The Biofeedback Certification International Alliance

(formerly the Biofeedback Certification Institute of America)

Blueprint of Knowledge Statements for
Pelvic Muscle Dysfunction Biofeedback Certification

I. APPLIED PSYCHOPHYSIOLOGY & BIOFEEDBACK - 5 hours

A. Introduction to Biofeedback

1. Definition of biofeedback
2. History of biofeedback
3. Biofeedback modalities overview
4. Basic concepts of feedback and control in biological systems
5. Overview of principles of human learning as they apply to biofeedback:
   a. Learning theory, e.g. habituation, classical and operant conditioning, discrimination, generalization, extinction
   b. Applications of learning theory to biofeedback training, e.g. reinforcement, discrimination training, length and number of sessions, massed vs. spaced practice, generalization to life situations

B. Surface EMG Instrumentation

1. Essential terms and concepts for EMG biofeedback:
   a. Conduction and insulation
   b. Voltage (E)
   c. Current (I)
   d. Resistance (R)
   e. Ohm's Law (E=IR)
   f. Power
   g. Impedance
   h. Electrode impedance
   i. Input impedance
   j. Signal-to-noise ratio
   k. Amplifier and differential amplifier
   l. Common mode rejection
   m. Artifact
   n. Amplitude
   o. Integrator
   p. Bandpass
   q. Frequency response curve
   r. Volume conduction
   s. Time constant
   t. Integral average voltage
   u. Peak-to-peak voltage
   v. Root mean square voltage
   w. Power spectrum
   x. Optical isolation
   y. Ground fault interruption
2. Sources of artifact:
   a. How to identify artifact and correct environmental noise levels, including 60 Hz, radio frequency and electrostatic interference
   b. How to evaluate instrument noise levels
   c. How to perform a continuity check on electrodes and cables
   d. How to identify and correct electrical short circuits
   e. How to identify and correct extraneous biologic activity in recordings
   f. How to identify and eliminate electrical shock hazards
3. Principles of EMG sensor placements:
   a. Skin preparation
   b. Wide and narrow
   c. Size and type
   d. Relationship to muscle striations
4. Selected EMG placement sites.
   a. Frontal (wide)
   b. Temporal/suprahyoid (wide)
   c. Cervical trapezius (wide)
   d. Upper trapezius (wide)
   e. Upper trapezius (narrow)
   f. Forearm extensor bundle (wide)
   g. Wrist to wrist and ankle to ankle
   h. Dorsal lumbar (wide)
   i. Lateral, low back (quadratus lumborum and external obliques)
   j. External abdominal oblique
   k. Gluteus maximus
   l. Hip adductor/adductor longus, gracili
   m. Perivaginal/perianal

5. General EMG Assessment Considerations - Factors affecting interpretation
   a. Posture
   b. Adipose tissue
   c. Static and dynamic norms consideration
   d. Volume conduction
   e. Age and gender
   f. Protocols
   g. Skeletal alignment.
6. Signal processing and feedback displays

C. Biofeedback and Distress

1. Stress and the biopsychosocial model of illness
2. Stressful life events and risk of illness
3. Psychophysiological reactions to stressful events
   a. Acute stress: Cannon's fight or flight response
   b. Chronic stress: Selye's general adaptation syndrome
   c. Psychosocial mediators of stress, e.g., cognitive appraisals, personality dispositions, social support

D. Neuromuscular Relaxation Training

1. Relaxation techniques assisted by EMG biofeedback
   a. Progressive muscle relaxation
   b. Autogenic training, guided imagery
   c. Hypnosis and self-hypnosis
   d. Meditation
   e. Diaphragmatic breathing and paced respiration
   f. Quick relaxation exercises e.g., body scanning, abdominal breathing,
   g. Cognitive interventions: e.g., reframing, self talk
2. Integrating relaxation into daily life
3. Overview of additional biofeedback modalities used for neuromuscular relaxation and autonomic regulation, i.e., heart rate variability, thermal, electrodermal, and EEG

II. PELVIC FLOOR ANATOMY, SURFACE EMG ASSESSMENT OF PELVIC FLOOR MUSCULATURE AND CLINICAL PRACTICE PROCEDURES - 5.5 hours

A. Introduction: Patient Populations and Behavioral

1. Introduction to elimination disorders treated with biofeedback assisted behavioral therapy
2. Overview and history of biofeedback and behavioral modalities utilized

B. Anatomy: Pelvic Floor Structures

1. Anatomy of pelvic floor muscles and structures
2. Pelvic bony structures
3. Pelvic diaphragm
4. Urogenital diaphragm
5. Urinary and anal sphincters
6. Smooth and striated muscles
7. Connective tissue

C. Surface EMG Pelvic Floor Muscle Assessment

1. Vaginal and anal surface EMG placements
2. Infection control
3. Protocols for evaluation
4. Baselines
5. Phasic and tonic muscle testing
6. Endurance
7. Dysfunctional voiding or incoordination
8. Physical exam, if indicated
9. Interpretation of data

D. EMG Instrumentation Options

1. Sensors
2. Surface EMG instruments
3. Home training devices

E. Preparation for Clinical Practice

1. *BCIA Professional Standards & Ethical Principles of Biofeedback*
2. Patient education
   a. Biofeedback procedures
   b. Relevant basic anatomy and physiology
3. Patient intake
   a. Medical and symptom history
   b. Bowel and bladder assessment forms
   c. Bladder/bowel pain diaries
   d. Treatment planning
   e. Report generation
4. Communication with other health care providers
5. Medicare re-imbursement guidelines

III. CLINICAL DISORDERS: BLADDER DYSFUNCTION - 4.5 hours

A. Anatomy and Physiology: Urological

1. Structures and processes
2. Urine storage/continence
3. Voiding
4. Somatic & autonomic innervations

B. Physiological Basis and Testing for Disorders: Urinary Related Problems

1. Varieties of bladder disorders:
   a. Stress urinary incontinence
   b. Urge urinary incontinence
   c. Mixed urinary incontinence
   d. Overflow urinary incontinence/chronic retention of urine
   e. Functional urinary incontinence
   f. Urinary hesitancy and frequency
   g. Bladder sphincter dyssynergia
   h. Painful bladder syndrome
   i. Prostatitis
   j. OAB – overactive bladder
   k Pediatric population: enuresis , nocturnal enuresis, spina bifida
2. Overview of medical diagnostic procedures
3. Urodynamics

C. Medical and Behavioral Treatment Modalities: Urologic

1. Neuromuscular reeducation and therapeutic exercise assisted by vaginal/anal surface EMG and other EMG placements sites for bladder disorders.
   a. Pelvic floor muscle motor recruitment and strengthening strategies and exercise protocols
   b. Strategies and treatment protocols for pelvic floor muscle hypertonus and detrusor overactivity
   c. Treatment protocols for dysfunctional voiding/bladder sphincter dyssynergia
2. Other behavioral methods specific to bladder disorders
   a. Patient education
   b. Urge suppression techniques
   c. Bladder retraining
   d. Dietary counseling relating to bladder dysfunction
   e. Vaginal weights
   f. Toileting strategies
   g. Pelvic floor muscle electrical stimulation
   h. Dilators
3. Non-behavioral treatment modalities
   a. Pharmacological
   b. Surgical
   c. Electrical
   d. Physical interventions
4. Practice limitations and appropriate referral guidelines

IV. CLINICAL DISORDERS: BOWEL DYSFUNCTION - 4.5 hours

A. Anatomy and Physiology: Gastrointestinal

1. Digestive structures and processes
2. Stool continence
3. Elimination
4. Somatic and autonomic innervations

B. Physiological Basis and Testing for Disorders: Gastrointestinal

1. Gastrointestinal disorders
   a. Fecal incontinence
   b. Constipation (outlet obstruction type)
   c. Pelvic floor dyssynergia/anismus
   d. Irritable bowel syndrome
   e. Colonic inertia
   f. Pediatric population: encopresis, Imperforate anus, spina bifida
2. Medical diagnostic procedures
   a. Manometric and defecographic evaluation
   b. Transit time study
   c. Dynamic MRI for prolapse as well as muscle incoordination

C. Medical and Behavioral Treatment Modalities: Gastrointestinal

1. Neuromuscular reeducation and therapeutic exercise assisted by vaginal/anal surface EMG and other EMG placements sites for bowel disorders
   a. Pelvic floor muscle motor recruitment and strengthening strategies and exercise protocols
   b. Strategies and treatment protocols for pelvic floor muscle hypertonus and bowel urgency
   c. Treatment protocols for dysfunctional elimination/pelvic floor dyssynergia
   d. Bowel sensory awareness training

2. Other behavioral methods specific to bowel disorders
   a. Patient education
   b. Dietary counseling
   c. Toileting strategies

3. Non-behavioral interventions for bowel disorders
   a. Pharmacological
   b. Surgical
   c. Electrical
   d. Physical interventions
4. Practice limitations and appropriate referral guidelines

V. CLINICAL DISORDERS: CHRONIC PELVIC PAIN SYNDROMES - 4.5 hours

A. Physiological Basis of Disorders: Pain, General

1. Psychophysiological basis of pain
2. Basic pain mechanisms involving pelvic floor pain
3. Bone, nerve, and tendon
4. Pain-stress-muscle tension relationships, role of trauma
5. Connective tissue/fascia
6. Muscle trigger points
7. Viscerosomatic/somatovisceral reflexes

B. Physiological Basis of Disorders: Pain Syndromes Related to Pelvic Floor Dysfunction

1. Chronic pelvic pain syndromes
   a. Vulvodynia generalized, localized
   b. Vaginismus
   c. IBS-Irritable bowel syndrome
   d. Protalgia fugax/ levator ani syndrome
   e. Anismus/pelvic floor dyssynergia
   f. Dysfunctional voiding patterns
   g. Prostatitis
   h. Painful bladder syndrome
   i. Coccydynia
   j. Pudendal neuralgia
   k. Endometriosis
2. Co-morbidities
   a. Fibromyalgia/ Chronic Fatigue Syndrome
   b. Urinary disorders
      -Chronic urinary tract infections
      -Retention
   c. Bowel disorders
      -Constipation
      -Diarrhea
      -Fistula/fissure
      -Crohn's disease/colitis
   d. Abdominal/ Pelvic trauma
      -Surgical
      -Radiation
      - Injury
   e. Pelvic organ prolapse
   f. Hernia
   g. Back injury/ surgery
   h. Pregnancy
   i. Migraine
   j. TMJ
   k. Life stress

C. Medical and Behavioral Treatment Modalities: Pain

1. Neuromuscular reeducation and therapeutic exercise assisted by vaginal/anal surface EMG and other EMG placements sites for chronic pelvic pain syndromes
   a. Strategies and treatment protocols for pelvic floor muscle hypertonus and instability
   b. Postural corrective strategies
2. Other behavioral methods specific to pelvic pain
   a. Patient education
   b. Dietary counseling related to pain control
   c. General relaxation modalities
3. Non-behavioral interventions for pelvic pain syndromes
   a. Manual therapy, soft tissue mobilization: connective tissue and trigger point releases, dry needling technique, neural tension, visceral mobilization, manual lymph drainage, and joint mobilization
   b. Pharmacological
   c. Surgical
   d. Electrical
   e. Physical interventions
4. Basic sexual history taking, sexual counseling
5. Practice limitations and appropriate referral guidelines