It's fun for me to talk about this, I mean this is my job day in and day out. I can get frustrated with this injury but so are the patients, so I feel like we are on a joint - the same page there. So it's a fun mystery of concussion and medication. I don't have any disclosures, that's my easiest slide.

So the objectives today we want to talk about the treatment goals, the treatment timeline, symptom cluster approach to pharmacologic treatment and the treatments themselves. And so this is a medication talk so those that don't prescribe medicine don't zone out because your athletes may be on these meds and it's better to know about them and have a good understanding so that you can help them understand why they need to be on these treatments if they are.

So early diagnosis is key, and we talk about this time and time again. And the main thing that I like to say about early diagnosis is that it allows you to provide that education early to help them understand their injury, to help them understand what they are going to be going through during their recovery phase and it just gives them a sense of ease when they have that education. I find that a lot of the patients that come to see us that don't understand concussion they feel so much better leaving at the end of the day because they start to get it, they are like okay, this is what my injury is and that helps them to recovery faster. Education is key as we know.

We want to determine a treatment trajectory and really that's for your sake. It helps you to organize your thoughts, to organize the symptoms and to allow yourself to kind of make focused treatment plans for the patient. And then initiate appropriate treatments when needed whether

that's conservative through therapy versus medications. We want to limit the medications. I always say when they come in because they are going to say we don't like meds, and like okay well I don't either so we are on the same page. And I say you know meds are a part of your treatment in some cases but we are going to try to limit them. I understand that they are scary but once again once they are educated on that medication they feel a little bit better. And if they need it and they respond well to it they'll appreciate it in the long term.

So when do we start to think about medications with concussion? My slide is a little covered there, sorry about that. But when the current symptoms are severe enough to really impede their recovery. So if their symptoms are just limiting you now day to day activities you know you need to start thinking about that, and if the symptoms aren't getting better within a reasonable time. If the symptoms are interfering with their rehab program, so if they are not able to do their vestibular therapies or they are getting headaches with their exertional therapy and it's been going on long enough we have to start thinking about treating the symptoms because we know that if we don't rehab some of these systems that are injured these symptoms are going to go on for a long time and you are going to be seeing them for a longer time and other things are going to develop so it's really important to address those severe symptoms.

I also treat if the current symptoms are keeping them from work or school because we know now that if we take them out of social centers or their work environment or their school related environment they start to kind of fall downhill, you know they start to get secluded, they start to get anxious and then they get frustrated because they are getting so behind. Sp if they are not

able to go to school because of these that's a real reason I start to think about meds. And if the - sorry this is totally in the wind. But if the symptoms are severe enough that they are rehabbing and they are still not getting better I'm thinking meds.

So some of the risk factors that we look at, and you've heard these time and time again, they are very important from a medication standpoint because this is what I'm assessing when they are coming in. Do they have a family or a personal history of migraines? That makes me think okay if they do I might be heading down the med pathway at some point. Do they have a history of anxiety of depression or a family history? Now is there a genetic component that maybe this injury might bring that anxiety out of them. Do they have a history of sleep disturbance? You'll hear this is the main thing I focus on because if they are not sleeping it's really hard to get better. That's when we do recover from not just concussion but just any activity to be honest. That's where our muscles recover, that's where our rest comes from. And a lot of the time if you don't know that they are coming in with a preexisting sleep issue you are going to struggle, so make sure you ask is this a problem for you beforehand so that you can know all right well they are already baseline at a lower sleep number so that will help you in the long run. Do they have a history of ADD or ADHD because that sometimes becomes a little exacerbated or really what I use is deconditioned. And then history of vision abnormalities and then car sickness and dizziness. That helps me to know okay what are these risk factors that they might have that I may need to address with medications?

And of course, yes, I am probably one of the most conservative people and so I like to start with conservative therapy, but again I become the aggressive part of the treatment and so letting patients know that hey I want to be conservative too but we may need to get a little bit more aggressive with this helps them to understand you are on their side, you want to do what you can without meds but you will use them if needed. And you can see our conservative and we have the cognitive rest, the sleep hygiene, the physical rest and accommodations. Now when you - whenever you see cognitive rest and physical rest remember that is not in a dark room, that's relative rest is what I like to use. I use that for my musculoskeletal athletes too. Don't worry I try not to shut you down, but relatively we are going to change some things in your daily routine so that you don't get hurt further.

And then we start to advance. Do they need therapies, the cognitive, the psychotherapy, over the counter meds I consider a little bit more moderate, vestibular or vision therapy and then physical. And then we get to the aggressive and you can see that whole line says meds, meds, meds, meds. And so we are trying not to hit that place but there is a role for it, there really is and we'll talk about that.

As you've seen before you can tell we are a team. I mean I think we function as a unit because we all have these slides that talk about the clinical trajectories and that's because it's important. Again for the education of the patient but to get your mind organized. This really helps me, I look at this and I go through it with the patient as well and I say all right which category or categories do you fall in? We are going to address this sometimes together, sometimes

individually but I think again it's about organization in your mind, otherwise you are going to be a jumbled mess in there.

But first before we go into those trajectories again let's address sleep, it's all about sleep. I mean I love it, you love it, we probably don't get enough of it. But what could be causing it? Oftentimes preexisting sleep disorders and that's again a big one I talk about, just issues from a neurophysiologic effect from the injury itself you know that neurometabolic imbalance can create a sleep disturbance. Pain, a lot of people neck pain, headaches, there is a lot of issues keeping them up at night. Environmental stimuli especially in our younger population, TV, phone, music, etc, especially that phone, that buzz, buzz. I mean we all know what it is, it's right next to their bed. And you've got to say you know I'm not trying to be mean, I'm not trying to be the parent at this point but this is the best thing for you, shut that phone off at night. You know we focus on texting a little bit less because they get those text messages at night and you say this is your private time, this is when you are sleeping. You know you can talk to those friends in the morning. And again if you address ti saying I'm not being the mean one I'm just trying to get you better faster so you can get out there sooner. It's all about the way that you talk with them. It's a better understanding of their injury, a better understanding of why you are telling them no.

Pharmacologic effects, I could be keeping them up. What if I gave them something from a medicine standpoint that now you know you think you are giving them an antihistamine and they

are that population that is hyper and alert as a result of it. So make sure you are not the cause of it.

And then anxiety and depression, such a real issue with sleep. Folks are thinking about what they missed the day before, what they need to the next day, just depression and anxiety itself keeps you up at night. I'm sure many of us are type A personalities so we all have a little anxiety, that's how we succeed in our jobs. And so you know that there are struggles at night sometimes with sleeping.

But do we do about it? Conservative, proper sleep hygiene, we've talked about this a lot. I stress to them you get 7 to 9 hours, no more, no less, and no naps. As soon as you hit that no haps you know they are like oh darn, that's what I'm doing every day for 2 hours. So you want to restrict them. And again the way that you say it is this is what's going to help you get better faster. That's what they want to hear, you know they want to get better faster and you are giving them tools and really you are giving them a little bit of the authority in this. Hey, you create your schedule, you are going to get yourself better. It's all about motiving as well.

And then relaxation therapies. Turn on that nice waterfall, turn on some white noise even, a fan, I say put it on the floor and face it away from you so you don't freeze. Let that hum go so that your mind is hearing that instead of its thoughts. And then I also think of little things, this always sounds silly when I'm describing it but you lay there in your bed and you start at your hair and you think hair relax, scalp relax, forehead relax, eyebrows relax and you go down and

then you bore yourself by the time you are midway you are falling asleep. So just little tools to take their mind off of their thoughts.

But when all else fails yes we may be going to pharmacology. I use some of the over the counter medicines first. I've got non-concussed patients on Melatonin you know because our body has that hormone we need to enhance it a little bit. Just be careful because people will go high up in their dosages and really our body just needs a small amount, really 1 mg should work for a lot of us but I usually say about 3 to 5, that seems to be the one that works. And there is a regular versus extended release so if they are waking up in the middle of the night they can try that extended release. If they are having trouble falling asleep initially the regular.

Antihistamines I use just minimally but I do tend to try to reset their sleep cycle with a simple med like Benadryl or Vistaril is helpful because it's also helpful for that anxiety component so I'll do that short term, I don't want them using you now Z-Quill for the rest of their life but sometimes we just need to reset that sleep cycle. We do some more specific and prescription medications because again I've got to get them sleeping.

So in some cases I am using Amitriptyline and that is becoming more readily used I think because I use low doses of that medicine and it also helps migraine headaches, so I try to kill a couple of birds, even though I love the birds, with 2 stones, or with 1 stone. And I find that Amitriptyline if you titrate up slowly will really get that drowsing side effect, but you want to make sure that you are not just titrating up too fast because they'll really be groggy during the

day and then what are you accomplishing, they want to do those naps that you are asking them not to. So I'll start at 10 mg, titrate up to 30 and then sometimes I'm up to 50 with that;, but it depends on the patient. You can use this in the younger population but again you want to be conservative with the children I mean as you are with anyone, but they can have more side effects that you've got to watch for. And again you are only using these if necessary.

Trazodone is a good sleeping pill. At baseline it's an antidepressant antianxiety but we use it as a sleeping pill. You just have to watch some of the side effects but to be honest I have good toleration for my patients and I'm usually about 50 to 100 mg of that, and again it's short term. This is what you are telling them, this isn't for the long haul, let's get your sleep better and let's get you off the med. They feel a little bit more comfortable that way.

I rarely use Ambien but on those that I've tried everything I just knock them out with Ambien. And you have to give them the side effects, you may wake up in the middle of the night, go to the refrigerator and eat something, but hey, at lease you are eating something. But those are some crazy side effects, so I limit the use of that. Low dose for that too, 5 mg.

But let's talk about some of the factors that may affect using pharmacologics and the thing that I look at when I'm starting to treat a patient is you know have we given them enough time to heal? And to be honest I've got the best team in the world so I know that they are sending them to me at the point where they need something, you know. And so we've let that brain rest, we let that brain heal on its own for a period of time. And so at that point you know usually about 3 weeks

in if they are still struggling we are really talking the meds. Oftentimes though the majority of my patients are months into their recovery and I'm really trying to get them back on track.

Would earlier treatment speed recovery? That's kind of what we are trying to figure out, and again remember I don't love using meds so if I don't have to use them I'm going to try not to. But if I see that their symptoms are severe enough or feel like they truly would benefit from a medicine a little bit earlier I will try to get that started if possible.

What age is too young to give medications? Well that's really what you are comfortable with as a prescribing physician. I've got some kids that are 8 years old and they need headache medicines for their migraines. You try not to do that but again when the time is right you use it. But it's a comfort thing and what you've been trained to do. There is other issues, for older adults my age and above they may be on other medications and they have other comorbidities so if they are coming in on multiple meds I'm probably not going to try to add another medication except for maybe a little Melatonin. But you've got to watch what they are already on, the interactions you know that can be a big issue. And then again the past medical history is what's going to guide me. That anxiety, depression, migraine, car sickness, learning disabilities or ADD, ADHD those things may say okay Dr. Anderson, start thinking about you know the medicine trajectory that you might be heading to here.

So we are going to kind of go through this circle and talk about how we use medicines in these treatment trajectories. Dizziness as we've talked about time and time again is very important to

identify and treat. On field dizziness we know is our best predictor of recovery, and I utilize that quite a bit. In the notes from my neuropsychologist I'll see one of their initial symptoms was dizziness and like okay how far out are we? A couple of weeks in we are in vestibular therapies, we are struggling, okay I'm pulling out my meds from my pockets, not literally. And I'm trying to figure out along with them, gosh we are talking, I think Anne comes down to my side of the treatment place several times throughout the week and we talk about is this a migraine variant, is this central, is this peripheral, is it from the ocular system? Is it a cervicogenic type dizziness or is it psychologic? You know so again there is not one medicine to treat all dizziness. I wish I had that. And we know that vestibular therapy is the first line in treatment of this, however there is a medicine that we can use and there are medicines that we can use to help treat the symptoms and really suppress them so that they can get through their therapies.

I usually start to think this when they have increased sensitivity to crowded environments, travel or moderate to severe dizziness. So if they are coming in and they are - they are not able to go out to the grocery store, to the mall, they are avoiding social situations because their symptoms are all stirred up they start to avoid, and that's the worst is avoiding those situations because then again the words that I like to use with them, you are becoming deconditioned. Just your muscles get weak when you stop exercising your body, your mind, your brain gets deconditioned to those places and that's where we start to again lead to some anxiety, some depression because they are withdrawing. And so those are the times where I will use a medication if needed.

So I use Klonopin, use it as a vestibular suppressant. The mechanism of action is unknown but it does, it has been studied to suppress that vestibular response. .25 to .5 mg, so I'm usually saying don't worry, I don't like this med either because ti come with a you know a bad label on it of addiction but I use it at very small doses and for a short period of time. So .25 mg is usually half a tab twice a day. In my very severe or moderate to severe vestibular patients I'll do .25 in the morning, l25 in the afternoon, on occasion I'll do .25 in the morning, l25 in the evening because let's remember this is actually an antianxiety medicine so if they are not sleeping I can calm that brain just a little bit at night as well. And the goals are to suppress those vestibular symptoms so they can get through their rehab, so they can get through their day, so that they are not starting to avoid. It also improves the vestibular related anxieties and I supplement this with vestibular therapy. So most often they are still in their therapies and as those therapies conclude so does their use of the Klonopin. And you have to set the stage, this is what we are going to be using it for and then we are coming off. My goal is to come off all of their meds at the end of their recovery. Again education, you know talking to them about the medicines and why they are using it and what it's used for and how long they are going to, they are hopefully going to be on it is so key for them.

So we've covered two of them, let's go to the next one, the posttraumatic headaches. Notice this is posttraumatic headaches and there is a list of different things that this could be coming from. So again this is why I went into medicine, I like mystery, I like figuring things out. So the goal is to figure out are they having a posttraumatic migraine? Is it musculoskeletal in origin? Do they have trigger points, muscle spasms, facet or disc related issues? A lot of this is whiplash so

we are stirring up the cervical spine. Are they get rebound headaches from the medicines that they are on? We'll talk about that in a little bit. Do they have nerve injury from impact you know or irritation or spasm that's causing unacceptable neuralgia, you can see the nerves just fan out behind the head so I start to think okay if we are getting this headache that just kind of goes like a seashell I like to say up over your head is that a source of headache? Are they fatigue related which we'll talk about. Are they vestibular/ocular? So again it's a team approach to figuring out where this is coming from.

Musculoskeletal headaches we try physical therapy. We do sometimes muscle relaxants or analgesics, I limit those meds if possible because either I have them on some other or that makes them drowsy and I don't want that. I use a lot of TENS units, I love this, let's trick the mind, let's have the mind thing about that stimulation instead of feeling the pain that the brain is getting from the body. Thoracolumbar support bracing, a lot of my patients come in like this and I'm like guys the next visit I better see you like this. I have better posture now because of my patients I think. But I'll use braces that help to pull those shoulders back and it's training braces, it's to help them remember this is where we need to be to take the pressure off of our traps and our cervical muscles. Manipulation whether that's in PT or with an osteopathic or chiropractice manipulation, we do utilize that at times. And then if they have no relief with conservative we are going into the x-rays, we are looking at the MRIs. There may be referrals for injections and again we are sort of taking that scale from conservative to more aggressive.

And we limit the over the counter use you know of medications. It is not forbidden to use them but we want to limit them, and I'll talk about that. Hydration is key. At baseline we all should be having 80 oz of water a day, my goodness it makes me want to go to the bathroom now. But think about we are getting them active again too and a lot of them are athletes and so they are working off and burning off more fluids, so they need to be replacing what they are burning off in those exertion therapies that they are going through. Making sure that they are getting 3 regular meals a day or 5 small a day. I mean this is just general good health and that's what I'm telling them, we are going to make you better at the end of this concussion than you were before it. Cold compresses to the forehead or the back of the head. And the other things are it's covered up here but you know what else is going on? It's allergy season right now, I know mine are acting up. You know are they getting sinus congestion, that's the cause of their headaches. So ask questions.

Acute relief, again do you use over the counter meds, Tylenol, Ibuprofen, Naproxen, these are not - this is not poison, they can have it now and then. It's just we want to make sure that they realize that you can get a rebound headache because they do not write that on the bottle and everybody comes in, oh I'm taking you know Aleve twice a day every day. Okay, well how long have you been doing that for? Ever since my injury which was back in January. Oh, you know I have the joy of having a team that assesses that as well but some sneak through. And I'll be like okay, we've got to jump on that.

The tension headache medicine I like for my younger population because it doesn't have the aspirin component in it, and so they can get it over the counter and use it for those acute migraines, again limit use. And then Excedrin, I love that one, that works for my migraines. And so they've got to do a little trial and error process there. And then we go secondary to the prescription meds like the triptans which Maxalt, Imitrex that help to break that acute migraine that comes in. Side effects though can be nausea, dizziness, drowsiness and muscle weakness so make them aware of that.

And so there is medication overuse headaches, they mimic our regular headaches, they occur daily, they can wake you in the morning, they improve with simple medications. They return as the medication wears off and it increases with physical or mental exertion. Every headache does that right. And so you really have to ask what meds they are on.

Vitamin supplementation comes in with migraine treatment and these are folks that really truly have a history of migraines. People like to take medications sometimes because they feel like it's doing something, well hey hit them with a vitamin. It really does take 3 to 6 months to take effect if they take it daily so don't expect immediate treatment or relief with this but it's a good tool to add on, especially in that history of migraines.

And then sometimes like I said we are really going onto the preventative treatment with some antidepressants, anticonvulsants and even those oldies but goodies the beta blockers. The Amitriptyline I like because it helps the sleep, it helps the headache component. SSRIs are used

in the times when there is anxiety, depression involved, that's the stress related headaches. And again I try not to use this, but it's common in my practice these days because we've seen what concussion can do to the anxiety and depression side.

And then cognitive symptoms, headaches that worsen as the day progresses is called a cognitive fatigue headache. And this is the simplest of all the prescription meds I use actually and that's Amantadine. I use it with 100 mg with breakfast for 5 days and 100 mg with breakfast and lunch and it really does improve their quality of life. And I've seen that from a subjective standpoint with my patients. I see hundreds of concussion patients and the ones that this works for they just are very thankful for it. It gets some bad rap though. One of the Indianapolis Colts, Tyler Varga, had been suggested this medication and looking into it he had asked some other physicians and they said no, no, no, you can get psychotic features with this. I have not seen that yet in my population. It can happen, it's a side effect, but what he said is oh they said you can never stop this medicine, you have to keep increasing the dosage until your symptoms go away, that's the way I understand it. That's the problem, he wasn't understanding it appropriately. And that's where my job comes in to educate our patients on these meds because it really does help a lot of them if they have cognitive fatigue headaches, if they have slow reaction time, slow speed on their testing.

Rarely do I use some of the psychostimulants. If they've used them in the past or they have that deconditioning form their previous ADHD their coping techniques are down, I may go to those, but infrequently.

And then finally kind of one of the biggest things, so I should probably put this at the beginning of my talk is the neuropsychiatric portion. Mood changes do occur often following concussion and I'll be honest I'd like to see, I'd like to almost at some point say the majority or most patients have some type of neuropsychiatric issue. And that's because concussion can make them nervous, can make them irritable. Ask their parents, they are very irritable. They can have the sleep disturbance and sadness and increased emotions. If you haven't yet you are going to see a football player who is crying on the sideline after his injury or crying in your office later which is unusual right? But it's very real. There is fear because they don't like the way they feel, they don't know what's going to happen or will they recover. There is social stress, family stress, so there is reason to have these increased emotions. And our goal is to be their support and to educate them. I can't say that enough.

Conservative psychotherapy, is that really conservative though? I mean that's pretty important and it is kind of moderate to aggressive because one, they don't want to do it, that's the problem. And so explaining to them why this is so important you know you may have been able to handle these situations and you are going to handle them again but we have to just remember you know how to train our brain to think a different way as opposed to being scared just to being confident again. So that confidence key is huge, they definitely lose that during this process.

And sometimes I am heading to the SSRIs and that's okay, again medications can be scary but if you get comfortable with them and you use them on the appropriate patients and you educate

them they are not as scary. And so some of your athletes may be on Lexapro or Zoloft or Prozac and that's because they have a real issue with that anxiety or that depression. And it could be worsening their symptoms, triggering their migraines. And so if they are on it help them to understand that it's not just meds that are going to get you better, we've got to work through this, we've got to talk through this.

Benzos I use on a limited basis but if they are having panic attacks I'm going to help them out a little bit. And again Klonopin I use for that vestibular related anxiety. And it's usually supplemented with vestibular therapy. All of this is of course short term for the benzos.

So early education on postconcussion symptoms, and I like symptoms not syndrome because once they are labeled with postconcussion syndrome that will go with them their entire life so I really have tried to back off on using that term a lot. Initiate therapies when needed, we've talked about them today and we are going to continue after my presentation, vestibular/ocular, psychotherapy, cognitive therapy, exertion therapy. We don't always want to get them in all of those therapies but in the right ones. And then determine if meds will be needed. Regular followup is key, I do not do my best work when they are coming every 6 months, even when they are coming every 3. So I'm usually trying every 4 to 6 because I need to watch these changes, I need to watch their recovery from their therapies and adjust my meds during that time period. My associates will say when I see one coming it's been 6 months I like go oh what am I going to do for this one? You know I really need that close followup, it's critical.

And my advice to the clinician is keep calm, whatever happens think positive. These athletes will get better faster I've noticed in my own practice if they are staying positive. The ones that come in and are like this is miserable, I'm like I get it, it's miserable but it's going to be more miserable if you keep with this attitude. So let's think positively, let's think forward. I know everybody has told you that but it really works, I see them get better faster.