

The glymphatic system, brain clearance, and the potential role of CranioSacral Therapy

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Summary

Michael Morgan speaks with Liz Brinson about the glymphatic system and its role in moving cerebrospinal fluid, delivering nutrients, and clearing metabolic waste from the brain. Brinson explains the importance of astrocytes in these pathways and discusses how impaired clearance is being investigated in relation to inflammation, aging, and neurodegenerative conditions.

The conversation explores how CranioSacral Therapy may interact with these processes. Brinson discusses its relationship with the autonomic nervous system, sleep, fascial structures, and fluid movement, while emphasizing the importance of treating the whole body rather than focusing on the glymphatic system in isolation.

They also discuss the need for more objective research. Brinson highlights cerebrospinal and interstitial fluid-flow measurements as promising areas of study, alongside biomarkers and collaboration between CranioSacral therapists, glial researchers, neurologists, and other healthcare professionals.

Highlights

- *The glymphatic system helps move fluid through the brain and clear metabolic waste, with astrocytes playing an important regulatory role.*
- *Sleep, inflammation, aging, and nervous system regulation can influence the conditions associated with healthy glymphatic function.*
- *CranioSacral Therapy may support relaxation, autonomic regulation, and fluid dynamics, but its specific effects on glymphatic function require further research.*
- *Future studies could use fluid-flow measurements, biomarkers, imaging, and interdisciplinary collaboration to better understand the effects of manual therapy.*

Interview transcription

Michael Morgan:

Hello, everyone. I'm Michael Morgan, host of the 2026 Alzheimer's World Summit, and it's my great pleasure to have back with us again Liz Brinson, who is a licensed massage therapist, a Diplomate-certified CranioSacral Therapy practitioner, and instructor with the Upledger Institute International.

She's specialized in CranioSacral Therapy since 2004. She teaches CranioSacral Therapy 1 as well as a specialty class called *CranioSacral Therapy: Touching the Brain*, and both levels of that, which focuses on glial cells and their roles in the health of the central nervous system.

So, Liz, welcome again to the Alzheimer's World Summit.

Liz Brinson:

Thank you, Michael. Thanks for having me.

Michael Morgan:

This, for all of us in this specialty, has been a continuing educational experience. And I just want to acknowledge Liz for being such an expert in this area.

For those of our viewers that aren't familiar, in terms of the glymphatic system and brain longevity, for someone hearing about the glymphatic system for the first time, can you give us a simple overview of what it does and why this system is becoming increasingly important in the conversation about brain health, aging, and cognitive longevity?

Liz Brinson:

Sure. I think that if we're going to talk about the glymphatic system, the place we need to start is with fluids.

Cerebrospinal fluid is the fluid that protects the brain and spinal cord, bathes it in nutrients, and assists in bringing waste out from the central nervous system. It also plays a hydromechanical role in protecting the brain and spinal cord from impact.

Many people are familiar with the idea of the lymphatic system in the body, which clears fluid from our extremities, bringing fluid back into systemic circulation. It has a clearing role out in the body.

In the 2012 timeframe, there was a researcher who was trying to understand fluid flow through the brain.

It had been thought for many, many years that the lymphatic system in the body does not extend into the brain and spinal cord. But she was asking this question: There has to be some mechanism.

The brain is so active that cells there produce a lot of waste. They need a lot of nutrients. There has to be some fluid mechanism that brings in nutrients and brings out waste. What is it?

She identified a system of cells around the vascular structures, blood vessels basically, of the brain, and she named or dubbed it the glymphatic system.

Michael Morgan:

This was a researcher named Maiken Nedergaard.

Liz Brinson:

Yes.

I think, to back up for just a second, most people are familiar with the idea of neurons. We think of neurons as the main cell of the central nervous system and of the nervous system in general.

But in fact, half the cells of the central nervous system are not neurons. They are these glial cells.

One particular type of glial cell called an astrocyte is a star-shaped cell. It forms these fluid pathways around, you can think of it like a straw within or outside of a straw. If a blood vessel is a straw, or like this pen, around it is this space of fluid, and the astrocytes create that space.

They also regulate the movement of fluid from the subarachnoid spaces, the space around the brain where the fluid is.

That fluid comes in along those spaces, and the astrocytes regulate fluid inflow into what's called the parenchyma, the specialized tissue of the brain, and the fluid movement out along perivascular spaces.

Those are the spaces around the blood vessels.

I'm just trying to keep it simple but also be clear about what these are.

The glymphatic system describes the system that regulates the fluid inflow, dispersal through the specialized tissue of the brain and spinal cord, and the outflow of cerebrospinal fluid.

That's the glymphatic system.

The pathway, they describe a glymphatic pathway, is the fluid that comes in from that subarachnoid space, through the brain, and out of the system.

Michael Morgan:

Which is amazing.

I kind of look at it like, as our friend Tad, who developed this class, said, it's like you've got 100 billion astrocytes and 100 billion neurons and 400 miles of vascular supply all crammed in the head.

It's pretty remarkable that that fluid can be regulated.

Liz Brinson:

It's vitally important.

The health of this system is really important to the health of our central nervous system.

This pathway needs to be open and clear because if there's a buildup of waste in the system, that can lead to inflammation.

Inflammation can then cause a disturbance, and you think of it maybe like the architecture that the cells live in, and that can then lead to cellular dysfunction and neurodegenerative disease.

There are researchers who believe that neurodegeneration is a direct result of impaired clearance along the glymphatic pathway.

Michael Morgan:

That leads us really to our next question, practically, from science to manual therapy.

Your work takes this emerging understanding of the brain's fluid clearance system and asks whether it can be influenced through hands-on therapy.

I'm curious, and I think our listeners would be too, how did this manual approach develop?

And since we last spoke, what have you learned that has most changed or expanded the way you think about this work?

Liz Brinson:

How did it develop?

That all, of course, goes back a long way, even farther behind.

We always talk about the roots of CranioSacral Therapy being in osteopathic medicine.

I'll just say briefly that osteopathic medicine began with a doctor named A.T. Still, who, inspired by others before him and his life experience and the experience he had gleaned from working with Native Americans in a tribe near where he lived, developed a system of manipulative, drug-free therapy, a kind of medicine that would help the body recuperate on its own when challenged.

That's osteopathic medicine.

In osteopathic medicine, one of the main tenets is that we treat the body as a whole. It's a unified system, and it self-regulates.

It knows how to heal at some level.

We talk in Upledger CranioSacral Therapy about the inner wisdom. And in part, that wisdom is simply the work of the cells.

It's just amazing.

The more you learn about the body and how it forms, how things occur, learning about the formation of the brain itself and the way the cells know where to go, it's kind of mind-blowing, or mind-opening anyway.

The goal in our work in CranioSacral Therapy...

A.T. Still started osteopathic medicine. There was a fellow who came after him, Sutherland, who developed cranial osteopathy.

This led to our teacher and the person who started the Upledger Institute, Dr. Upledger, who then started this institute in Florida.

At some point, Tad Wanveer, who you mentioned earlier, was working at the institute at the clinic there.

He became the director of the intensive therapy program, this program where they would work with several, five, maybe six people at a time in a large room where people would get multiple-hands work.

They came in with really pretty extreme situations, many of them.

Tad started to wonder.

We talk about craniosacral work as working with our hands and connecting through the fascial matrix, meaning the tissues of the body, which are interconnected from skin into bone and into the fascial container of the brain and spinal cord, the meninges.

The fascial system connects all the way into this fascial container of the brain and spinal cord.

Tad was wondering, "Great, I understand how we connect to the brain and spinal cord. But what then?"

How are these really profound changes happening in people's nervous systems if we're just getting to the container?

There has to be some other structural basis for the effects that we're seeing in the work that we do.

He looked and he looked.

He said to me at one point, "I could have asked Dr. Upledger." We called him John. They became really good friends.

He said, "I could have asked John, but I was kind of stubborn. I wanted to do it myself."

He finally found this image, and it was in one of the Netter books, that shows the meninges, that fascial container, and the connection that they have to this cellular matrix within the brain formed by none other than those astrocytes, which form an interconnected matrix of structure of the central nervous system.

You and I know they've done so much research now on these cells. They do so much more than form structure.

For a long time, they were thought of just as structure-forming.

He found that image and he started to develop some work.

He found himself working differently the more he learned about these cells, working with being able to sort of feel, in a sense, I think of this as cellular patterns within the brain, within the spinal cord.

Because that connection, the astrocyte matrix, goes from the inside of the pia mater, that's the innermost membrane, all the way to the walls of the ventricles, which are the fluid-filled spaces.

We're back to where we started our conversation.

The ventricles are where cerebrospinal fluid is generated.

That's really quite profound as I think about it right now because we were talking about how we have to start our conversation around fluid and how important this fluid pathway is for the health of the brain, because disruption of the glymphatic system is implicated in so many neurodegenerative issues.

Michael Morgan:

May I say, just to tie this together, the way I think about it is, with craniosacral classically from A.T. Still through John Upledger, we're looking at the periphery of this meningeal system, which is only about as thick as a newspaper on end.

But as you say, Tad was visualizing, well, what's inside the brain? This complex structure of hundreds of millions, billions of interconnections.

Funnily enough, one of our other instructors, Gail Wetzler, with her interview with some leading French osteopaths, are saying really the tie-in with manual therapy and what we're doing, science-based, is that you can actually start and trace from the bone through the fascia all the way down through the network to the cellular level.

There's a related interconnection that crosses through all these platforms of the brain, which is quite amazing.

I think that's allowing functional medicine doctors and others to see, "This is where the manual therapy can complement what we're doing in nurturing those areas."

That's a nice way to put it. I just wanted to add that little piece.

When we talk about lymphatic function, inflammation, and cognitive health, you've spoken about, and we know that, for example, sleep, fluid movement, inflammation.

CranioSacral is all about movement, right? Fluid movement, vascular health, and the brain's ability to clear this metabolic waste.

Where do you see this lymphatic function fitting into the larger picture of memory and cognitive decline?

And where might manual therapy potentially contribute?

Liz Brinson:

The health of the lymphatic system has been implicated in Alzheimer's and Parkinson's disease as examples of two instances where there's a buildup, a buildup of something that is sort of clogging up the spaces within the central nervous system.

In addition to these conditions that maybe start with lymphatic dysfunction, there are other conditions, like a concussion.

Even a mild concussion can cause inflammation in the central nervous system, TBI, a stroke.

There are many, many things that can lead to, or that are caused by, chicken-or-egg question, lymphatic dysfunction.

One of those things is aging.

As we age, disruption in sleep, maybe we get less deep sleep for some reason.

Sleep is hugely important. Deep sleep, I should say, is hugely important for clearing out the lymphatic system.

These fluid pathways open up during deep sleep, which is a really fascinating area of research.

Just this year, there was an article that came out about, how is this working?

They're still trying...

I always feel like when I talk about this stuff, it's like talking about Mars. We're still understanding. There's so much to learn.

If there's a disturbance in sleep or a concussion history or some history of inflammation, and we now see that there's this communication between inflammation out in the body and within the

central nervous system, even cardiovascular disease can lead to this disturbance in the glymphatic system.

The reason I bring all this up is because what is historical matters to our brains, our brain and spinal cord.

If there's a disturbance in clearance or fluid flow through that glymphatic system, that can lead to an accumulation of proteins.

Those proteins, depending on which ones they are, lead to different neurodegenerative disease.

Interestingly enough, when they trace those proteins that build up, they follow the pathway of the glymphatic system.

It's all connected.

This is one piece we're talking about, and that can lead to further inflammation, the loss of function through the neurons, the cells not being able to do the work they need to do.

Then that can lead to memory decline.

Michael Morgan:

Here's this little side question I've always wanted to ask.

I think it'd be perfect for you to tie this together.

Nedergaard, who did some of the original research on this glymphatic system, noted that when you have deep recuperative sleep, that's when about 40 or 60% of all this clearance of the glymphatic system works.

I've noticed clinically, I think you have too, that when people get the CranioSacral or glymphatic work, after that they seem to sleep even better.

It's a more profound rest.

I'm wondering what your experience or observation is between the connection between sleep and this manual therapy, how those two reinforce each other in terms of that drainage mechanism.

Liz Brinson:

That's a really interesting question.

I think of it as because our work is so connected to the autonomic nervous system.

That's the part of our nervous system that, I'll just say, is in charge of self-regulation.

It's the part that is in charge of heart rate, breathing, temperature, blood pressure.

What's been shown, I think probably the most well-documented technique that's an osteopathic technique that we do in craniosacral as well, called the CV4, which is what's called a still point, is that it changes the autonomic nervous system.

It changes the balance in that.

There are implications to that.

There is evidence from decades ago, actually, that when the sympathetic nervous system, which is the part of the autonomic nervous system that responds, say, to stress or threat, or even just getting up and going, getting up in the morning, when that is upregulated, they say that actually reduces the production of cerebrospinal fluid.

I wonder sometimes if our work, at some level for sure, at the very least, it's very relaxing and we are helping to balance that autonomic nervous system.

Without ever even learning about any of this, somebody who starts in CranioSacral Therapy and learns the protocol and gets into their therapeutic presence and practices that presence and connection with their clients, they don't have to know about that.

We teach about it, but do they have to remember sympathetic upregulation is going to decrease the amount of cerebrospinal fluid production?

They don't have to remember that.

They're already doing something by being present and centered with their clients.

I've been fascinated to learn about all of this.

I'm so glad to find myself just saying this right now to you because I also teach CranioSacral 1.

I love these *Touching the Brain* classes that I teach, but teaching CranioSacral 1 starts people with this.

We emphasize presence, that sense of being really grounded and centered here.

When we do that with somebody, we're already helping them potentially through their nervous system.

Anyway, that's one answer.

Michael Morgan:

Even from a very basic level.

What you're reflecting, just to summarize, is that when you're lowering autonomic tone and it's more parasympathetic, probably that's encouraging deeper sleep, which also builds on encouraging that clearance of the glymphatic system.

Liz Brinson:

With sleep, this is really...

I am curious, beyond the autonomic nervous system thing that I brainstormed, what is happening in sleep?

I think that's a huge part of it.

I think that the autonomic nervous system thing is a huge part of it.

I'm wondering in this moment, is there another way in our work that we help people to maybe more consciously feel their own bodies?

Almost the way that when you get rid of all distraction, you don't have lights on at night, you let yourself go out in the morning and feel that sunlight, your body clock comes into balance in that way.

I wonder if our hands-on therapy, and especially I'll say with CranioSacral, because I think a lot of manual therapy is helpful, but the CranioSacral is...

I'm only working with as much connection or engagement with the tissues as I find is required for change in the tissue.

Our relationship is very gentle, and I believe that is an invitation for the person on the table to more consciously feel their own bodies and to come back to nature, to their own nature.

Michael Morgan:

Many of our speakers have spoken about this as well, this oscillation.

You're getting more in tune with fundamental rhythms like the cranial rhythm. You're getting cardiac, respiratory, cranial, and even starting to attune yourself to these rhythmic tides.

You're talking about circadian, lunar rhythms as well, some of our speakers.

All of these, I think, the more that people consciously and unconsciously are more in tune, the body starts to be more in tune too.

That could be a whole other piece, which is very intimately tied to sleep.

Liz Brinson:

Connecting to our natures. I like that.

Michael Morgan:

I wanted to ask also your thoughts about moving towards objective measurement.

One of the themes of this year's summit is moving beyond symptoms alone towards objective measurement of brain health.

We're now looking at blood biomarkers such as p-tau217, GFAP, and neurofilament light.

While these are not direct measures of glymphatic function, could biomarkers, imaging, cognitive testing, or other measures eventually help us study what happens before and after glymphatic-oriented manual therapy?

What would you most like to measure or investigate?

Liz Brinson:

The technology now exists to measure the flow rate of cerebrospinal fluid and of interstitial fluid.

They're able to trace the movement of fluid.

Since that movement of fluid is really essential to the functioning, bringing in the substances that are needed, dispersing those nutrients or substances, and getting rid of waste, I think measuring the impact of CranioSacral Therapy on cerebrospinal fluid and interstitial flow would help us.

It would help us to perhaps define what we're doing in a better way and also to develop new techniques so we can understand what works well and what's effective.

Michael Morgan:

One of the measures is called GFAP. It's really looking at the glymphatic system per se, which is kind of secondary, but for us important because we have these manual techniques to directly address that, which I think is very exciting.

You've helped us, full disclosure, in other intensives where we've been able to identify whether it's more inflow or outflow, what the blockage is, because if there's blockage, you're not getting the same kind of clearance.

The manual therapy, I think, speaks to that as well.

Liz Brinson:

If I can add something there, Michael.

There was somebody that I have worked with who, when you and I first started working together in a couple of intensives, I dutifully came home and I made myself a chart.

I was going to rate every one of these measures that you and I decided we would track, which we did.

It was really cool during the intensive. "Let's go around. Let's just assess these many things."

Then I found that I actually had to back up, break myself of this sort of rigid construction that I'd made for myself, and instead work the way I always work, which is assess the body, work where I find fascial restriction first.

From outside in, in a sense.

What's happening in the whole body that's affecting the central nervous system?

That includes those techniques from CranioSacral 1, for instance, and CranioSacral 2.

Then things started to shift.

I've found that I really have to treat the whole body.

Michael Morgan:

It's all interconnected, right?

Liz Brinson:

Absolutely. Absolutely.

Keep learning the same lesson.

Michael Morgan:

That's going to promote longevity as well and keep promoting brain health.

Where does this work go from here?

As this interest in the glymphatic system, which there's been a tremendous amount of study in the last 10, 12 years on this, continues to grow, what do you see as the next step for this work, both in research and clinical applications?

For the CranioSacral and other manual therapists listening today, how can they learn more and begin exploring this approach responsibly?

Liz Brinson:

Next steps might include establishing collaboration with glial researchers.

That would be very interesting to do so that we could measure the effect of CranioSacral Therapy on glymphatic or even dural lymphatic systems.

We were talking before we started the call about these lymphatic vessels that were only recently, in 2015, discovered.

They're embedded in dura mater. That's the outermost meningeal layer.

It would be very interesting to find out, what do our techniques do?

Maybe glial researchers could help us do that.

It would also, I think, be good to collaborate with practitioners in our community, in the CranioSacral community, to generate outcome studies.

Find out what happens and track someone's progression.

I feel like, in many realms, CranioSacral Therapy helps other work happen.

This happened for me working with those who are undergoing chemotherapy, or children who are in occupational therapy, or people who are in physical therapy, that the CranioSacral somehow helps their systems do the work that's being asked of them in other places even better.

I think that collaboration with practitioners...

What we could find out also is what happens, what do the professionals...

Of course, this would all be, this is just a picture.

But it would be interesting to start asking our PT, OT, speech therapy colleagues, "How's this going? Is it going faster or slower than you anticipated?"

Could we get to that level of something with neurologists?

How are we supporting?

Anyway, that's a side thing.

The intention of either of those is to then support the development of new techniques or the understanding of what's effective, techniques that almost anyone can learn.

You then asked, how can people learn this work and practice it responsibly?

I think, to get to do the CranioSacral path with the Upledger Institute.

One can go to Upledger.com and find out, call them up and find out about taking CranioSacral 1.

The classes that I teach actually only require the first two levels of training.

I have found each one of those, CranioSacral 1, CranioSacral 2, and these *Touching the Brain* classes, each time I have taken one of those classes, well, it's been over 20 years since I took my first, but each one has changed my whole practice, how I work with the body, in a really significant way.

Michael Morgan:

A couple of updates on that point.

We are currently looking at the biomarker testing and kind of looking at before and after.

We do one test. Then we're retesting to see, after a certain amount of time with X amount of manual therapy, like the cranial and glymphatic work, if there's change.

We're in the middle of continuing to chart that right now.

I think there's a growing awareness in the functional medicine community, with Dale Bredesen and others, that we can start to look in a more interdisciplinary way because people realize it's not just one size fits all, but all of these, in an interdisciplinary sense, all of these approaches really complement each other.

That's very exciting.

This has been, you and I and others, kind of an ongoing collaboration.

We're in the process in our longevity program of even training certified longevity specialists that can take this basic training and then add in all this research that we have been doing.

That's been an exciting development over the last couple of years as well.

Liz Brinson:

In your longevity class, Michael, what is required for somebody to take that?

Michael Morgan:

Basically, either you're trained in the first two levels of lymphatic, or CranioSacral 1, CranioSacral 2, or SomatoEmotional Release.

The requirement is typically somebody has a healthcare licensing for the therapist because there are different audiences that are listening to this.

It could be therapists. It could be caretakers. It could be somebody on the spectrum or somebody who just wants to promote their own brain health and vitality over time.

This is the whole spectrum, but it's good for people to know, as we've discussed today, the applicability of all these manual therapy techniques and how this can help.

Connecting the dots.

Liz Brinson:

There's so much possibility.

Michael Morgan:

Liz, thanks for joining us today.

It's such a delight to have you and sharing your expertise and thinking about how we can really help people through a broad range of applications.

On the Upledger Institute or on our website for Alzheimer's World Summit, we'll have a place where you can share individual studies and information about what you're doing as well.

Liz, again, thank you for being with us today and being part of the summit.

Liz Brinson:

Thank you.

Thanks, Michael.