

FROM THE EDITORS

Dual Special Issue: Surface Electromyography and Rehabilitation, and Surface Electromyography and Pelvic Floor Muscle Disorders

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The cover of this Summer 2012 issue of *Biofeedback* shows the face of John, a four-year-old boy who learned to smile for the first time through biofeedback treatment. John's case is described by Jeffrey Bolek in the article "Habilitating a Smile" in this issue. The surface electromyography sensors used in his treatment are visible in the cover photograph.

The two special issues in this dual issue focus on the training of muscles through surface electromyographic (SEMG) biofeedback. John Basmajian pioneered biofeedback training-retraining of muscles in the 1950s. Ultimately, he showed that almost any human subject, with feedback, could learn conscious control over a single motor unit. Basmajian's research offered hope for the fields of physical therapy, neuromuscular rehabilitation, and pain management (Basmajian, 1967). This issue will give the reader some glimpses into where the state of the art is today in surface electromyography (SEMG) in both rehabilitation and pelvic floor muscle training.

Professional Issues

The issue begins with an article on the *Biofeedback Certification International Alliance* (BCIA) certification process and certification exam. BCIA now emphasizes the entire certification process: the availability of three Blueprints of Knowledge and three Core Reading Lists in the areas of general biofeedback, neurofeedback, and pelvic floor muscle biofeedback. The didactic training and the candidates' learning process are focused on one of the three Blueprints, each of which identifies fundamental science, history, and concepts underlying each modality in a practice area; the didactic education and the Core Reading Lists are keyed to this Blueprint. When the candidate is ready for the certification exam, he or she will find that each exam question is keyed to a specific Blueprint item and referenced to one of the Core readings. There are no curve balls . . . so,

as the article says: "What are you waiting for? File your application and set a study schedule!"

Special Issue One: Surface Electromyography and Rehabilitation

Jeffrey Bolek of the Cleveland Clinic opens this section with an article on an innovative new approach within rehabilitation, which he calls QSEMG or quantitative surface electromyography. When rehabilitating a complex motor disorder, SEMG training on single muscle sites is not sufficient for making meaningful changes in function. Rather, the practitioner must begin with a kinesiological understanding of a constellation of muscles, each of which must increase or decrease its motor recruitment for a purposeful action to occur. In QSEMG, the practitioner sets training goals for each muscle, and the combination of relaxing or activating muscles is rewarded, for example, by turning on or off a video. The patient does not seek to control discrete muscles, but to produce a patterned response that produces reward. The effect is somewhat similar to Z-score neurofeedback, where multiple variables are monitored at more than one brain site, with an audiovisual reward as the multiple variables move toward normal. Bolek provides two clinical examples—a four-year-old girl with cerebral palsy and a six-year-old girl, poststroke. He shows by these cases how confusing it is to seek patterns in the display of multiple line graphs from discrete muscle sites, whereas the display showing the lengths of time when all criteria are met makes the learning process more evident.

In a second article, Jeffrey Bolek presents a case narrative of a four-year-old boy with seventh cranial nerve palsy, a deficient sucking reflex at birth, left-sided facial droop, and a deficient smile. When he tried to smile, a co-contraction of other muscles caused the edges of his lips to pull back. The child's smile was dysfunctional from birth, and there was no past achievement of a normal smile to which the

training could return, so the training goals involved habilitation, and not rehabilitation, hence the title “habilitating a smile.” This case provides an example of the QSEMG approach Bolek introduced in this issue. With this biofeedback protocol, the child received feedback, not on a discrete muscle, but on a constellation of muscles. Only when the zygomaticus muscle increased recruitment and the buccinator muscles relaxed, thus creating a smile, did the child receive reinforcing feedback (initiation of one of the child’s favorite videos).

Gabriel Sella contributes an article for this issue on the challenges facing a practitioner in producing a report on diagnostic SEMG testing for a patient, the insurance industry, or a court. He focuses on conducting a dynamic SEMG evaluation of the cervical musculature, and introduces assessment guidelines, as well as reporting guidelines. He emphasizes an evidence-based assessment process and an evidence-based report.

Stuart Donaldson and three coauthors provide a discussion of the assessment and treatment of a challenging headache case. Their article discusses the multiple neurophysiological systems that play a part in headache, and the need for a multimodal treatment approach. In their assessment, they utilize a quantitative electroencephalogram to identify cortical dysregulation, a manual palpation of potential trigger-point areas in the musculature, a surface electromyographic (SEMG) assessment of dysfunctional muscle patterns, and a psychophysiological stress profile to identify the individual’s physiological response to stress. This assessment enabled the authors to develop an individualized headache treatment program including SEMG biofeedback, myofascial trigger point release, and a stress management-relaxation program.

Special Issue Two: Surface Electromyography and Pelvic Floor Muscle Biofeedback

In the initial article in this section, Howard Glazer and Claudia Hacad introduce The Glazer Protocol, an “early stage evidence-based medicine” tool for assessment and intervention in a wide variety of pelvic floor disorders. The authors specifically mention functional genitourinary (female reproductive and urinary system), gastrointestinal, sexual, and pain disorders as targets for pelvic floor muscle training (PMFT) biofeedback. Glazer is currently compiling data from a number of clinicians trained in the use of his protocol. The patient data will provide a normative database to assist a more precise assessment process and treatment design.

In a second article, Hacad and Glazer provide two case studies illustrating the application of their approach. The

first case is a 56-year-old male who underwent radical prostatectomy and experienced both nocturnal and daytime urinary incontinence. His treatment included behavior therapy, use of a voiding diary, and pelvic floor muscle training biofeedback. His posttraining assessment showed a number of patterns indicating a normalization of muscle function, substantial reduction in nocturnal incontinence, and a remission of daytime incontinence.

The second case was a 22-year-old woman with hypoactive sexual desire and pain upon intercourse. Her assessment showed a number of specific abnormalities in muscle function, including hypotonic pelvic floor muscles. The practitioners approached her treatment using the “hypothesis that sexual desire, arousal, and orgasm disorders can be musclogenetic.” Her treatment included twice-daily SEMG home training, the use of vaginal dilators, vibratory assisted orgasms, and sexual counseling. The outcome included normalization of muscle function, reduced pain during intercourse, increases in spontaneous desire and arousal, and an improvement in interpersonal relatedness.

Reference

Basmajian, J. V. (1967). *Muscles alive: Their functions revealed by electromyography*. Baltimore: Williams and Wilkins.



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Proposal and Abstracts

Authors are invited to submit manuscripts on any topic in applied psychophysiology and biofeedback. Articles are welcome presently for special issues on the *Role of Biofeedback in Cardiovascular Rehabilitation* for Spring 2013, and *Pediatric Biofeedback* for Summer 2013, and *Variability Biofeedback* for Fall 2013.