ISF1 and ISF2 vs ILF

The following is mostly a rehash of information discussed previously but given Virgílio Baltasar's post it might help answer his and others questions about the difference between ISF and ILF

The development of Infraslow (ISF) neurofeedback began nearly twenty years ago. Training below .1 Hertz was a novel endeavor that was slow to gain acceptance in the neurofeedback community. Two decades later, we have two forms of ISF, a growing research base, and far more acceptance among practitioners in the field. The ISF neurofeedback community continues to grow with many practitioners doing both ISF1 and ISF2. What's the difference between the two? On a fundamental level the two forms of ISF differ in the number of electrodes required with ISF1 needing only five and ISF2 demanding a full cap of nineteen electrodes. Moreover, ISF1 utilizes a bipolar montage targeting activity on the surface of the cortex while ISF2 employs sLORETA that helps focus the training on deeper structures in brain. While there are certainly common effects of both iterations, ISF1 and ISF2 have distinctly different impacts and outcomes as well.

Arguably one of the most formidable tools in neurofeedback, both iterations address autonomic dysregulation that is so often at the heart of dysfunctional behavior. So, both forms of ISF can be quite helpful with complex trauma. Both forms of Infraslow training help with pain, sleep, and creating a sense of well-being. The difference between them lies primarily in the speed of training response with ISF1 being more rapid than ISF2. This difference requires training to identify the client that benefits the most from each form of ISF. Faster is not always better in mental health treatment. Other differences include the types of pain that respond best to ISF with migraines being better managed by ISF1 and joint pain by ISF2. Sleep is better managed by ISF1 while complex presentations with multiple presenting issues may be better managed by ISF2. Ultimately, which ISF intervention you choose may come down to experience in neurofeedback generally. ISF2 is more difficult to master given the larger knowledge base necessary to perform the intervention effectively. A 10/20 cap is more difficult than a few electrodes. Identifying and understanding the behavioral impact of networks embedded in deeper structures required in ISF2 may be intimidating to some. On the other hand, apart from these obstacles, ISF2 may be more accessible to many as it resembles "typical" neurofeedback more than ISF1. We train directionally to increase or decrease ISF in targeted regions. While not necessary, many ISF practitioners use QEEG to help with targets for training. ISF1 is merely a display of the signal, no increase or decrease of the signal is required. ISF1 causes the client to "feel" something. It causes state shifting along the autonomic continuum that requires mental health training in many instances to contain client response effectively. This experience will be welcome to some practitioners while the more technical aspects of ISF2 will hit the comfort zone of others. Now that I have described Infraslow Neurofeedback, let me contrast it with Infralow. The most obvious difference is that ILF does not have a LORETA component. ILF is limited to a few electrodes in a bipolar montage. As I pointed out in past articles, ISF has been performed on a DC coupled amplifier since 2006/7. The Othmer's finally arrived on a DC platform at the end of 2013. While they were still using the AC amp they raced to get lower at every turn due to non-optimum outcomes many in their community were experiencing. That is, they explained the lack of an optimum response as the result of the limitations of their amplifier: they couldn't get low

enough. We have had the capacity to dwell in the low AC domain due to the addition of DC and learn from our experience there. One clear difference in clinical outcomes is our clients do not "pile" up at the lowest frequencies of our ISF band. In fact, in ISF training, the majority of adults train at one frequency at the high end of our training band. This is most likely due to the filtering of the signal. While both ISF and ILF use fast Butterworth filters, the addition of a quadrature component implemented by Tom Collura of Brainmaster makes for less roll off of the training band and therefore more precision. There is very little roll off of the dialed in frequency band. So when you set the band at 0.0062 there is damn little 0.0063 in that signal. This engineered precision may be the reason that many describe ISF as stronger than ILF. The Othmer's train exponentially lower in frequency than we do. They are solidly in Ultradian/circadian rhythm territory. Our frequency territory is quite a bit above that mark. They are most likely affecting different processes than we are. We are in the Resting State Network territory as reflected by the most recent research. Moreover, our research and that in the biofeedback literature strongly suggests that we impact the Autonomic Nervous System. As I have said, they are in the Circadian Rhythm region. My experience with their work is admittedly limited. I have only worked with clinicians and clients whose experience with their work was non-optimal. In those cases, all have had a result that reflect training too low in frequency. While a comparison research project would be necessary to quantify the differences precisely, my guess is that to the extent that there are behavioral differences related to frequency within the Infraslow range, we have different behavioral outcomes. Ours are clearly related to Autonomic function. It isn't clear to me precisely where they fall in behavioral outcome categories.