# How Home Neurofeedback Can Change The Way We Treat Brain And Mental Health Disorders Transcript

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## Introduction to Dr. Francesco Amico

Actor Francesco Amico. A good friend of mine, he's part of our team at Texas Center for medicine. And he's also a expert in something called neurofeedback.

We want to talk about neurofeedback today and what we actually see, in patients. So Doctor Amico is a PhD is in behavioral neurosciences. So 20 years of experience and, neuropsychological research and his latest publications were actually with me as well, looking at, populations with a lot of head traumas.

And because that can cause of injuries, CBD, and what they look like on, neural imaging. And so he record collapses with a lot of clinics, within North America focusing on this thing called remote neurofeedback training.

So we're going to talk about that today. I'd still like to welcome doctor, Francesco Amico. All right. Welcome to the show. Thank you for coming on. I really appreciate you for coming on.

And we're going to get started. Go directly into this thing called neurofeedback before we get into neurofeedback. Let's call it research first. And that's that's your background.

What is really the gap between where research is now and how some of the practice is, whether it's neurologists or primary care or all of that, where's the gap?

Sure. Well, first of all, thank you for having me. And, yeah, it's a great honor to, to speak at this summit. So basically the, the big gap is, and we have tons of research and, near imaging and diagnostics in general.

And, the way that, and clinicians approach diagnostics and what happens is mainly, not all the, the, the tools and the, information that we have is that comes straight from research from the last, I would say, 30 or 40 years of research.

## Research Gaps in Neurology and Psychiatry

Not or at only a fraction is used in clinical practice. And, one of the, you know, my expertise ranges from, apart from my PhD, which was a new pharmacology, from neuroimaging to, EEG and QED.

Now I'm going to talk about the these in just a, in a very, very briefly but mainly near imaging. There's, there's lots of research and, neuroimaging research and that the basically, shows us that, there's a strong link between, neurological imbalances and neurological or psychiatric imbalances and, anomalies in the brain.

The only problem is, is that, MRI can can't we can't really be used in clinical practice, to show functional, functional damages or functional anomalies.

It's mainly used to look at, any, insults from a structural point of view. So that's where, EEG, generally speaking. Comes, you know, really handy because of the temporal resolution and, and also because it can really show, it's from a, it's it's a lot easier to set up, it takes minutes instead of, you know, and it can provide so much information.

But at the same time, classic with standard EEG, the gauge, it has been used, it's it's mostly common. And the most clinicians are familiar with can provide still can provide enough information and, other than, in swings in magnitude of activity.

And that can be very, very, very informative. So let's let's break it down for a second, you know, breaking down real

quick. And so MRI for everyone listening to this is basically an image of the brain.

The image of the brain doesn't tell us much. It tells us other tumors, maybe other large strokes. We see small strokes, other, you know, any sort of brain abnormalities or vascular malformations or anything like that that can cause particular symptoms.

But most of the time, no MRI doesn't look any different. When people have neurological disorders, it's because there's the functionality of the brain, not the actual.

Like what the brain physically looks like on the MRI. That's different. And this is where this technology called EEG electroencephalogram comes in. So if people are familiar with the EKG or EKGs, basically a rhythm of the heart, we're now looking at the rhythms of the brain.

So instead of, 12 leaves, 12 things that a doctor puts on you will look a whole lot more, on your brain. And different EEGs have different leads. And so we're basically looking to have a, have a cap.

Some people have a cap on, some people have direct leads onto the brain. We're looking at how each brain conducts, per second of whatever it's doing. And sometimes we have EEG that we see people just chillin at rest.

Some people, we have them, blinking. Some people, we have eyes, those eyes open and challenges. So it's like, the. And then we get to this world called quantitative easing, which is we're talking about today.

It's like a high definition movie of what's going on in your brain that you can't see with MRI or c. T. Scans and stuff like that. So that's what we're talking about.

Yeah. And but the most important part that what you're talking about is we can see why people are doing certain things in this functionality test of the brain.

Right. Why people or is there any evidence of like attention issues, depression issues. And in your research you actually found patterns of people maybe who who are more likely to commit suicide, right.

Yeah. Yeah.

## EEG, qEEG, and Brain Mapping

My, both my research and, also my, more lately, I'd say in my practice where with, my, and neurofeedback clients, I'm saying, that, that, certain patterns, some, some that, specific frequencies or in specific regions are, show, imbalances.

The so it's, it's a, if you, if, if you work with patients, on a regular basis, you see that if, for example, patients is particularly stressed, has some specific imbalances in some specific areas of the brain, and this is what Shiji really shows, a can can break down the whole, EEG signal into discrete, specific frequencies.

And, research shows us that, these imbalances in a specific frequency range in specific regions of the, of the scalp, are very much, very much correlate to and neurobehavioral imbalances.

That means an imbalance of, memory impairments or, hyperactivity or attention deficits. So it's highly informative and it's a huge leap. When we compare it to standardized standard EEG.

And now what's interesting is that this, this quantity two is not necessarily like the standard of care currently within neurological societies for neurological disorders.

Right. And partially is because, this is a functional test is not used necessarily diagnosing these things, but it's used to answer why things are actually happening.

Right. And when people are actually working at, this when I go over the patients looking at the quantitative EEG, there's there's a bit of a validation because we're really turning their words into numbers like, hey, you're yes, you say inattention or poor attention, but how do you, compared to the rest of the population, like this is where you are compared to the rest of the population.

That's your age, gender. And this is what we call the normative data, the normal data that we, that we asked compared to we have this amazing ability to collect this information.

Right. And and of course, I realized we use the brain view, which is a quantitative EEG device. So we have this amazing device called the brain view. And, it's it's on a laptop.

And we see this brain imaging. We also have an amazing ability because we have this technology to train the brain into doing something that's design right, better sleep retention, etc., etc..

How does that work? That's called neurofeedback. How does neurofeedback work? Yeah. Well, basically, it's a when neurofeedback is a way to train the brain to self-regulate in a completely noninvasive way.

So, we using, learning, to, teach the brain to help the brain find a more effective way to function. And we're using a very specific type of learning is called operant conditioning.

That is, nothing less than, you know, getting a reward every time the brain does something that is desirable. So we create protocols, that are, you know, designed to train specific frequencies in specific in electrode regions and, and electrode sites.

And, every time that goal is reached, the, the patient, is rewarded in a very specific way in, in a very engaging way. We use, videos or video games, to, again, engage the patient in the training.

So every time, for example, if a patient is watching a YouTube video and every time a goal is reached, the in the video will start playing is the goal is not reached, the video will start shrinking or maybe getting darker.

So, so the brain, without any effort, the brain naturally starts to, to function, to respond to, to this. We're worried, spending a lot, I mean, more and more frequently, more time, in that specific, frequency and working in that specific specific frequency range.

And and there's no effort, you know, a lot of time patients ask me, so do I have I feel if I, if I, you know, if I strive to, to get, you know, the, the video to play more clearly, you know, I get better results.

No, it's it's just an impression that your, your brain naturally does it. So, and without any, any, any help. So which is it? You know, there's no stimulation, just learning.

And, this is so key, especially in those patients who can be, it can be medicated for different reasons, or the medication may not work anymore. Right.

Or the medication worked in the first place can tolerate. And so, or even on medications, it's very useful to the, to the neurofeedback.

## How Neurofeedback Trains the Brain

And what's, what's important about this is and, and I tell people that because we're looking at your brain frequencies, a lot of this is is not conscious.

You don't really know what frequency you're in. But we're feeding back to you that this is the frequency that you're in. So whenever you're in a desired frequency, then you're being promoted.

And that's through a game. And that's through, you know, progressing through the game. And so essentially what's

happening is that a lot of the the circuits that we operate on, may be stimulated from childhood traumas or just traumas in general, and maybe stimulated by the way that we were raised and stuff like that.

If a lot of those things are creating this neural circuitry, and most of it's created between the ages of three and eight and, we can actually, you can actually look at it on the quantitative EEG, then we can say, you know what?

This circuitry may not be serving you anymore, right? You're an adult. Yeah. Or maybe after a particular, you know, time in life is no longer serving anymore.

But this one, maybe we can create that. That path. And you know what I used to do and a lot of people used to, is that we were able to do this in the office, but now we have the technology to do it at the comfort of the patient's home, the people's home.

So you're watching this a lot in York. People like you can actually do it at home. That's monitored by professional. And so, how does how does that work?

Can you kind of explain that the home that is, it is a very exciting, you know, because this is my role with the clinic and and it's very exciting, to be, collaborating with you.

And so we, there's, as you were saying, there's a, technology has been evolving very quickly in this field, especially with, some, some, some patients, in mind.

And it's a population and a huge population of patients in mind. Those patients can travel to, to the clinic for some reason. So, and technology has been simplified and to, you know, from, you know, a computer at, an amplifier and a head cup to it's a simple head headset that are in, you know, very lightweight and easy to, to sit in between your forehead and your and, in your, your ears and, and an external electrode that can be moved, wherever we want.

So basically, I do the work in the background, I create, I create these training protocols that we mentioned, and, the, there's an app that, tells the patients step by step what to do, where to place the electric, how to the to do the calibration, the, you know, resting EEG calibration and and then provides a library, customize Bible library of videos and, and video games that, the patient can access and can train anytime during the week, any time of the day.

And, it can always connect with me, you know, my all my patients. Right to me, you know, they have full access to me. That if they have any any questions, I'm always here to answer.

The so basically, so it's, really, you know, it really solves the problem. Those patients who can't really, move, drive weekly to, to the clinic. And on top of that, it's a lot, a lot cheaper than the average.

I would argue it's a lot more effective. And I'll tell you what, it's. I think it's so effective that we stop doing a lot of the neurofeedback, or all of the neurofeedback in house.

And I think there's multiple points of this one, it's easier to feedback a brain where it's in rest mode, like, hey, get up early in the morning versus we start neurofeedback session.

We feel pretty good, right? It's a lot easier to promote, use alphas and etc. doing that. Second is that the adherence is so much easier. You know, you're not taking hours out of your day.

You take in, you know, ten, 15 minutes out of your day. You do a neurofeedback session. Third, as long as you have internet connection, you can do it anywhere in the world.

Right? And so it's you could put it with you. And I took mine in San Diego with me, recently. And and number and number four, it's, it's relatively inexpensive, to access a lot of neurofeedback sessions are quite expensive because the machines themselves are extremely expenses for the clinic.

Because I know, because I have to, we don't use anymore. But but, but now it's like, now becomes, like, not very

expensive and stuff for, for the version that we're using, it's called mind lift, meaning the lift, it's app that you can actually download.

And our code is called Brain Raspberry. I know it's on the, on the code there to request neurofeedback sessions. So it's literally an app on the phone or the iPad or whatever.

And and people can download it. And then there's also, things that are beyond that. There's, there's, there's journeys, there's mindfulness journeys and meditation journeys, because it's not just about the technology within the brain.

It's about what piece can you really create and which is now we're getting into the, you know, integrative health of functional neurology. Right. And so, but let's talk about that for a second.

So we talked about the where the gaps are in the current technology. In clinical practice. We talked about EEG. It's over quantity of EEG. Now we're talking about home neurofeedback.

Yeah. Let's dive into what does it actually take to get the brain a lot better. Because very recently I was emailing you about somebody and you're like, gosh, you know, I hope, I hope she's doing a lot more than just neurofeedback needs a lot of like mind body medicine, therapy, etc., etc., right?

Yeah. So it's not just about a piece of technology that you can that that's going to create miracles.

## Remote Home-Based Neurofeedback

It is a very holistic journey. Right. And so what do you think are the current components that are missing in practices that can allow the patient to develop this brain healing journey?

Well? But the main thing I have recently published that, on a, a commentary that summarizes my thoughts and this context. The main thing is that, a clinician, for many reasons, doesn't have enough time or sometimes the tools to, to really dig into, the symptoms.

So very often in clinical practice, especially psychiatry, patients get asked, to ask the question, how are you? How have you been over the last couple of weeks?

And, sometimes, the, you know, they ask this a lot of questions, but from research, we know that this is not enough is a is a huge cognitive bias. And especially in my in my area research like depression and suicide.

So people say, hey, I'm okay. And next time, you know, next thing you know, they're doing like, right. And it's very serious. So, so we need, in clinical practice to effectively combine, the, with screening, the symptom screening, the interviews, of course, the in the questionnaires, the cognitive performance in, in, cognitive paradigms, and also EEG and, metrics, as much as possible.

And so this is if you, you know, I've talked to you during the course of my research and I've had the chance to talk to to several consultants and, they actually don't have the time because they see so many patients and they don't really have sometimes even the background to understand how symptoms relate to e.g., and do MRI and, you know, you have to be an academic, and, and so my list, my opinion solves many of these problems.

We can run an assessment. I run assessment my patients with our patients every one once every month. We can run an assessment for 40 minutes. Pretty much.

We can, I can select those questions that are relevant to their intake. So they, they have to answer the questions. The questioners have to perform the cognitive task, and they have to to do resting state eyes closed eyes open, engaging.

And I get tons of metrics, from, from the assessment and Q EEG as well. Now, so I have a lot of information that, I

can on the base, of course, of, you know, my knowledge on them and how these and these metrics altogether put together.

Tell us about the imbalances, the behavioral imbalances of, of the patients so I can put together, protocols that, target, those, you know, in most prominent, imbalances that need to be addressed. So, every month, again, your assessment, I tweak the protocol.

Sometimes I delete the old ones and make new ones, because in the meantime, stuff happens to the US. There you know, there is stress, there is work. There is, you know, there's so much so you need to.

And that I can do in, in 30 minutes, I can think about what's happening because of course, there's research that tells us so much, in about 60 years of research and, of neurofeedback research, plus Q EEG.

And that tells us, a lot of information about clinical populations, ADHD, epilepsy, your stress disorder. So, I can customize those protocols on the basis of what the, the patient's background is.

And on the basis of all these data, behavioral, you know, symptoms and complaints, some people call them. And, neurobehavioral, psychomotor and, and, EEG.

So I, you know, here I am, you know, what have been, advocating for many, many years in my research. I'm doing it with patients. You know, it's amazing.

So now now the research is meeting the the technology is actually meeting in clinical, which is which is really nice. It's also pretty rare that we actually see that right off the bat.

Right.

## Holistic Care and Personalized Protocols

And so you know, you know, let's talk about who who are the perfect people for this neurofeedback and for the mindless, like who are the typical people that should say, hey, I should try this.

Well, generally speaking, neurofeedback can be a can be used by anybody. I use it actually, actually every, every week or train between as much as possible.

So whether there's no such a person who's, let's say perfect, there's no the perfect profile, we all go or I mean, we human beings. So what are your you you know, you work in, in the corporate world, you know, there's stress.

There is, especially, you know, if you feel healthy after a year, there's an excited stress. So even though you, there's no psychiatric or neurological condition, you're in neurofeedback, especially what we do then really get provides, a lot of support to those people who feel, you know, that life is kind of been, has been heavy, you know, the last few months or years.

Right? Right. So, of course, you know, there you know, there's immediate feedback is very research, is very much explored in, in, in developmental disorders, for example, ADHD, autism, although and the main effects are on the the effective signs autism but also epilepsy and depression anxiety.

And so there, there is, there is a lot, there's a lot anything we can we would definitely, our patients, our patients, reflect pretty much this, applicability of, neurofeedback.

Right. There's a very large body of, doing quantitative analysis and your feedback and, like, addictive behavior, you know, quitting smoking, cutting, drinking.

Yeah. And then other drugs and stuff like that. Right. So I think, a lot of this is coming into fruition, you know, very recently. And I'm glad that we're really, ahead of it.

And, and, you know, doing neurofeedback just for me professionally is one of the most rewarding things I've ever done in my life. Just seeing the patients actually improve, not responding to medicines or not responding to supplements, not responding to diet changes, not responding to the fasting and lifestyle changes.

Right. And so so that's been a really big game changer. Now, you know, the, the, the people who are the absolute best outcomes, for neurological disorders, whether it's memory loss, ADHD, Alzheimer's, parkinsonism, etc., etc., the people with the best outcomes of the people who receive coaching, as well.

Yeah, yeah. So we've got lifestyle coaching. We have, functional medicine coaching. We have, Mind-Body medicine coaching, tai chi, qigong, all this stuff in our facility, which is very good, but we've taken it to the digital side, as well, a lot of people to get in on zoom, and that's what people want to do, is during the pandemic and our outcomes are better than they were in person, which is weird to me.

I figure in person would have been better, but actually it was, it was it was not. It was actually on, on these, video sessions. But I think it's it's a very holistic thing.

Right? It's like our brain are very complex. It's a very complex, organ. And because it's a very complex organ, there's so many different, things of factors, that are, that are creating, sort of brain destruction or destructive states and, really takes everything all inclusive together to, to formally change, you know?

Yeah. Exactly. And, it's important due to the fact, the stress, the fact that, there is the research out there showing that, neurofeedback is a can be effective on its own, but even more effective if it is combined with psychotherapy or.

Yes, you know, as you was saying, in a much more holistic, fashion, with other types of, interventions, whether it be itchy, whether it be, it coaching in general and the resistance there.

And so, so it can be used as a standalone or complementary, even with pharmacotherapy. You know, it's a their pharmacotherapy can't really solve it. People think, okay, I'm going to give it this antidepressant, I'm going to solve all my problems.

No, it doesn't work unfortunately. That way apart from side effects it doesn't work that way. And neurofeedback has no side effects. In 60 years of research, it's the no side effect has been, has been shown, only, bit of heartedness.

You can feel it. For example, sometimes I train twice because I love it, and I feel a little bit more tired. And so I take a take. It is. Okay. It's a, I've been I've been training quite a lot, but it's like, as if you've been, you've been playing a video game.

Feel a bit, you know, a bit tired of playing a video game, but it's no side effect whatsoever. And not in the short term, in the medium term or long term.

So it is important to know. Right. And right now we're actually going, undergoing, study within my facility right now with our neurofeedback patients to look at hospitalization rates as well as emergency room visits.

So far we've been able to reduce emergency room visits, especially with those with chronic neurological disorders like parts and disorder. Noumea. And narcolepsy is a big one.

And other sleep disorders, I mean, sleep disorders, they do very well on, on neurofeedback. So I think, I think the, the technology is, is available now for people to kind of tap into, especially with mind lift.

And so the, the one thing that I think is missing, in, in medicine is the ability for us to put numbers onto feelings right until now, because we can do so, you know, in with, especially with neurofeedback and say, hey, you did you know, this is what your brain frequency look like, like what was going on for that day.

So we can actually I'm creating more conversation with the patients and able to identify things that may be triggers

for them that they didn't know that were triggers. Right.

## Who Benefits from Neurofeedback

And that is a very interesting conversation because they realize, wow, you know, I didn't realize, you know, this person or this thing or this thought was really affecting my brain that much.

And like, hey, we see it, you know, and it's reflected on the positive edges of reflected on the neurofeedback and the neurofeedback assessments. So I think it opens a conversation into, you know, what?

You know, I may not know the way that you feel, but we can see it. So let's let's take a look at it. Like, why not just just take a look at it. Let's get a brain mapping.

Let's take a look at it and let's see what we can do, what we can do about it. I think that's the most powerful tool, is quantifying how someone feels, because when it just went from a mental problem to a brain problem, right.

And one, it's a mental problems and visible. It's a brain problem. We can do something about it. Right? I stole that from Doctor Eamonn when I interviewed him.

But what is the brain problem? We can we can do something about it. And that's the most powerful reason why, I think neurofeedback is, is is crucial. So and then when the family sees what's going on and they're like, wow, you can actually see like, you know, we can actually visually see on a report what the behavior, you know, looks like, you know, on here.

And and not only that, because there's something that we can do about it, there's a sense of openness, people connecting deeper relationships with their spouses, with their loved ones, because they kind of finally understand what's going on in the brain, you know?

Yeah. And can quantify it. I think that makes generational change of relationships within the family, to be absolutely brilliant, you know, and especially with those people going through addictions and other different things like that one, one of the main things and one of the, I, I remember one of the first slides I used to present my students in biological psychology was that the brain?

The mind is what the brain does. So, even for a patient who, you know, doesn't have a background in either psychology or neuroscience, even knowing that from somebody who's been, you know, studying this stuff for, for many years, so they have some somehow they have to trust you.

Right? So the mind is what the brain does. So if you if you can trust that whatever you or you're thinking you're feeling, then you, you have to, to trust the, the, the, the whole process of improving your brain, those metrics that we will look at, so improving your brain functionality of, say, optimizing your brain function is very likely to improve your mind.

And a lot of people just want to answer that, because, you know, a lot of people ask that, is this is going to affect your personality, you know, your personality.

And there there are many theories about how a personality set and, you know, there's a strong genetic component. There's a genetic component. Fine. But, no, neurofeedback doesn't affect your personality.

So you can be unique. Even though you're looking at, normative range, it's pretty much as you go to get your bloods done and, you check your ranges. But, in the case of your brain, optimizing your brain or normalizing your brain doesn't mean it's going to make you like, you know, like everybody else, like the same, you can.

So you still can be. You can still be yourself and but but, so that's not going to affect who you are. That's important to to know is yes, I think this first of all, nothing can really change your personality unless you also mind altering medications.

That's probably considered personality or even prescription drugs. Right. But something like neurofeedback, it's not something that one can sort of overdo.

It's not something that one can overdose on. No one dies neurofeedback. It's not any side effects. And so this is a true it's true answer to looking at how the brain can, can potentially function optimally and how to deep, develop deeper relationships and meaningful relationships, with, with, with people and for them to understanding all the things that you're going through, they can actually see, I think is an absolute powerful.

## Takeaways on Neuroplasticity and Hope

So, you know, as we end the segment, you know, I always think that it's important to, to provide people, listening some, some takeaways and, and, and I want to ask you, you're going to kind of give one first.

You can kind of piggyback off of it. My one takeaway for people that are listening to this, so if you're going through any sort of mental health crisis, if going through sort of any bring duration crisis, post-Covid syndrome, bring fog, fatigue, anything like that, there's always something that, you can do and no matter what you're going through, there's always hope.

And that's my one takeaway, I want people to, to listen to, to, to, and I hope people take that into heart when they listen to this. So what is what is one takeaway that you're going to want people to have when they're listening to this takeaway is that, again, there's no such normal person in a way that, we all have or vulnerability, in and it's important to understand this a human beings, can be vulnerable at some stage of their life, and it's okay.

It's completely okay to, to look for help with, you know, ask the right people. Sometimes we think that, in talking to friends or maybe, you know, having a few more drinks is going to help, you know, very likely it's not going to help friends or very likely going to get involved in the crisis and the problem or maybe a part of the problem.

So it's important too, generally speaking, to speak, to speak to a professional and, not necessarily and not necessarily going to have to take medication.

Their a your brain has already the ability to to find, to develop those resources. Especially because, new and I'll say recent research shows that you're also in grown ups.

Our brain is capable of remodeling. It's called neuroplasticity. And, so it's not true. Not anymore. True. Or we thought it was, but it is not true that only kids are able to, to change, their, their brain.

But grown ups can do that too, through learning. And neurofeedback is just it helps you target, those areas of the brain that are somehow along the way, you know, drifted and the wrong in the wrong direction.

So, that's, that's my takeaway. So never be absolutely. No, no humans perfect. And no humans are perfect. There therefore, is never a need to blame yourself.

Right. It's like, so wonderful. Listen, thanks for coming on. What an awesome discussion. I think that as as we develop more technologies and we're able to execute more on them with more data, we're looking to be changed in the field of neurology as well as psychiatry.

And so, thanks for coming on today. I really appreciate, all right.