So I’m going to talk about the medical management, I have 30 minutes to talk about everything I do. I could probably spend the whole day trying to explain how we do this but I’m going to try to be brief here for you but explain it all. My objective today is to help you to identify and medical manage post-concussion syndrome in the areas of sleep dysregulation, headaches, cognitive difficulties and mood disorders.

Some of the limitations I wanted to first and foremost start with are that there are no FDA approved medications for post-concussion syndrome. When I meet with a patient or their families what I say to them is no medication that we talk about today is going to cure your concussion, what it’s going to do is it’s going to help facilitate your recovery, it’s going to help those symptoms so that you are able to get through this process a little bit easier. Research is limited on the subject of medications with regards to concussion and so that’s an area that I’d like to get further invested in. Also post-concussion syndrome, it is a multifactorial issue and symptoms can be difficult to manage at times but one of the biggest things is just to sit back and don’t get frustrated, utilize your colleagues. I’m sending emails to my therapists, to my neuropsychologists, talking to them on the phone because again it is a multifactorial approach and without their input I wouldn’t be able to do my job as best as I could.

So the four areas that I tend to look at, I come into play about 3 or weeks or so into the injury when you know the rest is just not enough and the symptoms to be a little bit overbearing. So I look at four specific areas, neuropsychiatric where we are dealing with a lot of emotion, sadness, nervousness, irritability, they feel out of control with this injury; I look at the physical symptoms
including headaches, visual disturbances, dizziness, latent noise sensitivity and even ringing in the ears, nausea; we look at the sleep dysregulation, there is a significant sleep disturbance with concussion, either people are having difficulty falling asleep, maybe staying asleep, they are waking up a couple of times during the evening or they are just sleeping too much or too little; and then finally we look at the cognitive symptoms, attention and focus difficulties, memory dysfunction, that’s a very big frustration for our parents – or our patients, fogginess that big word we always talk about, fatigue and then just kind of just slowing, they just feel slower than usual, they even tell me you know I really feel stupid, I just don’t feel like I’m working at the level I should be.

So first and foremost if I cannot get them to sleep, their symptoms are going to be difficult to manage and so again like I said we have issues with sleep dysregulation in terms of sleep initiation, maintenance, too much, too little sleep. Some of the issues and the – what we’ll find is – some of the possible etiologies for sleep dysregulation they may come in and already have trouble sleeping so you are kind of starting from behind the boat there. They may have headaches that are keeping them up at night or when they wake-up to go to the bathroom you know they are like I still have this headache, I can’t get back to sleep. Environmental stimuli is a big thing, don’t allow the kids to go to bed with the TV on or their phones next to them. Music playing sometimes can be a plus or a minus. And then some pharmacologic effects, maybe the medications that they are already on are creating some insomnia, or even maybe the medications I’m starting them on are worsening that so we have to take that into consideration. Also anxiety and depression whether they’ve come in with some of those emotional aspects or the concussion has brought that out, anxiety and depression we know can cause hypo or hyper insomnia.
So treatment, first and foremost I am the medication lady in the group, however if I don’t have to start a medication I’m even happier. So we’ll start with behavioral strategies which our neuropsychologist and vestibular and exertional therapists will back me up on. We work on proper sleep hygiene. Again, limit that TV, the computer use, the phone, remove I-Pads and I-Pods at night. You really don’t want that distraction, those kids are sneaky so be careful. We work on relaxation therapies, whether it is putting a little bit of a slight spa like noise in the background, you know water falling, sometimes I’ll have them turn on a fan to create a little bit of white noise or just having them lay down, put some heat behind their neck, have them relax their scalp, relax their forehead, relax their cheeks and on down to their toes, just some easy techniques. But the biggest thing is sleep restriction. We have got to get those sleep cycles in check. I tell them no more and no less than 7 to 9 hours. I don’t want you napping and that’s where I get flack back from those students but napping just interrupts the body’s natural sleep cycle and that just really makes this difficult.

So next we are going to talk about if these behavioral strategies aren’t helpful for them then we are getting into some pharmacology. First I want to remind the body you know that it’s nighttime, and so we’ll try the melatonin agonist first. I typically start with 3 to 5 mg. Your body does not need a lot of melatonin so they should respond to these lower levels, regular versus extended release. Some of the pharmacies will carry the extended version and what that will – what I’ll use that for is if they are having trouble staying asleep throughout the night. If they do wakeup in the middle of the night and they are taking a low dose it’s okay to start to take another tab about 3 to 4 hours later. Antidepressants, in the field PCPs will use some of these medications just as a sleep aid initially.
Amitriptyline is good and I use that especially if there is a headache component, we’ll titrate up usually to about 30 mg. Trazodone is another good one. I start with 50 and increase to 100 mg. And this is if sleep is just the issue. You do want to monitor side effects in these, you are starting antidepressants. And men in particular they like to be aware that there is a possibility of priapism, so that’s something to mention.

If there is a sleep issue and it’s intermittent, you know they are having trouble getting that sleep cycle back I will use those non-benzodiazepine hypnotics like Ambien or Lunesta. Typically I’ll try Ambien and this does have an addictive potential so you want to be careful with it but in the short term I tell them you know we just need to get that sleep cycle back on track so we’ll use it for maybe 1 to 2 weeks to regulate that cycle and then just use it as needed. But make them aware of some of the vivid dreams they might have with those. Antihistamines, I’m not so afraid to use those in children especially because that helps them fall asleep. You can even tell them they can try Benadryl to just for the next week get that cycle back on track. I included some of the dosages of the medicines that I use in case you need those.

So next we are going to talk about the somatic symptoms. Many patients are going to experience headaches, dizziness, nausea, latent noise sensitivity, tinnitus which is a very frustrating issue. Tell them that it likely will get better. I have a few patients however that are kind of getting used to their ringing in the ears now. These are important things to let patients know. A lot of them will experience this. Make sure that they realize that they are not alone in these symptoms.
I want to first talk about dizziness because this is a big frustration for our patients. Dizziness and we have found and Mickey’s talked about it in previous discussions that patients with protracted recovery from concussion frequently have dysfunction in the vestibular system. What I’ll do is I’ll see them a couple of weeks possibly after the neuropsychologists have evaluated them so I’m doing my own evaluation in terms of a gross vestibular exam. We are doing the gaze stability and the VOR, the accommodation/convergence because maybe they’ve allowed them to go back to school a little bit and that increased stimulation has brought out that vestibular dysfunction. And so I’ll talk about that with them and then speak with the neuropsychologist again and we may get them into that vestibular evaluation.

The vestibular therapy of course is the mainstay of therapy and Dr. Mucha will talk a little bit about that in a little. This can be central or peripheral. One thing that I like to kind of help out with is if I feel that there is a positional component to their vestibular dysfunction as in the BPPV, the benign paroxysmal positional vertical, it’s a transient vertigo, they’ll talk about it you know as I go to lay down and turn my head from side to side on the pillow I’ll feel significant dizziness. You can do this easy exam in the office, Dix-Hallpike maneuver where you are assessing the posterior, anterior and horizontal aspects. You do the Epley maneuvers to fix that in the office or I’ll have my vestibular therapist make sure that they assess and treat that as well. But it’s a quick easy test you can evaluate in the office.

Headaches, this is possibly the bane of my existence but it is a – it’s also a challenge which makes it exciting to try to figure out. Most commonly reported symptom of concussion they talked about
earlier yesterday that 70% of concussed athletes may experience headaches. The important thing to note is it may not develop right after the injury, it may come out a couple of days later so make patients aware of that. And often as we’ve noted before it’s worsened with physical or cognitive exertion.

So somatic symptoms, again we’re going to go through the differential of headaches. We may experience rebound headaches, patients may be self medicating with ibuprofen or acetaminophen and so we need to make sure we’re assessing rebound. Musculoskeletal or cervicogenic, often times these injuries come with a whiplash effect and they’re having myofascial or tension related headaches, facet tenderness even. They could even have some injury to the greater occipital nerve and be experiencing nerve related injury. Post traumatic migraines which we’ll talk a lot about. And then there’s cognitive fatigue related headaches that as the brain is stimulated throughout the day it gets tired and then you result with a headache.

The rebound headaches are what I want to talk about first because if you’re not assessing that it’s going to drive you crazy when you find out they’ve been taking ibuprofen everyday. Medication overuse is such a big issue. Rebound headaches - the most common causes of those headaches are opioids. So they’re feeling like those narcotics are working for their headaches, tell them that it’s going to develop into a chronic issue. The Butalbital containing combination analgesics are also one of the most common, and then the aspirin, acetaminophen, caffeine or the Excedrin migraine type medications are a big offender. In particular the opiates, I want to make sure that you guys realize the importance of avoiding these in headaches is because there is that huge risk of transition
from the episodic headache to the chronic headache. It’s actually even more of an increased risk in men who are using those medications greater than 8 days out of the month. So you can tell your patients yeah I know that you feel like this is working but it’s going to be very detrimental to you actually. Acetaminophen of note has a greater risk of rebound headaches than NSAIDS and the triptans. And just again, I know that they want that brief relief but tell them that in the long run it’s going to be better not to take those medications.

Let’s talk briefly about the musculoskeletal, the cervicogenic component. You’re going to be looking at that in the office as well or the physical therapists are going to be dealing with this. I’ll often do my assessment in the office and if there’s a cervicogenic component I’ll send them for physical therapy. They’ll work on range of motion, modalities, ultrasound has been great, massage and traction. I’ll also actually even send them home with a TENS unit myself if that seems to be helpful in PT. We will occasionally use pain releivers and muscle relaxants but you want to use those sparingly especially muscle relaxants mainly at night because the drowsing effect. Occasionally if we find occipital or cervical paraspinal trigger points we’ll do trigger point injections which can create some relief. The nerve blocks, I use those sparingly, but if you’re hitting a wall and you realize that this may be a greater occipital neuralgia issue then go ahead and send them for those. Again, relaxation techniques, biofeedback, and then ultimately some patients like to try acupuncture and I’m okay with that.

The post traumatic migraines, the big issue that we like to talk about here because it is, I mean if people are coming in with migraine headaches, it just, it makes the recovery a lot more difficult and
therefore, I think that medications play a huge role in this. So the post traumatic migraines – ask about personal history, ask about family history that sets them up, it kind of lowers that threshold for them to have post traumatic headaches. It’s when they have a headache throughout the day, usually it’s unilateral behind the eyes, there’s light or noise sensitivity, nausea, dizziness, we’ve talked about the vestibular migraines, so if you notice that they’re really, they’re just having daily headaches, they go to bed with a headache, they wake up with a headache, I’m typically trying to, I’m going to initiate a medication most likely. But again, I like to, if I don’t have to prescribe I won’t, so we’ll try behavioral modifications like working on sleep, nutrition, hydration, stress control and exercise. If they hit all those areas and work hard at it, they can cure their own headaches so that’s what you want to stress.

Vitamin supplementation, that’s also been shown in some randomized control trials to decrease the migraine frequency with chronic supplementation. So I’ll tell them for the next 3 months I want you to take these meds daily, and I’ll either initiate it at the beginning or if I’ve tried all kinds of different treatments and nothing seems to be working, I’ll add that in. Here’s some of the dosages. The main 2 that I use will be magnesium oxide and riboflavin, but if they’re willing to take other vitamins and increase their pill count we try the Omega threes, Coenzymes Q-10 and then the ALA.

If their headaches are occurring maybe once a week and it’s just getting to a point where they can tell that that headache is going to come on, it’s going to reach migraine potential but I’m not afraid to use the abortive medications like Imitrex or Maxalt, the triptans. I use them sparingly. I ask them, you know use this when you know it’s going to be that headache that’s going to send you to
the emergency room for the migraine cocktail and typically those patients, they’ll know when that headache is coming on. I’ll use either of the triptans, you can use whatever you like best, but I definitely like to use the lowest effective dose, so I’ll have them start usually at 25 mg of the Imitrex and titrate up as they need. Same goes with the Maxalt but again, limit the use because these can create rebound headaches as well.

Alright, so post traumatic migraines, if they’re occurring greater or equal to 2-3 times during the week and it’s included with sleep dysregulation, nothing seems to be working for these headaches then I’m going to use a preventative medication. I try to avoid it because it does have a higher side effect profile, but it is very much a part of my treatment regimen. This is kind of a busy slide but it’s the medicines I use for post traumatic migraines, so write them down, highlight. They are a great tool in helping these patients. Typically what I’ll go to first for preventative medications from a pharmacologic standpoint is Amitriptyline, that is my golden medication mainly because it’s number one side effect is drowsiness and often times with headaches I’ll have issues with sleep. I titrate up from 10 mg every 3 days to 20 mg for 3 days and then ultimately 30. In some cases I will go up to 50 but I don’t go any higher than that. Parents and patients will get nervous when you say that it’s an antidepressant but make sure that they know you’re using lower doses. Antidepressant dosages are up in the 100s, 150s, 200s and it’s just an excellent medication for migraine prevention. In some cases if there’s a mood issue involved as well, we’ll use the Venlafaxine or the Lexapro or the Zoloft. The headaches, those migraine headaches could be triggered by the anxiety or depression so make sure you’re aware of that. Anticonvulsants I try to limit, however, they are a great medication for migraine headaches. The Topiramates I have had some higher side effects on that so I try to
avoid it but it again, if you need it, you need it. Especially in the dancers who are worried about weight gain, Topiramates for migraines are a good choice. Depakote is also used and then Gabapentin, I rarely use this unless there’s a true nerve involvement. I don’t get good relief from Gabapentin unless it’s that occipital neuralgia type of a headache, and then beta blockers which of course you have to be careful in your NCAA or NFL or professional athletes because it is on the restricted list. Also in patients of course, whose blood pressure is an issue that’s always a good addition if you need a migraine medication.

When I talk to people about starting a preventative medication I do say that this is kind of a commitment. It takes 4-6 weeks to see the maximal benefits of these medications so tell them yeah you’re going to, when we take this step you’re going to be on it for a couple months. I typically like to use it for about 4-6 months before pulling it off, and once they’re aware of that treatment plan they’re okay with it. But I definitely like to warn them of that.

And then cognitive symptoms, this is a big area for us. Often times patients are going to complain of that fogginess, it’s difficulty concentrating and focusing at school or at work, they have memory impairments, cognitive fatigue, what we say is that slow, thinking or processing. Patients feel just almost like a sense of loss of control, they just don’t feel like they’re able to produce the results that they normally do at work or at school. So this is very frustrating for them. The cognitive fatigue headache that you may hear us talk about is a headache that worsens as the day progresses. Typically in the morning they wake up, they’re feeling pretty good, they go into school or to work and by lunch time that headache is settling in and they’re just getting so tired. We found that
medications that improve the dopaminergic transmission, helps that cognitive fatigue, it can improve long term functional outcomes that can facilitate recovery and increase the quality of life, it just makes them feel better which is what they want right now, they’re frustrated enough with this injury. So here’s one of the studies that UPMC Concussion Center performed and it’s about the efficacy of Amantadine treatment of symptoms and neurocognitive performance among adolescents following sports related concussion. The study involved a treatment group and a control group. Now the treatment group received 100 mg of Amantadine, 2x a day, there are 25 males and female adolescents and then control group was treated conservatively without the medication. These adolescents had not recovered within the 3 weeks with just the rest, the physical, cognitive rest and accommodations and then were started into the program. They checked the pre and the post treatment at 3-4 weeks neurocognitive and symptom assessments and what they found was that Amantadine was helpful, more helpful in the treatment group. The findings provided the initial support for the efficacy of Amantadine. Again the 200 mg a day, again it is not, it’s a treatment for the symptoms of concussion, it doesn’t cure it, but we have found great benefit. By the time the patients are seeing me that is one of the medications they’re likely to start. We do however, need a double blinded, randomized control trial of the efficacy of Amantadine to really give us a good, large sample to corroborate these findings, and hopefully we’ll be working on that and publishing that at some point.

Next I wanted to talk briefly about a case that proved the efficacy of Methylphenidate. Don’t be afraid to use some of the stronger stimulants. I always start with Amantadine, it has a less side effect profile, it’s not addictive, but these, the stronger neuro stimulants work as well. White et al, in 2004
conducted a double blind placebo controlled crossover trial of Methylphenidate. Thirty four moderate and severe TBI outpatient patients were used in this trial and the key findings show that there is a primary benefit on impaired processing and speed. It may also improve attention, memory, and higher demand cognitive tasks. The thing that I look at on the impact tests are the reaction time and the visual motor speed and if those are low then I’ll find that that stimulant is going to help them so that’s where kind of I can contribute to the impact scores. And they’ll alert me of that as well, which is helpful.

So don’t be afraid to use these neuro stimulants, it really does help the symptoms and you just see the personalities come back, because they’re feeling better, they feel that they’re processing speed is better, the reaction time is better, they feel more alert and are able to focus and concentrate. I have the majority of my patients will come back and say you know what after just starting that medication a couple days I felt more myself. It works on the dopamine receptors creates, alertness, the ability to focus and concentrate, gives the brain a little bit of an energy boost is what I tell them. I mean overall it just makes the body have a little bit more energy as well. Like I said I’ll use Amantadine first, 100 mg with breakfast for 5 days, then 100 mg with breakfast and lunch, it typically wears off 4-5 hours, so you want to make them aware of that. I have them take it with food because initially it may upset the stomach and create a little bit of nausea but that will go away. The number one side effect of this is a little bit of jitteriness so we ease it into the system by going once a day for 5 days first and that typically goes away. In rare cases I’ll have it do the opposite effect and create more fatigue so be aware of that. And then in my very, very type A anxious patients it may in crease their anxiety a little bit so you may want to titrate that a little slower or half the dose. I will also if
needed, if Amantadine is not effective or not effective enough, I will try the Adderall, the Ritalins, the Concertas, the Stratteras if needed. Especially in patients who have a history of ADD or ADHD, what I’ll find is that and they’ve discussed before, that with concussion those focus and concentration issues are just exacerbated and so we will likely start them on something they may have previously been on. The other thing to note if someone has been on a neuro stimulant already for those issues and they’ve been on a dose for maybe you know steady 2-3 years, 5 years or so, I don’t hesitate to try Amantadine on top of that because they’re body is used to that dosage and if their cognitive symptoms are worsened I will add that in, just kind of a little side note there.

Finally neuropsychiatric symptoms, last but not least for sure because we’ll find that mood disturbances occur following concussion in many, many cases and these are my most complicated cases, Nickie can back be up on that. If there’s an anxiety, depression, even a post traumatic stress disorder component some of those symptoms will overlap with our post concussion syndrome and even prolong the recovery period. Patients will feel nervous, they’ll feel irritable, more irritable than normal, nausea, sleep disturbances, sadness, just hyperemotional. I’ll have patients where they’re like I never cried before but I’m crying here in your office and I’m like I do that to a lot of people it’s okay. But they just, they have that sense of loss of control and that is uncomfortable especially for you know athletes and people who are in the workforce, they just don’t like feeling out of control. We remove them from their social experiences and from the activities that they love, we try to get them back in quickly but it’s uncomfortable for them to be off of that normal routine. There’s also family stressors that may be going on and there’s even school stressors, kids are mean in school sometimes, we know that. And when you can’t see this injury, kids at school may make fun of them
and say oh you’re just faking it, you know and so you need to be aware of that and counsel the parents on that as well to be looking for that because that leads to anxiety and depression in kids and even people in the workforce as well. The big thing is don’t forget to evaluate for clinical anxiety and depression and post traumatic stress disorder, get them into the services that may benefit them earlier. We’ll definitely have people who came in with undiagnosed anxiety and depression and finally they’re kind of admitting to that which is helpful in their treatment program.

First and foremost we try psychotherapy. If you’re in an area that you aren’t familiar with your therapist or psychologist, make sure that you get to know them because they’re a great resource and if you know a couple names that you know really work well with concussion patients then you’re going to want to give those as referrals because you send people out and you say you know you need to talk with a therapist, talk with your PCP. We’ve found that less people are really getting into those therapy sessions because that’s extra work for them or it’s difficult to find a referral so link in with a couple of the psychologists or therapists in your area.

Antidepressants I will use, definitely that’s part of my treatment regimen. Most of the time when they’re seeing me for the first time we’re not talking about this but if the issue has kind of gone and gone on and things aren’t getting better then we’re talking about SSRIs, TCAs or SNRIs. I hold off on the TCAs only if they have a headache component, but I use a lot of Lexapro and Zoloft in my regimen, those are just 2 that I’ve worked with frequently you can use whatever works for you. But in the patients where again they may have had an anxiety, depression disorder prior to this and it has worsened now this really will lift their spirits, it does work, so don’t be afraid to use it. Like I said
the TCAs if there’s a headache and a sleep component that may be beneficial however, remember you’re using lower doses of that for headache and sleep so it may not be as effective for the anxiety/depression.

Benzodiazepines, we always afraid of those, limit the use for sure but they do have a role in concussion management because in some cases you just need to treat that anxiety for the short term instead of going to an SSRI. Some patients may develop panic attacks, sleep disturbance because they can’t shut that mind off at night, they’re worried about what they’ve missed during that day, you know the future, am I always going to feel like this. So occasionally I will use Ativan or Klonopin at low doses. Again this can be addictive and you worry about the potential for selling this, you know drug seekers, but we don’t really get that in the concussion world which is wonderful, but I will use a little bit of Ativan or Klonopin at night. The other thing is, and Dr. Mucha will talk a little bit more about this in the vestibular talk, but when there’s a significant dizzy component these patients get anxious. If they’re in this crowded room, walking through the hallway, they’re going to probably set off a panic attack. In the grocery store, even on the bus, or in the hallways, that space and motion issue will take over and then that anxiety comes out and that’s actually where Klonopin can come into play and I use that twice a day. It’s been shown to decrease vestibular symptoms and improve the vestibular related anxiety so I’m not afraid to use that. I’ll be in communication with vestibular therapists and the neuropsychologists and we’ll decide you know if this is taking over we need to control that. The reason I choose Klonopin is because it has a longer term effect. It’s not in and out of the system like an Ativan or a Xanax might be. We don’t want it to go in waves, we want it just to settle out and kind of have that long term effect. So I’ll use .25 mg 2 times a day. In some patients who the dizziness is pretty significant during the daytime we’ll do it morning and
early afternoon, but if there’s an issue with sleep and the mind won’t shut off at night then I’ll do it more towards the evening. They should not be on this medication for very long, a couple weeks, it supplements their vestibular therapy so as they’re finishing out with vestibular I’m usually starting to come off and actually Ann and I will talk a lot about interactions with patients and say okay I think we can kind of try to titrate this off or keep it on a little bit longer. Again that’s why I stress the team approach, communication is key in concussion recovery. But don’t be afraid to use these medications again it’s short term and they come off of them.

So again I kind of want to summarize with the four areas that I deal with, the emotions, the cognitive symptoms, the sleep disturbance, the somatic complaints, no 1 patient or 1 concussion is the same, you will find that out. It’s important for you to get information from the parents even from the athletic trainers in terms of the sports related concussions. It is a team approach, I can’t stress that enough. But these are the 4 areas patients may experience 1 of the 4 areas, others may experience all 4, just realize that they’re scared really and what your role in this as a physician or a medical provider is to treat some of those symptoms but again I want to stress that none of these medications are going to cure it, it is just going to make the process a lot easier for them. We try to avoid medications early in the concussion recovery process, but there is a role. When you’re talking to these parents and you’re talking about antidepressants, you’re talking about preventative migraine medications that these kids might be on for a little while, for a couple months, they’re concerned. So your job is to ease that level of anxiety in the family so that you can, you’re able to treat the kids, because they do get better. I do love what I do. It’s interesting because I have the ability to kind of be a part of their lives for short term but you make them feel so much better and you watch them go
from you know this quite individual to seeing their personality come out and it’s enjoyable. So I really do love what I do.

What we do know though is that for sure this is definite that rest and reduced stress on the brain helps with recovery; cognitive rest with academic accommodations, physical rest, however, again don’t let them sit in a dark room that worsens the situation. We do know that sleep helps, again 7-9 hours, no more, no less, no naps. That’s like my mantra for the sleep issue. And then treat the symptoms, there are appropriate medications, there are appropriate therapies, get them into vestibular or the exertional rehabilitation if needed, and what we’re finding though is more research is needed and so that’s where we come into play. It is an exciting role to be on this team and I’ve appreciated all of the input. So questions we’ll take during the panel discussion. So thank you.