



**Gain-Control Theory:
A Guide for Pain Relief Nursing:**

Paul Arnstein, RN, PhD,
Director: MGH Cares About Pain Relief
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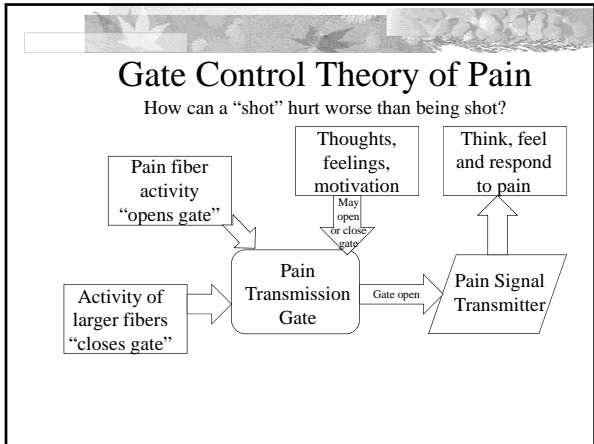
Historical Understandings of Pain

- Pain is mystical / spiritual
- Pain is purely emotional
- Pain is purely physical
- Pain is social / culturally learned
- Pain is multidimensional



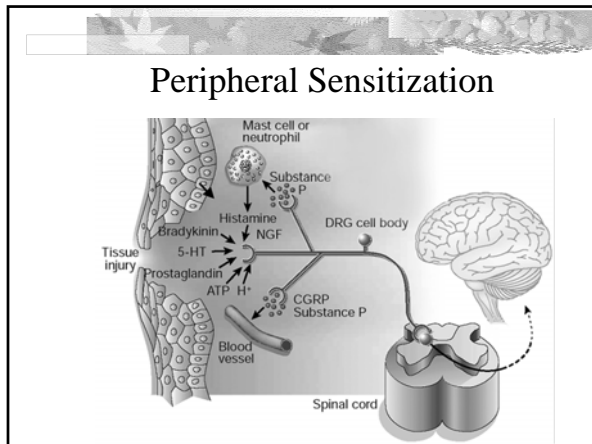
20th Century Theories of Pain

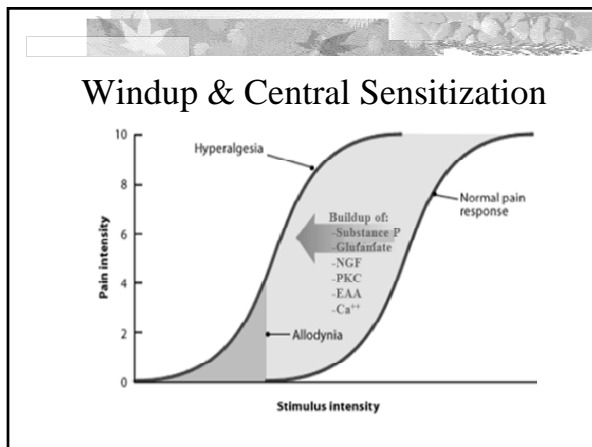
- Specificity Theory
- Pattern Theory
- Psychological Theory
- Learned Behavior Theory
- Gate Control Theory

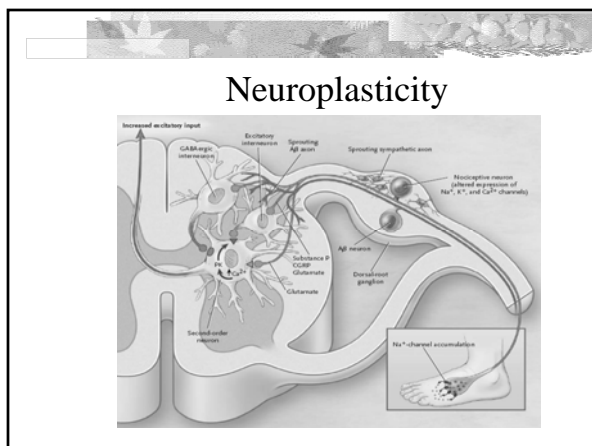


- ### Physiological Categories of Pain
- Nociceptive
 - Somatic
 - Visceral
 - Neuropathic
 - Central
 - Peripheral
 - Sympathetically Maintained

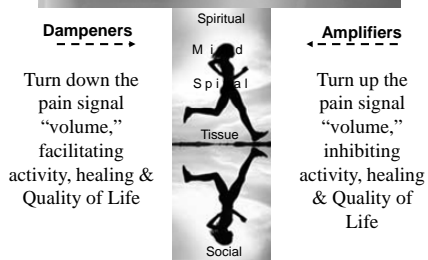
- ### Merits & Limits of Gate Control
- | | |
|---|---|
| ■ Stimulated research | ■ Emphasis on spine |
| ■ Synthesize other theories under one "Grand" perspective | ■ Nerves fixed, unidirectional? |
| ■ Revolutionized education re: pain | ■ Fits nociceptive pain better than other forms |
| | ■ No on-off switch |
- Paradigm Shift: From Gate Control to Gain Control**







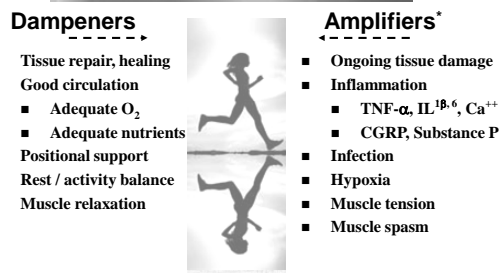
Gain Control Model of Pain



Adapted from Amstein PM (2010) *Clinical Coach for Effective Pain Management*. Philadelphia, FA Davis

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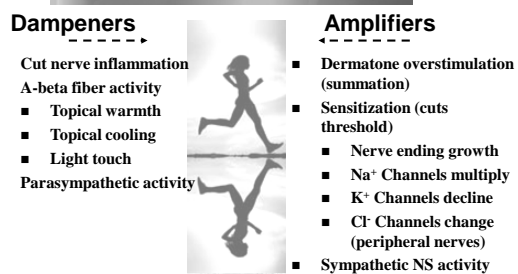
Gain Control: Tissue Level



*Partial list

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Gain Control: Peripheral Nerves



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Gain Control: Central Nerves

Dampeners

- Pre-emptive analgesia
- Descending inhibition
 - Endorphin release
 - Cut limbic/RAS excitability
- Norepinephrine
 - Blocks hyper-excitability created by excess Ca⁺⁺



Amplifiers*

- Nerve inflammation/death
 - Dendritic sprouting
 - New synapses
 - Neuronal cross-talk
- Glial cell activation
- Ca⁺⁺ channel hyperactivity
 - Elevates prostaglandins & glutamate
 - Hyper-excitabile state
- Long-term potentiation
- CNS reorganization

*Partial list

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Gain Control: Whole Body

Dampeners

- Homeostasis
- Comforting environment
- Low stress / eustress
- Quiet immune system
- Muscle relaxation
- Balance activity / rest
- Healthy sleep pattern



Amplifiers

- Physiological imbalances
 - Fluid/electrolyte
 - Thermal
 - Acid/base
- Environmental extremes
- High stress/distress
- Generalized infection
- Muscle tension
 - Fatigue/spasm
- Sleep deprivation

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Gain Control: Mind Level

Dampeners

- Emotional stability
- Feel loved
- Self efficacy, optimistic
- Acceptance
- Realistic beliefs and expectations
- Mental distraction
- Pain & stress coping




Amplifiers

- Emotional distress
 - Anxiety, fear, depression, etc
- High or prolonged stress
- Unhelpful thoughts
 - Catastrophizing
 - Self doubts
 - Helplessness, hopelessness


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Gain Control: Spiritual Level

<p>Dampeners</p> <ul style="list-style-type: none"> ■ Strong faith ■ Essence unchanged ■ Sense of purpose ■ Sense of connection ■ Energy flow balanced 		<p>Amplifiers</p> <ul style="list-style-type: none"> ■ Spiritual distress ■ Lost connections ■ Dire meaning ■ Suffering ■ Energy imbalance
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Gain Control: Social Level

<p>Dampeners</p> <ul style="list-style-type: none"> ■ Socially engaged ■ Meaningful, pleasurable activities pursued ■ Effective communication ■ Work, volunteering 		<p>Amplifiers</p> <ul style="list-style-type: none"> ■ Socially isolated ■ Relationship/role conflict ■ Over-dependency ■ Dysfunctional coping
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Net Effect

<p>Dampeners</p> <p>Pain prevented / controlled</p> <p>Distress avoided or transient</p> <ul style="list-style-type: none"> - Emotional - Spiritual/Existential <p>Behaviors can change</p> <ul style="list-style-type: none"> - Functional improvement - Adaptive coping - Socially engaged - Wellness behaviors 		<p>Amplifiers</p> <p>Amplifies, spreads & prolongs pain</p> <p>Distress persists</p> <ul style="list-style-type: none"> - Emotional - Spiritual/Existential <p>Behaviors can change</p> <ul style="list-style-type: none"> - Functional decline - Maladaptive coping - Social discord - Costly illness behaviors
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Transduction targets to dampen pain

- Local anesthetic before tissue injury
- Protect from / minimize tissue damaged
- Prevent inflammation / infection
- Preemptive analgesia
- Control pain once established

Prevent peripheral sensitization
and lowered pain thresholds

Transmission targets to dampen pain

- Prevent / minimize nerve damage
- Reduce neuronal excitability
 - Fluid/electrolyte
 - Acid/base
- Limit exposure to intense pain

Prevent neuronal hyperexcitability,
long-term potentiation and
sensitization

Modulation targets to dampen pain

- Reduce prolonged pain, stress / distress
 - Stimulate release of endorphins
 - Laughing, crying, exercise
 - Accupuncture
 - "Healer effect"
 - Realistic expectations
 - Conditioned responses (use what has worked)
- Promote physiological and
psychosocial wellness and balance

Perceptual targets to dampen pain

- Lower physical/emotional arousal levels
- Explore meaning of pain and treatment
- Cope with existential suffering and losses
- Motivators to transcend pain
- Attention directed away from pain
- Meaningful people, places and rituals
- Develop capacity

Prevent pain and suffering from becoming the focus of existence

Nursing Care Target: Tissue

- | | |
|------------------------------------|---------------------------------------|
| ■ Pharmacological | ■ Non-drug |
| ■ Cause-directed | ■ Massage, rubbing |
| ■ Inflammation | ■ Moist heat |
| ■ NSAIDs | ■ Application ice |
| ■ Substance P | ■ Positioning |
| ■ TNF- α | ■ Braces, orthotics, compression |
| ■ Na ⁺ Channel Blockers | ■ Remove source of pain or irritation |


Nursing Care Target: Nerves

- | | |
|---------------------|-------------------------------|
| ■ Pharmacological | ■ Non-drug |
| ■ Acetaminophen | ■ Reduce summation |
| ■ Opioids | ■ Excessive dermatone stimuli |
| ■ Anticonvulsants | ■ Activate inhibitors |
| ■ Antidepressants | ■ Regional A-B fibers |
| ■ Local anesthetics | ■ Contra-lateral stimulation |
| ■ Alpha blockers | ■ Proximal/distal stimulation |
| | ■ Endorphins |




Nursing Care Target: Body

- Promote
 - Good nutrition, hydration,
 - Good oxygenation, diaphragmatic breathing
 - Paced activities and exercise
- Consider
 - Dietary supplements
 - Acupuncture / acupressure
 - Functional / multidisciplinary rehabilitation



Nursing Care Target: Mind

- Promote
 - Relaxation techniques
 - Knowledge about condition/sensations
 - Distraction (music, reading, writing)
 - Change thinking, attitudes
 - Reduce sadness, helplessness
 - Reduce fear, anxiety, stress
- Consider
 - Biofeedback, Counseling
 - CBT, Coping skills training



Nursing Care Target: Spirit

- Promote
 - Prayer, Meditation, Spiritual Healing
 - Self-reflection, re: life / pain
 - Meaningful rituals
- Consider
 - Energy work (e.g. TT, reiki)
 - Magnetic Therapy
 - Homeopathic remedies

Nursing Care Target: Social

- Promote
 - Improved communication
 - Caring presence
 - “Healer effect”
- Consider
 - Psychosocial Counseling, Family therapy
 - Pet therapy
 - Support groups
 - Vocational training, Volunteering

Multimodal Approaches

- Address multiple amplifiers/dampeners
- Combine “active” & “passive” approaches
- Integrate therapies the patient believes in
 - Medical modalities
 - Physical modalities
 - Psychosocial modalities
 - CAM modalities
- Consistent evidence

Meeting the Challenges

Learn and teach the use of a variety of tools available to reduce pain, improve functioning.

Best tools are:

Multi-modal

Multidisciplinary

Tailored for the individual