

Dr. Peter Selby: Welcome. This is ASAM Practice Pearls, a podcast series from the American Society of Addiction Medicine. I'm your host, Dr. Peter Selby.

I wonder how many of you have seen that 2015 movie starring Will Smith called Concussion. No spoiler alerts, but if you do see it, it starts off with the retired Hall of Famer, Pittsburgh Steeler Center, Mike Webster, who was found dead in his pickup truck. And, on autopsy, the pathologist there, Bennett Omalu, notices very particular patterns of brain degeneration, which we now know as chronic traumatic encephalopathy. And I won't spoil the rest of the movie for you, but it comes out they published a paper in neurosurgery, which talks about a case series of football players who all died in this way with this repeated neurotrauma.

It's a fascinating movie to watch. But that's the topic of our podcast today. And as we take care of people who may be professional athletes, but even if we don't, brain injuries are very common in the United States and around the world. And it leads to about 70,000 deaths and 215 hospitalizations annually, with about 2.8 million people experiencing brain injuries.

So, therefore, it's a fatal condition if unrecognized, untreated. And, often, it is because they have a deterioration in functioning. There's often concurrent substance use and mental health disorders. And so, with these kinds of statistics, the chances are that we in addiction medicine will have come across them.

I know that in my program, we used to consider these individuals as repeat users of the system. They would be non-responders to treatment, and they would be very frustrating for the treatment team. But often, we would not know about their traumatic brain injuries or acquired brain injuries. And so, for today, that is what we're going to talk about.

I am so delighted to welcome today's expert, Dr. John Corrigan, who specializes in co-occurring traumatic brain injuries and addictions. So, welcome to the show, John.

Dr. John Corrigan: Thank you so much, Peter. It's really a pleasure and an honor to be here.

Dr. Peter Selby: I'm really glad that you're here. So, could you explain to the audience a little bit about what neurologic-informed care is, why it matters in addiction medicine, and how do we approach this new way of thinking in our field?

Dr. John Corrigan: Certainly. So, in 2024, I believe it was, with the Fourth Edition of the ASAM Criteria for Adults, there was a new chapter added on cognitive impairment. In that chapter, it introduces this concept of neurologic-informed care, and it's intentionally named to parallel trauma-informed care in that it is not a specific modality.

Instead, it's a context in which, whatever modality is being delivered in whatever setting, that care is neurologically informed. And the need for it is exactly what you've alluded to, that we've tended to think of traumatic brain injury as kind of a low-incidence condition, and that's because we think of just the most severe of those individuals. But recent systematic

review indicated that, at least in the states, something like 18% of non-institutionalized adults will have had at least one traumatic brain injury in their life that resulted in loss of consciousness. So, that's not any traumatic brain injury. That's not just being hit in the head and having a period of confusion or post-traumatic amnesia but actually losing consciousness.

Now, many of those folks don't have disability, et cetera, from it. But what they will have sometimes is subtle cognitive weaknesses. And it won't be the kind of thing where it would be obvious because they have problems in speech production or they're obviously amnesic in some way, but instead, what we're going to see is that their deficits, their weaknesses, show in certain circumstances. "If I don't get enough sleep, then my attention span drops." "If it's been a stressful week or two weeks, then I'm going to be less able to learn new material." And that's the subtlety. And so, in many of our treatment programs, these individuals will be overlooked.

Matter of fact, we've had a pilot project going here in Ohio in a couple of centers. And when we introduced ourselves and what it actually takes to do neurologic-informed care, with boots on the ground, they said, "Oh yeah, we've had a couple people with brain injury," and mentioned somebody from a year ago or two months ago.

They think of it as a very low incident. But then, when we start doing systematic screening of everybody coming through their doors, we're getting 80 percent in one, in the 70s in the other. Systematic reviews suggest that it's at least 50 percent of persons in substance use disorder treatment. And the higher the level of care, both of these programs that we're working in were residential, the higher the percentage of individuals who have had a history of brain injury that is sufficient to at least be suspicious that there are these cognitive weaknesses. And so, that's why there's the need for taking this approach that we call neurologic-informed care.

Dr. Peter Selby: That really resonates here at the Center of Addiction Mental Health. When I was the clinical director, we, with the colleague Carol Lenski, we introduced systematic screening, and I was a skeptic, and I was blown away with what the prevalence was and actually repeated admissions. Readmissions was highest for those who had moderate brain injury, not the most severe, not the one, but who had two or three. They were the walking wounded. They'd looked fine, they just weren't responding to the treatments because you could see that they were coming back more frequently. So, this is a hidden epidemic, I think, in the addiction world.

Dr. John Corrigan: If you go back to the old match study, for those of us who remember the match study that Marsha Bates did, one analysis, where she looked at what happened to individuals with cognitive impairment. And what she found is that they had this relatively quick trajectory towards premature termination, and generally, the agency saying they were non-compliant. But preceding that in testing, they would see a low self-efficacy or low expectation for the efficacy of the treatment and saying things like, "Well, this is a good program, but I'm not sure it's going to work for me." or "This makes sense, but I don't know if it's what I need."

And our suspicion, we don't have the data from that study, is that the providers are not seeing this neurologic impairment. They're not seeing the cognitive weakness. And let's say somebody misses an appointment, and the next time they see their therapist, the therapist lays into them for not being motivated to be there because they didn't get there.

They made the immediate assumption that behavior was a reflection of motivation. But you know, in brain injury rehabilitation, we start with the assumption that people aren't going to show up because they're going to be forgetful, or not get it in their calendar, or not get their things together to get there that day.

And it doesn't reflect motivation, we know, it reflects their cognitive abilities. And so, that's what neurologic-informed care is. As providers, to be in a position to ask ourselves, "Which is at play here? Am I dealing with somebody who's not motivated?" or "I'm dealing with somebody with a cognitive impairment and that's why I'm seeing some of these behaviors."

And it's not that it's either-or sometimes, but we need to be thinking it could be one or the other.

Dr. Peter Selby: Well, it's a misdiagnosis, right? We are attributing to motivation what is actually ability. And so, we need to help them compensate for that. So, therefore, it makes sense to screen. But we are also seeing this coming up more into the media, and more to our attention is that we are seeing and hearing a lot more people who have multiple overdoses and recovering from them.

And I was wondering if you could just enlighten us a little bit about what that relationship is with this hypoxic damage that's occurring primarily with opioids, especially street opioids, and your thoughts about how that looks and how that presents.

Dr. John Corrigan: Well, you know, you mentioned the acquired brain injuries earlier, and traumatic brain injury is one of the acquired brain injuries, and one of its uniquenesses is that it doesn't always get medical attention.

Matter of fact, recent study from the Centers for Disease Control suggested that for every one adult treated for a traumatic brain injury, that there may be 30 untreated events. It's an extraordinary number that I wish that team were still in place to do the follow-up studies on. But the other acquired brain injury, where that's true, is anoxic and hypoxic brain injury.

You know, most of the others, stroke, encephalitis, tumors, you have an obvious medical event that receives medical attention. But in traumatic brain injury, you don't necessarily. And in anoxic and hypoxic events, of course, there are some that you do, but particularly, as you've mentioned, we don't think that an overdose is a time when the brain has been denied proper oxygen, and that's why there is loss of consciousness or reduced consciousness. And with enough of these, there's every way in which the brain is compromised. If you do it repeatedly, you're going to get more of an effect. There's a

cumulative effect that goes above and beyond any single event, and certainly in individuals with multiple overdoses.

But another population that we become concerned about anoxic and hypoxic injuries are, particularly, women who are subjected to intimate partner violence because, besides being hit in the head, and the head is the most likely place hit because the hair hides bruises, but also, strangulation is very common and sometimes in the same event.

So, you're getting a traumatic brain injury and an anoxic/hypoxic event occurring simultaneously, which, from the early days of traumatic brain injury treatment in neurosurgery, the first thing was [to] get oxygen in there. We have just, in the last, I would say, five years, there's been a recognition within the domestic violence community, that there's a lot more women who have experienced brain injury through traumatic anoxic/hypoxic events, that they need to be rethinking the approach, which also applies to if that person has a substance use disorder, which there often is, how that treatment should be provided.

Dr. Peter Selby: Exactly. And then they'll end up in the similar situation: homeless, not responding to care, not responding to the social supports, and [it] gets attributed to lack of motivation, whereas actually, it's ability.

And so, I think what you're highlighting is there are many ways in which the brain can get hit or harmed and then show up in the substance use field. Are there clinical differences in how somebody with an anoxic brain damage, repeated, will present clinically, versus a more traumatic injury, versus a combination thereof that a clinician should be thinking, "Oh, you know what? Maybe they are both at play." Is there a clinical difference of how they show up?

Dr. John Corrigan: I think there are more similarities between traumatic brain injury and anoxic/hypoxic brain injuries, but for different reasons than we might think. One, both have diffuse effects on the brain. When there's diffuse effects, certain manifestations are more common, particularly a reduction in attentional processes, speed of information processing, ability to focus attention, et cetera, as well as more difficulty and more complex information processing or abstraction. That tends to go along with any diffuse effect versus, let's say, if you have a pretty focused stroke, let's say an ischemic stroke.

But they get it different ways. And the traumatic brain injury, the fingerprint, is that no matter where the blow comes to the head or where the head is hit, there is a damage in the frontal areas. And it happens for two reasons. One, if it's enough energy exchange that the brain jiggles, then there are some bony under-surfaces towards the frontal poles in the orbital frontal area that the brain can scrape across. And so, you'll get more contusions in the frontal areas.

There's also, in terms of shearing and tearing, just, it's again, mechanical, that there's so much mass in the frontal areas. We pack a lot in there to deal with this complex society of

ours. And the effects of inertia cause more tearing and shearing in the frontal areas than in any other part of the brain.

So, no matter if you do get contusion in the back, because you're hit in the back, if it's enough energy, the brain moves about, then you, in one or more ways, will end up with injury in the frontal areas. And whether it's been autopsy reports or more sophisticated DTI, we keep seeing this. That frontal area is the fingerprint of traumatic brain injury.

Dr. Peter Selby: And so, does that then lead to that disinhibition that we see and, therefore, are more impulsive, more likely to use drugs, more likely escalate the use of drugs, whether it's alcohol or opioids or what have you. And then now they are in a vicious cycle.

Dr. John Corrigan: Exactly. It's this so-called executive functions of the brain.

Everything from allocating our attention and being able to sustain our attention to inhibiting impulses, to being able to make goals that we are able to recall when we need to, and delay gratification to reach goals that have rewards later, all those things. You know what I always say is that, as a human living in a complex society, if you are going to pick one of your lobes to damage, leave the frontal lobes out because you really need them to get along in a complex society.

And our persons in substance use disorder treatment are living in a complex society and have developed a complex condition that needs a pretty high level of behavior change to resolve. And if anybody needs their frontal lobes, it's a person in substance use disorder treatment.

Dr. Peter Selby: Yeah. The way I say it is that, basically, the very organ that has been affected by the condition is needed to recover from the condition.

And so, if you have a traumatic injury or anoxic injury, then that's going to make it doubly hard. So, protect your frontal lobes as much as you can. So, as you were saying before I interrupted you, you were talking about the anoxic brain damage. So, how does that play out?

Dr. John Corrigan: So anoxic/hypoxic, while it's what we mostly think about, is that some of the susceptible parts of the brain, although the brain in general, compared to the rest of the body, is more at risk simply because it's a real hog for using oxygen.

But we normally think of, like, the hippocampus often affected. It, too, is a high user of the cerebellum, but the midbrain, where there are those connections to the frontal poles, the frontal areas, orbital frontal cortex, frontal poles, dorsal lateral prefrontal cortex, those connections are at risk as well. And so often in anoxic/hypoxic injuries, we see these same kind of dysexecutive function problems.

Not having good executive skills, that we just mentioned, goes along with that injury as well. So, it looks, in many ways, a lot like a diffuse traumatic brain injury.

Dr. Peter Selby: You've given us a lot to think about here, and, as a practitioner who might be in ambulatory setting in an addiction setting or other setting, what are some practical ways that we should be screening for brain injury routinely, and how should we modify our treatment?

Dr. John Corrigan: Neurologic-informed care has two prongs, and the first is the one you mentioned. It's screening. And you know, some folks think, "Well, I'll screen if I detect something, maybe." But you're going to miss the people you most need to see, because the most severe cognitive impairment, most clinicians will detect that. But it's the subtle, those are the ones, and if you wait and say, "Well, I'm going to wait till somebody is having trouble in treatment or is failing," then you've let that happen. And maybe that could have been prevented. So, the recommendation is that we put it at the front end. That we screen everybody as they come through the door, whether we think they may have a cognitive impairment or not. So that we have some sense of whether there are some red flags here.

Screening doesn't have to be elaborate. We're not talking about doing neuropsychological assessments. There's a couple different approaches, and these are talked about in that chapter in the Fourth Edition of the Adult Criteria.

One approach might be to do a simple cognitive screener that is actually a performance test. Problem there is that most of the performance tests have a lot of false negatives, so it doesn't look like a person has a problem, but there is a subtle problem there.

Dr. Peter Selby: What about the HELPS?

Dr. John Corrigan: The HELPS. That's a self-report method, one of the earliest ones. There are more validated instruments now where they get a lifetime history of exposures, but not by just asking. You can't ask, "Did you ever have a brain injury?" "Did you ever have anoxic/hypoxic event?" You're going to get a lot of no's to that when, indeed, they have.

So, most of the available instruments that have been validated go at it two part. They start by trying to identify events in a person's life, injuries that might have involved the head or neck, and then taking them one by one. What happened right after that? Were you dazed, confused, have a gap in memory? Were you knocked out or lose consciousness? And if so, for how long?

It's not perfect, it's self-report. It's asking people to remember things from their past that may have been just glossed over, but we have done the validation to know that what you do get is enough to tell you, here's a red flag. And the thing is that it's not just one minor injury that creates this weakness.

And so, the instrument that you use doesn't have to be that sensitive. It's when you've had repeated exposures over time, or you've had one that actually resulted in loss of consciousness, particularly if it was in youth. These screening measures that get at self-report of past history, are some of the most commonly used.

Another kind of self-report is simply to ask somebody if they have problems with paying attention, if they have problems with learning new things, and get self-report of the functional implication rather than the history. Actually, I think the best is using both of those techniques, and I suppose if you had the resources to do a little more testing, that as well.

But if you just do the functional, you know, asking someone the functional implications, do they currently have problems concentrate, et cetera, they may say "yes," but they don't really get this same interest in it as if you start with getting at this history. And often in taking the history, they start to realize that "Wow, I have had a lot of things happen to my brain over time."

And you'd think that would be discouraging. Often, it's empowering. And I don't know how many times I've had somebody say, "I just thought I was stupid," or "I just thought I was a bad person." And when you help them understand that this history of brain injury may have been the trigger, why nine months later you had whole new friends and started doing drugs, why that happened in high school, or why you lost your job after that car crash in the months post, you know, got into trouble with your use.

Dr. Peter Selby: And then we also have to manage patients like this because we don't want to create the iatrogenic addiction because, obviously, people who've had traumatic injuries, we want to give them pain medication, they're in pain, you'll end up starting opioids and then they leave the hospital, and the next thing you know, because of all the cognitive and executive function problems, their addiction just takes off in a way you never expected.

Dr. John Corrigan: Rachel Sayko Adams and I have written about a cascade of vulnerability in opioid addiction for persons with traumatic brain injury. That starts with, for whatever reason, but the data is really clear that there's more likelihood to get the initial exposure to the opioids, folks with a history are more likely to be prescribed opioids.

We have a pretty good sense of why that is. It's because often there's pain involved with the consequences of the injury, whether it's headache or something else. And while opioids are not an indication for headache, people get opioids when they have pain, so you have this greater likelihood of exposure, Risk 1.

Once exposed, the person with a history with brain injury is more likely to convert from just use to misuse, whether that's studies that looked at extended use, then excessive use, and moving into illicit use, it's more likely with a traumatic brain injury.

And then the third level of the cascade is now you have the disorder, and your traumatic brain injury is gonna make it harder for you to respond to the treatment to help you get past it. So it's a triple threat that we've seen repeatedly.

Dr. Peter Selby: Yeah, no, absolutely. So, is there anything else you'd like to share with our listeners about implementing neurologic-informed care into substance use disorder treatment that we didn't cover?

Dr. John Corrigan: One thing, given the audience today, I think that there is potentially a unique role for the physician involved in treatment to look at potential for sleep disorders in this population.

One, sleep disorders are concomitant with brain injury as they are with substance use disorder, so it's just increased likelihood. But sleep disorders then are going to make this cognitive weakness worse. And it's a potentially reversible source of the cognitive weakness. So, it's something we are pushing everywhere now, is to think about sleep as part of remediating the weaknesses.

Dr. Peter Selby: Thank you so much. I think this has been really rich and very informative for our field in addiction medicine, and I think we need to pay attention to this topic. And there's lots more. But before we go, are there any key takeaways from your perspective?

Dr. John Corrigan: Well, I think the second pillar of neurologic-informed care. So, you've done the screening for everyone. You've identified individuals that may have more susceptibility because of cognitive weaknesses. But then the second is that the treating staff has the skillset to do simple accommodations as part of treatment for poor attention or learning that's not as good as the next person, or more concrete levels of abstraction.

And, you know, our work in treatment programs, we found some really interesting things like environmental factors, where group rooms are noisy with bright lights that are distracting. House rules that, in group, you can't do anything else. Many people, I didn't come up with this spontaneously, said, "If I do something with my hands, it's easier for me to listen." And so, one of the programs now allows the women to knit during treatment or play with these little fidget things. But being able to stand up during group and just stretch, having shorter sessions.

Dr. Peter Selby: That cognitive exhaustion that occurs in people in recovery, right? Then suddenly everything becomes this blur, and they dissociate from the meeting, and they can't process what's happening, and then they exhaust it and don't necessarily benefit from treatment. One of the accommodations I use at my practice is to use little yellow sticky notes and write it down or write it on the wall, so they actually have like a motor and visual as opposed to an auditory, which is our typical way of communicating with our patients. But then they can walk away with those stickies. We can move the stickies around on a page. They're actually doing it with their hands so they can think about the sequence of what they need to do. It doesn't work with everybody, but I find the electronic means actually worse for them because it's too flat. It doesn't allow them to process it.

Dr. John Corrigan: That's an excellent idea because, well, what we say is that mixed media—using mixed media. You say it, you show it, and show it should be maybe in words as well as graphics, and/or interact with it. All are ways to improve the learning or the engagement with whatever material.

You know, another thing we've found is that many programs haven't examined the reading level of the workbooks and other things that they provide. There is a lot of functional literacy out there, folks who can fill out a form, but they struggle with paragraph-level reading and extracting. And so, those are ways in which the environment can be adapted.

But also in the counselor level, the session pace and using repetition, meaning repeating things you're saying, but also asking the person to retell you what it is we were just talking about in their own words to see what they actually heard, not just what you said. Those kind of just simple accommodations to the way we communicate can make a tremendous amount of difference for somebody with cognitive weaknesses.

Dr. Peter Selby: I really want to thank you for sharing that expertise. Thank you, everyone, for listening to ASAM Practice Pearls. I would like to thank our expert, Dr. John Corrigan, for sharing his insights on Neurological Informed Care with us.

For more information on integrating brain injury awareness into addiction medicine, check out ATTC's Traumatic Brain Injury and Substance Use Disorders: Making the Connection toolkit and webinar series, which can be found in today's show notes.

Don't forget to hit subscribe and share this episode with colleagues who may find this information helpful. We'd also love to hear from you. What topics are you interested in hearing more about? Email us at education@asam.org.

Thanks again for listening, and we'll see you next time on ASAM Practice Pearls.