



# Biofeedback

## Applications for Palliative Care

John Jordy, M.Ed., LMHC

12 Bellwether Way, 223

Bellingham, WA

255-2505, ext 108

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# “Applied Psychophysiology”

Various therapies designed to improve mind-body relationship

reduce high arousal, increase relaxation, pain reduction,  
improved medication response, improve focus

Biofeedback/Neurofeedback

Guided Imagery

Relaxation Strategies

Hypnosis/Self-hypnosis

Postural Modification

Mindful Stretching

Cognitive strategies: challenging assumptions and examining beliefs

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# Biofeedback

A learning process to help people gain skills to control their body's response to stress.

Usually a body function is measured and displayed with a computer so that complex body functions can be viewed easily.

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# Biofeedback

- “Bio”- biological information
- “feedback”-providing information back to the source in order to modify (improve) function
- Biofeedback= providing biological information back to the source for the purpose of modifying function

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# Biofeedback

- \* Biofeedback training encourages active involvement
- \* Guidance, coaching, and instruction to assist the development of specific skill set –”self-regulation skills”

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# Biofeedback Modalities

## Most Common:

- \* **Skin temperature** (degrees), ranges from a few degrees below room temperature up to approximately 95 degrees
- \* **Skin perspiration** (EDG), measured in micromhos ranges from 0 to 50 (average 7-15)
- \* **Muscle activity**, (EMG) measured in microvolts ranges-1-100uv
- \* **Brain waves**, (EEG) measured in microvolts and frequency from 1-40hz, 0-100 uv
- \* **Respiration**, breaths per minute, pattern
- \* **Heart rate**, variability (HRV), rate- beats per minute

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# Biofeedback & Pain Management

Goal: **More Awareness and more control** → **more choices**  
→ **personal empowerment**

1) Reduction of general nervous system arousal (“down training”)-

reduce fight or flight response

strengthen homeostasis

2) Increased control over specific body functions  
such as muscle contraction or heart rate

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# Biofeedback

## Demonstration

### Specific Body Function Training

Reducing Dyspnoea- “misplaced energy”

#### EMG Training:

- > shoulder tension reduction
- > mindful stretching
- > passive limb movement

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# Biofeedback

Reducing the Stress Response Fight, Flight or Freeze

## Physical pathways of stress reactivity

Sympathetic – activation

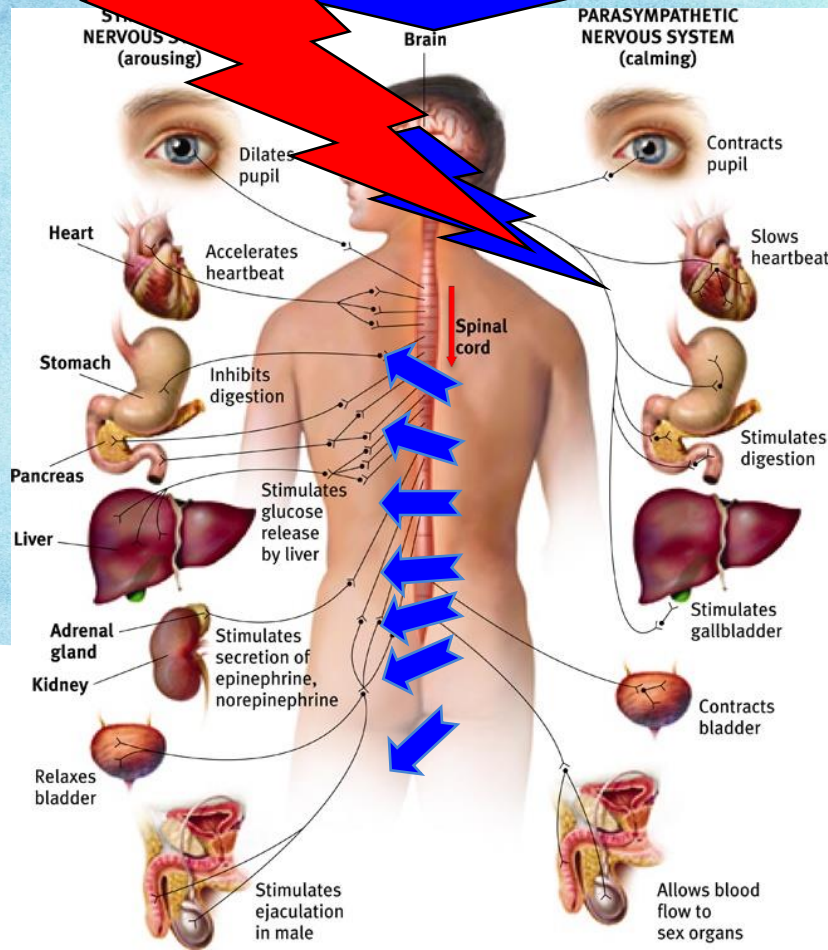
→ fight or flight

Parasympathetic – relaxation, rest and digest

→ freeze/paralysis

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# STRESS!!



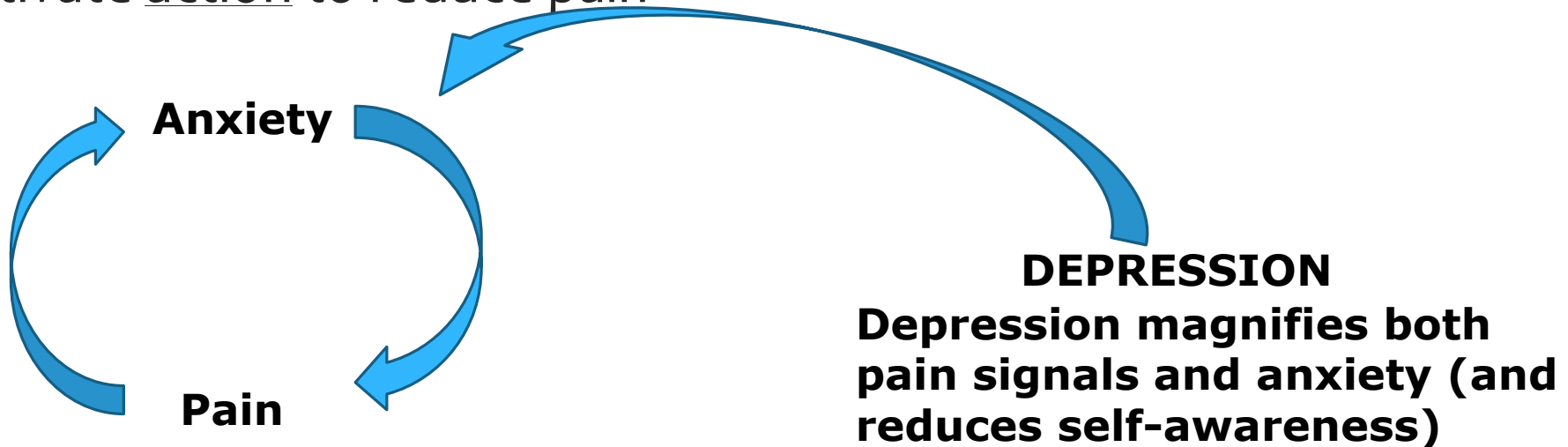
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# Anxiety-Pain-Depression cycle

Anxiety - generates hypervigilance - high degree of focus on information (physical or communication) which could indicate pain or danger

Pain - a primary function of pain is to heighten awareness and motivate action to reduce pain



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# Anxiety

**Unpredictability and ambiguity are key triggers for anxiety**

To help reduce anxiety- focus on what can be seen clearly and controlled rather than what is unknowable and uncontrollable

“Whatever you focus on expands....”

Biofeedback can give us something tangible to hold our focus and promote a sense of control

Having a sense of control can sometimes help break the negative feedback loop of pain - anxiety - depression

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# Anxiety

We seek control to feel safe from threat- usually this control is attempted over external factors- people and events

Our control (influence/power) over external forces decreases as our health declines

Skills in regulation of our own emotional response is one form of control that can actually increase

Learning how to do this requires specific information and feedback of our progress, like any other form of learning

Biofeedback breaks down and overwhelming task to specific steps that allows for “self-regulation” skills to develop

# Anxiety & Pain

Types of Control - Passive and Active Will

**Active will-** use of force and energy to control outside circumstances or our own body

**Passive will-** based on acceptance and permission, letting go with gentle intention

Biofeedback training develops abilities with passive will and can show immediate physical changes of mastering passive will

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Biofeedback based

*Breathing Retraining*

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# Breathing

When we regulate breathing we can “cultivate” greater balance within the nervous system (homeostasis) and stabilize a range of different physical functions such as blood pressure, digestion, PH level of the blood and brain activity.

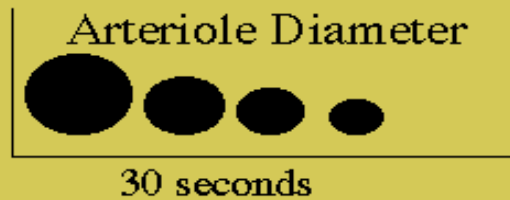
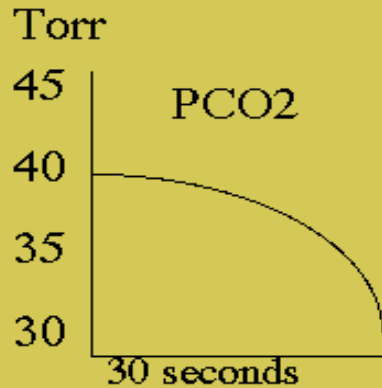
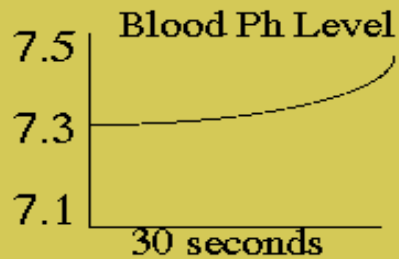
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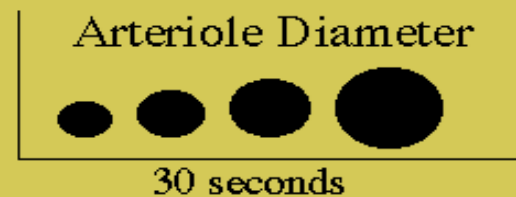
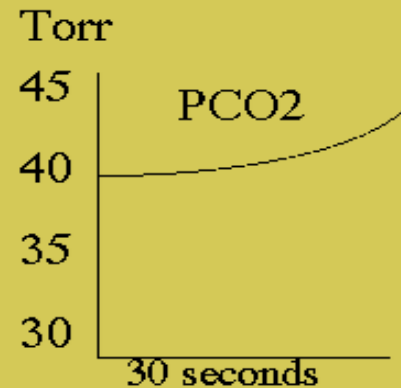
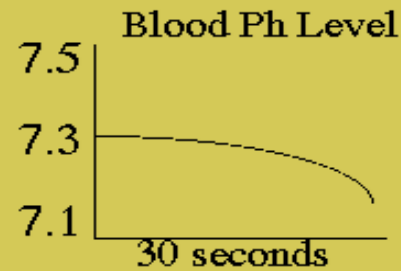


# Breathing and Blood CO2 levels

## Hyperventilation



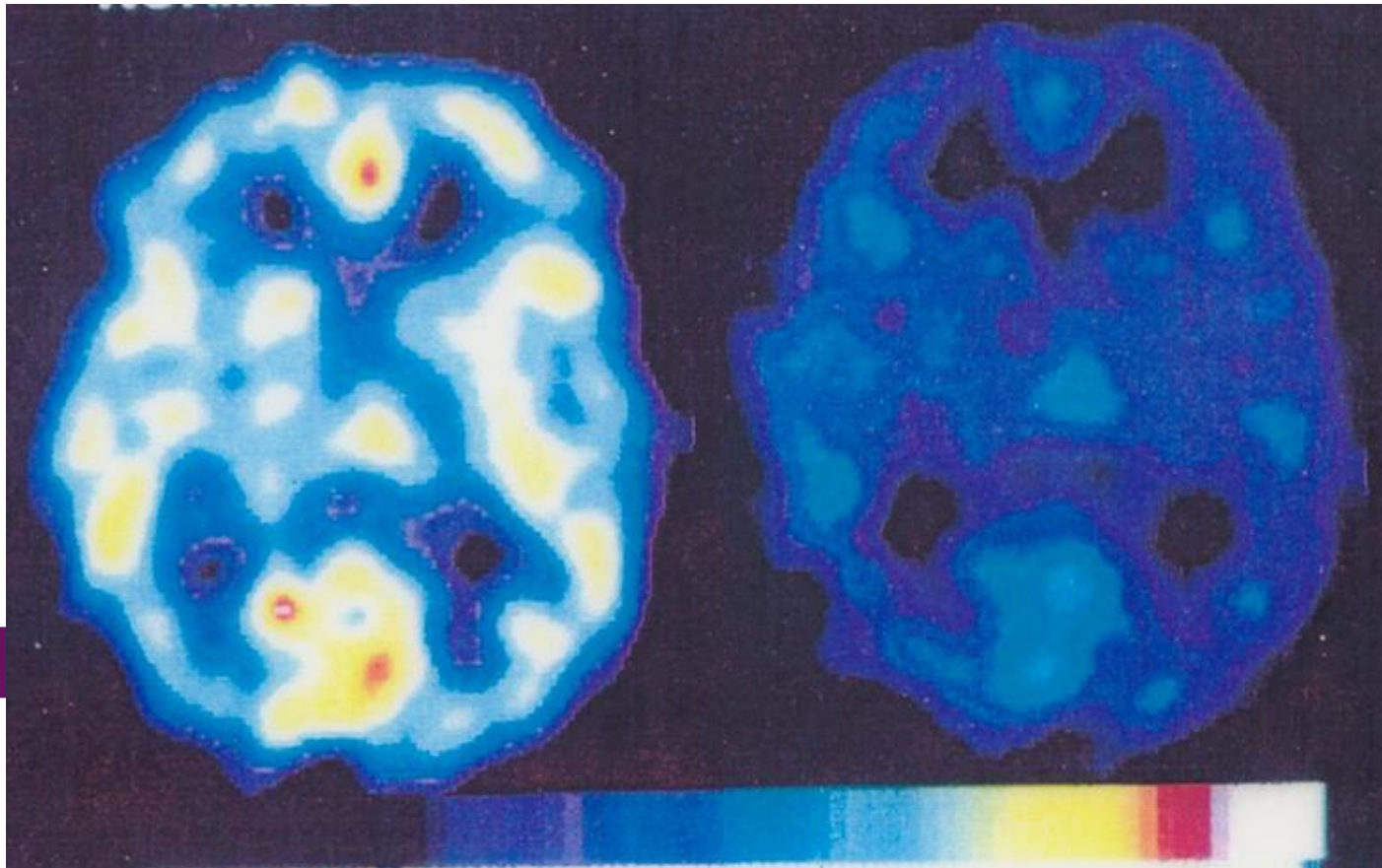
## Breath Holding

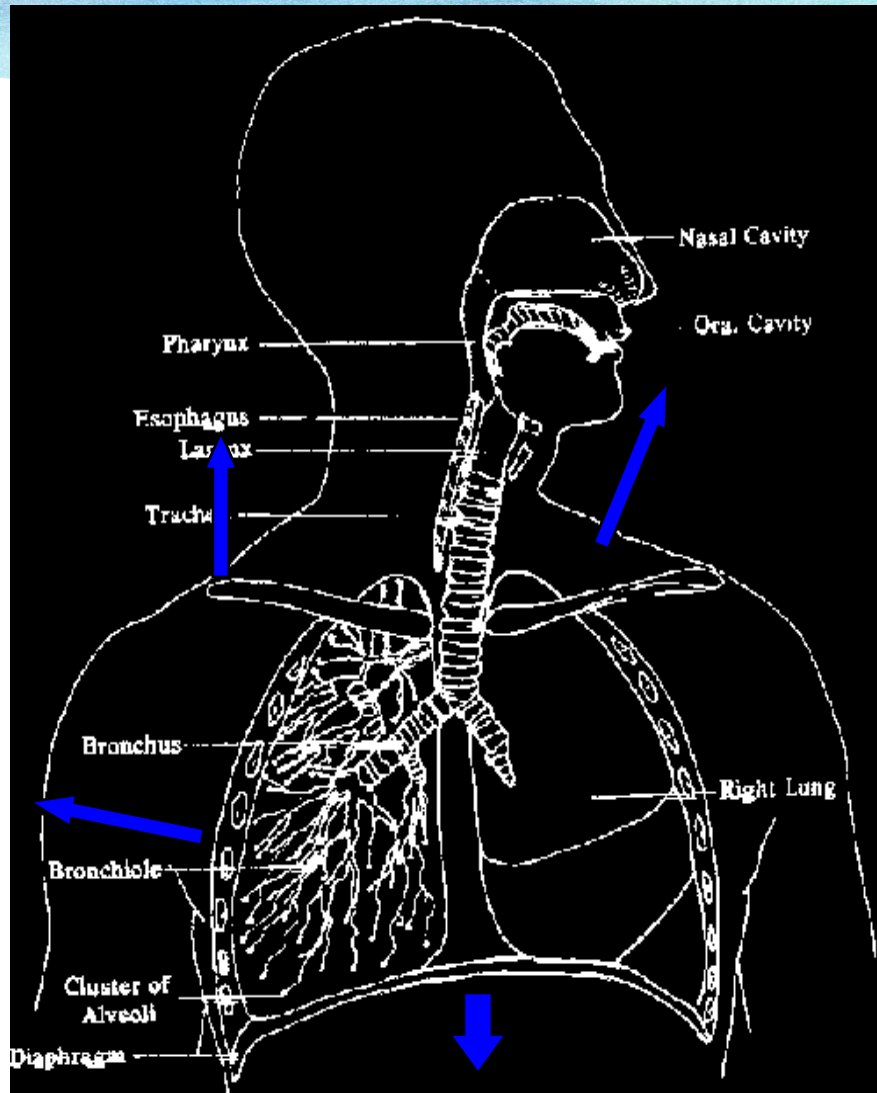


The lighter the area, the greater the brain activity.

Your brain...  
normal breathing

Your brain on stress -  
rapid, shallow breathing...

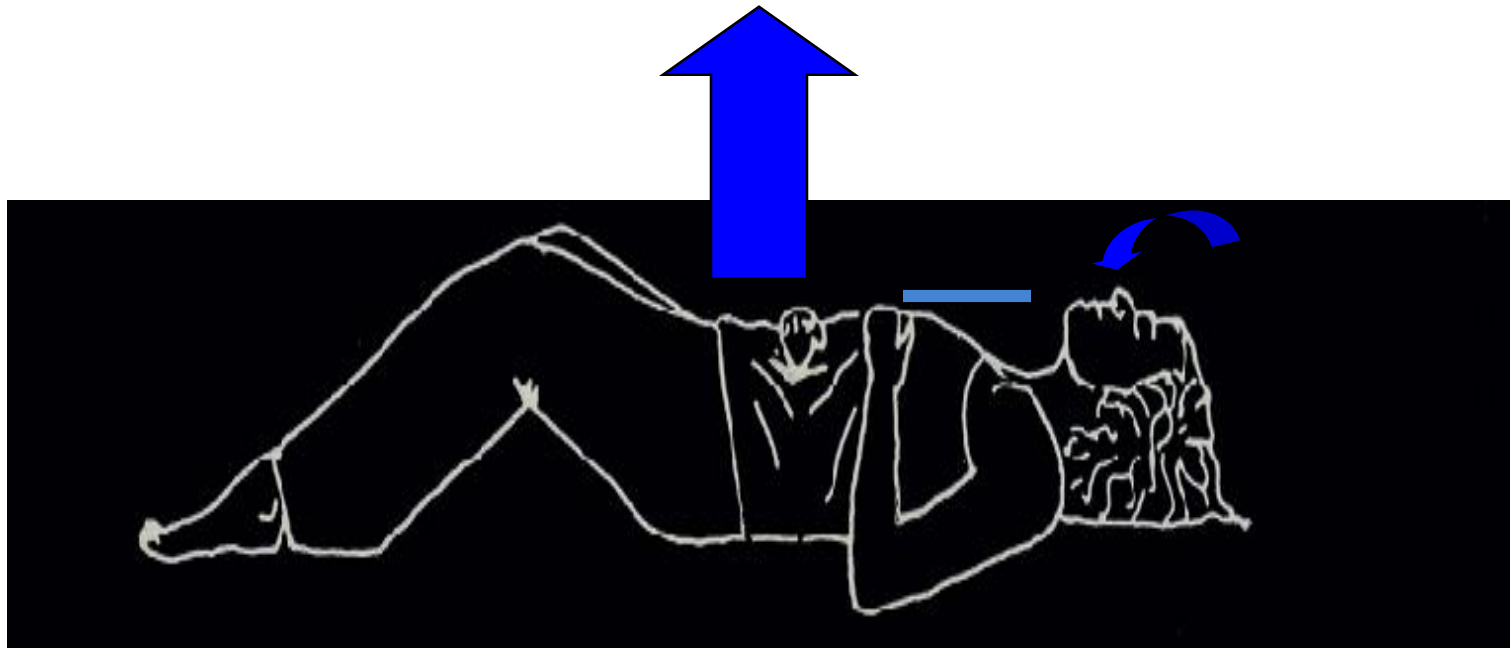
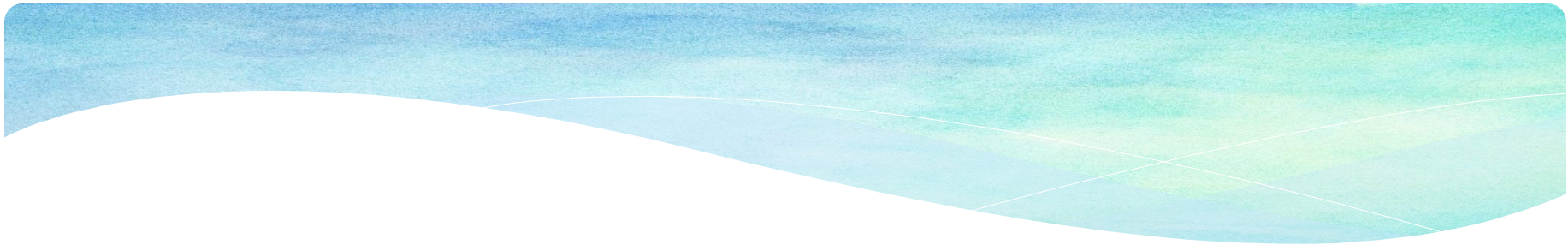




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John Jordy,  
M.Ed





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# Breathing & Heart Rate Control

- \* Respiration rate and pattern influence many aspects of body function
- \* Heart rate is a key regulator of arousal and constantly varies -this is called Heart Rate Variability (HRV)
- \* When influenced by respiration- this variability is called Respiratory Sinus Arrhythmia (RSA)

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# Biofeedback

## Demonstration

### Heart Rate & Breathing

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# Biofeedback- Home Training

emWave/ Heart Math

Portable GSR units

Low cost digital thermometers

Journey to Wild Devine

Stress Dots

My Calm Beat

Phone applications: Belly Bio, emWave

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# Typical Problems with Practice\*

- \* Concentration/distraction
- \* Difficulty being physically still
- \* Fear of failure/perfectionism
- \* Listen to a relaxation exercise but not attending
- \* Difficulty of task (complex imagery or relaxation strategies)
- \* Hurrying
- \* Time of day/fatigue
- \* Falling asleep during practice
- \* Dependency on relaxation audio programs
- \* Medication effects
- \* Problems with generalization – application to real life challenges
- \* Lack of support (can't ask for help-support)

From: Applications Standards and Guidelines for Providers of Biofeedback

Biofeedback Society of America, 1982

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# Critical Issues in Self-regulation Training

Chronic separation from our feelings leads to an inability to distinguish between relaxation and tension: Being tense=normal

Sometimes being out of touch is a way of coping- being numb easier vs. feeling pain

Numbness also allows for a greater degree of activity (productivity) which strengthens self esteem and also helps distract from pain (emotional and physical)

Feeling relaxed may feel strange, uncomfortable, and even trigger anxiety  
(loss of control – loss of self; Relaxation Induced Anxiety)

Performance anxiety- trying to relax perfectly- replication of how one may live life generally- the harder you try- the worse it gets → panic cycle

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# The Five Finger Exercise

- \* *relaxation*
- \* *mastery*
- \* *closeness*
- \* *safety*

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## Resources

Association for Applied Physiology and Biofeedback  
<http://www.aapb.org/>

International Society for Neurofeedback and Research  
<http://www.isnr.net/>

Biofeedback Certification International Alliance  
<http://www.bcia.org/>

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# Resources

## Books

The Relaxation and Stress Reduction Workbook  
(Martha Davis, et al.)

Progressive Relaxation (Fanning, et al.)

Thoughts and Feelings: Taking Control of Your Moods and Your  
Life (McKay, et al.)

## Biofeedback Equipment

<http://www.stens.com/>

<http://www.jjengineering.com/>

<http://www.heartmath.com/>

<http://bio-medical.com>

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