

Emotional aspect and mindfulness solution

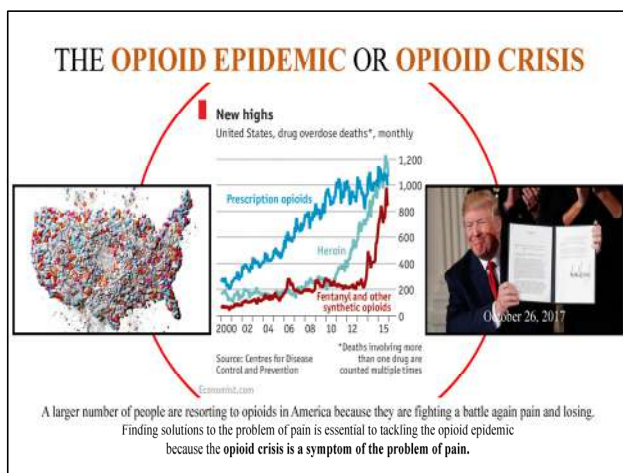
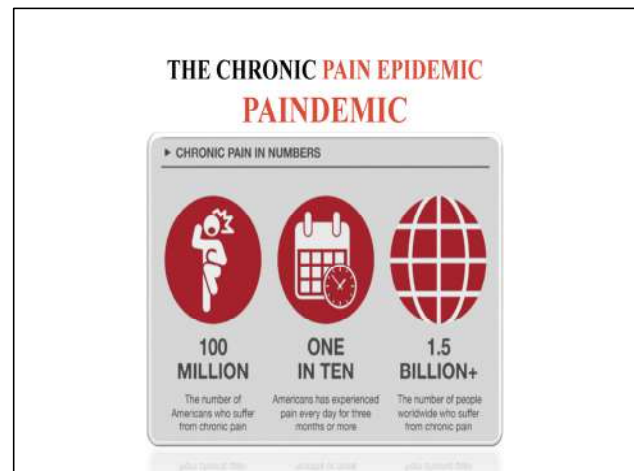
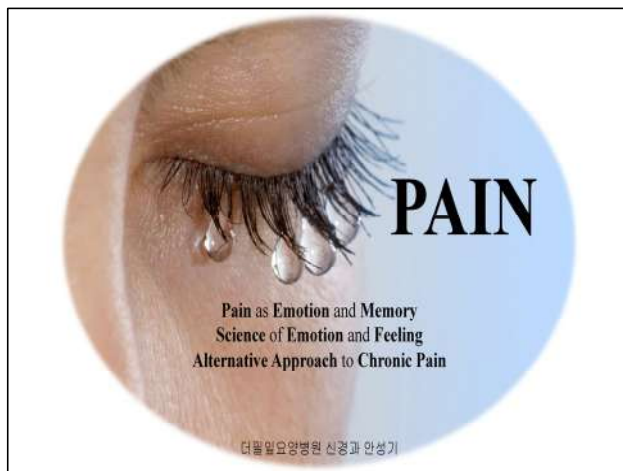


안 성 기

더필요양병원 신경과

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THE SHARP RISE IN PRESCRIPTION OPIOID CONSUMPTION

In 1986 a paper describing the treatment of 38 chronic pain patients concluded that OPRs (opioid pain relievers) could be prescribed safely on a long-term basis. Despite its low-quality evidence, the paper was widely cited to support expanded use of opioids for chronic non-cancer pain.

Chronic Use of Opioid Analgesics in Non-Malignant Pain: Report of 38 Cases.
Portenoy RK, Foley KM. *Pain*. 1986 May;25(2):171-86.



FADS IN THE TREATMENT OF LOW BACK PAIN

Deyo RA. N Engl J Med. 1991 Oct 3;325(14):1039-40.

The **history** of medical care for **low back pain** – one of the most common causes of morbidity and absenteeism in the United States – involves **serial fashions in diagnosis and therapy**.

Table 1. Baseline Characteristics of the Randomized Patients.*

Characteristic	Placebo Group (n=100)	Levamisole Group (n=100)	Randomized (n=200)
Age (yr)	52.8 (11.1)	51.2 (10.8)	52.0 (11.0)
Male sex (%)	93.0	88.0	90.5
Race (%)			
White	88.0	88.0	88.0
Black	12.0	12.0	12.0
Other	0.0	0.0	0.0
Severity of osteoarthritis in knee (%)			
Mild	20.0	27.0	23.5
Moderate	80.0	73.0	76.5

A CONTROLLED TRIAL OF ARTHROSCOPIC SURGERY FOR OSTEOARTHRITIS OF THE KNEE

Moseley JB, et al. N Engl J Med. 2002 Jul 11;347(2):81-8.

No Better Than Placebo Procedure

Mean (SD)	88.0 (10.8)	88.0 (10.8)	88.0 (10.8)
Standard deviation	11.3 (12.7)	9.0 (12.4)	10.0 (12.6)
Range	20.0-100.0	20.0-100.0	20.0-100.0
Median	54.0 (22.0)	52.0 (20.0)	53.0 (21.0)

*†† Acute OA, 1 grade OA, 2 grade OA, 3 grade OA, 4 grade OA (††)

††† Acute OA, 1 grade OA, 2 grade OA, 3 grade OA, 4 grade OA (†††)

†††† Acute OA, 1 grade OA, 2 grade OA, 3 grade OA, 4 grade OA (††††)

In the last thirty-five years, **three** have been so often **misdiagnosed** that their incidence has reached **epidemic proportion**.

Chronic Pain from Back, Neck, Shoulder, and Limbs
Fibromyalgia
Carpal Tunnel Syndrome



THREE MINDBODY EPIDEMICS

TMS PAIN
(MILD OXYGEN DEPRIVATION)

CONCIOUS MIND

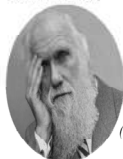
UNCONCIOUS MIND

RAGE
EMOTIONAL PAIN
SADNESS

THE BRAIN'S
DECISION MAKER
(THE EGO)

The Expression of the Emotions in Man and Animals.

Darwin, C. (1872)



(1809 – 1882)

...certain actions, which we recognize as expressive of certain states of mind, are the direct result of the constitution of the nervous system, and have been from the first independent of the will, and, to a large extent, of habit...
Our present subject is very obscure, but, from its importance, must be discussed at some length; and it always is advisable to perceive clearly our ignorance.

- Charles Darwin (1872)



International Association for the Study of Pain's definition:





"Pain is an unpleasant

sensory and emotional experience associated with **actual or potential** tissue damage, or **described** in terms of such damage."

Pain. 1979;6(3):247-8.

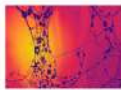
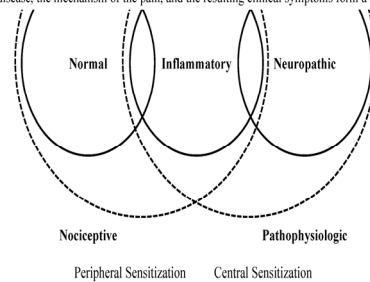


Four Major Pain Syndromes

Noiceptive Pain	Inflammatory Pain	Neuropathic Pain	Dysfunctional Pain
			
Noxious Stimuli	Inflammation	Neuronal Damage	No Noxious Stimuli No Inflammation No Neuronal Damage
Protective	Healing/Repair/Pathological	Pathological	Pathological
Burn	Rheumatoid Arthritis	Herpes Zoster	Fibromyalgia
Acute Pain	Chronic Pain		

Pain Syndrome

Clinical chronic pain conditions may be a combination of noiceptive, inflammatory, and neuropathic pain. The underlying disease, the mechanism of the pain, and the resulting clinical symptoms form a complex relationship.



Peripheral Sensitization (Irritable Noiceptors) & Central Sensitization (Use-dependent Synaptic Plasticity)

Adaptive		Maladaptive	
Noiceptive	Inflammatory	Dysfunctional	Neuropathic
Osteoarthritis	Rheumatoid Arthritis	Fibromyalgia, Irritable Bowel Syndrome, Interstitial Cystitis	Peripheral or Central Nerve Damage

*Maladaptive in the sense
that the pain neither protects nor supports healing and repair*

Annu Rev Neurosci. 2009;32:1-32

A Life free of Pain

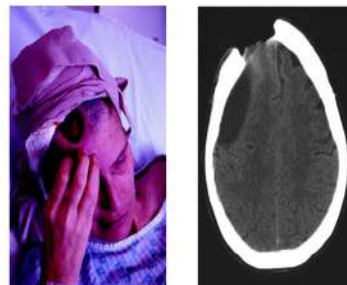
vs.

A Pain for Existence

Imagine a life free of pain.

How would it be—calm, fearless, serene? Would you feel invulnerable, invincible?

Loss of noiception, as in hereditary disorders associated with congenital insensitivity to pain (Cox et al. 2006, Indo 2001), leads to repeated injury and inadvertent self mutilation, illustrating the highly adaptive function of noiceptive pain.



Intractable Postherpetic Itch and Cutaneous Deafferentation after Facial Shingles.
Oaklander AL, Cohen SP, Raju SV. Pain. 2002 Mar;96(1-2):9-12.

Pain translates **objective sensory information** into **a subjective percept**, which signals **threat** and thereby fulfills **vital protective functions**.

Cereb Cortex. 2015 Nov;25(11):4407-14

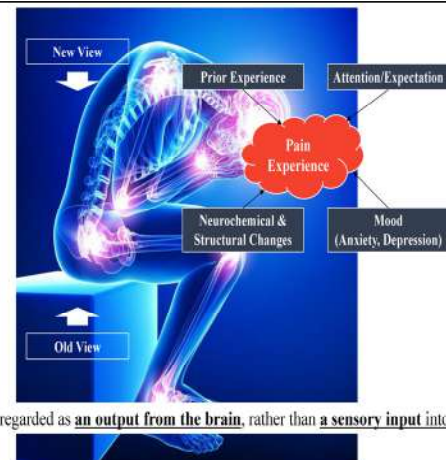
However, pain can also occur as **an ongoing percept without obvious sensory information**. In such **chronic pain** states, pain no longer serves a protective function, but represents a pathological condition with devastating effects on **quality of life**.

Cereb Cortex. 2015 Nov;25(11):4407-14

PHANTOM LIMB SYNDROME

The amputation or deafferentation of a limb or another body part is usually followed by a **global feeling that the missing limb is still present (phantom limb awareness)**, as well as **specific sensory and kinaesthetic sensations (phantom sensations)**. These non-painful phantom phenomena are reported by **almost all amputees**.

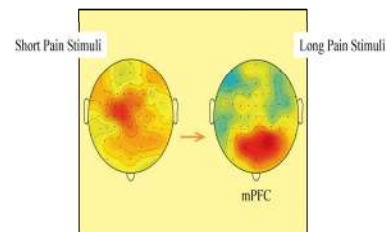
Phantom limb pain (50-80% of amputees), or phantom pain, belongs to a group of **neuropathic pain syndromes** that is characterized by pain in the amputated limb or pain that follows partial or complete deafferentation. **Residual limb (or stump) pain** and non-painful residual limb phenomena are sensations in the still-present body part adjacent to the amputation or deafferentation line.



The perception of pain depends on **bottom-up-mediated factors like stimulus intensity** and **top-down-mediated factors like expectations**.

Pain. 2015 Feb;156(2):289-96

Pain In The Brain Switches From Sensory To Emotional Processes Over Time



If pain persists over a prolonged period of time, the associated brain activity shows that it changes from a **pure perception process** to a **more emotional process**

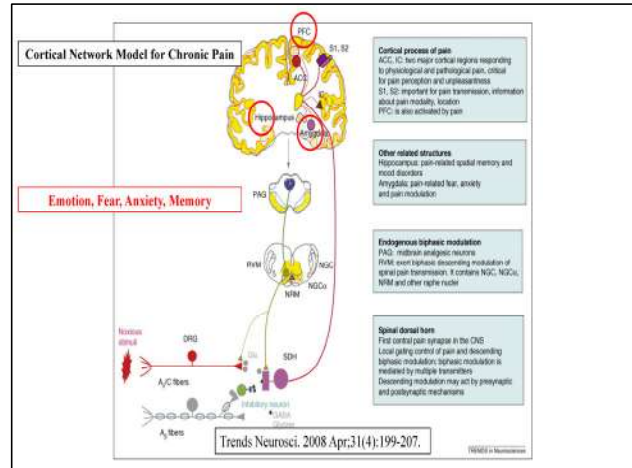
Cereb Cortex. 2015 Nov;25(11):4407-14

Ongoing pain particularly engages the **medial prefrontal cortex**, which has been interpreted as a **shift** away from **sensory** to **emotional** processes when pain is ongoing for months and years..

J Neurosci. 2006 Nov 22; 26(47):12165-73
J Neurosci. 2011 Sep 28; 31(39):13981-90
Brain. 2013 Sep; 136(Pt 9):2751-68
Cereb Cortex. 2015 Nov;25(11):4407-14

This **mPFC activity** was strongly related to intensity of CBP, and the region is known to be involved in **negative emotions**, **response conflict**, and **detection of unfavorable outcomes**, especially in relation to the **self**.

J Neurosci. 2006 Nov 22; 26(47):12165-73



Pain is an **integrative phenomenon** that results from dynamic interactions between **sensory** and **contextual** (i.e., **cognitive**, **emotional**, and **motivational**) processes.

Trends Cogn Sci. 2017 Feb;21(2):100-110

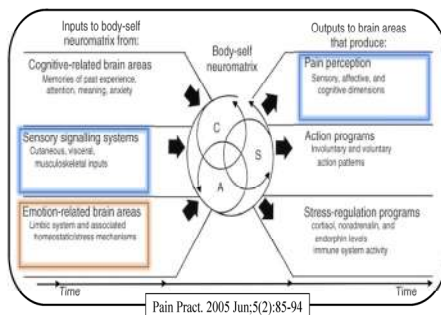
1965 FROM THE GATE TO THE NEUROMATRIX

Melzack R¹. Pain. 1999 Aug;Suppl 6:S121-6.



BODY-SELF NEUROMATRIX THEORY OF PAIN

Factors that contribute to the patterns of activity generated by the body-self neuromatrix, which is comprised of **sensory (S)**, **affective (A)**, and **cognitive (C)** neuromodules. The output patterns from the neuromatrix produce the multiple dimensions of pain experience, as well as concurrent homeostatic and behavioral responses.



CHRONIC PAIN

Sensation – Emotion – Memory – Story



NEUROPLASTICITY

PAIN AND PLASTIC BRAIN

Phantom limb pain Amputees without pain Healthy controls

the cortical representation of the mouth extends into the region of the hand and arm.

Phantom Limb Pain: A Case of Maladaptive CNS Plasticity?
Nat Rev Neurosci. 2006 Nov;7(11):873-81.

What Are Emotions?

Emotion, Memory and the Brain

by Joseph E. LeDoux

Unconscious Mind
Evolutionary Conserved Mind
Core Link between Body and Mind

Historical Milestones in Understanding the Emotional Brain. Nat Rev Neurosci. 2004 Jul;5(7):583-9

LeDoux proposes multiple amygdala pathways for fear conditioning. 1986

High Road
Cortical pathway
There is a snake
Conscious & More Slow

Low Road
Subcortical pathway
Rough, almost archetypal information
Unconscious and Immediate

Visual Thalamus
Visual Cortex
Amygdala
Emotionally Compotent Stimuli
Danger-Response
Heart Rate
Muscle
Blood Pressure

THE FEAR RESPONSE

LeDoux, Scientific American, 1994

Historical Milestones in Understanding the Emotional Brain. Nat Rev Neurosci. 2004 Jul;5(7):583-9

Damasio outlines his somatic marker hypothesis. 1991

FEAR
A subjective state of awareness
brought about when brain systems react to danger
LeDoux, Scientific American, 2002

몸은 단순한 반응의 대상이 아니라 느낌을 만드는 주체이다.

Visual Thalamus
Visual Cortex
Amygdala
Emotionally Compotent Stimuli
Danger-Response
Heart Rate
Muscle
Blood Pressure

THE FEAR RESPONSE

Damasio, Somatic Marker Hypothesis, 1991

Conscious, Interoceptive, Homeostatic

Feelings (of emotion) are Mental Experiences of Body States

Feelings signify **physiological need** (for example, hunger),
tissue injury (ex, pain), **optimal function** (ex, well-being), **threats to the organism** (ex, fear or anger)
or **specific social interactions** (ex, compassion, gratitude or love).

The Nature of Feelings: Evolutionary and Neurobiological Origins.
Damasio A¹, Carvalho GB. Nat Rev Neurosci. 2013 Feb;14(2):143-52.

Feelings constitute a crucial component of the mechanisms of **life regulation**, from simple to complex.
Nat Rev Neurosci. 2013 Feb;14(2):143-52.

LEVELS OF LIFE REGULATION

HIGH REASON	Complex, flexible, and customized plans of response are formulated in <u>conscious images</u> and may be executed as <u>behavior</u> .
FEELINGS	Sensory patterns signaling pain, pleasure, and emotions <u>become images</u> .
EMOTIONS	Complex, stereotyped patterns of <u>response</u> , which include secondary emotions, primary emotions, and background emotions.
BASIC LIFE REGULATION	Relatively simple, stereotyped patterns of response, which include metabolic regulation, reflexes, the biological machinery behind what will become pain and pleasure, drives and motivations.

Antonio Damasio, *The Feeling of What Happens*, 2004, table 2.1, p55

Looking for Spinoza: Joy, Sorrow, and the Feeling Brain
Antonio Damasio

감정은 행위 또는 움직임이다.
감정 중 상당수는 공개적이어서, 얼굴 표정, 목소리, 특정 행동에 드러나는 감정을 다른 사람이 볼 수 있다. 더 확실하게 해 두자면, 감정 중 일부는 만능으로 볼 수 없지만, 현재의 과학적 탐지 수단, 예컨대 호르몬 분석이나 전기생리학적 파동 패턴을 관찰함으로써 포착할 수 있다.

느낌은 모든 심상이 그렇듯 언제나 안에 숨어 있어 그 소유자를 제외한 어떤 사람도 볼 수가 없다. 다시 말해 느낌은 생물의 뇌 속에서 일어나는 가장 사적인 현상이다.

감정은 몸이라는 무대 위에서 연기한다. 한편 느낌의 무대는 마음이다.

곧 보게 되겠지만 감정 및 감정의 근간이 되는 관련 반응들은 생명 활동을 조절하는 기본 메커니즘이다. 느낌 역시 생명 조절에 이바지하지만 좀 더 높은 수준에서 작용한다. 생명의 역사에서 감정 및 관련 반응은 느낌보다 먼저 나타났던 것 같다.

감정 및 감정과 관련된 현상은 느낌을 이루는 기초이자, 우리 마음의 토대를 형성하는 심적 사건이면서 우리가 밝혀내고자 하는 대상이다.

Principles of Neural Science
Fifth Edition
Eric Kandel, James Schwartz, Thomas Jessell, Steven Siegelbaum, A.J. Hudspeth 2012.

Chapter 48. Emotions and Feelings (p1079-1094)

Emotion are **automatic, largely unconscious** behavioral and cognitive responses triggered when the brain detects a positively or negatively charged **significant stimulus**.

Feelings are the **conscious perceptions** of emotional responses.

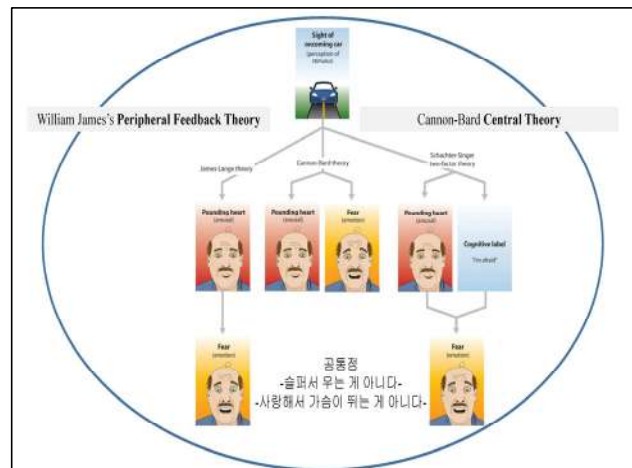
Joseph E. LeDoux
Antonio R. Damasio

Historical Milestones in Understanding the Emotional Brain Nat Rev Neurosci. 2004 Jul;5(7):583-9

William James proposes his **bodily theory** of emotion. 1872
Lange proposes a similar theory to James. 1885

Most contemporary affective neuroscientists would endorse
A MODIFIED JAMES-LANGE VIEW
in which **bodily feedback** modulates the **experience of emotion**

The Emotional Brain.
Daleish T'. Nat Rev Neurosci. 2004 Jul;5(7):583-9.



Somatic Feedback Theories
<http://www.iep.utm.edu/emotion/>

William James (1884) was the first to develop a somatic feedback theory, and recently James' model has been revived and expanded by Antonio Damasio (1994, 2001) and Jesse Prinz (2004a, 2004b).

Somatic feedback theories suggest that once the **bodily response** has been generated (that is, a change in heart rate, blood pressure, facial expression, and so forth), the **mind registers these bodily activities**, and this mental state (the one caused by the bodily changes) is the **emotion (feeling of emotion)**.

<http://subscories.com/research.html>

Historical Milestones in Understanding the Emotional Brain Nat Rev Neurosci. 2004 Jul;5(7):583-9

Panksepp coins the term 'affective neuroscience' 1992

The discipline of **affective neuroscience** is concerned with **the neural bases of emotion and mood**.

How are emotions and moods **embodied** in the brain?

This is the central question that is posed by affective neuroscience – an endeavour that integrates the efforts of **psychologists, psychiatrists, neurologists, philosophers and biologists**.

The Emotional Brain.
Daleish T'. Nat Rev Neurosci. 2004 Jul;5(7):583-9.

Evidence from this approach suggests at least **three major functions of emotion**:

Sensory Gating, Embodying Affect, and Integrating Knowledge toward Goal Resolution.

These functions appear to be **universal** and **automatically activated**, yet also moderated by conscious representation and regulatory efforts.

Emotions: Form follows Function.
 Farb NA, Chapman HA, Anderson AK. *Curr Opin Neurobiol.* 2013 Jun;23(3):393-8.

First, emotions have a sensory gating function, regulating the **breadth and focus of attention**.

Second, emotions have an expressive function, creating observable, embodied representations of internal states.

Finally, emotions have a knowledge integration function, distilling complex representations into concrete action tendencies that facilitate goal resolution.

Embodiment of emotion is constitutive of emotional experience rather than a downstream expressive byproduct.

Curr Opin Neurobiol. 2013 Jun;23(3):393-8.

EMBODYING EMOTION
 Niedenthal PM. *Science.* 2007 May 18;316(5827):1002-5

The theories of embodied cognition suggest that **perceiving and thinking about emotion** involve **perceptual, somatovisceral, and motoric reexperiencing** (collectively referred to as **"embodiment"**) of the relevant emotion in one's self.

The embodiment of emotion, when induced in human participants by manipulations of facial expression and posture in the laboratory, causally affects how emotional information is processed.

정서는 환경이 요구하는 바와 신체 반응을 일치하도록 하기 위한 방편으로 진화해 왔다.

정서 경험은 **피**와 **몸**으로 이루어져 있다.

통증에 감정이 개입되는 순간... 통증은 기억으로 변한다.

EMOTION

From the Cortex Down
 Psychological Processes
 Awareness of Life in Time
 Thoughts, Imagination, Beliefs

From the Inside Up
 Internal Milieu (Interoception)
 Pain, Temperature, ANS afferents,
 Fluid borne chemical Signals

From the Outside In
 External Senses (Exteroception)
 Awareness of Body in Space
 Special Senses, Vibration, Touch, Proprioception

FEELING

MEMORY

Now Here

Social, reward, processing partner preference and bond
 Fear extinction
 emotion regulation
 Emotional reactivity
 Fear conditioning

Historical Milestones in Understanding the Emotional Brain *Nat Rev Neurosci.* 2004 Jul;5(7):583-9

Cahill et al. reveal how the amygdala is important in the consolidation of emotional memories 1996

Stimuli: external/internal

Interpretation of Meaning

Influence Memory Storage

Long-term Function

Cognitive Emotional Response

Autonomic Stress-hormone Response

Short-term Function

Influence Immediate Coping Behavior

Trends Neurosci. 1998 Jul;21(7):294-9

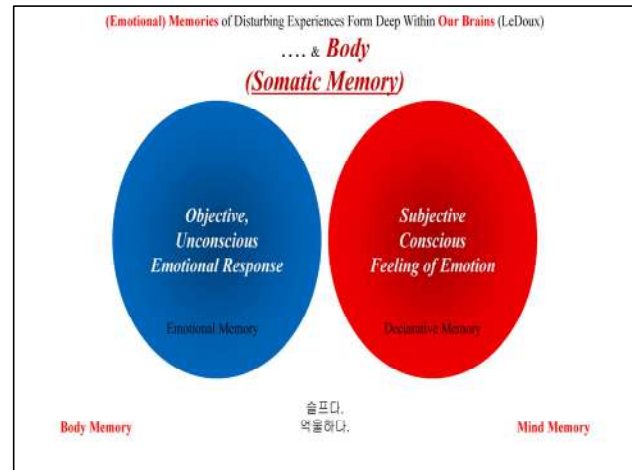
Historical Milestones in Understanding the Emotional Brain. *Nat Rev Neurosci*. 2004 Jul;5(7):583-9
 Cahill et al. reveal how the amygdala is important in the consolidation of emotional memories
 1996

Stress Hormones and Amygdaloid Complex
 as key, interacting modulators of **memory consolidation** for emotional events

TABLE 1. Evidence for the crucial role of the basolateral amygdala in memory modulation

Procedure	Basolateral amygdaloid nucleus	Central amygdaloid nucleus	Refs
Lidocaine infusion post-learning	Modulates memory	No effect	54
Infusions of glucocorticoid agonist or antagonist into AC nuclei	Modulates memory	No effect	34
Lesions of AC nuclei, systemic dexamethasone	Blocks modulation	No effect	32
Lesions of AC nuclei, adrenalectomy	Blocks modulation	No effect	30
Lesions of AC nuclei, infusion of glucocorticoid agonist, or antagonist into hippocampus	Blocks modulation	No effect	35
Lesions of AC nuclei, systemic diazepam	Blocks modulation	No effect	53
Infusion of beta-blocker into AC nuclei, systemic dexamethasone	Blocks modulation	No effect	55

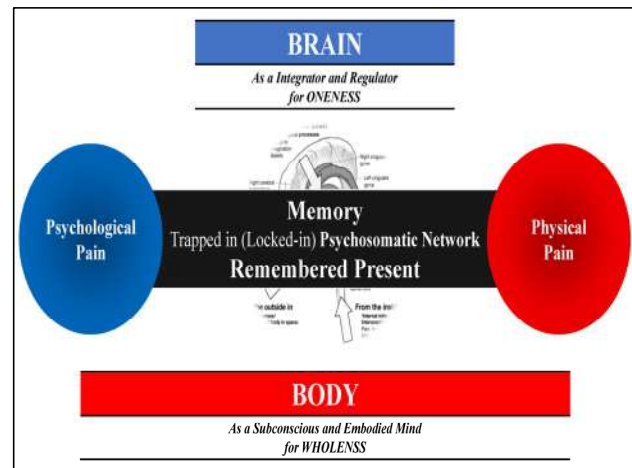
Trends Neurosci. 1998 Jul;21(7):294-9



The Psychosomatic Network: Foundations of Mind-Body Medicine.
 Pert CB, Dreher HE, Ruff MR. *Altern Ther Health Med*. 1998 Jul;4(4):30-41

Research in the 1980s uncovered ubiquitous neuropeptide-receptor distribution in brain structures associated with emotional processing, and throughout many organ systems. This finding supported **neuropeptides as biochemical substrates of emotion**, and the **neuropeptide-receptor network as a parasynaptic system** crossing traditional brain-body boundaries. The medical relevance of these findings was affirmed by **psychoneuroimmunology** research: neuropeptides help to regulate immunocyte trafficking, there is bidirectional communication between nervous and immune system components, immunocytes produce neuropeptides, and nerve cells produce immune-associated cytokines.

Emotional expression is also a marker for psychospiritual vitalization, and further research should evaluate **links between energy-based models of health and neuropeptide-receptor-based models** under the rubric of an informational paradigm.



모든 현재는
 과거의 산물이며, 미래의 원인이다.

몸은 마음을 만들고, 마음은 몸에 저장된다.
 기억(회상)은 몸 속에 저장된 마음을 다시 깨우는 일이다.


EMBODIMENT & REMEMBERED PRESENT

SOMATIC FEEDBACK THEORY EMOTIONAL MEMORY

**BODY POSTURE FACILITATES
 RETRIEVAL OF AUTOBIOGRAPHICAL MEMORIES**
 Dijkstra K¹, Kaschak MP, Zwaan RA. *Cognition*. 2007 Jan;102(1):139-49.

We assessed **potential facilitation of congruent body posture on access to and retention of autobiographical memories** in younger and older adults.

...
 We discuss these findings in the context of theories of embodied cognition.



EMBODIED MOOD REGULATION:


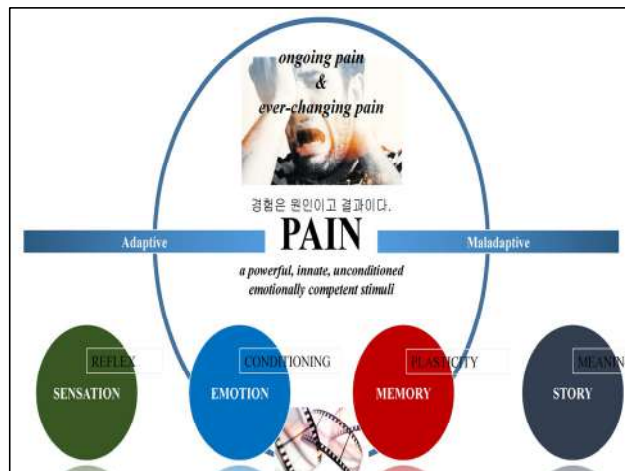
the Impact of Body Posture on Mood Recovery, Negative Thoughts, and Mood-congruent Recall.
Veenstra L., Schneider IK, Koole SL. Cogn Emot. 2016 Sep 14:1-16.

Stooped posture (compared to straight or control postures) led to less mood recovery in the negative mood condition, and more negative mood in the neutral mood condition. Furthermore, stooped posture led to more negative thoughts overall compared to straight or control postures. In Experiment 2 (n = 122), all participants underwent a negative mood induction, after which half received cognitive reappraisal instructions and half received no instructions. Mood-congruent cognitions were assessed through autobiographical memory recall. Again, stooped (compared to straight) position led to less mood recovery. Notably, this was independent of regulation instruction.


These findings demonstrate for the first time that **posture plays an important role in recovering from negative mood.**

Chronic Pain


Antalgic Gait and Posture


ALTERNATIVE MANAGEMENT OF CHRONIC PAIN




John E. Sarno
& Tension-Myositis Syndrome
J. E. SARNO, M.D.
HEALING BACK PAIN
The Mind-Body Connection



Vilayanur S. Ramachandran
& Phantom Pain Syndrome
V.S. RAMACHANDRAN, MD, PH.D., AND SANDRA BLAKEMORE
PHANTOMS IN THE BRAIN
PROBING THE MYSTERIES OF THE HUMAN MIND



Bessel van der Kolk
& Post-Traumatic Stress Disorder
B. VAN DER KOLK, M.D.
THE BODY KEEPS THE SCORE
BRAIN, MIND, AND BODY IN THE HEALING OF TRAUMA

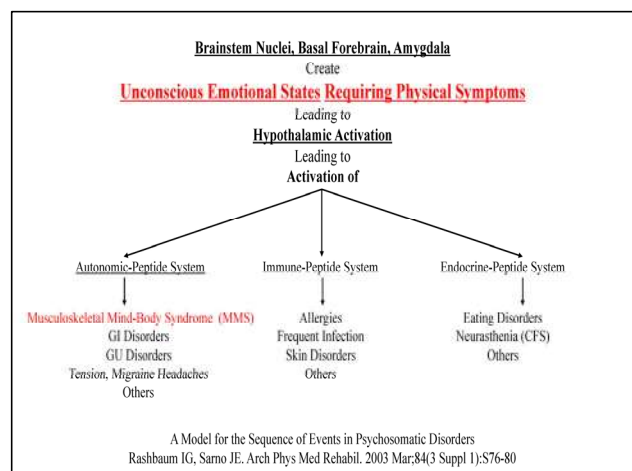


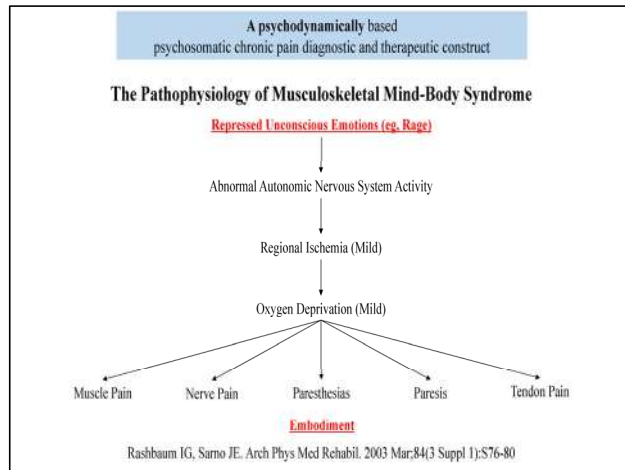
Physicians should avoid the pitfall of attributing chronic pain symptoms to structural aberrations, even when detected on CT and/or MR imaging, or electrodiagnostic studies.

Most patients with chronic pain suffer from a psychosomatic disorder, in which emotional phenomena bring about real, not factitious, physical symptoms with suffering.

Originally “tension-myositis syndrome”,
Now “musculoskeletal mind-body syndrome (MMS)”

Arch Phys Med Rehabil. 2003 Mar;84(3 Suppl 1):S76-80





PSYCHOEDUCATIONAL TREATMENT

This includes **patient education** about the physiologic and psychologic components of the disorder. Patients are instructed to **repudiate the structural explanation(s) for their pain and to acknowledge** and accept the mind-body process.

Physical activity should be resumed as quickly as possible, and patients are advised to **discontinue treatments such as spinal manipulation and physical therapy** because they tend to reinforce erroneously a structural causation for the chronic pain.

Support meetings are conducted for patients who remain symptomatic to review concepts and express thoughts and feelings.

About 20% of mind-body syndrome patients require **short-term, dynamic, analytically oriented psychotherapy** to understand fully the unconscious conflicts.

Rashbaum IG, Sarno JE. Arch Phys Med Rehabil. 2003 Mar;84(3 Suppl 1):S76-80

Sarno followed 109 consecutive patients from 1983 to 1986 who had at least 1 lumbosacral herniated disk confirmed by CT, **88% of whom were pain free and fully functional**, **10% of whom reported some improvement** in symptoms and function, and **2% of whom reported no improvement**.

Sarno JE. The mind-body prescription: healing the body, healing the pain. New York: Warner Books; 1998.

There have been no experimental studies on the **effect of vision on phantom sensation**. We used a mirror to **resurrect the phantom** visually in order to explore intersensory effects.



Touching The Phantom Limb

Ramachandran VS, Rogers-Ramachandran D, Cobb S. Nature. 1995 Oct 12;377(6549):489-90.



patient	age	pathology	location	time of testing
K.S.	73	car accident, crush injury	left arm 5 cm above elbow	2 years after amputation
J.P.	51	self-inflicted amputation	right forearm 3 cm below elbow	3 months after amputation
R.L.	36	voluntary self-amputation	right upper limb distal radius	2 months after amputation
P.S.	48	arm crushed in car accident	left hand 8 cm below elbow	7 months after amputation
K.T.	35	voluntary self-amputation	left arm 6 cm above elbow	7 months after amputation
P.S.N.	40	airplane propeller cut off arm	right arm above elbow	8 years and 3 months after amputation
D.B.	73	car accident, crush injury	left arm, distal radius of shoulder	3 years after amputation
D.S.	28	brachial plexus avulsion	left arm above elbow	9 years after amputation

- In six patients, when the normal hand was moved, so that the phantom was perceived to move in the mirror, it was also felt to move; i.e. kinesthetic sensation emerged in the phantom.
- Repeated practice led to a **permanent 'disappearance' of the phantom arm** in patient D.S. and the hand became telescoped into the stump near the shoulder. (**First known case of an 'amputation' of a phantom limb.**)
- Using an optical trick, impossible postures – e.g. extreme hyperextension of the finger – could be induced visually in the phantom. In one case this was felt as a transient 'painful tug' in the phantom.
- Five patients** experienced involuntary **painful 'clenching spasms' in the phantom hand** and in **four of them** the spasms were **relieved when the mirror was used to facilitate 'opening' of the phantom hand**; opening was no possible without the mirror.
- In three patients, touching the normal hand evoked precisely localized touch sensation in the phantom. Interestingly, the referral was especially pronounced when the patients actually 'saw' their phantom being touched in the mirror.

Synaesthesia in Phantom Limbs induced with Mirrors
Proc Biol Sci. 1996 Apr 22;263(1369):377-86

LEARNED PARALYSIS AND MIRROR VISUAL FEEDBACK

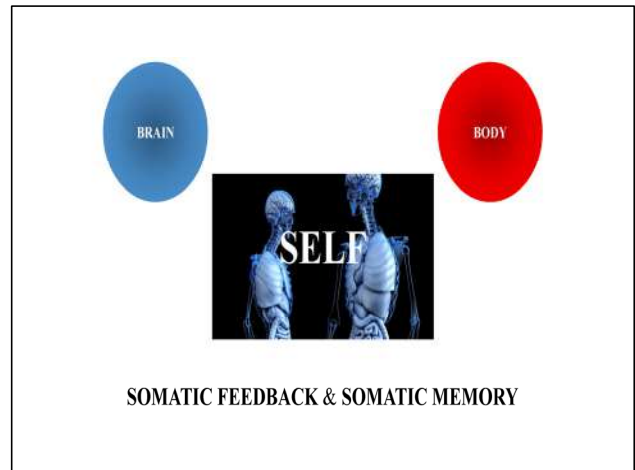
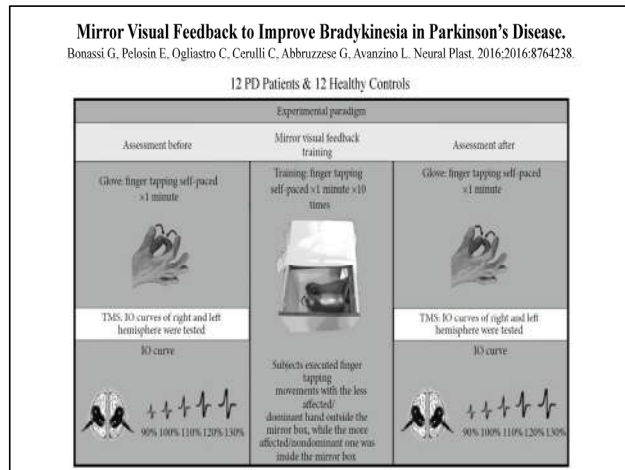
No Neuron
: Passive ROM Feedback




No Arm
: Mirror Visual Feedback

PHANTOM LIMBS AND PLASTIC BRAINS

Five patients experienced involuntary **painful 'clenching spasms' in the phantom hand** and in four of them the spasms were **relieved when the mirror was used to facilitate 'opening' of the phantom hand**; opening was no possible without the mirror. Proc Biol Sci. 1996 Apr 22;263(1369):377-86

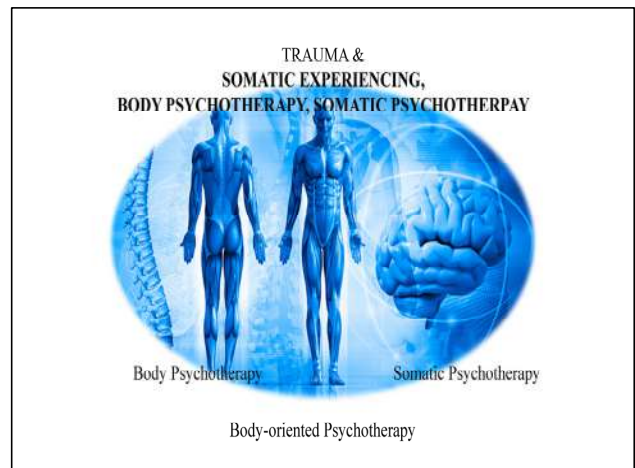


Trauma is much more than a story about what happened long ago.
The **emotions** and **physical sensations** that were imprinted during trauma are **experienced** as disruptive physical reactions **in the present**. (p 205)



There are 3 ways to palliate or reverse the damage trauma causes:

1. Top down, by talking
2. Medications that shut down inappropriate alarm reactions
3. **Bottom up**, that allow **the body** to have experiences that contradict **helplessness** and **rage**. (p 3)



Body psychotherapy
always refers to a psychotherapeutic framework, aiming at enhanced self-awareness, behavior modification or insight-oriented psychological problem solving.

Yoga as An Adjunctive Treatment for Posttraumatic Stress Disorder: A Randomized Controlled Trial
van der Kolk BA¹, et al. J Clin Psychiatry. 2014 Jun;75(6):e559-65.

Sixty-four women with chronic, treatment-resistant PTSD

Yoga significantly reduced PTSD symptomatology, with effect sizes comparable to well-researched psychotherapeutic and psychopharmacologic approaches. Yoga may improve the functioning of traumatized individuals by helping them to tolerate physical and sensory experiences associated with **fear** and **helplessness** and to increase **emotional awareness** and **affect tolerance**.

A Randomized Controlled Study of Neurofeedback for Chronic PTSD.
van der Kolk BA, et al. PLoS One. 2016 Dec 16;11(12):e0166752.

52 individuals with chronic PTSD

Compared with the control group NF produced **significant PTSD symptom improvement** in individuals with chronic PTSD, as well as in affect regulation capacities. NF deserves further investigation for its potential to ameliorate PTSD and to improve affect regulation, and to clarify its mechanisms of action.

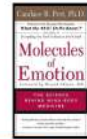
Somatic Experiencing for Posttraumatic Stress Disorder: A Randomized Controlled Outcome Study.
Brom D^{1,2}, Stokar Y¹, Lawi C², Nuriel-Porat V¹, Ziv Y¹, Lerner K¹, Ross G². *J Trauma Stress*. 2017 Jun;30(3):304-312.

This study presents the **first known randomized controlled study evaluating the effectiveness of somatic experiencing (SE), an integrative body-focused therapy** for treating people with posttraumatic stress disorder (PTSD). There were 63 participants meeting DSM-IV-TR full criteria for PTSD included. Baseline clinical interviews and self-report measures were completed by all participants, who were then randomly assigned to study (n = 33) or waitlist (n = 30) groups. Study participants began 15 weekly SE sessions, whereas waitlist participants waited the same period, after which the second evaluation was conducted. All participants were evaluated a third time after an additional 15 weeks, during which time the waitlist group received SE therapy.

Pretreatment evaluation showed no significant differences between groups. Mixed model linear regression analysis showed significant intervention effects for posttraumatic symptoms severity (Cohen's d = 0.94 to 1.26) and depression (Cohen's d = 0.7 to 1.08) both pre-post and pre-follow-up. This randomized controlled study of SE shows **positive results indicating SE may be an effective therapy method for PTSD**. Further research is needed to understand who shall benefit most from this treatment modality.

“There Is More Wisdom In Your Body Than In Your Deepest Philosophy.”

Friedrich Nietzsche (1844 – 1900)



Your Body Is Your Subconscious Mind

Candace Pert (1946 – 2013)

Body-Mind & Body-Brain

Embodiment and Chronic Pain: Implications for Rehabilitation Practice

Bullington J¹. *Health Care Anal*. 2009 Jun;17(2):100-9. doi: 10.1007/s10728-008-0109-5.

Throughout the Western world people turn towards the health care system seeking help for a variety of psychosomatic/psychosocial health problems. They become “patients” and find themselves within a system of practises that conceptualizes their bodies as “objective” bodies, treats their ill health in terms of the malfunctioning machine, and compartmentalizes their lived experiences into medically interpreted symptoms and signs of underlying biological dysfunction.

The aim of this article is to present an alternative way of describing ill health and rehabilitation using the philosophy of Maurice Merleau-Ponty in order to deepen our understanding of the rehabilitation process. I will explore how **the experience of chronic pain ruptures the natural connection between body and world** and how the rehabilitation process can be understood as **the re-insertion of the body into the flow of experience, where the body “disappears” into its natural silence** in order to allow the world to once again unfold.

The experience of chronic pain places the painful body in focus, resulting in a diminished articulation of both self and world. Persons with illness suffer not only from the physical aspects of pain and discomfort but also from **a loss of identity where one feels alienated and detached from things that used to give meaning to ones life**. Rehabilitation must not only address the **material (medical) body** but also the **diminished sense of self** as well as **the retreat from the world outside of the painful body**.

사랑의 기억을 지우는 게 아니라 덮어쓰기 이다.

Extinction is an active learning process.
Such learning could be situated in connections between
the **prefrontal cortex** and the **amygdala**.

통증의 기억을 어떻게 지울 수 있을까?



만성통증을 호소하는 환자들과 어떻게 시작할 것인가?

공감이 연인이 될 수 있도록

...

EMPATHY

ev (en, “in”) + páthos (pathos, “suffering”)

Accumulating evidence has put forward the view that there are at least **two different routes** to put us in the shoes (the mind) of the other person. **One route is to share the other person’s feelings in an embodied manner**, known as **empathy** (note that a **similar embodied simulation** was first observed in the domain of motor actions in the monkey and human brain). The other route is to cognitively infer about the state of the other person, known as ‘theory of mind’, ‘mentalizing’, ‘mindreading’, or ‘cognitive perspective taking’.

Curr Opin Neurobiol. 2008 Apr;18(2):153-8

EMPATHY

εν (en, "in") + πάθος (pathos, "suffering")

Pictures

Pain No Pain

via an embodied manner
(a similar embodied simulation)

Curr Opin Neurobiol. 2008 Apr;18(2):153-8

Empathy describes the process of **sharing feelings**, that is, **resonating with someone else's feelings**, regardless of valence (**positive/negative**), but with the explicit knowledge that **the other person is the origin of this emotion**.

COMPASSION

a complementary social emotion elicited by witnessing the suffering of others and is rather associated with feelings of concern and warmth, linked to the **motivation to help**.

EMPATHIC DISTRESS

in contrast to compassion, an alternative outcome of empathy, may be **detrimental to the experience** as well as to **the suffering other**.

Current Opinion in Behavioral Sciences 2017, 19:1-6

우리의 모든 행동을 활성화하는 근본적인 힘은 바로 정서이다.

현대 정신의학자들은 정서를 다루기는 하지만 갖다 버려야 할 귀찮은 대상으로 보고 있다.

그러나 정서는 우리의 삶이다.

정서는 유기체의 언어이다.

필스의 게슈탈트 심리치료

(The Gestalt Approach & Eye Witness to Therapy. Fritz Perls. 1973)

Friedrich (Frederick) Salomon Perls (1893 -1970)

The core of the **Gestalt Therapy** process is **enhanced awareness** of sensation, perception, **bodily feelings**, emotion, and behavior, in the **present moment**. Relationship is emphasized, along with contact between the self, its environment, and the other.

https://en.wikipedia.org/wiki/Fritz_Perls

The Amygdaloids

Stephen Ormes: *Proc Natl Acad Sci U S A*. 2014 Feb 25;111(8):2859-2859

Mind Over Matter
- The Amygdaloids (with Rosanne Cash)