Well, me being a goalkeeper, I wasn't running that much and so I rarely had to take any extra electrolytes. But uh, my, my teammates used to take them when they would get a cramp.

Charlie Palmer: Okay. Yeah. If you were running bad things are happening. Probably... Awkward Pause... (Laughing)

Jose Pena: Nobody can see my nodding.

Charlie Palmer: All right. What else you got in your bag man?

Jose Pena: Okay. So the next one is another typical supplement in athletic performance that is also very popular these days is a protein supplement. And so when I got here is some whey protein from optimum nutrition is a gold standard 100% whey protein. I used to take this after the gym. It was commonly known that you have 30 minutes to take it after you're done with your lifting. So you know, you get your gains and whatnot.

Charlie Palmer: So yeah, whip yourself up a shake. Postworkout...

Jose Pena: that's right. As soon as you're done, the quicker the better. Apparently...

Charlie Palmer: Huge Chuck. So ubiquitous, so prevalent. This protein powder usage, what can you tell us?

Chuck Dumke: Yeah, we're very much in a protein-phillic carbohydrate-phobic society right now, you know. The product that Jose was referring to is nearly a 100 percent protein and it's got just enough carbohydrate in it and just a little bit of fat, you know, to taste like something. And when you see that, you know, and I was looking on the list and you know, immediately it's got artificial sweetener, otherwise it would taste like cardboard, right? And Jose also referred to the, you

know, this window after exercise in which you can stimulate protein synthesis, right. You know, then all of that is based on research that when you provide protein post exercise compared to when you don't, you can stimulate protein synthesis, right? But very little research actually supports the fact that that leads to more hypertrophy or getting bigger. And in fact, obeying that window becomes less important when you look at the rest of the 18 hours you're awake. And so, you know, spreading protein out is something that a lot of people ignore. Now I see people all the time in the weight room with their shakers, you know, and they're getting it during exercise or getting it before exercise or getting an after they're getting it with a meal. Part of teaching sport nutrition and you know, we do dietary analysis of both athletes and clinical patients and we've done a lot of wild land firefighters over the years. The people that do take protein shakes or sometimes taking four or five protein shakes a day and they end up getting more than three or four times the recommended amount of protein. And indeed on the typical western diet, in the absence of supplemental protein, people are still getting 50 to 100 percent more protein than they're actually required. So protein is not hard to get in our diets, but the marketing is strong. The whole ubiquitous idea of, you know, I lift weights, I must eat, drink protein, protein, protein, protein, protein, muscles, protein muscles. As a very prehistoric Fred Flintstone association. And people need to let go of that a little bit. I'm not going to say protein is unimportant and you know, Jose talked about whey. Whey is a dairy protein. It's the soluble protein in milk and it's been isolated typically so that people who are lactose intolerant are still fine taking way another less soluble protein in milk is called Casein. Okay. And so there's these two ideas that way and Casey and have different effects on their ability to stimulate protein synthesis. And that differs and kind of the rate of delivery. But there's also plant proteins, right? Soy Protein, quinoa, pumpkin seed, hemp, you know, there's all these different proteins and proteins do differ by quality. We have something called the PDCAAS Protein Digestibility Corrected Amino Acid Score and that's how we rate these proteins in their quality and indeed whey is the highest quality, right? All of those are being compared to what's considered the perfect protein. And that's the egg.

Jose Pena: There is some thing that I never understood when I was talking to other players about protein shakes and protein powder is branched chain amino acids and it was always a talking point and I never understood what they were.

Chuck Dumke: Yeah, so that's a good segue to continue on the quality of protein, so branch chain amino acids. The whole idea of assessing the quality of protein is in their provision of what we call the essential amino acids, right? The essential amino acids of the nine amino acids, the 20 and more amino acids in our body, and they're essential because we can't make them. Branched chain, which are leucine, isoleucine, and valine, are the three branch chain amino acids are three of those nine. Okay. There's lots of claims behind branch chain amino acids. The one that's kind of a getting the most popularity now is leucine. Leucine is considered to be a trigger specifically that one amino acid, and indeed essential amino acids are a trigger for protein synthesis. Right? So it is important to get high quality protein in your diet. Okay, and that doesn't mean you just have to

have whey both meat and other plant based proteins can be what we call complete proteins with high PDCAAS, but this Leucine does have research to suggest that if you get it post exercise, you get an additional stimulus for protein synthesis. You'll hear recommendations of getting two to three and a half grams of leucine post exercise to try to take advantage of this window. It stimulates something called the MTOR pathway, Mammalian Target of Rapamycin, which is what stimulates hypertrophy, protein synthesis and getting bigger and stronger, so that goes down a whole rabbit hole...

Charlie Palmer: We're already in it, I just saw bugs... (Laughing)

Chuck Dumke: ...the light disappeared. Uh, you know, the, the point was the quality of the protein, right? And the rating of the quality of the protein. Now, unless you're going through a food restrictive diet, now a lot of people, they hear that and they'll think Vegan, right? Vegans don't get enough protein will indeed. Vegans have plenty of high quality protein, right? Legumes, beans, nuts, seeds, and what a lot of people mistake when sort of counting protein in their diet. Sometimes they'll even count the grams is they forget that pasta, bread, all those things, cheese, you know, all of those things have protein in them as well. And so the number of total grams of protein add up very quickly.

Charlie Palmer: So a couple of things that you've said then. So if somebody takes four times the recommended or even necessary amount, what? What the hell happens,

Chuck Dumke: Right? What are the risks?

Charlie Palmer: Well, yeah, I'm taking four times the amount of protein I really actually need. What is my body do to that?

Chuck Dumke: Yeah. So you know, a lot of people early on people would say, oh my gosh, you're going to ruin your kidneys. Okay. And the reason is because the whey protein is different from the other macronutrients in our food is because of the nitrogen group and the only way we get rid of excess nitrogen is in our pee in the form of urea. And you'll see people, you know, the big weightlifting crowd walking around with their milk jugs of water, right? They're smart enough to know that they got to flush out all that extra protein because they're peeing it in their toilet. Okay. Now what are they doing with the rest of that protein is they're using it as energy. It can be a oxidizable fuel source. It can actually even be turned into in some cases fat and potentially carbohydrate. The amount that it does that is relatively small though, and so we do end up using it as a fuel and that's, you know, one thing that supports these people who are getting four times as much as they need is like, well I'll just burn it and pee it out and whatever, you know, that's the risk isn't that high. You know, it can in some cases a result in the leaching of other things such as calcium. Which could over time lead to osteoporosis. And this is kind of a different crowd. It's not gonna cause osteoporosis in a weightlifting crowd because that's protective to your bone mineral density. But perhaps in an older crowd, right? An elderly crowd who are getting more protein? I know my mother in law is all protein focus,

protein, protein, protein, right, and you know, she's following the today show diet.

Charlie Palmer: And then the other thing is oftentimes it seems like you see these protein shakes as a meal replacement. What are your thoughts on that? It doesn't seem to make a whole lot of sense that you would think I'll skip a meal and then just have a protein shake instead. Especially for a dynamic crowd like wild land firefighters.

Chuck Dumke: Right. So that's one thing I do with my students in sport nutrition. I'm like, all right, so when might you make recommendations for supplemental protein? When would you use it? And one of the answers is convenience, right? And it's such a competitive market, you can actually get it pretty darn cheap, but you could also make your own really well better than you can find in the champion the gold standard that Jose brought up. So it is convenience, you know, it's really easy to carry around a little bit of powder, mix it in with some water or some milk and, and boom, you've got some energy, basically a meal replacement. So you know, to have it in a backpack for a hiker or a wildland firefighter, you know, sometimes athletes in college are like bopping between classes and they skip meals and you know, that sort of thing. They skip breakfast. It's not a good excuse but it at least can get rid of what we call the episodic negative nitrogen balance. Okay. So what that was referring to is what I mentioned earlier about spreading your nitrogen out throughout the course of the day and avoiding periods of time of short term fasting when you didn't have some protein intakes and making sure you have some protein in every meal, getting a breakfast with some protein that the answer to some people might be that convenience of a protein supplement.

Charlie Palmer: Jose, what else you got in that bag?

Jose Pena: The next item is creatine powder, which we also use sort of like the C4 as a, as a pre workout and we didn't necessarily know why but it was supposed to give you maybe a little extra energy. You give you an extra rep in there.

Chuck Dumke: Did you say creatine powder?

Jose Pena: Yeah Creatine powder...

Chuck Dumke: Yeah. So creatine monohydrate, right is usually the form in which it is taken, is meant to increase in energy pathway called the Phosphocreatine pathway in this Phosphocreatine pathway supports exercise of high intensity. It's an anaerobic pathway. So it's for those people who are trying to do high intense weightlifting and you know, high intense sprinting and those sorts of things because it can provide the reprovision of ATP without the presence of oxygen. Right? Hence anaerobic pathway. It's probably the most researched ergogenic aid out there. It was actually kind of started. I always point to Linford Christie back in the early nineties, a 100 meter sprinter from England. But kind of like

Mark McGuire turns out maybe some other things were going on there as well. But nonetheless, creatine monohydrate right is often taken in regular daily doses. So when they're sprinkling it into pre workout supplements, that's, that's the example of Pixie dusting because basically it's not going to have any effect in an acute ingestion sort of way. And you know, it's really kind of funny for us to kind of see these aerosols, you know, they actually have little sprays that people spray on their tongue with creatine and you know, all these different ways of ingesting it. But in reality, what you're trying to do is increase the storage of Phosphocreatine in your muscle. And that's done over days and weeks. So oftentimes people go through loading and maintenance phase of Creatine monohydrate supplementation. And it's meant to upregulate this, this Phosphocreatine pathway. Now it does it work? well maybe.

Jose Pena: So for firefighters who are mostly aerobic athletes, more than anaerobic, creatine wouldn't necessarily play a big role?

Chuck Dumke: Exactly. It doesn't have much of a role at all. And so it's been, like I said, over studied. And so by being an anaerobic pathway, wildland, firefighters have little use for it. However, people have actually studied it in other situations of people exercising in the heat. Because when you take up and store more Phosphocreatine, you actually store more water. And people thought that was like a hydrating effect. Okay. But it turns out that it's not very effective in that manner. So the positive evidence that's out there is in repeated bouts of high intensity exercise. We have something we do in the lab called a wind gate where people get on a bike and it goes hard as they can for 30 seconds. Right? It's the best measure we have of your anaerobic power and if you were to do like say three or four of those in a row with a couple minutes rest in between your third and fourth wind gate might be a little bit higher when you have higher phosphocreatine stores. So that's the kind of thing it affects and people take that into the weight room and think, well I'll get out a few more reps in my third and fourth set. And there's a modest evidence to support that. That might be the case, but again, it's the wildland firefighter who's training for the season who might be using it to get ready and getting bigger, stronger, faster.

Charlie Palmer: I mean there are power components to being a wild land firefighter. Correct?

Chuck Dumke: Well, certainly. You got to be lugging a 45 pound plus pack. For sure.

Charlie Palmer: Primarily the job is various, Jose pointed out a robotic in nature and that you're more of an endurance athlete than a power athlete.

Chuck Dumke: Right. And you know that's again why it's. It's potentially more of a training tool and in fact people who do use it are careful to cycle off of it because creatine is both in your diet, right in the form of meat and you make it right for your own body. So when you take an exogenously in the form of a supplement, you down regulate your endogenous production and that can be dangerous if you're doing it for chronic periods of time. So again, the wild land firefighter might be doing it

in a preseason fashion, but then probably and perhaps even hopefully not taking it out to the field.

Charlie Palmer: All right, there's more stuff in Jose's bag, but we're going to leave it a mystery for now with the hope and the idea that we get you back. We appreciate and are grateful for all your efforts into our programming and the things that we've been able to do. We're gonna miss you. Thanks for taking the time today to come and share some of your bag with us. If we're going to close this thing up, Chuck will go with you first and then we'll, we'll let Jose, uh, take us home.

Chuck Dumke: I feel like I've talked enough, but, uh, thanks Jose for all the help and you get to bring Chile onto our listening nationality.

Jose Pena: It sounds good. We've got to learn English first. Yeah, I, I really appreciate the kind words. Thank you for having me. It's been a great experience. It's been amazing to work with wildland firefighters. I hope to keep working with wildland firefighters in the future. I mean, Chile's burning as well, right?

Charlie Palmer: Yeah, it's a worldwide issue. And most certainly faced by South American countries as well.

Jose Pena: Yeah, yeah, for sure.

Charlie Palmer: Alright, well with that being said. Thanks Chuck. Thanks Jose. And we will catch you next time On The Line.

Charlie Palmer: You've been listening to On The Line, a podcast for today's wild land firefighter. Our audio engineer is Mike Matthews, Production Assistant Joey Moore, and I'm your host Charlie Palmer. Thanks for listening. We hope to connect with future On The Line.

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