Suppose you’re working with a client who you suspect hyperventilates, and you ask him to try breathing more slowly and/or less deeply. Maybe you have a capnometer to confirm low CO₂ in his exhaled air, maybe not. In either case, suppose the client resists your instruction to reduce tidal volume (in essence, move less air), saying that he feels like he’s suffocating. In fact, he tends to take extra-deep breaths—sighs—to feel normal, directly contradicting your clinical judgment and advice. Whether his resistance is overt or covert, you may not have the credibility that you think you have.

Suppose now that you had a device in your pocket to confirm or disconfirm his claim that he is truly low in oxygen; furthermore, you could show him that the way he’s breathing actually reduces oxygen available to the body. This device could also detect whether his blood is truly deficient in oxygen, in which case it would be dangerous to urge him to breathe less. This device can be slipped onto a finger and begin reading in 30 seconds, and can be bought for less than $100.

It is not easy for the non-medical clinician to know whether excessive breathing is driven by anxiety or by a physiological need for oxygen. Oximetry provides a way to tell the difference. A pulse oximeter senses through the skin, via plethysmography, the concentration of oxygen molecules in the blood by measuring changes in “redness,” which indicates how much oxygen is carried by hemoglobin molecules. A digital display shows O₂ content on a 0 – 100% scale. The norm for oxygen saturation at sea level (PO₂ sat%) is 95% to 99%. The lower the number, the less oxygen is present in the bloodstream. Readings below 90% become progressively more dangerous. At high altitude, saturation will be lower. For instance, levels may typically range from 90% to 95% at 5000 feet. On an airliner it will often read below 90% because airline cabins are kept pressurized to around 8000 feet, not sea level.

Hyperventilation vigorously for a couple of minutes will usually raise saturation to 100%. At first glance this seems good: the blood is carrying all the oxygen it can possibly hold! But in this case, the 100% represents less oxygen available to the tissues, including important areas like the cerebral cortex and heart muscle. Hyperventilation causes respiratory alkalosis (low CO₂ = higher pH), and this causes the hemoglobin to hold on too tightly to molecules of oxygen rather than releasing them (the Bohr effect). In addition, hyperventilating causes blood vessel constriction, and the narrower blood vessels further limit oxygen release into the tissues. This is why a cardiologist might induce hyperventilation in a patient to provoke (test for) angina, or a neurologist might test the potential for seizure. In both cases, the reduced oxygen supply brings out potential problems.

Normal O₂ sat readings don’t always guarantee adequate oxygen supply (blood saturated with carbon monoxide will read normal also) but a low reading usually suggests trouble, possibly including pulmonary edema, congestive heart failure, lung disease, or metabolic acidosis. So a pulse oximetry reading below normal should 
not lead to the instruction to breathe less, because the body may already be low in oxygen and more oxygen (even hyperventilation) may be needed to compensate. Although this abnormal finding is not common, it should be heeded—and without an oximeter, you may not have caught it.

The following scenario is common in my practice, where I often use a capnometer to monitor CO₂ levels, and also have an oximeter available to emphasize the idea that hyperventilation is almost always a problem, not a solution.

(After client follows instructions to try breathing less deeply and/or more slowly)

“It feels like I need more air! I can’t get a deep breath.”

Continued on page 11
From the President

As I type this small tidbit for the BSC newsletter, I am sitting on the deck of a cruise ship in Alaska, and am amazed at all my eyes are taking in. There is so much beauty in the world! What is more, even though I am away in all this beauty, it hits me how much I am looking forward to seeing so many friends and colleagues at this year’s annual conference in San Diego. This year’s lineup of speakers has me quite jazzed. We are covering a broad range of subjects and emerging areas of emphasis in biofeedback, including sports applications, chronic pain, head injury, and starting a practice.

Part of what is exciting me is the growing number of students and others who wish to get into the field. At least from my perspective, it seems as though there is a resurgent interest in biofeedback. I am very hopeful for the future, and know that chance favors the prepared mind. In the world of surfing, there are times when an outside set of waves approaches, and paddling out toward the horizon—directly into the oncoming waves—is required. I believe this is one of those times. It is not time to paddle in closer to shore, fearful of what the future may hold for biofeedback or the healthcare industry. But instead it is time to paddle out, in anticipation of the larger outside forces.

It is in this spirit that I implore anyone reading this to invite someone interested in learning biofeedback to join us this year at our annual conference. If you know students, or other practitioners, who are curious, please bring them along! This year is bound to be worth the investment. Allow me to also encourage anyone reading this to answer our call for papers for this year’s conference. Let your voice be heard. We are unique as a Society, because our focus is on the issues relevant to the practice of biofeedback in the Pacific states. There are unique issues that face us in the West Coast states, and our desire is to highlight and empower those unique perspectives and focuses.

I look forward to seeing you all soon. The momentum is building, so let us encourage each other to greater things.

John LeMay

From the Editor

Well, summer has finally arrived and we’ve already had a long string of beautiful days to prove it! While our fearless leader is on a well-earned cruise to Alaska, I am fresh back from neurofeedback training with the Thompsons at their lakeside cottage in Canada, eager to start applying my newfound skills. I am also feeling the great joy and satisfaction of having just finalized plans with our fearless leader is on a well-earned cruise to Alaska, W

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I look forward to seeing you all soon. The momentum is building, so let us encourage each other to greater things.

Jim Cahill
FROM THE ED

Another beautiful day in paradise! As I sit in my home “office” (a corner of my bedroom, near a window, that I have designated as such) looking out over Richardson Bay, I feel so fortunate to have found a position within such an interesting and dynamic organization that also allows me the opportunity to be at home with my two toddler children, three and almost two years old. As an outsider to biofeedback, the past few months have been very interesting for me. While the responsibilities of this position are all familiar, it is refreshing to be immersed in a new venture and to learn about the practice of biofeedback. I hope to meet many of you in person at the annual conference in San Diego in November. Until then, please feel free to contact me anytime. I hope and look forward to providing the members of the BSC with the support they need.

Happy summer!

Angela Tortorici

Relieving Chronic Pain

Why the use of biofeedback is generating a second look

Peter Behel

It wasn’t that long ago that chronic pain was regarded as something that was fixed, immovable and required fairly strong measures to remedy. Intricate surgeries and prescription painkillers were popularly thought to be the only approaches potent enough to impact severe pain to the degree that pain sufferers could manage their lives reasonably.

While there may not be a single, magic bullet that stamps out all forms of pain in one fell swoop (short of severing nerves), we have graduated to learn that the nature of pain is not quite as rigid and entrenched as it once seemed. And, as it turns out, the same characteristics that have rendered chronic pain into a condition now recognized as being more flexible in nature are what has rekindled interest in the use of biofeedback as a principle means of achieving comprehensive pain management.

The watershed moment in chronic pain redefinition occurred in 1965 when Ronald Melzack and Patrick Wall formulated the Gate Theory of Pain, a construct that has stood the test of time ever since. The Gate Theory introduced the idea that pain signal transmission was in fact variable, and pain intensity could actually grow stronger or weaker depending on different circumstances. Melzack and Wall asserted that cognitive processes played a significant role in pain signal reception; and that emotional conditions such as anxiety, worry and depression serve to magnify pain, while happiness, optimism and overall interest in life events serve to decrease pain.

Continued on page 4

Alzheimer’s?

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Voila. The chronic pain landscape has never been the same. This pain signal plasticity is reflected in the underlying transmission process, itself influenced by the autonomic nervous system. This means that at the physiological level, pain impulses can become amplified within the spinal cord and brain. This process is referred to as central sensitization, and it provides an additional basis for comprehending how the actual experience of pain is not always proportionate to the pain stimulation.

Central sensitization is responsible for dysregulating normative autonomic functioning by hyperactivating sympathetic nervous system responsiveness. This in turn results in the altered allostatic of the pain signaling pathways in the body over time. There is an entire category of pain disorders characterized by an excessive or hyperactive response of the sympathetic nervous system. The hallmark of Complex Regional Pain Syndrome, for example, is continuous, intense burning pain out of proportion to the severity of injury.

Fibromyalgia is another example of elevated and painful responses to normally benign stimulation. Fibromyalgia sufferers also feature sustained sympathetic hyperactivity, and many are said to exhibit low HRV. Sympathetic overload may additionally be a factor in idiopathic pain (pain that persists after the trauma or injury has healed), and psychogenic pain (pain from no known physical origin).

In these sorts of conditions autonomic dysregulation is not secondary to their pathogenesis, it is primary. Yet historically autonomic regulation by way of biofeedback has been relegated to a peripheral role in standard pain management regimens, almost as an afterthought, as though autonomic dysregulation were incidental. Maybe that’s why the chronic pain patients that find their way into the pain management programs where I have seen them for over 13 years are classified as “failed cases,” or individuals who continue to experience persistent pain despite undergoing a multitude of procedures and interventions.

I’ve witnessed significant numbers of these “failed cases” stabilize their pain levels while transitioning off of long-term histories of narcotic and benzodiazepine use, with many actually reporting pain level decreases during this process. Many credit biofeedback with playing a major role in providing them with the means to regulate their pain.

My experience has caused me to believe that the more the nature of the pain signal transmission process is fully accounted for, the more the application of biofeedback will be recognized as the appropriate conservative first-stage treatment for chronic pain.

References
Recovering Spirituality in the Clinic:
A return to the ground of well-being
Jim Cahill

Integrative approaches to healthcare now consciously emphasize a psycho-bio-social approach to “whole-person care.” This integrative paradigm has made possible great strides in our understanding and treatment of many dimensions of disease and suffering that might otherwise be overlooked. It invites a multiperspectival approach that attempts to be maximally inclusive of the many facets of the disease experience, both mental and physical.

Of course, this is not a new approach at all, but rather represents a return to common sense understandings of health that reflect a massive amount of historical socialization and acculturation operating at both conscious and unconscious levels—most of it surely unconscious.

This new approach is in fact an attempt at re-integration, and it is far from novel. Integration is a defining principle of our natural healthy state, which we know as homeostasis (or allostasis). And yet an over-emphasis on the biological basis and treatment of disease, and the deconstruction of complex interactive systems to their physical, material, component parts, has led to an unintentional dis-integration of the whole, contextualized experience of health and disease. This divide-and-conquer approach certainly has practical value—making a complex phenomenon more tractable is just good science. However, it is not without its unintentional effects, not the least of which is a stifling compartmentalization of knowledge and treatment approaches.

In our zeal to reduce suffering, we habitually reach for our most promising contemporary tools, which for the last several hundred years have comprised our advances in the understanding and control of the physical world: molecules, potions, surgical procedures, advanced imaging, and direct interventions into the myriad physical subsystems that influence health.

So now we are encouraged to reach back, and somehow recover what was lost in a era of myopic pursuits of over-simplified paradigms of mechanistic cause-and-effect. Our much touted bio-psycho-social model is promoted as a return to a more inclusive consideration of the psychological and social dimensions of health, in addition to our well-developed biological models of physical function and dysfunction. But in order to truly understand what we have lost, we would do well to better understand the place from where we started.

As soon as we look back into our roots, the importance of the spiritual domain becomes immediately apparent. And even the most cursory retrospective on medicine reveals the central role of spirituality. For the present purpose, I will consider spirituality to denote those beliefs and practices that relate to the ultimate meaning of life, well-being, and a connection with an immaterial ultimate reality beyond the simply physical.

It is striking to realize that we Western moderns are the first people in recorded history to have attempted to systematically, even righteously, separate our experience of health and disease from our experience as spiritual beings. All previous cultures have understood and experienced disease within the paradigm of multiple levels of meaning, defined by a world view bursting with portent and implication. For better or worse, this is also the origin of modern medicine and it still affects us practitioners today. We are not immune to contextual thinking, and certainly have our own versions of spiritual thinking, even the most self-proclaimed materialists among us. This is often seen in the way we might selectively interpret and respond to diseases, by drawing upon a paradigm of physical material dysfunction, e.g., “matter is in disorder and so my focus must primarily be on re-ordering that matter.”

Even the most skeptical scientists are in some way locked within a paradigm. Some take this dedicated skepticism to heights of spirituality-like faith in a reductionist world view. Take the case of the dogged assertion of many contemporary neuroscientists that all phenomena of mind are reducible to matter and represent mere epiphenomena of matter interacting with matter—this despite the fact that there is no empirical evidence for this remarkable assertion. There are strong correlations, yes, but cause-and-effect links cannot be asserted based on the such evidence. Nevertheless, this assumption functions as a sort of official doctrine that can properly be viewed as an article of faith: that since we can’t see it directly, it must not be other than what we already believe!

There is no questioning the practical value and fruitfulness of our contemporary focus on material phenomena in medicine, but to reduce all of human experience to collisions among particles is a massive—and unnecessary—leap of faith. And to constrain all discussion and procedures with our clients to the simply physical, is to depart from the rich ground of being and becoming of our historical experience of health and disease.

How did we scientists get here? Do we have some equivalent of a biblical story that operates in our subconscious to prime us for leaps of faith and unfounded assertions? Indeed we do have our historical object lessons. For example, at some point most budding young scientists are exposed to a powerful allegorical story about science, subjectivity, and spirituality. This is the story of Galileo versus The (Catholic) Church, which is often used to teach that science and spirituality are fundamentally in conflict. Galileo’s discovery, through his telescope, that the universe does not

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revolve around Earth (or Rome!) contradicted the official view of both The Church and contemporary universities. Today, we are taught that The Church’s response was immediate, irrational, and vehement—at least that’s the version I took home.

However, a closer read of history reveals that The Church initially embraced Galileo’s findings, celebrated him, and even assisted him in publishing his subversive observations. In fact, his friend, Pope Urban VIII, specifically encouraged him to present a balanced argument that carefully addressed contradictory findings and claims. The real trouble didn’t start until after other academics, the entrenched Aristotelian scholastics, advised The Church that Galileo’s findings represented a threat to church authority. To make matters worse, Galileo employed an ill-advised strategy of presenting his theory in narrative form and using the pope’s own words through a character he called Simplicio.

This violated a well-known principle, which in Latin might be stated nihil insulito el pater! Of course, he was only thereafter denounced, subjected to an inquisition, and placed under house arrest. Far from being a knee-jerk reaction against contradictory claims, this famous punishment of Galileo was at least partially fueled by academic infighting and personal rancor, which are not unfamiliar to any academic practicing today!

Of course, one cannot be blamed for drawing the conclusion, from the conventional telling of history, that spirituality and science are necessarily in conflict, that subjectivity is the province of the artistic or spiritual, and that science should deal exclusively with the physical, objective, quantifiable, and “real.” Nor can we blame young students for concluding that, by extension, those who advocate spiritual perspectives tend towards the irrational, simplistic, and intolerant.

The conventional story primes young scientists to see such conflict as much more obvious today than it was to many of our most respected Western scientists, who were devoutly spiritual. These include Copernicus, Kepler, Descartes, Lord Kelvin, Newton, Galileo, and even Einstein. While Kelvin is known for stating “To measure is to know,” a mantra taken to the extreme by material reductionists, Einstein (much later) countered, “Science without religion is lame, religion without science is blind.”

These and other revered empiricists viewed inquiry into the natural world as a reverence for coherent systems, and ultimately as a spiritual pursuit. They sought to understand the lawful unfolding of complex universal principles, and their goal was to integrate with and benefit more fully from an understanding of those principles. They saw no contradiction between studying natural phenomena (science) and doing so within the paradigm of a spiritual world view.

We Western moderns are the first people to have attempted to systematically, even righteously, separate health and disease from our experience as spiritual beings.

Certainly, the utility of a spiritual view depends on the specific spiritual orientation, how doctrinaire it is, and its epistemology (its standard of truth), and clearly any epistemology based solely on (church) authority would consider a personal, systematic inquiry into facts, which have been predetermined by Church authorities, to be folly at best, and heresy at worst. But such cases are extreme, and should not be used to characterize a necessary relationship between science and spirituality.

While it is certainly possible to overstate the case, those of us working in mind-body medicine today may still be viewed as practicing counter to the mainstream. Of course, we do benefit from trappings of objectivity: our empirical measurement of physical phenomena, such as EMG, EEG, GSR, HRV, etc. Yet our skill as clinicians is still ultimately measured by our ability to coax changes in the physical by cultivating and refining the underlying subjective—even spiritual—drivers, such as the immeasurable mind. This mind-brain relationship is specifically referred to as “the hard problem” in consciousness studies. We biofeedback practitioners and therapists must work softly at this hard interface, and can be thankful that we are shielded by a patina of hard, objective surfaces (our equipment and measurements) that help to destigmatize our strange art form. Our objective trappings are both armor and keys that permit special entree, opening doors into the materialist medical establishment without triggering the woo-woo alarm or frightening memories of intolerance and irrationality from a time of spirituality gone awry.

Each of us practitioners must come to terms with the ultimate nature of our work, as we must all do as individuals with the ultimate nature of reality, if we are to take our practice to the highest levels of efficacy via maximal integration of all dimensions of our clients. Granted, it is still possible to do some good, at least in the early stages of working with a client, by simply attending to objective measurements and the physical correlates that constrain them. However, the true art and power of our work as biofeedback practitioners is to transcend the coarse level of devices and anatomy and to cultivate ever-finer levels of self-regulation through greater spiritual fluency. And so too must the dominant model expand, as we move towards fuller integration with a bio-psycho-social-spiritual model of comprehensive human flourishing.

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**BioFeedBack Resources International**

**Harry L. Campbell**

President

GSA Conract # V79P492FA

109 Croton Ave, 2nd Floor, #5

Ossining, NY 10562

Phone: 877-669-5463

914-782-1646

Email: Harry@biofeedbackinternational.com

Web: www.biofeedbackinternational.com
I used to believe that I would arrive at a point in my practice where I would know how to handle almost anything that would come my way. After 20 years in practice and numerous successes and failures as a therapist, I know better. I write about the following case because it has been one of continuous learning through both success and failure, and has also been one of the cases that has had a profound effect on how I see life and change in therapy.

Over the past several years I have poured myself into biofeedback and neurotherapy, reading anything I can get my hands on, listening to lectures, attending expensive conferences, and hearing conflicting advice about what “really works.”

The Blake family, as I will call them for this article, was referred to my office for neurofeedback three years ago. The family came to my office as a rural family referred by an overwhelmed child psychiatrist and neurologist. When Anna and Jack (the parents) came for the first session they told me how they had three girls: Julie, Jackie and Jennifer. Julie, the oldest daughter was diagnosed with autism, Jackie was a healthy adolescent girl, and Jennifer was diagnosed with ADHD and Oppositional Defiant Disorder. The main complaints in the family centered on Jennifer and her disruptive and somewhat driven behavior. Mom was in nursing school, and dad worked in mining.

At first, the case seemed to move in the traditional manner. A QEEG was performed, continuous performance exams were ordered, family therapy was initiated and a neuropsychological test battery was performed. The results were described to the family and sent to Jennifer’s physician and EEG biofeedback was initiated. Treatment began with optimism.

With my background in family therapy, I have learned that the family system dynamics must be addressed as an integral part of successful neurotherapy. The bottom line is that the family has to support the treatment and begin to look for how changes are affecting the whole system. This usually builds positive anticipatory energy and hope for change throughout the family. As part of this process I believe that it is necessary that each family member works on specific goal behaviors that will help foster growth and positive energy within the system. This also helps to decrease the focus on a training family member as the identified patient.

As therapy progressed we hit a plateau. It was not all bad. Gains had been made, but something bothered me. I seemed to be working harder than the family trying to make the magic formula that I had learned at the latest trainings work. It was as if I was trying to convert them into neurofeedback believers. And, I imagined that if I was successful technically, the whole ship would turn around. However, the gains were modest at best and it was not that the family members were not compliant to my recommendations. In fact they eagerly complied in spite of the very modest gains.

In many EEG workshops and trainings over the past few years it has seemed to me that most clients end up getting better through neurofeedback and sending their therapists potted plants for the next quarter of their life time. However, even though I have been known in my town for running plants for the next quarter of their life time. However, even though I have been known in my town for running

In my zealosity for neurofeedback success, I had forgotten two things. First, how to listen as a therapist and not an EEG technician, and second that the client has to do the therapy.
Learning from My Clients
Continued from page 7

nurse, and dad is not home even when
he is home? And why just because I ar-
gue am I considered the problem?"

I had been so concerned with try-
ing to do great magic with my neuro-
thrapy skills that I had not allowed
my office to be a sacred space in which
my clients could explore their internal
space.

Therapy is a sacred space—in our
busy and hectic world, very rarely do
people get to explore their internal
space. When that time is granted or set
aside, that alone time becomes sacred. I
wanted to do more neurotherapy, but
what the young woman needed was
to sort out the feelings that had arisen
in her times alone doing neurotherapy.
It was as if neurotherapy created the
space for her to finally stand up and
express more clearly what she had been
trying to say all along in her behavior.

Another forgotten key was so ba-
sic that I felt embarrassed by my own
behavior. It can be stated as, ‘The cli-
ent has to do the work of therapy.’ It
is easy to become a technician without
understanding the client is seeking
solutions. It is a mistake to think that
a client comes to my office to receive
biofeedback. My clients enter the office
to seek a solution, and it is important
for me to ascertain what problem it is
they are facing. Biofeedback is always
a means to an end. It is a great set of
tools, but in the end, biofeedback is not
an answer, just a method of inquiry
and study to help clarify the questions
clients are asking in their lives.

Finally, I had forgotten that
therapy begins when defensive blocks
are removed. Because of the nature of
neurofeedback, I was able to join with
this young woman without doing so
directly at first. This gave her enough
time to formulate her thoughts and
feelings and to spell them out rather
than act them out. If I had attempted
to confront this earlier, I do not be-
lieve that the intervention would have
been fruitful. In neurotherapy and
biofeedback, often change comes in
other areas because the client is able
to move past the defensive blocks that
keep them responding to situations as
a threat. When I was no longer a threat,
she was able to begin therapy.

In the end, the family and I stopped
doing neurotherapy and continued
to work together discussing what oc-
cupied their attention and minds, and
the young lady’s symptoms got better
rapidly. Sometimes, it is not the neu-
rofeedback or biofeedback magic that
opens the doors directly, but the ability
to hear what it is that our client seeks
in solutions.

As a matter of life’s course, nine
months after terminating neurofeed-
back, Jennifer’s sister Julie suffered
a stroke. It was at Jennifer’s request
that the whole family start to do neu-
rotherapy “so we can perform at our
best in spite of life’s ups and downs.”
At this point in time I have maps for
each member of the family, and it has
proved a helpful point of reference
for family sessions emphasizing the
shared experience of triumph in the
face of adversities. ✩

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Interview with Michael Linden, PhD
Director: Attention Learning Centers, Irvine, San Capistrano, Encinitas
949-489-3233, www.attentionlearningcenters.com

BSC: What have you been up to for the past couple of years?
I have been working in two areas. I have been working with QEEG Subtyping of individuals with Autistic Spectrum Disorder. We discovered subtypes of autism and two patterns of Aspergers that greatly improve our ability to diagnose combinations of autism, Aspergers, and ADD, and to individualize neurofeedback protocols. I am currently involved in a multi-site research project with the University of California, San Diego looking at QEEG, fMRI, and DTI brain assessments and QEEG-guided and standard protocol neurofeedback.

The other thing that has been occupying my time is Sport Psychology. I have co-edited a book titled Biofeedback and Neurofeedback Applications in Sport Psychology, with Ben Strack and Sue Wilson. It has both general overview chapters and specific chapters with details on how to conduct biofeedback and neurofeedback with athletes. I wrote a special chapter about athletes with ADD and Aspergers, which is becoming a favorite area of mine.

BSC: How did you get into biofeedback?
I actually learned biofeedback when I was an undergraduate at the University of Miami, and did a small research project with EMG biofeedback with hyperactive children. In 1982, I went to an AAPB meeting and met Joel Lubar, who introduced me to EEG, ERPs, and neurofeedback. I continued my interest in EEG and proceeded to do my PhD dissertation in ERPs with ADHD students and won the BSC Research Award in 1990.

BSC: What has been most challenging to you in the current state of healthcare?
It has always been an “up hill battle” running a neurofeedback center with-

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Roving Reporter
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out insurance support. Insurance reimbursement was good until managed care took over and limited long-term treatments. Although other centers have shortened their length of treatments and the thoroughness of their assessments, we have continued to provide the same level of service and find many patients come to us after seeing other professionals.

BSC: How do you think we as a society, and as biofeedback therapists, can face those challenges?

We need to continue to conduct research in our areas of expertise so the medical community learns about the effectiveness of our treatments. In addition, we need to have strong marketing and lobbying efforts to both professionals and the community.

BSC: What bits of wisdom have you learned that you wish to pass on to your colleagues or those who are just entering the field?

I recommend that clinicians focus on one main area of expertise and try to find a niche that other healthcare professionals are not providing. Be persistent and try to always explain what you do to people that you meet. We have a very powerful and practical way to treat most medical problems without side effects and with greater long-term effects, but we need to make this known. ♦

Northern Regional Meeting
Revisits Pain Management Strategies
Lucia Foltanova, BSc., SFSU student

It was an unusually sunny and warm Saturday when a diverse group of biofeedbackers, instructors, nurses, physical therapists, psychologists, other health professionals and students gathered at San Francisco State University’s (SFSU) Holistic Health Department to discuss the latest clinical practice, observations, literature, and stereotypes about healing pain. Despite such a serious and difficult subject, nine o’clock kicked off the “Applied Psychophysiology Adjunctive Strategies for Pain Management” meeting in a relaxed atmosphere, including a complimentary healthy breakfast for all attendees. The only worry of the organizers became having enough seats available to accommodate everyone.

The presenters made it clear that biofeedback plays a vital role in diagnosing and treating pain non-invasively, and that patients suffering from pain can benefit most from treatment when they carefully choose a health provider who can offer comprehensive pain diagnostics and alternative forms of non-invasive treatments, such as psychotherapy, practicing spirituality, physical therapy, or neurofeedback in order to encourage their own healing process.

Continued on back page
Pulse Oximetry
Continued from page 1

Me: "OK, go ahead and breathe deeply and let’s see what happens." (I attach the oximeter to his finger).

The oximeter reading usually shows 97 or above, and within 2 or 3 minutes the reading usually reaches 100%, and I say "This shows that your blood is carrying all the oxygen it can hold."

"That’s good, right?"

"Not if it stays in your bloodstream; it’s supposed to be going into your tissues, where it can do some good. Think of Safeway trucks parked outside the store, loaded with groceries, but there’s a strike or something and the groceries are being unloaded very slowly. Customers are waiting inside, but there’s not much on the shelves. That’s what hyperventilating does: it inhibits release of oxygen. You’ve got plenty of oxygen in your red blood cells, but it’s not being released as it should."

Then the client sometimes asks "Is that why I sometimes get tingly and light-headed?"

I answer "That’s mostly because of low carbon dioxide. Your CO₂ gets too low when you hyperventilate, and that causes weird symptoms, but it’s just a warning at that point that your brain is starting to suffer from lack of oxygen, and if it gets bad enough, you’ll faint. Nothing good comes of breathing too much."

At that point the client usually gets interested, and by breathing in a slightly restricted manner, he raises the CO₂ reading to normal and the oximeter reading drops from 100% to between 95% and 97%. As a bonus, the hands will warm up (vasodilation). I often follow this with a demonstration of the effects of breath-holding, in order to demonstrate the drop in oxygen and the rise in CO₂. (See Figs. 1-2.)

In the case of chronic hyperventilation, the body adjusts its chemistry, making the excess breathing start to feel normal. But it can be retrained; with enough practice in breathing without hyperventilating—in essence, to go on an “air diet”—the new breathing style starts to feel more comfortable because the body chemistry normalizes. This can happen within weeks, but the person first has to see a reason to practice. The oximeter provides the evidence that can make the difference.

Portable pulse oximeters have proven their value in emergency environments such as ambulances, where what looks like anxiety-related hyperventilation is actually a compensation for some problem with oxygenation. The standard remedy of breathing into a paper bag (rebreathing exhaled air) does increase CO₂ in the blood, but it also restricts access to fresh air, and this can be dangerous. Before oximeters were routine, an ambulance attendant might make the mistake of using a paper bag with someone with a heart problem, emphysema, asthma, or some other disorder that limits oxygen delivery.

Airline and private pilots use pulse oximeters because low oxygen saturation indicates cerebral hypoxia, meaning the brain isn’t working correctly—not so good when flying an airplane. Athletes use oximeters to monitor their oxygen saturation during intense exercise.

Pulse oximeters are available for $39 up to several thousand dollars, the higher prices representing extra features needed in hospitals. Some offer wireless transmitting via Bluetooth, and memory storage. All display pulse rate as well. Any clinician in the position of advising people to breathe differently can feel a bit safer with an oximeter available, and it will provide an added bonus of verifying adequate oxygenation without the need to hyperventilate.

Further reading: See my full article at http://aapb.org/tl_files/AAPB/files/BIOF3303_100-104.pdf

Figures 1 and 2
Meeting attendees reached a consensus that a focused professional team effort and a re-evaluation of the definition of pain are key to successful pain management.

In his presentation “God is in the Details,” Jim Cahill emphasized that pain often defies ‘physical or psychological definition’ and should instead be approached as a bio-psycho-social-spiritual phenomenon. He suggested that taking spirituality seriously and training personal and professional fluency in it positively contributes to coping with or getting rid of pain. In other words, the more we encourage developing our patients spiritually, the more successful we can be in our own practice. Rick Harvey, PhD, from SFSU, reminded us that we must understand the importance of correct pain diagnostics, especially the difference between pain and suffering, before we can proceed with treatment. In fact, he introduced scales and a protocol to better understand patients’ subconscious that may be useful for pain diagnostics. Nevertheless, Chris Gilbert, PhD, from Kaiser Permanente, described a working model at the Kaiser Permanente hospital in San Francisco that leverages the expertise of various healthcare specialists to deliver an optimal, customized plan for pain treatment.

For me, as a beginning student in biofeedback, the key take-away message from the meeting was to always question pain diagnostics, remember the importance of spirituality, and to collaborate with other professionals in the effort to help pain patients in our biofeedback practices. We must also ask: “Am I ready to alter the status quo in my biofeedback practice? Have I connected with other professionals? And have I considered a re-evaluation of my definition of pain?” Perhaps, it is time to reflect on these issues more deeply.

For a copy of the presentations from the meeting, please refer to the Biofeedback Society of California website. ◆