Can Chronic Inflammation Affect Regenerative Medicine Results? Transcript

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Inflammation as a Systems Problem

For years, providers are taught to think about inflammation as something to suppress. Inflammation is not the enemy. It's unresolved inflammation. That's where the problem lies. According to the CDC, in 2023, 76.4% of US adults reported at least one chronic condition and 51.4 reported multiple chronic conditions. So that means providers are seeing the downstream of expression of chronic inflammation every single day. Even when the word inflammation is not even in the chart, modern inflammatory load is being fed from multiple directions all at once. You have obesity, insulin resistance, poor sleep, sedentary behavior, chronic stress, gut barrier dysfunction. This is why so many patients feel inflamed everywhere. It isn't just one joint. Their knee is hurting, but the biology is systemic.

Inflammation is not something we should automatically fear. It's something we need to understand. Redirect the inflammation and then resolve especially the chronic lowrade because once you resolve that, then you allow the body to actually do what it's made to do.

So everything you were taught about inflammation is wrong. I love that title so much. We are focusing on systemic inflammation, the current landscape in this country, and why regenerative medicine is changing the paradigm.

Remember, a paradigm is how you think of something. It's how you view the world, whether it's you or your patient. So next slide. So we're going to dive right into that. All right. First off, for years, providers are taught to think about inflammation as something to suppress. If a patient hurts, you want to calm the inflammation. If symptoms flare, reduce the inflammatory response.

Chronic Disease and Unresolved Inflammation

You can see this when we look at our statistics for this country. When you look at NSAIDs, for example, uh 15th lead, well, it used to be 15th leading cause of death in this country. That's much higher on the the level now. And also opioids. Opioids used to be the third leading cause of death in this country behind heart disease and cancer.

It's now second. Our own health care system is the second leading cause of death in this country. So when we take a step back and look at how did inflammation the thought process about controlling inflammation um how is that connected here or is there a correlation? So the having a greater understanding about this inflammation is not the enemy. It's unresolved inflammation that's where the problem lies. So when you're thinking through cases, when you're thinking through medical history, you want to be looking at it's unresolved inflammation.

Acute inflammation, we need it. We want it. It's part of the healing process. The problem is the chronic lowgrade disregulated inflammation. That's what causes tissue breakdown, metabolic dysfunction, chronic pain, and accelerated aging.

So thinking of it from that paradigm, chronic lowgrade disregulated inflammation is what's driving tissue breakdown, metabolic dysfunction, chronic pain, and accelerating the aging process. reviews. And just so you guys know, I've got 17 peer-reviewed articles on the back of this that you'll be able to take a picture of that and reference everything. All right. Reviews in recent years describe how this lowgrade persistent state as a shared mechanism across cardioabolic disease, obesity, frailty, and age related decline.

Inflammation is not something we should automatically fear. It's something we need to understand. d redirect the inflammation and then resolve especially the chronic lowgrade because once you resolve that then you allow the body to actually do what it's made to do. So this is not a French concern it's actually the clinical reality of modern American medicine. According to the CDC in 2023 76.4% 4% of US adults reported at least one chronic condition and 51.4 reported multiple chronic conditions.

That's half. That's crazy. Multiple chronic conditions. And I think it's just continuing to get worse every single year. Another CDC summary notes that an estimated 129 million people in this country have at least one chronic major disease.

Chronic pain is also very widespread.

Systemic Drivers of Inflammatory Load

A quarter of adults reporting chronic pain in 2023 and 8.5% report reporting high impact through chronic pain. So that means providers are seeing the downstream of expression of chronic inflammation every single day. Even when the word inflammation is not even in the chart. So as a provider when you take a step back and look at this systemic inflammation is the most important thread tying modern chronic disease together.

We've got to So people come in with knee pain, they come in with autoimmune, they come in with all these conditions, chronic, multiple. It's thinking through it with systemic inflammation. How do I control inflammation on a systemic level, on a cellular level? That's the question we need to address here.

Modern inflammatory load is being fed from multiple directions all at once. You have obesity, insulin resistance. I know Dr. Maryanne Martin talked about this last week and she had she had a phenomenal presentation that she really explained some of this. Poor sleep, sedentary behavior, chronic stress, gut barrier dysfunction. This is something that people are becoming more and more aware of as well. Processed foods, microbiome biome disruption, and aging itself.

So these are the things we want to look at. How do we get control of this? Recent reviews continue to describe obesity as a state of chronic lowgrade inflammation.

Western style diet. Look at how people are eating in this country. Look at what foods are available to us and all of the chemicals that are in the foods. And again, there's more awareness now um from a regulatory standpoint, but there's so much damage that's already been done on this that's actually producing that chronic inflammatory disease state and increases risk significantly.

More attention is being put on the gut barrier dysfunction in the microbiome as contributors to the systemic inflammatory signaling. They're the gatekeepers. When the gate's broken, things get through the gate that shouldn't be there. And that really increases inflammation significantly.

Okay. So, um this is why so many patients feel inflamed everywhere. It isn't just one joint. Their knee is hurting, but the biology is systemic. Inflammation is not just about the pain.

It's about failed resolution. A key concept for this with providers is that chronic disease is often less about dramatic inflammatory storm and more about failed resolution of inflammation. The body initiates a response to injury or stress but does not efficiently transition back to tissue homeostasis.

So when you're looking at regenerative medicine and orthobiologics, the goal is to look at what inflammation is going on. Is it systemic? Is it local?

Failed Resolution and Osteoarthritis

Or is it both? Because if I just go straight to injecting that knee without handling the overall inflammatory components, how good is that knee injection going to be?

I've got to handle the big picture first because then I can look at getting a better patient outcome potentially. The body initiates a response to injury or stress but not efficiently transitioning back to that homeostasis. Over time, it creates a biologic environment favoring fibrosis, degeneration, altered immune signaling. We're seeing more autoimmune now than ever before. mitochondrial dysfunction and sensitized pain pathways, major pain issues with the patients that are harder to actually handle more now than ever before. It's especially relevant with aging or

inflammaging. I heard that term a few years ago and that is chronic lowgrade systemic inflammation associated with frailty frailty and age- related diseases. So the issue isn't just inflammation turned on. It's it doesn't actually turn off and get to the place of homeostasis.

So osteoarthritis is the perfect example of the outdated model. Uh OA wear and tear that is definitely part of it but that's not all of it. Current literature actually describes osteoarthritis is a joint as a whole um active roles for synovium subcchondrial bone innate immunity inflammatory mediators and tissue cross talk. So we have the um wear and tear and then we have the immune theory when you're looking at cytoines and a cytoine storm and that cytoine storm is actually upregulating your M1 cytoines that are causing it to be a more uh pro-inflammatory environment resulting in tissue breakdown versus creating homeostasis getting cytoines in there that are controlling the environment.

So recent literature argues that OA should be approached in many patients having systemic features, not just local mechanical degeneration. So if you still think osteoarthritis is just cartilage wearing out, you're already behind what is actually going on.

Because when we know exactly which cytoines are being upregulated and downregulated in those different cycles, then we know more of okay what type of a product or nutrition like what do I need to do for this patient specific to this patient to modulate this and the goal create homeostasis.

That's what we're trying to go for. It isn't just putting in um a product that's got certain types of collagen or got cloth though or HA like how good those can those things actually do if we don't regulate inflammation in their whole body first. Why conventional care often stalls? Traditional care often focuses on symptom based care, suppression, escalation, NSAIDs, steroids, activity modification, more medication, and then a scope, and then a total joint replacement. These tools absolutely have a place, but they often do not address the broader inflammatory micro environment or support tissue signaling in a way that promotes restoration of function. That's the goal. How do we support tissue signaling that promotes restoration of function, restoring, repairing, things like that?

So this is one reason so many patients cycle through temporary relief without that more uh durable biologic improvement.

Why Conventional Care Often Stalls

Newer regenerative discussion is gaining traction because it's trying to shift from blocking symptoms to influencing the healing environment. Framing this is supported through recent reviews on immuno modulatory strategies.

I can't stress that enough how important that is to understand you are modulating the immune system. That's upregulating certain pathways, downregulating other pathways with your cytoines and your proteins because you want to stimulate that homeostasis that will assist with cartilage regeneration and whole joint restoration. We're moving not just out of the pain management mindset but actually into a tissue environment mindset. It's completely different when you think of it from a tissue environment mindset. Okay. So what regenerative medicine is really changing it is changing the paradigm because it isn't just built around suppressing the inflammation. You want to be looking at modulating the inflammation which will help with cell signaling.

support, repair and assist to restore homeostasis in the tissue environment. That is absolutely the key here. Um so that's why terms like imunom modulation, signaling, secretone, cytoine balance and tissue micro environment have become so important to understand.

Reviews on mazinkal stromal cell biology and tissue engineering repeatedly point to anti-inflammatory immuno regulatory and repairerative mechanisms as the key reasons the approaches are under such intense study.

So like I said, the future is not just anti-inflammatory. It's how do we create that pro-resolution, pro repair, and that's through modifying, upregulating, downregulating those different um pathways. All right, PRP is a good example providers can understand. So PRP has become one of the most clinically practical examples of this shift. It's simply not a growth factor shot. So before I go into this anymore, I want to preface this. I am a firm believer as a provider,

it is so important to understand everything in the regenerative umbrella.

as and you as a provider, you can choose what you want to provide for your patients, but understanding and versus being able to speak to it, understanding the science, understanding how it affects the body, understanding who is a good candidate and who is not for different treatments of everything, whether it's autotogus, anything from your own body, PRP, um, PRF, A2M, autotogus, bone marrow, autotogus atapose or something allergenic like an umbilical cord derived Wharton's jelly or an exoome.

Regenerative Medicine and Immune Modulation

Regardless of the source, there are pros and cons to everything. But as a provider, understanding every single one of those treatments, how they work, and why, and then making a decision on what is best for that specific individual. It's okay to have preferences, but understanding who's a good candidate for this or that um and who is not, that's half the battle. But as a provider, that's your job. Like take that level of understanding to a new level. Okay. So um current literature describes PRP as exerting effects through inflammatory modulation, cell recruitment, angioenic signaling, matrix effects and support of tissue repair. Recent reviews and metaanalytic summaries continue to report benefits for pain and knee function in knee OA compared to placebo and in many analyses HA there is side note HA doesn't repair it is cushion it I call it jelly in the donut it does not have anything that will actually help restore or repair anything it doesn't stimulate any um type of event it's simply jelly of the donut cushion Okay, there's also growing attention on the importance of PRP composition and dose. So, how much blood am I drawing? Is it a single spin or a double spin? What is their platelet count coming into this? Concentration does matter, especially if you're looking at aesthetics or osteoarthritis or soft tissue partial tear. Um, so those are all things that you definitely want to be thinking about of what is best for that specific individual.

So here we have peer helped open the door because it taught providers that biological signaling matters and preparation. How what kit do I use? Is it at 510k cleared? Not pieces, the actual kit. Is it um what's the dosage? What is the most robust evidence supporting that? Um I really like to give this super fast example of not everything is for everybody all the time. There is no one recipe that fits best. If I have a patient who's highly uh systemic um systemic inflammation, is it a good idea to give them something from their own body that's going to upregulate that inflammation more? And can their body create the teeter totter effect to get it back into homeostasis?

Something to ask yourself and that's a great question. If I have somebody who's super healthy, um they're not on a lot of medications, they eat healthy, they exercise daily, and they are, you know, younger, do I have a better potential outcome with the PRP for that person versus somebody in their 70s, a horrible diet, on a lot of smoking, drinking, and on a lot of medications definitely will have two different outcomes within 48 to 72 hours. I've seen it for years. So things to take into account why the field is expanding beyond simple injection thinking. The regenerative conversation is broadening because providers are asking better questions. What pathology is present?

Is what type of cartilage defect am I looking at? Is it tendon? Is it ligament? Is it cartilage? Like it isn't just I have knee pain here. Let's put something in it. No, let's address what specifically is going on. What type of tissue is involved and what type of product has the ability to potentially help restore the that restoration within those types of tissues. Cartilage for example, type one, type two, type three, right? Um or a tendon or a ligament or a soft tissue tear like in a muscle.

PRP and Patient-Specific Treatment Selection

What inflammatory phenotype does the patient have? Is the issue mechanical overload, cynitis, atipost driven inflammation, metabolic dysfunction, immune disregulation, huge t failed tendon healing or combination.

The field is moving away from oneizefits-all and towards strategic protocols that match the biology of the individual patient and the tissue. That's the mindset you want to be using when you're looking at what type of product am I using. Is it autotogus, allergenic, why, how often? What's my dose? What's my frequency? What is my goal that I'm looking to solve here?

That direction is reflected in the newer muscularkeeletal and cartilage regeneration literature emphasizing

patientspecific and really looking at how do we immunom modulate uh immunom modulatory strategies. So the question is no longer what can I inject the question is what biology or pathology am I looking to influence?

What am I looking to upregulate or downregulate and why? All right. The connection between systemic inflammation and muscularkeeletal outcomes. This matters especially in muscularkeeletal and pain medicine because joints do not exist in isolation. I love that joints do not exist in isolation.

Obesity related inflammation, poor metabolic health, microbiome dysfunction, aging, chronic stress, all influence pain sensitivity, tissue quality, and the healing response.

So the more you address these other things before you look at the joints, are you potentially going to have a better outcome? Recent reviews connect chronic low-grade inflammation with metabolic disease, aging, chronic pain, and some literature highlights microbiome and gut mediated contribution to pain and inflammatory signaling. So if the patient is systemically inflamed, which is very common in this country especially unfortunately um your outcomes may plateau unless you address the whole patient. Why patients are seeking this now? Patients are absolutely more open to this now and they are looking for options. The old ladder of medication, repeated steroids, and waiting until surgery feels unavoidable. That demand is growing because they want treatment that is personalized and biologically intelligent.

I love that personalized biologically intelligent. Regenerative medicine speaks to that desire, especially when it's presented responsibly. As a provider, it's so important to not be saying that you're curing and you're treating and um it's not magic. This is evolving framework for supporting tissues for healing and improving function in appropriately selected patients.

Patients are not just asking for pain relief. They're asking, "Can you help my body heal better?" All right. The field is promising, but it is not a freeforall.

So, this is where it's so important to have um your provider credibility matters, getting the mentorship, asking the right questions, looking for peer-reviewed articles that support your decision-making process. Regenerative medicine space is exciting, but it is not a license to overpromise.

Systemic Inflammation and Musculoskeletal Outcomes

The FDA continues to warn that many products marketed as regenerative therapies, including stem cells, exoomes, are being promoted without adequate approval or evidence of wide range orthopedic and other conditions.

This is why it's so important to be part of FDA approved IRBs and part of documenting patient outcomes on a big scale. The FDA pages updated through late 2025 show ongoing regulatory activity and warning letters in this space. So the winning long-term approach is not hype. It's disciplined science, patient selection, informed consent. I cannot stress that enough.

Informed consent, good documentation, and responsible clinical communication. Do not promise rainbows and unicorns. It's responsible clinical communication from provider to patient. The providers who win in regenerative medicine are the ones who combine innovation with rigor.

And that's why I love being part of FDA approved IRBs, part of this ongoing mentorship, communication, and how do we advance this field? Talking with experts, discussing what's up on the horizon.

What I'm going to challenge all of you to do differently, I'm encouraging each of you to stop reducing inflammation to a symptom problem and see it as a systems issue. That means evaluating the patients joint, tissue, metabolic health, inflammatory load, stress patterns, nutrition, sleep, and recovery capacity.

You know, so often people are looking at, oh, this is functional medicine side. Oh, this is orthopedic side. This is I'm challenging each of you to combine that because that's where you're going to see the best patient outcomes.

Responsible Regenerative Medicine Practice

Regenerative medicine becomes far more powerful when it is integrated into a broader precision care model rather than treated as a standalone procedure. It drives me nuts when people do the one and done here. Let's do a super maybe do a quick exam or not. Let's inject you one time and off and you don't ever follow up with the patient. Like I have a lot of opinions on that type of care and I'm very much not I think of this regenerative medicine is far more powerful when it's integrated into broader precision care model. Let's all be part of that model. Regenerative medicine is changing the paradigm because it forces us to ask better questions. Not just how do we suppress symptoms, how do we restore a healthier healing environment? That's the key here as a provider. All right. In closing, everything we were taught about inflammation is wrong. Even if we think the answer is simply to shut it down, the real opportunity is to understand the inflammation, the inflammatory pathways. How do we upregulate, downregulate, and why?

Identify when it has become chronic and maladaptive and use smarter strategies to help patients move from breakdown to repair. This is why regenerative medicine is not just a trend. It is part of a larger shift in how we think about healing. And this paradigm shift starts with each and every one of you, the providers.