



**Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury
Webinar Series**

“Using the Performance Triad for Optimal Traumatic Brain Injury Recovery”

July 14, 2016 1-2:30 p.m. (ET)

Jessica: Welcome and thank you for standing by. All participants will be able to listen only until the question and answer portion of today’s conference. To ask a question please press *1. Today’s conference is being recorded. If you have any objections please disconnect at this time. I will now [inaudible 00:00:15] the conference over to Ms. Jessica Ray so she may begin.

Ms. Ray: Good day and thank you for joining us today for this DCoE traumatic brain injury July webinar, “Using the performance triad for optimal traumatic brain injury recovery.” My name is Jessica Ray, I am a traumatic brain injury subject matter expert. I will be your moderator for today’s webinar.

Before we begin let’s review some webinar details. If you experience technical difficulties please visit dcoe.mil/webinars to access troubleshooting tips. Please feel free to identify yourself to other attendees via the chat box but refrain from marketing your organization across.

Today’s presentation references and resources are available for download from the files part and will be archived in the online education section of the DCoE and DVBIC websites.

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The evaluation will be open through Thursday July 28 2016. Throughout the webinar you’re welcome to submit technical or content-related questions via the Q&A part located on the screen. All questions will be anonymous. Please do not submit technical or content-related questions via the chat line.

I will now move on to today’s webinar, “using the performance triad for optimal traumatic brain injury recovery.”

In 2013, army medicine launched the performance triad to maintain, restore and improve health through making informed choices. This holistic approach to health systems focuses on three key foundations that influence a person’s health, sleep, activity and nutrition. Under the model of maintaining, restoring

and improving health, the performance triad offers a proactive approach to wellness that can empower patients with mild traumatic brain injuries to activate recovery opportunities by integrating informed choices with the supported care of their providers.

This exemplifies the army's is "Ready and resilient campaign."

[Inaudible 00:02:30] veterans who experience the TBI often experience contraptions in sleep patterns and restrictions in both physical and cognitive during acute, sub-acute recovery period. Dietary factors may influence recovery and should be carefully considered in patient management.

All care providers therefore should take particular attention to sleep, exercise or activity level and nutrition in managing patients with TBIs. Providers can effectively apply the key components of a performance triad to optimize patient recovery.

This webinar will review the essential components of the performance triad and describe how clinicians can apply this model to enhance patient outcomes in TBI. After conclusion of this webinar, participants will be able to identify and explain army performance triad, sleep, activity and nutrition, examine unique benefits the performance triad has for implementing holistic models of recovery in TBI patients, to grab available DVBC resources to aid in the TBI recovery process at it pertains to the army performance triad model.

Mr. McKinney is the chief of a clinical practice and clinical recommendations at the Defense and Veterans Brain Injury Center. He is a certified brain injury specialist and personal trainer. He's a retired US army medic, he's a member of the American College of Sports Medicine Brain Injury Association of Maryland, an order of Military Medical Merit Association.

His primary areas of clinical interests are sports concussion and exercise physiology. He received his masters in sports and health science from American Public Military University and is currently pursuing a doctorate in health sciences at A.T Still University.

Dr. Panakkal is a TBI subject matter expert on the Defense and Veterans Brain Injury Center. He's a board-certified by the American Board of Psychiatry and Neurology. His expertise is in neuropsychiatry. He's in operations and [inaudible 00:04:27] veterans, a former commander of the 300-employee sports [inaudible 00:04:31] hospital at Fort [inaudible 00:04:33] New York and he's retired from the US Army and US department of state, US diplomatic service. He's a former clinical associate professor of psychiatry at the Albany Medical College in Albany New York.

Lieutenant Rosbrook is a US army dietician and is currently the chief of the outpatient nutrition at Walter Reed National Military Medical Center.

He is the command champion for army triad, physical performance and [inaudible 00:04:59] shape weight management program. He's the assistant director for nutrition research currently investigating biomarkers and body composition changes and beneficiary attending weight management programs with and without mandatory exercise programs.

He received his masters in science and nutrition from [inaudible 00:05:16] University in [inaudible 00:05:18].

Let's begin with a polling question to see who is in the audience today. Please select one of the choices on the slide. Thank you. I will now turn over the webinar to Mr. McKinney.

Dr. McKinney:

Thank you Jessica, thank you Ms. Ray.

Today I'm going to give you a brief overview of the performance triad on [inaudible 00:06:28] then I'm going to do a brief overview of concussion and mild TBI and then returning to activity and then briefly talk about the army or DVVIC's progressive return to activity [inaudible 00:06:43] recommendations.

I don't have anything to disclose, all the views expressed in this presentation, those are my own and not the department of defense or the US government.

As you could see right here the performance triad, the performance triad is a comprehensive plan that Ms. Ray covered earlier and it was developed to improve [inaudible 00:07:17] and increase resilience through public health initiatives and leadership engagements.

The triad is army's medicine foundation to a system of health, a partnership for soldiers. I think the performance triad is a really great concept as far as when you think about promoting a healthy lifestyle. It hits the nail on the head so to say as with the things you need to do or the things you should do to promote a healthy lifestyle.

[Inaudible 00:07:50] the system for health, it maintains and restores and improves, those three things, maintain health and fitness and illness, injured [inaudible 00:07:58]. What you do day-to-day, it plays a large role in your fitness and your health and your well-being.

On the triad's webpage they coin a phrase called life space and that's the time that you spend outside [inaudible 00:08:18] the time when you are with your healthcare provider. The thing that you do, many of you may have heard it being referred to as a lifestyle, the way that you live. The things that you do, do your day-to-day activities will greatly increase your health, your cognitive and mental and physical resilience.

Some key messages that I like to point out and then we're going to talk about it, there's going to be a few other speakers, a couple of the speakers behind me that are going to go a little bit deep into all this but we're going to talk about the importance of getting quality sleep, not just going to sleep but really getting quality sleep and the importance of engaging activity.

When I say activity I'm not just talking about going to the gym or going to a run, it's just things that you can do day-to-day to increase your mental and your physical resilience, then also things you can do to improve your nutrition. Those are the key things that the performance triad touches on that we would like you to take away from this presentation today.

First of all what's concussion? What's the definition of a mild traumatic brain injury? In 2014 the DoD updated its definition of TBI, a physiological disruption in brain function as a result of an external force.

It can present itself by an alteration of consciousness or a LOC, confusion, disorientation, memory issues, slow thinking. Those are some of the signs [inaudible 00:10:17] that the concussion may present itself with. Again you see it's a complex [inaudible 00:10:23] physiologic process affecting the brain, induced by traumatic biomechanical forces, outside external forces.

TBIs can be classified as mild, moderate, severe, [inaudible 00:10:40]. If you referenced to the DoD's or the DVBC's website you'll see the worldwide numbers and the majority of TBIs are [inaudible 00:10:49] at 82.3% in the DoD. Again for those that are not familiar with mild TBIs as the name, traditionally a lot of times this can refer to as a concussion.

A little bit more about concussion and the symptomology of concussions.

Again regardless of the mechanism of injury, TBI can result in significant neurological impairment, acute clinical symptoms, functional disturbances, the structure which we typically not be seeing doing a standard imaging. A lot of times that's why imaging is not at the forefront of the diagnosis in the beginning with some of the acute.

The diagnosis of acute concussions usually involves assessment of the lines of domains including physical signs and symptoms. If you see up here, headache, fatigue, cognitive issues, behavioral or emotional issues, and of course includes sleep dysfunction or some type of sleep disorder, excessive daytime sleepiness. Many people find themselves sleepy throughout the day.

Moving on to I mentioned earlier about lifestyle, the triad talks about life space which I've always heard it referred to as lifestyle. Your lifestyle can either be active or sedentary.

Basically what that is, an active lifestyle is that you engage in some type of activity, some type of physical activity throughout your day, not just going to the gym. That could be something as simple as doing yard work, walking your dog for a significant amount of time or something that a team here at DVBC like to do every so often. They'll go to the bottom floor and they'll make their way to the ninth floor in the stairs.

That's an active lifestyle. You hear some people, "I don't have time to work out or [inaudible 00:13:12] work out," and there's 24 hours in a day and it doesn't take time to walk from the ninth to the first floor and back.

Sedentary lifestyle will be something [inaudible 00:13:24] that your activity is either nil, you don't get any at all or really low. Those are just different types of lifestyle and the physical activities and the different types of activities that you can do, anaerobic and aerobic and relaxation.

When I say anaerobic, those of you guys and girls that like to go to the gym or that type of exercise you're going to do where it doesn't require that much oxygen. You're going to go into the gym and you're going to pick up weight, move things, push things around, is that commercial "I like to pick things up and put them down." That's anaerobic exercise.

Then aerobic, example would be going for a bike ride or going for a slight jog to a really high [inaudible 00:14:18] jog. Those are aerobic exercises or activities and then relaxation exercises would be progressive breathing and muscle relaxation where you sit and relax. Some people like to do yoga and things like that.

You just really find yourself a calm, relaxed place and from head to toe slow your breathing and relax and take deep breaths while you're doing so, a head to toe progression of relaxation of your muscles. These are things that you can do to promote your lifestyle and your physical activities level.

The goals of exercise or physical activity, there's a larger list of more goals but a global goal would be it lowers your risk of health complications. When you have a sedentary lifestyle you tend to be at a bigger risk for disorders or diseases that you could prevent or you could possibly avoid by having a more active lifestyle.

Again as you know weight loss is a major goal of a lot of people. An active lifestyle will help you and aid you into weight loss, again relaxation, stress and depression management, just relaxing or going to the gym. I know when I go to the gym that's the way to blow off some steam and you feel better, you refresh. That in combination with sleep and nutrition will help you with your global health.

A few ideas, I mentioned one for increasing your activity is again like instead of sitting all day we have a lot of spanning workstations, doing the stairs, going out

for a walk on lunch. You take the stairs versus the elevator or if you need to send an email but the person is right down the hallway, take that opportunity to walk down to say what you had to say unless it needs to be placed in an email but there's ways to mitigate.

Around the home again, doing yard work, working in the garage, things like that, doing your "honey do this" that many of us get tagged with and then play. Play could be playing with your kids to playing some type of competitive sport.

How often and when to exercise, I think that depends on the individual, 30 minutes of aerobic exercise or 30 minutes on a consistent basis would be well enough. Three to four times a week should be good enough. That exercise with sleep and nutrition should be good enough or great for many of us to obtain our goals.

Some of the unique needs of TBI when it comes to patients, the connection of activity for TBI patients. I mentioned earlier the physical, cognitive and the vestibular earlier parts. When I say physical there's always an increased physical performance that an individual with or without a TBI can benefit from.

Again exercise increases your cognitive abilities, it helps your memory. It's really great all way round, vestibular balance. That's really great. Depending on what the abilities are for the individual with the TBI, if they're able to do a specific exercise or a specific activity, it would be on their primary care manager to assist them in mapping out the exercises or the activities that they could do or that they should do.

A lot of times I think I saw online there's a lot of rehab providers. For this particular profession this is when this really play a large role in the recovery for an individual who suffers from TBI. We mentioned earlier that a majority of TBIs are mild and if you see acute TBIs, they usually last from seven to 10 days and then chronic to persistence is greater than 10 days.

When it comes to recovery, the primary care manager should take in consideration an individual who has multiple concussions. The treatment and the recommendation for the type of activity or physical and back to aerobic or anaerobic will have a lot to do with their ability or how many concussions that they have.

Key things when we talk about returning to that activity is provider clearance.

Just like any injury or any patient, before you get into exercising you should always first consult with your healthcare provider before you join. I know I have trained people in the past and one of the things that would always be a checklist is have a physical of some sort. That same thing applies to a patient with TBI. Before they are recommended to return to activity it should be cleared by their primary care manager before they are allowed to do certain activities.

Also just ease into that role of whatever those activities are, limit those activities again based off of their physical abilities and their cognitive abilities, what they can actually do. This would be if you say someone were to want to get into some type of activity they should consult their PCM and work with whomever if they have a trainer or someone like that.

In our case many times with the military I'm going to briefly cover leadership responsibilities, military, everyone has a first line supervisor and a supervisor should be aware of the limitations that their service members can and can't do, the combination of following the recommendations or the guidelines of the healthcare manager.

Here on this slide, slide 30, I briefly cover DVVIC's clinical recommendation and we have the progressive return to activity following acute concussion and mild TBI. There's two packets so to say, there's one for the primary manager in the deploy setting as well as one for the rehab provider. Later one Ms. Ray we're going to cover places where you can go to get some of those resources and then I touch on it as I go through.

If you have ever seen the DVVIC clinical recommendations this week is comprised of the narrative and algorithm and education brochure for the patients. On the right side of the slide there is a screenshot at what an algorithm of progressive return to activity looks like.

Within that algorithm you see that when a concussion is diagnosed or confirmed, the provider should provide mandatory 24-hour recovery period before recommending physical activity and also review DVVIC's acute concussion education brochure which I mentioned that's part of the packet.

The symptom management or NSI is also part of that evaluation prior to clearing an individual to return to activity. Initiate a PRA or refer to a rehab provider if the PCM gets to a point where they feel that the individual or patient should see a specialty like a OTPT neural type four before they are recommended to go on to the next phase within the PRA.

The PRA protocol has three domains here, physical, cognitive and vestibular which I think I briefly hit on earlier and these are the basis, base ground for PRA, [inaudible 00:24:23] activities that are from extremely light to a maximum exhaustion is tolerated.

Again I just like to remind everyone that we're not talking about just exercise, we're talking about physical activities because when active duty communities and stakeholders, when they return to duty, a lot of times they're doing a lot of physical activities besides their PT or exercise or there's a lot of exhaustion so leadership should take into consideration what the primary care manager has prescribed for them to do before [inaudible 00:25:11] fully back into some type of physical activity.

Cognitive progression includes activities with very low cog demand to multitasking. That can take a toll on the individual.

The PRA has a six days approach as you can see the slide on the right from rest all the way to unrestricted activity before a person or individual that's being seen.

DVBIC's PRA recommends that they have any signs and symptoms of a TBI that is reoccurring and comes back up if they get to a certain point then you have to either stop at that stage and go back to the previous stage before they're allowed to move on, again with using the physical exams and the NSI and a resting heart rate and a blood pressure.

Those areas are really highly recommended items that should be taken care of prior to moving on and being cleared. Again if you see from rest all the way down restricted activity.

Here are the items referenced in CR itself on where an individual should be done prior to moving on, no new symptoms, no symptoms above one rest on an NSI, a resting BP not to exceed 140 over 90 and a resting heart rate not to exceed 100 heart beats per minute.

An example for stage three like occupational or any other activity or six-minute physical activity periods for maximum, going on a long run or being in the gym or a full day at work to a light duty day doing some type of admin work or a half a day schedule again based off what the primary care manager recommends or the rehab provider.

If the criteria for progression are met, advance to the next stage and I mentioned it a little bit [inaudible 00:27:53]. You either stay, get re-evaluated by the PCM and recommend to move back to a previous stage, again return to prior stage for 24 hours.

A lot of times if we go back to life space, the healthcare manager will not be able to see how the individual ... How they're doing day-to-day with their symptoms doing activity as where again leadership responsibility will come into play for them to catch on and really have an understanding of the signs and the symptoms so they can refer their soldier or their servicemen back to the primary care manager.

Here if you go to armymedicine.mil and you'll be able to see the full army performance triad and you can click on each one and you'll see sleep activity and nutrition and then there is a DVBIC PRA [inaudible 00:29:04] that I mentioned at dvbic.mil and then CDC's prevention for heads up. That's another good resource for managing return to activity's information. CDC has a return to activity heads up program aimed at play, work and school for colleges, family members and athletes alike.

Again [cdc.org/heads-up](https://www.cdc.org/heads-up) and again for coaches, athletes, family members, for an individual or a person that is cleared to return to activity.

That is all I have. I'll turn it over to you lieutenant Rosbrook.

Lt. Rosbrook:

Thank you. Good morning, good afternoon everyone. I'm going to piggyback just a little bit in terms of prefacing this with saying that many of the resources available and things that are referenced in my slides are also available on the army medicine website linked into the performance triad nutrition page and I do appreciate the opportunity to spread the nutrition message.

Next slide please.

Obviously anything I do say is my view and my view only. It does not reflect the position of the department of defense.

Next slide.

What I'm going to cover is going to be a little bit of a preface for a background on TBI nutrition both from the acute and recovery phase. This might be a little bit more specific information but could be useful in the future for some of you.

We'll go over the performance triad nutrition pillars, specifically what the army promotes for nutrition recommendations, some statistics on particularly soldiers but it could apply mostly to just about any service member, the current eating behaviors that we see in the forces, how poor sleep affects nutrition to give you some second and third order effects there, talk about stimulants and caffeine because that's a hot topic and could be very useful information and then we'll talk about supplementation with regards to vitamin D and Omega Three.

Next slide.

In the recovery phase for nutrition ... Sorry, you're one ahead of me, back one. There should be an acute phase slide in there.

In the acute phase I'll just say it before I talk to this slide, in the acute phase calorie needs are increased roughly about 50% depending on the physiology of the wound, whether it was blunt trauma, penetrating. They can vary widely in terms of how many calories we recommend for recovery. It's really important to initiate feeding as soon as possible when someone has a brain injury. As soon as they're hemodynamically stable you should be feeding them.

Protein needs may also increase in the acute phase due to increased nitrogen losses, maybe potential for negative nitrogen balance which of course complicates your outcomes.

In the recovery phase, and this is where the bigger message comes through, is a lot of individuals that suffer TBI, their nutrition needs pretty much go back to a baseline requirement. What that means is their calorie levels don't really change or don't really affect any higher or lower than someone else that didn't suffer an injury.

Their protein needs may go up or down depending on their activity level and if they have any other wounds to mend. Food consistency is also another thing that sometimes we forget about. If they have any kind of complication with swallowing in the oropharyngeal phase, that can complicate their recovery because they have to have proper food consistency.

Proper hydration is another issue that is also addressed in the performance triad. If there was for example some kind of hypothalamic insult, their thirst mechanism is not very good and therefore they become dehydrated much more common.

Supplementation with Omega Threes, vitamin D, I'll talk about at the end of this presentation.

Next slide please.

There was the slide for the acute phase. You can reference those standards again.

How can the performance triad aid in TBI recovery? That's the question at hand, that's what we're talking about.

Next slide.

With most of the nutrition requirements for a TBI recovery being close to baseline, many of the performance triad recommendations still apply.

Let's go through this one by one, proper fuelling for performance and recovery. This is not just a buzz word for operators, for people that are on the field. When we're talking performance we're also talking cognitive performance, ability to remain on task, increasing productivity and also just like Garry mentioned, the ability to sustain exercise for the key part of recovery. But if you don't eat properly, you don't refuel after training, that limits your ability to train more often and get that [cross-talk 00:34:46] benefit.

Eight servings of fruits and vegetables, this relates also to the fiber, the vitamins and minerals for general health, also the antioxidants that convert any [inaudible 00:35:00] oxidation from the hyper metabolism and there's certainly some emerging science coming out that's exciting talking about quality of life improvements from the individuals that consume eight servings of fruits and vegetables a day.

We recommend that you limit caffeine within six hours of sleep. The half-life of caffeine is six hours so it allows you to more easily reach that restful sleep more expeditiously as you're lying down.

Proper body weight and reduction of injury risk. Musculoskeletal injuries increase exponentially when individuals BMIs are above 25 and obviously below 18.5 if they are underweight. Reaching that optimal body weight certainly reduces their risk for injury moving forward in their career and their life.

Being smart with supplementation, here we're talking about using resources like operations supplement safety and a [cross-talk 00:36:07] performance resource center both as individuals and as healthcare providers are great resources.

Next slide.

The next two slides are basically soldier-centric performance triad materials talking about fueling before and after exercise, refueling after exercise and hydration. This is good information for you as providers to share with the individual if you're trying to focus on keeping them hydrated if you're in a hot climate or if they have thirst issues, using this as a guide to keep them hydrated and keep them healthy.

The left handed side you can see those recommendations for keeping someone refueled after an exercise and improving their performance.

Next slide.

Start strong, stay strong and finish strong. These are key points with the refueling initiative's aspect of performance triad. These are again things that you can review on your own, but one thing I want to point out is the recommendations to refuel after exercise, we're talking anything that's strenuous, moderate intensity, something that causes the heart rate to be about 75, 80% or higher.

If you're doing that sort of activity, we recommend a four-to-one ratio of carbohydrates to protein within 30 to 60 minutes after you finish. What does that exercise look like? A four to one ratio could be like a 40 gram or 10 gram carb-protein ratio with a 10-ounce glass of chocolate milk or a small bagel and an egg. You can look at the right side of the slide and see several different recommendations for pre-fueling, during fueling and after fuel.

Next slide.

How do the soldiers, individuals in the services eat currently? How close are they to dietary guidelines for Americans? In 2013 there was a study published, more like a report from the global assessments tool, the GAT survey that we use in the army to assess lifestyle behaviors is an requirement for soldiers.

What this did was it looks and compared Responses to what soldiers reported eating against the dietary guidelines for Americans. You can see the highest proponent was fruit and fish intake. The fruit you can probably assume was something like bananas from the [inaudible 00:38:44], fish more than likely is going to be high because of tuna fish, it's cheap. Soldiers love to keep it in their bags.

We still have a lot of work to do in the vegetables, whole grains and dairy components.

Next slide.

The key findings here is related to the healthy eating score which to break it down more simply is just a method of comparing an individual's intake in a score-wise fashion against the dietary guidelines. Those who scored the highest in the healthy eating score A consumed breakfast six or more days a week. This goes in line with the recommendations in terms of weight management. Those that consumed more breakfast had an easier time managing their weight, breakfast more often, excuse me.

Also ate a post-exercise recovery snack which again goes back into the refueling after exercise which means you can exercise more often and maintain your weight.

Lowest intake of both regular and diet sodas, not just regular sodas but diet also. They also had the best odds of healthy [inaudible 00:39:57] metrics, so easiest or best odds of maintaining healthy weight. Those who passed the fitness test were two times more likely to score higher on the healthy eating score. That's an interesting statistic. Look at the bottom one, good sleepers, meaning more than seven hours a night, were four times more likely to score in the highest categories than those who slept six or less hours per night.

We'll talk about why that might be in a couple of slides.

Next slide please.

Recommendations in terms of what you can say to an individual, two to three servings of fruit per day, four to five servings of vegetables, that gives you the eight servings a day recommended by the performance triad. Three servings of dairy and dairy alternates. This is not just focused on the proteins, it's also focused on the calcium and vitamin D for reducing the incidence of fractures and other stress-related bone injuries.

[Inaudible 00:40:56] protein, certainly just getting your quality high biological value protein in when possible and keeping the grains mostly whole, you see some examples there. Personally refueling, rehydrating and achieving seven to eight hours of rest of rest for sleep.

What happens when we don't get seven to eight hours of sleep?

Next slide.

There's been several research studies that have looked at chronic sleep deprivation as well as acute and interestingly enough a lot of them have many of the same effects. I've summarized a few of them here for you, significant reduction in daily physical activity. That this means is they attached a FitBit to someone, cut their sleep in half for one or two or three nights and seen how active they were during they were.

It doesn't take too much to imagine that they were probably pretty [inaudible 00:41:48], didn't feel like moving around a whole lot more in the day. There was an impact there just on the activity piece.

Their leptin, satiety hormone reduced 18%. Ghrelin, hunger hormone increased to 28%. They were less faceted, more hungry or glucose tolerance reduced 30%. They had more irregular meal patterns, so they were snacking more randomly, consumed more energy-rich foods and lower fruit and vegetable intakes. A lot of negative consequences of not getting enough sleep.

Interesting leptin levels, the satiety hormone, directly correlates with sleep duration, meaning the less sleep you get the less leptin you ... Pretty much a direct line correlation.

Next slide please.

Now we're going to talk about the opposite end of the spectrum, the stimulation and stimulants.

Next slide.

Who actually consumes the most caffeine? Are we focused on the right aspect of the equation here? When we're asking people about caffeine consumption most people would say probably the younger generation with the Redbulls, the Monsters, all of the energy drinks are consuming the most caffeine. Not necessarily the case.

You can take [inaudible 00:43:09] data which is pretty much nationwide and you see the highest caffeine consumption per person is in the 50 and older populations.

Next slide.

Here's how you can see how that's possible. Caffeine content of coffee especially Starbucks, lattes, things like that, rival the caffeine content or even double the caffeine content of Monsters and Redbulls, things like that.

Caffeine is adequate in a number of different sources.

Next slide.

This last graph just breaks it down by type of drink. Some of the same questions were asked of different individuals asking them to break it down between coffee, colas, teas and energy drinks in terms of where they got most of their caffeine. Intuitive but you would see that the highest proportion of cola and energy drink consumption is in the youngest population with the highest coffee consumption in the oldest population.

The bar in the right is an example of an in-theatre sample, meaning this was taken I think during ... Was asking individuals questions about how many energy drinks they had in the day and broke it down by rank. Keep in mind this was also around 2010, 2011 when Rip It was available in the defec.

Anybody that's been deployed knows how common those things were back in that time.

That gives you a little bit of interesting data points.

Next slide.

How much is too much? The Food and Drug Administration says that pretty much 400 milligrams a day is not generally associated with negative side effects for caffeine. World Health Organization defines it as 500 milligrams as being what they consider to be overuse. General clinical guidelines for those with hypertension which you may see in several TBI patients, up to 300 milligrams a day can be considered safe.

Next slide.

The big picture what's the question here? What's the deliverable to you? To what extent is caffeine use linked to behavioral or health problems? Really there isn't a lot of causal evidence linking caffeine and energy drinks directly to behavioral or health problems. The most common overdoses, the most common ER visits that we see occur as a result of caffeine that is in powder form where there is a huge variance in the caffeine content with such a small margin of error. The difference between a table spoon and a tea spoon of caffeine powder can be exponential, 10, 15 times the caffeine amount.

Also dehydration and heat, that's the most common negative effect we see in soldiers and members is when they combine it overseas or in a hot environment and also mix with alcohol. Think back to [inaudible 00:46:20].

The literature is more focused on linking the lack of sleep with behavioral and health issues.

Next slide.

The recommendations here, look at the big picture, look at the perpetual loop that the individual might be in. Are they experiencing a lack of recuperative sleep that's causing them to drink more caffeine and then the more caffeine they drink the less sleep they get which means they have to drink more caffeine again? It's a vicious cycle.

Another thing to ask is are they using sleep aids? It's a very common prescription especially in special operations community and again that can cause more of a drowsy feeling in the morning if they don't get enough sleep in conjunction which means they'll drink more caffeine and here we go again.

My recommendation is to not demonize caffeine as a provider. Often times and some other providers may not realize this but nutrition believes how people eat, when they eat, what they eat are as closely held as their personality, as their religion. It takes a little bit of care and empathy and negotiation to get people to change in their nutritional behaviors more effectively.

So, 300 to 400 milligrams a day I would say is pretty much the upper limit of what I would recommend just based on all the other recommendations.

Next slide.

The last few minutes I'm going to talk about supplements for TBI recovery.

Next slide.

The first one I'm going to talk about is Omega Three fats which most of us are familiar with in terms of providing a benefit with heart health, ability to lower triglycerides most notably and also possibly blood pressure and heart rate.

EPA and DHA are the main Omega Three fats that we're focused on, found in marine oils, fish, quills, squid, algae. Some people will say that you can get Omega Threes from walnuts and [inaudible 00:48:24]. That's technically true, you get [inaudible 00:48:28] acid from plant-based sources. However that is extremely poorly converted to EPA which means your effective dose is extremely small. We're talking 5% and half a percent for EPA and DHA respectively. Getting the marine sources is much preferred.

How does this help? It can possibly aid in maintaining and restoring cell membranes following traumatic brain injuries and reducing the risk of ischemic stroke and subsequent inflammation. Recommendations here about a gram to a gram and a half of EPA, DHA effective per day which is in line with what the American heart association recommends.

Notice it says EPA DHA, not Omega Three. If you're buying an Omega Three supplement on the shelf and it says 1,000 milligrams on the front, you have to flip it to the back and see how much actual EPA and DHA is listed. It might say 1,000 milligrams Omega Three, sure, a lot of that's, ALA and then you actually look and it's only got 200 milligrams of EPA DHA. You have to pay attention there.

Next slide.

The last thing I'm going to talk about is vitamin D. This is still very much emerging science but a lot of really good correlational evidence with some of it. We're familiar with vitamin D as the product of skin exposure to UVB light radiation. Insufficiency and/or vitamin D deficiency is what we're really trying to avoid. What this can cause is an increased risk for dementia, increased risk for inflammatory damage and neurological impairment following a TBI, meaning it makes you recovery that much more difficult if you're deficient.

Also vitamin D Three being sufficient and/or supplements are excellent adjuvants for progesterone TBI therapy if that's something that you're employing.

Recommendations here to maintain serum levels 35 to 40 nanomoles per liter and about 1,000 to 2,000 [inaudible 00:50:35] a day via food and supplements. That's slightly above what the DRI is listed for this vitamin but it's overall what I would consider to be safe and effective.

Now it's done with the nutrition component. I'll turn it over to the sleep aspect.

Dr. Panakkal:

Thank you. Lieutenant Rosbrook that was an excellent [inaudible 00:51:05] into my voice on sleep and TBI. I have no relationship to disclose and my views are mine and not represent the department of defense or the US government and I'm going to be covering mostly TBI and sleep and briefly on sleep disorders and the clinical recommendations. I will spend some time on pharmacological and non-pharmacological treatment.

The first thing to look at is there's been a number of studies that chose sleep deficits in deployed soldiers and sleep in TBI's relationship. The first one is the [inaudible 00:51:54] analysis. An average population perhaps 25 to 30% people having some difficulty with sleep but in this study the analysis showed that 50% of people from TBI had some form of sleep disorders.

The second one is a study that was done on deployed soldiers and again 15% had shown insomnia as part of their spectrum of headaches and fatigue that was secondary to TBI.

The third one [inaudible 00:52:30] study that was about 41,000 people and they were grouped into two groups. One is deployed and the other one is no-

deployed and the deployed service members were assessed before and after the deployment and nearly 50% have some form of sleep disorders.

So many more studies but the last one that I'm going to talk about is the whole study that showed the deployment and combat experience or exposure has higher fatigue and TBI and sleep disorders.

When I looked at the part of people attending the conference I noticed that there were many civilians out there who are providing care to the veterans.

In 2014 we had about 9 million people registered with AVA and only 6 million get care from AVA. The rest are being provided by civilian providers. One other thing you would want to think about is to ask about people having served in the military or if they have had any close family members who served in the military.

Among the things that you will want to look at is the sleep history. Very briefly I will review the sleep architecture. This is the schematic for the difference with [inaudible 00:54:16] and sleep.

There's four stages of sleep. For the sake of time I'm not going to go into the stages of sleep. As the night progresses or the longer you sleep you are spending more time in REM and there's a very clear psychological conditions that are associated with the REM architecture disruption.

When you look at sleep disorders the latest classification according to [inaudible 00:54:57] five is that they have acute and [inaudible 00:55:00] and chronic. One of the things you want to [inaudible 00:55:05] see somebody in your clinic, in your office is to ask them if they're satisfied with the quantity of sleep. Do they have trouble initiating sleep, maintaining sleep? Do they have early morning awakening?

If it happens more than three times a week up to three months you call it acute or short term. If it is more than that one to three months and persistent, that is episodic and if it is more than three months you would think about chronic sleep disorder.

The other common ones are circadian rhythm sleep disorder, hypersomnolence, narcolepsy, obstructive sleep apnea, [inaudible 00:55:53].

For this presentation I'm going to be limiting myself to the circadian rhythm sleep disorder and obstructive sleep apnea and the short term sleep disorders.

The four common sleep disorders fall in concussions. If you look at the population we have especially mild TBI, when I talk about concussion it refers to mild TBI. We have short term insomnia, chronic insomnia and previously what is known as circadian rhythm sleep disorders and obstructive sleep disorders.

The preference is high for obstructive sleep apnea and circadian rhythm sleep/awake disorders following a TBI. I will spend a minute about what is a circadian rhythm.

Mammals and humans have a nucleoid located in their hypothalamus just above your optic nerve that controls the sleep-wake cycle. It vibrates or resonates in sync with the day time and night time.

Each cell has its own internal clock and they communicate and oscillate in a rhythm that lasts that lasts 24.5 hours. Every time you wake up in the morning it becomes synchronized with the daylight. It really does not present a problem unless you travel across time zones.

There is an article in the American Institute of Physics that published just a couple of days ago that showed that if you travel eastward across the time zone you have a harder time readjusting to the daylight change whereas if you go westwards it's much easier. If you're interested you can look it up with the complicated but interesting calculations.

As we talked previously, sleep disorders will impact negatively for TBI recovery and there are many functional deficits that happens with TBI and sleep disorders.

What is involved in insomnia evaluation?

As a provider you don't have as much time. How much time do you really have to speak with somebody in the middle of doing an examination?

One of the things I suggest that you do the insomnia severity index. It's on the public domain, actually covers all of these aspects of sleep. It's a brief validated seven-item questionnaire. It's useful for assessments and also gives you a sense of how severe the sleep issue is.

The other thing you want to ask your patients to do a sleep diary. As you know [inaudible 00:59:54] because often people will say, "I haven't slept well for many years," and it's actually biased to respond. You really want someone to show you their sleep diary in order to assess the severity of their sleep disorders.

Moving on to the DVBC's recommendations we have APR that was recently updated that talks about the management of sleep especially following TBI or concussion. The algorithm essentially is asking to do a focused sleep evaluation and then gives you guidelines as to which way to proceed.

If a service member has been diagnosed with concussion you complete the focused sleep assessment and it red flags a person, what is meant by red flag is that if the service member or a civilian is involved in an operation that will be

dangerous to self or others especially operating machinery, driving long distance, you will want to get them to see a sleep specialist sooner than later. Also you want to think about other associated conditions like depression and suicidal possibilities and then get them to be seen soon.

Also you want to rule out other same conditions, stress and anxiety plus all of those producers sleep disorders as a secondary phenomenon.

The first thing to do is to discuss the stimulus control sleep agents and administer the ISI, complete the differential diagnosis that we talked about and manage according to what's probably the ideology for a sleep disorder.

The issue [inaudible 01:02:08] and some of the guidance and pharmacological and non-pharmacological measures but what are some of the laboratory tests that I would suggest you do? You would want to do a thyroid screen, a simple TSH would do if you want to do a [inaudible 01:02:31]. That should be [inaudible 01:02:33] if necessary, some recommendations for testosterone [inaudible 01:02:36] or [inaudible 01:02:38] measurements, vitamin D level et cetera and of course we'll have infections and other common conditions.

You want to talk about caffeine as lieutenant Rosbrook was talking about, you want to see how much caffeine somebody is consuming six hours before sleep. It's best not to have any caffeine because caffeine will prevent you from getting into stage four [inaudible 01:03:09] sleep.

The performance triad talks about 10 sleeping habits results with the [inaudible 01:03:21] schedule. One of the things you want to ask patients about sleep is that if you have enough time to sleep do you sleep? People don't have enough time to sleep, asking how much you sleep doesn't really tell you if you have a sleep issue.

I'm a very, very avid advocate for turning off your screens because of the melatonin secretion in the pineal gland only happens if the room is dark. It takes a couple of hours for that melatonin to be secreted so that you can fall asleep. That's what switches you from being awake and sleep. People have a habit of looking at their LED screens late into the night or even in bed.

Turn off your smartphone. Unless you're on call there's no need to keep looking at your smartphone during the night. Turn your clock away, do an exercise too late in the evening, continue on to the rest of it. If you are [inaudible 01:04:41] of course with the bed don't go to bed too early in the evening because then you wake up too early and then you are tired the rest of the day. If you're not asleep within 30 minutes I suggest read quietly under low light and not again watch TV or look at your tablet.

One of the things people do often do is to look at the clock when they wake up in the middle of the night and they start worrying it's already 3 o'clock, I haven't

slept. If you set the alarm there's no need to look at the clock. Just turn it away and you'll wake up when the alarm goes off.

This is the schematics and [inaudible 01:05:29] for therapies for insomnia.

One of the things to think about is the cognitive therapy. That is one of the most evidence-based responsive treatment for ... Non-pharmacological treatment for insomnia. The first line treatment for insomnia is always non-pharmacological. If there were other causes of insomnia reassuring, educating and stimulus control would help someone to be able to get back to sleep on a regular basis.

It is important that if you didn't sleep well one night and still get up in the morning at the same time and still go back to bed the next day at the same time you are likely to switch your clock back to a rhythm that's reasonable.

Cognitive behavioral therapy for insomnia, there is a downloadable Android and iOS [inaudible 01:06:44]. It's free and it actually helps you to work with the provider and there's some commercially available ones. Harvard University has tbc.com. You pay \$25, it teaches you how to [inaudible 01:07:04] your mind before you go to sleep.

Briefly talking about pharmacological treatments, one of the things you commonly hear people ... At least one of the common ones that I have seen people do is to take over-the-counter drugs especially Benadryl. Benadryl is available. If you have taken Benadryl for whatever reason you notice that the next day you're very dry, you're drowsy.

What it does is that it is an anticholinergic drug but actually the reason you fall asleep is because it is antihistamine because the histamine is what keeps you awake. If you block the histamine in your system you fall asleep.

But you can get into trouble if you're older because the anticholinergic effect will block your memory and also there's a rebound problem when you start taking Benadryl you can't fall asleep. I don't recommend taking over-the-counter Benadryl for sleep.

If you look at the C drugs, the [inaudible 01:08:18] and similar drugs, they're all likely to cause dependency and arbitration and tolerance.

Do not prescribe them more than two weeks at a time. What kind of C drugs you're going to prescribe depends on the half-life of the drugs. Some of them have a short half-life for example [inaudible 01:08:40], five milligrams the immediate acting, will work right away.

But then if you use a non-immediate release it works through the night. One of my favorite is doxepin, it's a tricyclic. It doesn't have all the side effects of tricyclic if you use it a small dose. Melatonin has been used or recommended by

some people [inaudible 01:09:07] guidance and RFPR says that innocuous [inaudible 01:09:15] non-expensive [inaudible 01:09:16] and deployed setting you should look for an NSI post-TBI.

It's recommended as a routine part of screening and again the same measures that we do for [inaudible 01:09:39] setting, there are [inaudible 01:09:43] Android and sleep and [inaudible 01:09:46] now that you can actually download. This is a new app that recently came out that teaches you. It is intended to reduce your nightmares.

In conclusion sleep disorders are most common. It's the most common sleep disorder on concussion especially obstructive sleep apnea and circadian rhythm disorders. [Inaudible 01:10:16] sleep medicine is likely or necessary and there is a red flag and you have references and at this point in time I would like to invite questions from the audience either for me or Mr. McKinney or lieutenant Rosbrook.

Ms. Ray:

Mr. McKinney, Dr. Panakkal and lieutenant Rosbrook for your presentation. If you have any questions for the presenters please list them now via the Q&A location on the screen.

[Inaudible 01:10:55] this webinar, there's significant overlap between nutrition, activity and sleep health. Nutrition, physical fitness and sleep are significant areas of wellness that are affected by TBI which greatly impact a patient's ability to function as well as the quality of life.

Symptoms should be considered independently but managed holistically.

The army performance triad can be implemented until they see their recovery model to maintain, restore and improve [inaudible 01:11:21] in TBI patients.

It's now time to answer questions from the audience. If you have not already done so, submitting the questions now via the questions part located on the screen. We will respond to as many questions as time presents.

The first question we have here is for lieutenant Rosbrook, is that regarding zinc that you mentioned in the previous slide is there any [inaudible 01:11:59] zinc as is related to hypogonadism which we frequently see in this population?

Lt. Rosbrook:

That's actually an interesting point. I do apologize, I cut the zinc [inaudible 01:12:12] just for the sake of time but it's not any less important in terms of TBR recovery as Omega Three is or vitamin D and actually there is a research with regards to hypogonadism.

Hypogonadism in individuals with zinc can be prevalent with TBI because of the zinc excretion is also increased the same way nitrogen losses are increased in TBI. Hypoalbuminuria, albumanemia, those kind of issues increase zinc loss. It's

really critical to keep serum zinc levels between .66 and 1.1 I think micrograms per milliliter is recommended serum amount.

Getting enough beef, pork, cashew, [inaudible 01:13:13], high zinc foods will help maintain it and avoid the risk of hypogonadism and infertility as another side effect. Same thing with vitamin D, there's a lot of emerging research with infertility and vitamin D deficiency.

Ms. Ray: The next question is for Dr. David Panakkal. Is it really possible to make up for sleep deficiency when having to endure long term sleep deprivation while their performance remains on optimum?

Dr. Panakkal: When you talk about if you're using Benadryl one or two nights especially if it is a younger person it's really fine. But I would recommend using other means of falling asleep or getting to sleep. [Inaudible 01:14:12] especially if it is much, much more often than once or twice a month.

Ms. Ray: The next question is for Mr. McKinney, in terms of TBI recovery and cognitive improvements are there clear cut benefits of aerobic exercise versus anaerobic exercise or vice versa?

Dr. McKinney: That's a good question. I've always thought that the type of exercise that you chose or you choose again it depends on the preference of the individual and also the ability of the individual. There have actually been studies conducted referencing anaerobic versus aerobic exercise and the few that I have seen in the end there's really no clear cut benefits of one over the other.

There are benefits of both, cognitive benefits and relaxation and some of the other things that were missing in the presentation but as far as one being better than the other it again depends on the ability of the individual, what they can do and their preference.

Ms. Ray: Another question here for lieutenant Rosbrook, what medications may interfere with adequate nutrition or hydration?

Lt. Rosbrook: There's a wonder list. You're going to run into a lot of drug nutrient interactions with most of the common medications that couldn't be used in TBI recovery, some more so with the acute phase but just a couple of examples, let's see, like antipsychotics. If you've got someone on risperidone you've got potential for weight gain. If they're on cortical steroids trying to control inflammation you're looking at [inaudible 01:16:19], hypoglycemia, osteoporosis with chronic use, stuff like that.

Propofol, if you're using that as a sedative, again that provides lipid calories and Omega Six fats. We're trying to avoid that kind of inflammation long term

Vasopressors is another one that can decrease gut perfusion and cause issues there with motility and proper digestion.

Ms. Ray: Thank you. This question is again regarding nutrition. Regarding nutrition prior to bed time what would you recommend as a routine snack or [inaudible 01:16:57] meal if there is a certain amount of time to let it digest prior to laying down?

Lt. Rosbrook: Well, there isn't a lot of hard and fast guidelines in terms of the content of the meal. The one thing that I will say is avoiding alcohol close to bedtime.

We've seen some preliminary research, some more case studies also just with people that report waking up more commonly in the middle of the night if they drink close to bed time. It's like the point of full metabolism in their body starts to wake up looking for more alcohol, it's an interesting effect.

Same thing goes for carbohydrates. If they eat a lot of carbohydrates [inaudible 01:17:42] bed time, I'm talking 40, 50-plus grams, again it can impair their ability to hit the deep sleep quickly in their sleep cycle and again that same influence reaction, they come more close to getting out of sleep or come out of sleep completely if they have too much carbohydrates close to bed.

Ms. Ray: The question may be best for [inaudible 01:18:08] lieutenant or Dr. David. If someone is taking sleep aids and using caffeine to wake up to get rid of any sleepiness from the sleep aids and not fall asleep once they get to the duty station, what do you recommend they eat first? Dr. David, comments on that?

Dr. Panakkal: I'll take a crack at it. I think this is addressed by lieutenant Rosbrook. The problem with caffeine is that it prevents you from going into your [inaudible 01:18:40] sleep. Even though you have slept you really wake up feeling fatigued and then you drink more caffeine and it is a vicious cycle. There's no other way around caffeine or at least giving you six hours before you sleep for your caffeine to metabolize.

Ms. Ray: This question is for Mr. McKinney, what if any have recent research studies revealed about the efficiency of the performance triad on improving readiness and increasing resilience? Should these three components really be the focus?

Dr. McKinney: That's a great question. As far as the performance triad itself goes, there weren't any active research studies about the entire performance triad other than the phase that the triad that the army is going through within their ranks of using the triad and evaluating it for their program.

As many of you know there are a multitude of surveys on sleep which is one of the components of the performance triad. The other part, should these three components be really the focus, I believe so. In the beginning I said I think that the army hit it dead on. They want I think each support each other.

You don't have a great nutritional habit, you're not getting sleep then for those of us that exercise then you're not going to be able to exercise well and then with the lack of exercise and a healthy lifestyle or life space then you know that again is going to be really key to how you feel from day-to-day.

Again they support each other and nutrition, exercise or activity, let me correct myself, for the triad or activity are really important, really key components for day-to-day activities in life space, life skills, lifestyles, sorry.

Ms. Ray: Thank you sir. This question is for Dr. Panakkal. How long in general the residual issues i.e. memory take to be restored to normal or can a patient have residual memory deficit for an extended time i.e. months, years?

Dr. Panakkal: I wasn't quite sure about what to say. Are we talking about concussion or are we talking about drug effect? The cognitive deficits in the post-concussive syndrome have been known to last a year or more. That's a very small percentage of mild TBI [inaudible 01:21:44] patients. As I said, 85% or more of the mild concussions recover fully with no residual effect. Thank you.

Ms. Ray: Thank you. [Inaudible 01:22:14] questions? Dr. Panakkal, can you address the role of meditation, yoga? I'm sorry, that's for Mr. McKinney. Can you address the role of meditation and yoga and are you aware of any studies involving TBI with yoga or meditation?

Dr. McKinney: To answer the second point I'm not aware of any current research surrounding meditation and yoga but the benefit of yoga itself, it reduces stress and relaxation and it's a way for an individual to become self-aware.

There could be a possibility of it addressing some behavioral issues as if you refocus yourself and turn yourself to reset yourself back in line so to say.

Yoga does have its benefits in the general community as well as it could show some great cognitive and behavioral benefits for those that suffer with TBI or concussions. Thank you.

Ms. Ray: [Inaudible 01:23:50] questions. After the webinar please visit dcoe.cds.pesgce.com to complete your online CE evaluation and download or print your CE certificate or certificate of attendance.

The online CE evaluation will be open through Thursday July 28 2016.

To help us improve further webinars, we encourage you to complete the feedback tool that will open in a separate browser on your computer. To access the presentation [inaudible 01:24:22] to this webinar, you may download them from the files part on the screen or at the DVBIC website, dvbic.dcoe.milonline/online-education. An audio recording and edited transcript after closing captioning will be posted that week in approximately one week.

The chat room shall remain open for an additional 10 minutes after the conclusion of the webinar to permit attendees to continue to network with each other.

The next DCoE TBI webinar “Animal assisted therapy and alternate treatment to traumatic brain injury rehabilitation” is scheduled for August 11th 2016 from 1 to 2:30 pm eastern time.

The next DCoE psychological health webinar to be determined is scheduled for July 28th 2016 from 1 to 2:30 pm eastern time. The DCoE 2016 summit [inaudible 01:25:26] “advantages and diagnostics and treatment of psychological health and traumatic brain injury in military healthcare” is scheduled for September 13th to 15th 2016.

Thank you guests for attending, have a great day.

Jessica:

Thank you for your participation, you may disconnect at this time.