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Tim Lightfoot: Hello and welcome to the weekly edition of the Huffines Institute for Sports Medicine and Human Performance Podcast. I'm your host Tim Lightfoot and I want to thank you so much for taking the time to download us and join us this week. Our goal is to bring you interesting people in the world of exercise science and health. This week is no exception. WE have today with us Captain Julianne Gillespie from the US Air Force with us. Welcome, Julianne.

Julianne Gillespie: Hello.

Tim Lightfoot: It is great to have you here.

Julianne Gillespie: It is great to be here. Thanks for inviting me.

Tim Lightfoot: Super. I'm going to tell the audience a little bit about you so they know kind of why we have you on. And then we'll just launch in to our conversation here. Captain Gillespie is an aerospace physiologist in the Air Force and she works as a flight commander and she works with the F22 Raptor group, they are at Tyndell Air Force Base in Panama City, Florida.

The reason that we have her on today is that she suffered through a few of my classes as a student, way back way. She is a registered clinical exercise physiologist. She has a Masters degree in clinical exercise physiology from the University of North Carolina, Charlotte.

We are going to talk to her today about being an exercise scientist in the Air Force. Does that sound good for you, Julianne?

Julianne Gillespie: It sounds great. I'm excited.

Tim Lightfoot: Let's just get started here. How does being an exercise physiologist translate in to working in the military?

Julianne Gillespie: Well, it is not just necessarily exercise physiology but really any background somebody would have in the sciences, biology would be one of those examples, any type of anatomy and physiology that somebody could have and translate that in to a high altitude environment, a high gravitational force environment. Just having that basic foundation of physiology and the sciences to translate that in to something maybe a little bit different is really kind of beneficial for somebody that would be looking in to this career field.

Tim Lightfoot: You are in the Air Force. You are dealing with aerospace physiology, in high G environments because you are working with a fighter group there. Has your exercise physiology background given you any advantages to that? Why did you go in to this?

Julianne Gillespie: I went in to it because I heard about it while I was in grad school at UNC Charlotte and I thought it sounded really cool. So looking in to it more and talking to a recruiter I found out that this was a way to use my physiology background and move it in to something a

little different from exercise. Although I do work with my exercise physiology background I do have to translate it in to a little bit different of a mindset. I just thought it was something neat and interesting to do and that's why I jumped in to .

Tim Lightfoot: I know from past history that there has been...we talk about application of exercise to pilots. What are the general guidelines for exercise in pilots in the Air Force, especially in fighter planes? Do you let them do anything they want to do?

Julianne Gillespie: As long as they stay in good shape, that is really kind of what we are looking for. As we know with exercise physiology everybody is different, everybody's goals are different and what people have to work on to be elite are different. So we try to make exercise prescriptions for those that need it, but really these pilots that are flying the F22 are so high level of athletes that there is very little that we have to do here; however, we do try to make sure that they do have a very strong muscular strength portion of their exercise, especially for their lower body and their core. So we try to focus on that more than aerobic training although it is obviously vital to have aerobic training as well.

Tim Lightfoot: Why do you focus on resistance training?

Julianne Gillespie: The main reason for that is when you pull Gs or those gravitational forces that we talked about earlier, when you do that those are called 'positive Gs' the main ones that they kind of sustain, when that occurs the blood in your body will pull from your head down to your lower body.

Tim Lightfoot: It doesn't sound comfortable.

Julianne Gillespie: It does not. I went through the centrifuge and it is not very nice. But, the main thing that they have to do when they are flying and that happens to make sure that they don't pass out essentially is to push that blood back up to the brain and to do that they have to do an isometric contraction with their lower body and their core to shoot that blood back up from where it was pooling from. So, having an anaerobic conditioning program, especially looking at the lower body as I mentioned is vital for those pilots.

5:30

Tim Lightfoot: So while they are flying they are doing isometric contractions to try to stay conscious?

Julianne Gillespie: Yes.

Tim Lightfoot: Interesting. It is not really exercise much as it is survival methods, isn't it?

Julianne Gillespie: It is. It is a survival methods; however, I would still say that it is kind of like a workout. Being under that amount of pressure due to G forces, upwards of 9 Gs and having to do that isometric contraction is really like a workout. So these guys are athletes. Just as some people wouldn't think that a race car driver was an athlete, some people might not think that a pilot was an athlete but they are definitely doing some exercises up there for sure.

Tim Lightfoot: Now they are not only depending on these isometric contractions to maintain blood flow are they?

Julianne Gillespie: No, they also have to perform a breathing technique with will further increase their inner-thoracic blood pressure and that helps to push the blood up to their brain as well. And that is the main reason that we don't necessarily having them doing a ton of aerobic condition, because if their blood pressure is too low it might make them not necessarily be able to increase that blood flow like they need to.

Tim Lightfoot: Doe the Air Force limit the amount of the aerobic condition that the pilots can do?

Julianne Gillespie: No they don't. And actually I've seen several pilots that do a lot of aerobic conditioning. As we mentioned everybody is a little bit different, there's guys that are triathletes and are in tremendous shape and do a lot of aerobic stuff but are still able to pull G forces. I think it just comes down to everybody's person anatomy and physiology as well as the workouts that they are doing.

Tim Lightfoot: If you get a pilot on the flight line and he is on the flight line continuously do they get better at handling these G forces?

Julianne Gillespie: Absolutely. It is like anything else. If you play a sport for a long period of time your muscles kind of gain that muscle memory of doing some of the techniques that you are used to. Absolutely, if they are pulling Gs for several years they will be better at it than somebody who is just starting out. You definitely want to make sure these guys are flying as much as they can to maintain that muscle memory that their muscles have to ensure that they don't necessarily have to work as hard as somebody that is just starting out.

Tim Lightfoot: When these pilots aren't flying do you put them in a centrifuge regularly to try to keep that G tolerance up or are there other training methods they do to try to maintain themselves between other times in the flight line?

Julianne Gillespie: They fly typically enough to maintain that. They really only go through the centrifuge once and that is initially to make sure they can pass the qualifications of pulling the G forces they need to for their particular aircraft. Unless they've been out of the jet for several years then they might have to go back to re-qualify.

Tim Lightfoot: You just said something that is interesting. There are specific G forces qualifications for each kind of plane they fly?

Julianne Gillespie: Yes, sir, only for the fighter pilots. If you are flying a heavy aircraft you are not obviously going to be pulling G forces to where you'd have to qualify. But any fighter pilot, for the Raptor, the F16, the F15 they need to qualify at 9 G forces. Other aircraft might not hit that amount of Gs so they might not need to qualify that high.

Tim Lightfoot: Yeah, let's hope some of the big planes don't pull those kinds of Gs.

Julianne Gillespie: That would be bad.

Tim Lightfoot: Yeah, if they are pulling those kinds of Gs there are other kinds of troubles, aren't there?

Julianne Gillespie: Absolutely.

Tim Lightfoot: Tell us a little bit about what happens...we are kind of focused on the extreme G forces right now, but that is a fascinating physiological state. You talk about having to pump blood to the brain. What happens when that doesn't work right or that doesn't happen?

Julianne Gillespie: If that doesn't happen it is called GLOC, G induced loss of consciousness. So it is really just passing out because you don't have enough blood and oxygen going to your brain as would happen if you lost too much blood, we really just call that hypoxia, not having enough blood and O₂ going to the brain to keep you awake. If that happens when they are flying it is pretty bad news. That is why we really try to make sure these guys are in shape enough to decrease their risk for that. They are never going to be in a position where it is not going to happen, but we try to make sure they are in good enough shape to where they decrease that risk from occurring.

Tim Lightfoot: We keep using the descriptor 'guys' for these pilots. But there are some women in the flight line, aren't there?

Julianne Gillespie: There are. However, as of right now there are no women that I am aware that fly in the F22. But there are women fighter pilots, absolutely. So I should say 'pilots' and not 'guys'. I get used to that around here. But you are absolutely right, there are women that are flying and that are fighter pilots.

10:20

Tim Lightfoot: That was my next question, are there any gender differences in G tolerance and some of the responses to these high performance G environments?

Julianne Gillespie: Due to the fact that men usually have more muscular strength, they probably have an easier time with kind of shunting that blood back up to the brain; however, if somebody is shorter they might have an easier time than a taller individual due to the distance from the heart to the brain of being able to pump that blood would be a shorter distance. So it really just depends on anatomy and physiology, as I mentioned. However, there are really tall dudes that are...or females...that are fighter pilots and don't have a problem. It just comes down, I think, to every individual.

Tim Lightfoot: Everybody has a little bit different inherent G tolerance.

Julianne Gillespie: Yes, absolutely.

Tim Lightfoot: Let's switch back...You mentioned very briefly how you were in school in Charlotte and got interested in this area. We have a lot of people that listen to these podcasts that are interested in how you got to where you are. We may have people that say, "I'd like to do

that. That's sounds really cool." If we have somebody listening that says, "You know, I'd like to become an aerospace physiologist in the Air Force.", what the process?

Julianne Gillespie: The process would be, first of all, to find a recruiter. If you want this job to specifically find an officer recruiter because you would come in as a commissioned officer rather than enlist. Therefore if you are an officer you have to have a degree. Definitely find an officer recruiter is the main thing that I can tell somebody. And I will stomp it and stomp it and stomp it because there will be several enlisted recruiters that will try to recruit you to enlist and you won't necessarily be in this job.

You really have to be careful, get the information on your own as well as talking to several people so that you can be sure you are getting the correct information. Just go to an Air Force base, if you can, that has aerospace physiology and talk to the officers there and just to try get as much information as you can to formulate your opinion.

Right now I have a gentleman who is in graduate school, he is hanging out with us for a few days and he is interested in the program. That's what he is doing, just sitting in our classes and trying to get a feel for what we do.

Tim Lightfoot: So when you finished your graduate degree did they just automatically commission you and put you on the flight line as a flight commander? What was the process?

Julianne Gillespie: A little bit more of a process... When I talked to my recruiter I had to get a whole package together to be able to be accepted. I drop up to Washington, DC to have an interview with the leader of our career field. I got accepted for that and shortly after I was accepted I went to OTS, which stands for Office Training School in Maxwell, Alabama.

Tim Lightfoot: The garden spot of the South.

Julianne Gillespie: Absolutely. It was hot and humid. After that I went to the physiology course which is about six weeks long. Shortly after that I was then stationed at my base and then you do a lot on the job training. Let's be honest, when you go to school you don't really get a degree in aerospace physiology. There is a lot that you have to learn on the job and that's what I did. There's a few things that you have to get signed off on before you are a fully qualified physiologist. You just kind of have to work through it.

Tim Lightfoot: One of the old sayings with military recruiting was Join the Military and See the World. You've seen quite a bit of the world, haven't you?

Julianne Gillespie: I have. I've gone TDY, which stands for Temporary Duty, which means you go for a few weeks to different assignments. I've gone TDY to several locations, a lot to San Antonio, Ohio, several places in Florida, Alabama and I soon will be moving this summer to Washington state.

Tim Lightfoot: Wow. But the good thing is you haven't been deployed overseas yet.

Julianne Gillespie: I have not. A lot of people...it is a positive and a negative thing. Some people enjoyed being deployed to better further their education on what we are doing and get a different grasp for the job. But some people would rather just stay with their family. It is a positive and a negative, depending on who the individual is that wants to join this career field. We really don't deploy that frequently.

Tim Lightfoot: What's been the biggest surprise that you've had being in the military?

15:03

Julianne Gillespie: The biggest surprise, I think, would be the amount of leadership skills that are really required to be an officer. It is a good thing. I've gained a lot of experience with supervising individuals and just learning how to be a leader and an officer. When you talk about the military, you are that first, you are an officer first and then you are your job.

Tim Lightfoot: We always try on the podcast to personalize these podcasts a bit. We always ask our guest about any humorous situations or situations they will always remember that they probably didn't expect. Do you have any stories like that?

Julianne Gillespie: Just torturing air crew is sometimes funny.

Tim Lightfoot: Oh, torturing the air crew...oh, okay!

Julianne Gillespie: We have an altitude chamber here at Tyndell and we take them to 25,000 feet and allow them to get hypoxic and that whole experience is interesting to see how the air crew react when they have a lack of oxygen going to their brain. Anything from euphoria to belligerence to passing out, which we try to avoid obviously. But sometimes it is unavoidable. Just to watch that happen on a weekly basis is intriguing.

Tim Lightfoot: have you gone through that?

Julianne Gillespie: Yes, I have. I have gone through the centrifuge as well as the altitude chamber and several other torture devices.

Tim Lightfoot: What is it like to go to 25,000 feet without oxygen?

Julianne Gillespie: Well, if you don't have oxygen you can't be up there for too long because you will get hypoxic and eventually pass out. But it is interesting to feel the effects of hypoxia if you have never done that before.

Tim Lightfoot: Did you get belligerent or were you euphoric?

Julianne Gillespie: I would say I was more euphoric. It was more of a this feels really nice then me wanting to beat somebody up, which is probably a bad thing...I don't know if it is good to feel good when you are hypoxic because you might not recognize that it is a bad thing occurring.

Tim Lightfoot: So you were a happy, euphoric individual is what you are saying?

Julianne Gillespie: I was.

Tim Lightfoot: We are running short of time here and as we also always ask our guests to do is to provide us with a take home message. Have you got something that you'd like the people listening to this podcast to always remember?

Julianne Gillespie: I would say my take home message would be really just the fact that you can never have too much education and if something scares you like going in to the military and doing aerospace physiology, do it, because you are going to get a lot more experience and education than maybe being a personal trainer or working in cardiac rehab. It is okay to be scared sometimes and just take those leaps forward to do something new and different.

Tim Lightfoot: Great take home message. Julianne, thank you so much for being with us today. We've enjoyed having you on. It is always nice talking to former students who have gone on and done great things. Congratulations on your career so far. We are looking forward to watching it as it continues to progress.

Julianne Gillespie: Thank you so much, I appreciate that.

Tim Lightfoot: You are welcome.

For all those who are listening we want to thank you for taking the time to download us and you are all probably waiting with baited breath to hear the podcast question of the week. Here's our producer, Kelly, with that question.

Kelly: What area of the body are most important to resistance train in fighter pilots?

Tim Lightfoot: Excellent podcast question there. Be the first one to send us the correct answer via email to the address HuffinesPodcast@HLKN.tamu.edu and you'll win one of those nifty podcast tee shirts.

Again, thank you Julianne.

Julianne Gillespie: Thank you so much.

Tim Lightfoot: You are welcome. Thank you all for listening to us. We hope that you will join us next week when we have another interesting person from the world of exercise science, human performance and health. And until then we ask you and we hope that you stay active and healthy.