Robert Schleip, PhD, MA, is Research Director of the European Rolfing Association, and also Director of the Fascia Research Group of Ulm University, Germany. Together with Thomas Findley, Eric Jacobsen, Stephen Evanko, and others, he was instrumental in setting up the first FRC (Boston 2007) as well as the subsequent congresses. He has been a Certified Rolfer since 1978, a certified Feldenkrais teacher since 1978, and served on the international Rolfing faculty as a Rolfing Instructor since 1992. Following a research sabbatical in 2004, he switched careers and became an enthusiastic scientist, exploring fascial tissue properties in his own laboratory at Ulm University. His findings on the active contractility of fascia have been honored with the Vladimir Janda Award for Musculoskeletal Medicine. He is author of numerous popular books as well as scientific publications. More at www.somatics.de or www.fasciaresearch.de

Szaja Charles Gottlieb MA was once an aspiring academic, having received his master's degree in European intellectual history in the early 1970s. Fortunately, a series of unexpected events, especially getting Rolfing sessions in 1978, set him on a transformational course that included becoming an artist and then a Certified Rolfer in 2001 and a Certified Advanced Rolfer in 2008.

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The Implications of Statistical Significance and Clinical Relevance

Karen Price Discusses Her Research into Rolfing® SI for Cerebral Palsy

By Karen S. Price, Certified Advanced Rolfer™ and Marie Terrill, Certified Rolfer

Introduction by Marie Terrill

Karen S. Price has been a Rolfer since 1979 and specializes in working with children, including children with spastic cerebral palsy (CP). Self-described as a 'closet-scientist', Karen recently had the opportunity to work with a research team led by Heidi M. Feldman, MD, PhD, Medical Director of Developmental-Behavioral Pediatrics and Professor of Pediatrics at the School of Medicine at Stanford University. The goal of the team was to look at the effects and potential benefits of Rolfing® Structural Integration (SI) for children with spastic CP. The project took six years to complete and culminated in three seminal publications. The last one was published in 2015 in the journal *Frontiers in Pediatrics*. I had the opportunity to speak with Karen recently about the project, including the research results and the implications for further research on this topic.

Karen Price

Marie Terrill

Marie Terrill: You have been practicing Rolfing SI for children for nearly forty years now. How did you first become interested in [working with] children?

Karen Price: When I did the first part of my training, we had what they used to call Children's Day at the Rolf Institute® of Structural Integration. At the end of the class, the instructor and some of the newly-trained practitioners would work on babies and children from the community. I brought the son of my neighbor, a tall, thin, twelve-year-old boy who had worn braces on his legs when he was young. He and Michael Salveson (my instructor) hit it off immediately. Michael had also worn braces when he was young, and had a similar build. He agreed that he would give the boy Rolfing sessions if I could bring him up to San Francisco, which is where Michael practiced. This was after the class ended. Obviously, I could then watch the Ten Series.

That was my first experience and my first mentoring with children. It was powerful, particularly since Michael, normally regal and professional, was now joking and laughing with the boy. This nurtured their connection and made the boy comfortable. I saw that Michael was able to maintain his integrity as the adult while still managing to be playful and sometimes downright silly. He showed me there is a way to work with children where you meet them where they're at.

MT: What changes did you see in the boy?

KP: He changed a great deal, very quickly, both physically and emotionally. His legs supported him, his movements were more integrated, his body was more coherent overall, and he became more mature. The thing that strikes me with Rolfing work on all children is the maturity that appears very quickly.

MT: Can you talk more about this maturity?

KP: When we organize the structure through our work, it becomes more differentiated and then integrated. This is the hallmark of maturity for any organism. Ida Rolf talked about this. In this case, the boy's mother could see it after the sessions. The parents were newly separated and the mother could see how much more mature and responsible he became despite the troubling circumstances.

MT: That is particularly exciting to me; given that my personal interests are related to the sense of self and how changes in embodiment affect that. What I'm hearing you say that you witness in children is that you watch their sense of who they are in the world change before your eyes through the process of Rolfing SI. Does that sound accurate to you?

KP: Perfect, yes.

MT: Let's move on to talk more about Rolfing SI for children with spastic CP. First of all, for the benefit of our readers, what is spastic CP?

KP: Spastic CP results from an insult to the brain, typically due to hypoxia (lack of oxygen), that happens in the womb or shortly after birth. It is often found in babies who are born prematurely, although it does appear with full-term babies. It's a non-progressive neurological disorder, but what *is* progressive is the contracture in the soft tissue.

MT: The contracture is progressive as the person grows.

KP: Yes. That's why Rolfing SI is perfect for working with CP because obviously we know as Rolfers that our work is with the soft tissue. With our study we were affecting the neurological aspect with an approach that targeted the tissue. We're literally going right to the tissue itself to decrease the spasticity and increase not only the range of movement but the quality of movement, as well as improve balance, etc.

MT: So the portal is the soft tissue, but you are affecting the entire neurology.

KP: Right! And the younger the better, because the brain and the body are so plastic. The younger kids especially haven't developed a belief system surrounding their condition yet. By the time they are six or seven years old, they *know* and they *believe* that something is wrong with them and that they can't be fixed. But at a year and a half, two, three years old, their sense of self is not that strong yet, and similarly they don't have a sense of anything being wrong with them in a fixed sense.

MT: That's profound.

KP: It's very profound, yes. With a lot of our work with adults, you can see that they come in and they've got this problem and they're hoping maybe you can help them, but a lot of it is they have a fixed belief that something is wrong with them. That's a big obstacle to their healing and how we go about changing that nobody knows. But with little kids, they don't have that yet.

MT: That's beautiful. You catch them when their sense of self is still forming, so the belief that something is wrong with them is not yet fixed. There's a moment where you can get in and really make changes along the developmental pathway for that child.

KP: Exactly, exactly.

MT: This is what the study with Dr. Feldman and your team was all about. You had the chance to affect these kids along their developmental pathway. [Readers can find out more about how the study came about on page 17 in another interview where Karen Price discusses how to go about engaging with research as a Rolfer.] For now I want to focus on the actual research. As I understand it, the project produced three separate publications. The first publication resulted from the pilot project where you collected data from eight children, aged two to seven, which produced the first article and poster that you presented at a medical conference. Based on this first publication and its promising results, your team was able to secure a grant from the Gerber Foundation. This grant supported the research that resulted in the next two publications. The second publication was from the pilot study for use of the GAITRite® mat, which is a special computerized mat that measures all aspects of gait. There was little data on using the mat for children and even less on using the mat for kids with CP. In your study, you used, among other measures, the measure of heel strike for the nine ambulatory children. The third and final study involved a larger cohort (twenty-nine children aged three and under) and combined these two outcome measures.

KP: Yes, that's all correct.

MT: The statistical metric used, Gross Motor Function Measure-66 (GMFM) in the final study is quite stringent. This, in addition to a small sample size, and the heterogeneity in the severity of CP amongst the study participants, meant that overall changes were hard to detect across the group as a whole and therefore the findings were not statistically significant. In my experience in clinical research, there is a difference between statistical significance and clinical relevance: i.e., outcomes can still have very meaningful implications for clinical relevance while not achieving statistical significance. For this study, can you talk about the changes you did see, and what clinical significance you think this study demonstrates?

KP: Yes. First let me say something about the children in the study. It was a condition of the grant that they were three years old and under. Our intention was that the children be ambulatory and GMFM level II to IV in severity so we could use the GAITRite mat. It turned out, however, that we ended up with nine ambulatory kids of the twenty-nine (far fewer than we intended). We collected a lot of data, and found that the data on heel strike for these nine ambulatory kids was statistically as well as clinically significant. In our analysis, greater heel strike translated into improved foot contact with the mat and more normal walking than prior to Rolfing sessions. We ended up only having nine ambulatory kids because with CP there are not that many ambulatory kids who are three and under and also Level II severity, so we started accepting additional kids who had higher levels of severity but were not ambulatory. In many cases they couldn't even crawl, sit unsupported, or even roll over. One way this affected the outcome was that if we had stuck to working only with ambulatory kids, all measures of change would have had the same baseline. However, because we had varying levels of severity, there was no common baseline across the group from which to measure each kid's change throughout the process.

MT: That's beautiful that you decided to include the kids that had a higher severity of CP in the study. And it doesn't mean that they didn't experience changes due to Rolfing SI. In fact, they may have had very significant changes that may have been measurable. And then there's the human factor of quality of life. The changes that you did see in those kids with a higher level of severity were probably not detectable by the measure that you used.

KP: That's right, because we had to combine them in one group, which blurred our ability to measure change. We could have chosen not to accept these kids with higher severity, but none of us wanted to do that because we fell in love with these little people and wanted to give them an opportunity to experience Rolfing SI and what it could do for them.

Therefore, my message is that there *was* change. There was a great deal of clinical change that we saw, not only in quality of life but also in movement, communication, appetite, height, and weight. Many children with CP are underweight and/or in frail health. Becoming bigger and stronger is an important asset. Many of the children in our study gained new abilities such as being able to sit unsupported, roll over, or propel themselves on the floor. This resulted in greater independence and autonomy for the child. Most increased in confidence and communicative ability even if nonverbally. Some children were able to supinate an arm that they were not able to do prior to Rolfing sessions. Drooling – which is a big problem with CP – improved. Parents reported more flexibility in their child, which made changing diapers and dressing easier. But due to the measure we used, as well as the issues I previously described, we were not technically able to report any statistically significant changes other than the heel strike using the GAITRite mat. The other thing that was really important that I felt was not emphasized enough in the paper was that four non-ambulatory children began walking during or just after the Rolfing sessions.

MT: Oh my gosh!

KP: It was just a little line in the publication. Three non-ambulatory children began walking during the Rolfing sessions and then a fourth started walking just after his Rolfing sessions ended.

MT: Wow.

KP: To me, this was the most exciting thing. Also in the first study, there was one two-year-old, non-ambulatory child who began walking during the Rolfing sessions. What I have found is that working with young children in this age range (two and under) with developmental delays with or without a diagnosis of CP is especially effective because of everything that we've been talking about.

MT: Rolfing SI can change the developmental trajectory. I'm thinking about direction here, and that before these kids saw you, they were on a certain trajectory that didn't involve walking, but the Rolfing SI nudged them enough degrees in a different developmental direction that they began walking. And they will continue literally walking along this trajectory for the rest of their lives.

KP: I completely agree. That's what I saw. Whatever is hardwired in us, why we learn to do these things as a species, why every animal on Earth learns how to move, is what gets activated. Rolfing SI is like flicking the 'on' switch. The younger they are, the easier they incorporate the changes due to the plasticity we've been discussing and which we know from our hands. These kids start scootching. Eventually they start pushing themselves up on all fours. Again, it depends on the extent of the brain damage. While there is probably a ceiling for how much they can improve, Rolfing SI helps them achieve that optimal place. I've worked with a few of the kids from both studies long-term, as well as many other children with CP and various conditions, and the changes are unbelievable. We are assisting them in their evolution. Rolfing SI quickens their development and their evolution. By organizing the structure as best as we can, given the limits inherent in that child, we create more normal movement and function.

MT: That was one of my other questions. Did you have the opportunity to do some follow-up work with any of the children from the studies?

KP: Yes, a few from each one. There was one boy from the first study who became my favorite client of all time. He was three, and wearing braces on both legs, and glasses. They were the first family we recruited. His goal was to do karate, but he couldn't balance on one leg. Nor could he jump or run. By the time he was four or five, he was doing karate, and jumping, and running! He taught me a tremendous amount. He was the most articulate little child I've ever met and would verbally tell me things about children with CP as well as his experience of his body. I worked with him over four years. He is now ten years old and has moved back to his country of origin. He doesn't wear leg braces, and he plays sports, including soccer.

MT: You were with him over a long amount of time while he met different developmental milestones, even though the milestones were delayed.

KP: Yes, and this could have been important for our study, particularly since we used the GMFM-66 as our measure, and this aspect of time is definitely important for future studies.

MT: Can you talk more about this? Why was the GMFM-66 measure chosen?

KP: I think there are different reasons. One reason is there are not a lot of good measurements out there to show what Rolfing SI (or indeed most therapies) achieves. Dr. Feldman is very much an objective scientist. She's very aware of the importance of the subjective domain, the necessity of including the whole person. She is also a yoga instructor. But she is still focused on the quantitative measures. Most of the journals agree with her. She has said that if we want to get published, we have to show the numbers and here's something that shows the numbers.

MT: Right. That was my thinking. When I was reading the article, I was thinking this measure is not really appropriate given what you are looking at, and yet if you did show changes by that measure, the implications for Rolfing SI would be huge in the scientific community. I can see the ambition in the publication and that Feldman probably wanted to extract the full potential, if it existed, of Rolfing SI, in using this particular measure of gross motor function. However, it's unfortunate that, for those not used to reading publications critically, or for those who don't quite know how to interpret the implications, the very first line in the discussion is "We did not see any changes."

KP: Right.

MT: This makes me think about the whole question of knowing who your audience is, and the importance of having the right audience when you're reading these kinds

of publications. I can only imagine that it was disheartening.

KP: Yes. It was difficult. When Feldman first said that this was the measure we were going to use, I had a bit of a sinking feeling. The GMFM-66 is a measure that is specifically designed for children with CP, and it measures and describes the children's abilities for gross motor function milestones at different ages. But of course any developmental milestone requires time to develop. For example, in order to change levels, a marker such as maintaining independent floor-sitting or pulling to stand would have to change sometime over the course of two years. So that means that in order for us to measure a change in gross motor function according to the GMFM, we would have needed at least one to two years of collecting data with Rolfing intervention to allow time for the kids to achieve their milestones.

MT: That all makes a lot of sense. That reminds me of the story of the old osteopath telling Dr. Rolf when she was first starting out that the one thing her recipe lacked was 'essence of thyme' (time).

KP: I was just thinking about that!

MT: In concluding, I want to come back to something you said earlier: about how CP is often considered a fixed condition, in that the brain injury is non-reversible, even though the effects of that can progress differently over time. Even though the injury itself cannot be reversed, we perhaps need to start thinking about CP as a more malleable condition, given the inherent plasticity of the brain and the body, particularly with pediatric populations. So if a therapeutic intervention is given early enough, the inherent neural plasticity can be fully exploited, possibly enabling the child to develop functionally beneficial neural compensations that would not have been possible if that intervention had not been given. I think your work is showing that Rolfing SI helps sculpt the brain through organizing the body and creating opportunities for more normal movement and functioning. We can think about the possibilities for the child, and how we can activate those possibilities to the fullest extent. Rolfing SI, clearly, is a part of that.

Karen Price's publications from the study with Dr. Feldman can be found on her website: rolfingchildren.com.

Karen S. Price graduated with honors from Northwestern University in 1974. After receiving Rolfing SI in 1977, she began her Rolfing training in 1978 and graduated from The Rolf Institute in 1979. She received her advanced Rolfing certification in 1988. She is a long-term meditator and a Registered Yoga Teacher (RYT-200). Karen has maintained a private practice in the same location in Palo Alto, California for thirty-seven years, specializing in work with women and children. For more information on Karen, please see the bio on her website rolfingchildren.com.

Marie Terrill is Certified Rolfer and Certified Structural Integrator℠ with a small private practice in Eugene, Oregon. She is also Secretary of the Rolf Institute Research Committee. Marie studied molecular biology at The Evergreen State College and has ten years of experience in the field of functional neuroscience, with a specific focus on epilepsy and epilepsy research. Additionally, Marie has an ongoing interest in the therapeutic aspects of movement, dance, and yoga, all of which she incorporates into her Rolfing practice. She has been a dedicated yoga practitioner since 2006 after sustaining a major injury, with a practice most recently fed by teachers in the field of Yoga Therapy and from the Iyengar tradition. Her website is www.mindbodyrolfing.com.

The Road from Rolfing® SI to Initiating Research Studies

An Interview with Russell Stolzoff

By Russell Stolzoff, Rolfing® Instructor, Rolf Movement® Practitioner and Richard Ennis, Certified Advanced Rolfer™

(Editor's Note: This interview took place in October 2015 when Stolzoff was sitting in on a Rolfing Structural Integration (SI) Advanced Training taught by Jan Sultan.)

Richard Ennis: Recently, you've taken an interest in research and did a study with Western Washington University. What drew you into an interest in research?

Russell Stolzoff: There's been a growing emphasis placed on trying to demonstrate Rolfing SI's efficacy through research. One of my clients is a professor at the university, and one day I just asked her. She was talking about some different research that she was doing, and I thought to myself, "I just need to inquire as to whether Rolfing SI could ever be part of a project that she supervised." She said yes. I never saw myself, being someone who didn't have an advanced degree, as being capable of initiating or conducting research, and I didn't know how I could become part of a team of people. Several years ago, Tom Findley came and talked to the faculty. It was all good information, but he was basically saying, "If you don't have a PhD, sorry for you." That was a little discouraging. But then I saw this potential opening, and I just asked about it and it went from there.

RE: If I'm interpreting you right, you thought that it was too daunting or impossible to get into. [But now] you've done this and realized that anybody who puts energy into it could do Rolfing SI and research.

RS: It's about making the right connections, and it's good if you can link with people who have some interest. Like this professor had a real interest in fascia research, and she's been going to the Fascia Research Congress (FRC). I think I really lucked out with her. [Similarily] Karen Price connected with a lead researcher at Stanford and got her thing going. [Editor's Note: Price conducted research on Rolfing SI and cerebral palsy; see the interviews with her on pages 17 and 29.]

RE: Say a little more about what your research project was.

RS: The project was to see if Rolfing SI sessions improved proprioception of the ankle, balance and power demonstrated by what they call 'counter movement jump', or 'two-footed jump', in recreational soccer players.