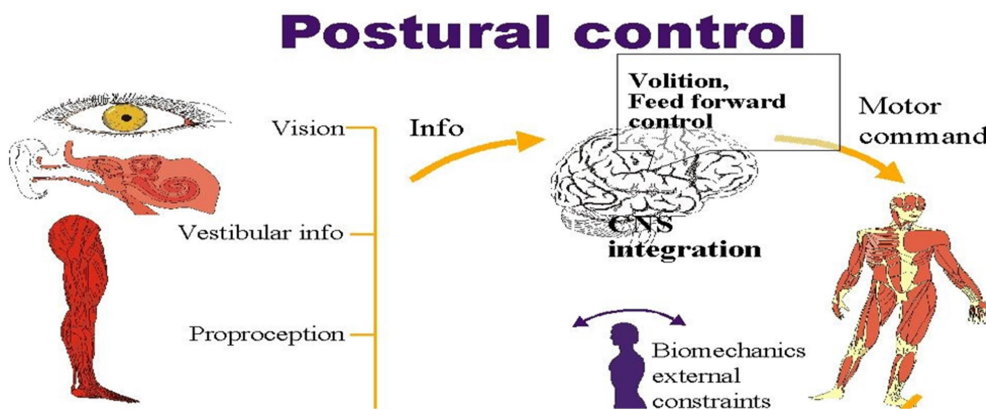




¿Qué es la posturología?

- Es la ciencia que estudia la regulación postural, la postura es consecuencia.
- Se centra en las vías de entrada sensorial, las investiga en un intento de explicar el origen del dolor, de las alteraciones vestibulares y propioceptivas y, finalmente busca reprogramar las entradas de información y la integración sensorial.

6.5.-Problemas en las entradas salidas de información (captorees posturales, fascia, piel)



EL SISTEMA VESTIBULAR EN ESTÁTICA ESTÁ MUDO, POR LO QUE EN ESTÁTICA NO ES IMPORTANTE. SOLO SE ACTIVA CON LOS MOVIMIENTOS.

LA POSTURA

ESTÁ CONTROLADA A TRAVÉS DEL SNC POR CAPTORES POSTURALES

CAPTOR VISUAL

CAPTOR ESTOMATOGNÁTICO

REGIÓN SUBOCCIPITAL

CAPTOR PODAL

FASCIA/PIEL

La información llega a centros superiores



¿Qué es la posturología?



SISTEMA EXTRAPIRAMIDAL ES LO QUE CONTROLA LA POSTURA
LOS GANGLIOS BASALES CONTROLAN EL TONO POSTURAL

J Athl Train. 2016 Feb;51(2):101-10. doi: 10.4085/1062-6050-51.2.08. Epub 2016 Feb 15.

Comparative Effects of Different Balance-Training-Progression Styles on Postural Control and Ankle Force Production: A Randomized Controlled Trial.

Cuñ M¹, Duncan A¹, Wikstrom E¹.

Author information

¹ Physical Education and Sports Department, Cumhuriyet University, Sivas, Turkey; †Department of Kinesiology, University of North Carolina at Charlotte; ‡Department of Exercise and Sport Science, University of North Carolina at Chapel Hill.

Abstract

CONTEXT: Despite the effectiveness of balance training, the exact parameters needed to maximize the benefits of such programs remain unknown. One such factor is how individuals should progress to higher levels of task difficulty within a balance-training program. Yet no investigators have directly compared different balance-training-progression styles.

OBJECTIVE: To compare an error-based progression (ie, advance when proficient at a task) with a repetition-based progression (ie, advance after a set amount of repetitions) style during a balance-training program in healthy individuals.

DESIGN: Randomized controlled trial.

SETTING: Research laboratory.

PATIENTS OR OTHER PARTICIPANTS: A total of 28 (16 women, 12 men) physically healthy young adults (age = 21.57 ± 3.95 years, height = 171.60 ± 11.03 cm, weight = 72.96 ± 16.18 kg, body mass index = 24.53 ± 3.7).

INTERVENTION(S): All participants completed 12 supervised balance-training sessions over 4 weeks. Each session consisted of a combination of dynamic unstable-surface tasks that incorporated a BOSU ball and lasted about 30 minutes.

MAIN OUTCOME MEASURE(S): Static balance from an instrumented force plate, dynamic balance as measured via the Star Excursion Balance Test, and ankle force production in all 4 cardinal planes of motion as measured with a handheld dynamometer before and after the intervention.

RESULTS: Selected static postural-control outcomes, dynamic postural control, and ankle force production in all planes of motion improved ($P < .05$). However, no differences between the progression styles were observed ($P > .05$) for any of the outcome measures.

CONCLUSIONS: A 4-week balance-training program consisting of dynamic unstable-surface exercises on a BOSU ball improved dynamic postural control and ankle force production in healthy young adults. These results suggest that an error-based balance-training program is comparable with but not superior to a repetition-based balance-training program in improving postural control and ankle force production in healthy young adults.



¿Qué es la posturología?

LA REPETICIÓN DE EJERCICIOS O EL TRABAJO PROPIOCEPTIVO SON SIMILARES EN LA MEJORA DEL CONTROL POSTURAL.

Clin Neurophysiol. 2018 Jan;129(1):33-41. doi: 10.1016/j.clinph.2017.09.118. Epub 2017 Oct 20.

Cerebellar transcranial direct current stimulation improves adaptive postural control.

Poortvliet P¹, Hsieh B², Cresswell A³, Au J⁴, Meinzer M².

Author information

- 1 The University of Queensland, Center for Sensorimotor Performance, School of Human Movement and Nutrition Sciences, Brisbane 4072, Australia; The University of Queensland, Asia-Pacific Center for Neuromodulation, Queensland Brain Institute, Brisbane 4072, Australia. Electronic address: peterpoortvliet@yahoo.com.
- 2 The University of Queensland, Center for Clinical Research, Herston 4029, Australia.
- 3 The University of Queensland, Center for Sensorimotor Performance, School of Human Movement and Nutrition Sciences, Brisbane 4072, Australia.
- 4 The University of California Irvine, Working Memory and Plasticity Lab, Department of Education, Irvine 92697, United States.

Abstract

OBJECTIVE: Rehabilitation interventions contribute to recovery of impaired postural control, but it remains a priority to optimize their effectiveness. A promising strategy may involve transcranial direct current stimulation (tDCS) of brain areas involved in fine-tuning of motor adaptation. This study explored the effects of cerebellar tDCS (ctDCS) on postural recovery from disturbance by Achilles tendon vibration.

METHODS: Twenty-eight healthy volunteers participated in this sham-ctDCS controlled study. Standing blindfolded on a force platform, four trials were completed: 60 s quiet standing followed by 20 min active (anodal-tDCS, 1 mA, 20 min, N = 14) or sham-ctDCS (40 s, N = 14) tDCS; three quiet standing trials with 15 s of Achilles tendon vibration and 25 s of postural recovery. Postural steadiness was quantified as displacement, standard deviation and path derived from the center of pressure (COP).

RESULTS: Baseline demographics and quiet standing postural steadiness, and backwards displacement during vibration were comparable between groups. However, active-tDCS significantly improved postural steadiness during vibration and reduced forward displacement and variability in COP derivatives during recovery.

CONCLUSIONS: We demonstrate that ctDCS results in short-term improvement of postural adaptation in healthy individuals.

SIGNIFICANCE: Future studies need to investigate if multisession ctDCS combined with training or rehabilitation interventions can induce prolonged improvement of postural balance.

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KEYWORDS: Achilles tendon vibration; Center of pressure; Cerebellum; Standing postural balance; Transcranial direct current stimulation



¿Qué es la posturología?

LA ESTIMULACIÓN TRANSCRANEAL CEREBELOSA MEJORA EL CONTROL POSTURAL ADAPTATIVO

Postural control during quiet standing following cervical muscular fatigue: effects of changes in sensory inputs

Nicolas Vuillerme^{a,*}, Nicolas Pinsault^b, Jacques Vaillant^b

^a Laboratoire de Modélisation des Activités Sportives, Université de Savoie, Domaine Universitaire, 73376 Le Bourget du Lac cedex, France

^b École de Kinésithérapie du Centre Hospitalier Universitaire de Grenoble, France

Received 10 November 2004; received in revised form 9 December 2004; accepted 9 December 2004

**LA FATIGA CERVICAL INCREMENTA LOS DESPLAZAMIENTOS DEL CENTRO DE PRESIONES EN
AUSENCIA DE VISIÓN, ESTO SE AGRAVA AL DESAFERENCIAR PIES. SI NO SUPRIMES LA
VISIÓN SE REDUCE**

Abstract

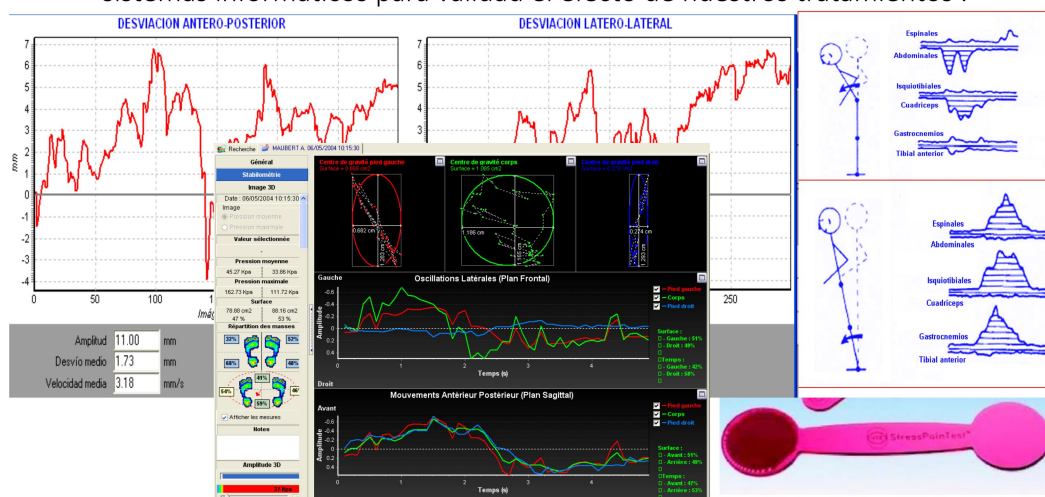
The purpose of the present experiment was to investigate the effects of cervical muscular fatigue on postural control during quiet standing under different conditions of reliability and/or availability of somatosensory inputs from the plantar soles and the ankles and visual information. To this aim, 14 young healthy adults were asked to sway as little as possible in three sensory conditions (No vision, No vision-Foam support and Vision) executed in two conditions of No fatigue and Fatigue of the scapula elevator muscles. Centre of foot pressure (CoP) displacements were recorded using a force platform. Results showed that (1) the cervical muscular fatigue yielded increased CoP displacements in the absence of vision, (2) this effect was more accentuated when somatosensation was degraded by standing on a foam surface and (3) the availability of vision allowed the individuals to suppress this destabilising effect. On the whole, these findings not only stress the importance of intact cervical neuromuscular function on postural control during quiet standing, but also suggest a reweighing of sensory cues in balance control following cervical muscular fatigue by increasing the reliance on the somatosensory inputs from the plantar soles and the ankles and visual information.

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DIAGNÓSTICO POR EL DOLOR

- !!!!!!!ERROR!!!!!!

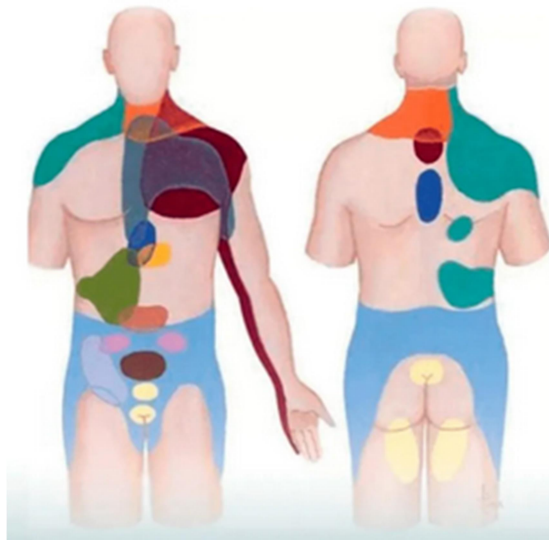
La integración Posturología- Osteopatía radica en la utilización sistemática de sistemas informáticos para validar el efecto de nuestros tratamientos .





¿Qué es la posturología?

6.6.-Desequilibrios neurovegetativos y tónicos en Osteopatía



Para que se regeneren las vísceras tenemos que estar en Parasimpaticotonía.

FAVORECER LA REGENERACIÓN TENDINOSA:

Jewson et al, Alfredson et al y Beccati et al (2019)

Se han observado alteraciones neurovegetativas en la génesis de las alteraciones tendinosas.

El SNV está implicado en la degeneración tisular y tendinosa.





¿Qué es la posturología?

Histol Histopathol. 2008 Feb;23(2):197-208. doi: 10.14670/HH-23.197.

Immunohistochemical and in situ hybridization observations favor a local catecholamine production in the human Achilles tendon.

Bjur D¹, Danielson P, Alfredson H, Forsgren S.

⊕ Author information

Abstract

Results of recent studies using immunohistochemistry show evidence of an occurrence of catecholamine production in the cells (tenocytes) of patellar tendons exhibiting tendinopathy (tendinosis). In the present study, antibodies against the catecholamine-synthesizing enzyme tyrosine hydroxylase (TH) and alpha1-adrenoreceptors were applied to sections of specimens of normal and tendinosis Achilles tendons. In situ hybridization using a probe detecting human TH mRNA was also utilized. It was found that sympathetic innervation was very scarce. On the other hand, there were distinct alpha1-adrenoreceptor immunoreactions in blood vessel walls. Interestingly, tenocytes, particularly from tendinosis samples in which the tenocytes showed an abnormal shape (not the typical slender appearance), displayed TH immunoreactions and reactions for TH mRNA. Of further interest was the finding of alpha1-adrenoreceptor immunoreactions in tenocytes. The observations show not only evidence of local catecholamine production at the protein level, which was the case in recent studies for the patellar tendon, but also at the mRNA level. The observations suggest that the tenocytes, especially those with disfigured appearances in tendinosis, can produce catecholamines and also that they can respond to sympathetic transmitters. This is of interest as adrenergic stimulation in other parts of the body is known to induce degenerative/apoptotic and proliferative events, features which are seen in Achilles tendinosis. These observations are completely new findings concerning the human Achilles tendon. It is likely that locally produced catecholamines and the occurrence of autocrine/paracrine effects of these substances are of great relevance during the process of tendinosis.

PMID: 17999376 DOI: [10.14670/HH-23.197](https://doi.org/10.14670/HH-23.197)

Front Aging Neurosci. 2016 Aug 9;8:186. doi: 10.3389/fnagi.2016.00186. eCollection 2016.

Role of VEGF, Nitric Oxide, and Sympathetic Neurotransmitters in the Pathogenesis of Tendinopathy: A Review of the Current Evidences.

Vasta S¹, Di Martino A¹, Zampogna B¹, Torre G¹, Papalia R¹, Denaro V¹.

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Chronic tendinopathy is a painful common condition affecting athletes as well as the general population undergoing to tendon overuse. Although its huge prevalence, little is known about tendinopathy pathogenesis, and even cloudier is its treatment. Traditionally, tendinopathy has been defined as a lack of tendon ability to overcome stressing stimuli with appropriate adaptive changes. Histologic studies have demonstrated the absence of inflammatory infiltrates, as a consequence conventional antiinflammatory drugs have shown little or no effectiveness in treating tendinopathies. New strategies should be therefore identified to address chronic tendon disorders. Angiofibroblastic changes have been highlighted as the main feature of tendinopathy, and vascular endothelial growth factor (VEGF) has been demonstrated as one of the key molecules involved in vascular hyperplasia. More recently, attention has been focused on new peptides such as Substance P, nitric oxide, and calcitonin gene-related peptide (CGRP). Those new findings support the idea of a nerve-mediated dysregulation of tendon metabolism. Each of those molecules could be a target for new treatment options. This study aimed to systematically review the current available clinical and basic science in order to summarize the latest evidences on the pathophysiology and its effect on treatment of chronic tendinopathy, and to spread suggestions for future research on its treatment.

KEYWORDS: VEGF; neurotransmitter agents; nitric oxide (NO); nociceptive substance P (SP); tendinopathy; tendons

Comment in

Commentary: Role of VEGF, Nitric Oxide, and Sympathetic Neurotransmitters in the Pathogenesis of Tendinopathy: A Review of the Current Evidences. [*Front Aging Neurosci*. 2017]

PMID: 27555817 PMID: [PMC4977280](https://pubmed.ncbi.nlm.nih.gov/27555817/) DOI: [10.3389/fnagi.2016.00186](https://doi.org/10.3389/fnagi.2016.00186)



¿Qué es la posturología?

Effects of Upper and Lower Cervical Spinal Manipulative Therapy on Blood Pressure and Heart Rate Variability in Volunteers and Patients With Neck Pain: A Randomized Controlled, Cross-Over, Preliminary Study.

Win NN¹, Jorgensen AM¹, Chen YS², Haneline MT³.

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OBJECTIVE: The aims of this study were to examine autonomic nervous system responses by using heart rate variability analysis (HRV), hemodynamic parameters and numeric pain scale (NPS) when either upper (C1 and C2) or lower (C6 and C7) cervical segments were manipulated in volunteers, and whether such response would be altered in acute mechanical neck pain patients after spinal manipulative therapy (SMT).

METHODS: A randomized controlled, cross-over, preliminary study was conducted on 10 asymptomatic normotensive volunteers and 10 normotensive patients complaining of acute neck pain. HRV, blood pressure (BP) and heart rate (HR), and NPS were recorded after upper cervical and lower cervical segments SMT in volunteer and patient groups.

RESULTS: The standard deviation of average normal to normal R-R intervals (SDNN) increased (83.54 ± 22 vs. 105.41 ± 20 ; $P = .02$) after upper cervical SMT. The normalized unit of high frequency (nuHF), which shows parasympathetic activity, was predominant (40.18 ± 9 vs. 46.08 ± 14) after upper cervical SMT ($P = .03$) with a significant decrease (109 ± 10 vs. 98 ± 5) in systolic BP ($P = .002$). Low frequency to high frequency (LF/HF) ratio, which shows predominance of sympathetic activity increased (1.05 ± 0.7 vs. 1.51 ± 0.5 ; $P = .02$) after lower cervical SMT in the healthy volunteers group. However, there was an increase in SDNN (70.48 ± 18 vs. 90.23 ± 20 ; $P = .02$ and 75.19 ± 16 vs. 97.52 ± 22 ; $P = .01$), a decrease in LF/HF ratio (1.33 ± 0.3 vs. 0.81 ± 0.2 ; $P = .001$ and 1.22 ± 0.4 vs. 0.86 ± 0.3 ; $P = .02$), which was associated with decreased systolic BP (105 ± 10 vs. 95 ± 9 ; $P = .01$ and 102 ± 9 vs. 91 ± 10 ; $P = .02$) and NPS scores (3 ± 1 vs. 0 ; $P = .01$ and 3 ± 1 vs. 1 ± 1 ; $P = .03$) following both upper and lower cervical SMT in the patient's group. The baseline HR was 67 ± 9 vs. 64 ± 5 (upper cervical) and 65 ± 7 vs. 69 ± 11 (lower cervical) in both the healthy volunteer and patient groups.

CONCLUSION: Upper cervical SMT enhances dominance of parasympathetic and lower cervical SMT enhances dominance of sympathetic activity in this young volunteer group. However, dominance of parasympathetic activity was found in patients with neck pain that received both upper and lower cervical SMT.

Microsc Res Tech. 2007 Apr;70(4):310-24.

Studies on the importance of sympathetic innervation, adrenergic receptors, and a possible local catecholamine production in the development of patellar tendinopathy (tendinosis) in man.

Danielson P¹, Alfredson H, Forsgren S.

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Abstract

Changes in the patterns of production and in the effects of signal substances may be involved in the development of tendinosis, a chronic condition of pain in human tendons. There is no previous information concerning the patterns of sympathetic innervation in the human patellar tendon. In this study, biopsies of normal and tendinosis patellar tendons were investigated with immunohistochemical methods, including the use of antibodies against tyrosine hydroxylase (TH) and neuropeptide Y, and against alpha1-, alpha2A-, and beta1-adrenoreceptors. It was noticed that most of the sympathetic innervation was detected in the walls of the blood vessels entering the tendon through the paratendinous tissue, and that the tendon tissue proper of the normal and tendinosis tendons was very scarcely innervated. Immunoreactions for adrenergic receptors were noticed in nerve fascicles containing both sensory and sympathetic nerve fibers. High levels of these receptors were also detected in the blood vessel walls; alpha1-adrenoreceptor immunoreactions being clearly more pronounced in the tendinosis tendons than in the tendons of controls. Interestingly, immunoreactions for adrenergic receptors and TH were noted for the tendon cells (tenocytes), especially in tendinosis tendons. The findings give a morphological correlate for the occurrence of sympathetically mediated effects in the patellar tendon and autocrine/paracrine catecholamine mechanisms for the tenocytes, particularly, in tendinosis. The observation of adrenergic receptors on tenocytes is interesting, as stimulation of these receptors can lead to cell proliferation, degeneration, and apoptosis, events which are all known to occur in tendinosis. Furthermore, the results imply that a possible source of catecholamine production might be the tenocytes themselves.

PMID: 17206652 DOI: [10.1002/jemt.20413](https://doi.org/10.1002/jemt.20413)



¿Qué es la posturología?

Importancia de las cadenas musculares, la fascia y el vegetativo:

1.-Supongamos que un individuo sale a correr a 128 ppm (metabolismo aeróbico seguro) pero siente lactacidemia en tibial posterior. El problema de base es un desequilibrio tónico con facilitación de la musculatura tónica y fatiga de la fásica sinergista → hemos de ir a verificar postura, hipo-hiper y fascia.

2.-No olvidar que aunque el sistema simpático actúa de forma genérica, **a la hora de analizar la inervación simpática de los lechos vasculares musculares o cutáneos dividimos según regiones anatómicas (extremidades proximales, distales , superiores , inferiores y tronco)se han de rechazar las ideas de que existe un tono simpático general responsable y determinante en la resistencia vascular periférica.** La conectividad refleja de las rutas nerviosas involucradas en el flujo sanguíneo cutáneo y esquelético son totalmente independientes.(W. Janig , 2018)

3.-La activación parasimpática mejora el perfil de citokinas (Md Paula Martín).Un cuadro disautonómico afecta a nivel neuroendometabólico se produce IL-6 , TNF alfa, los estresores activan el simpático , proliferación macrofágica y tormenta de citoquinas (misma vía de la depresión→ estrés crónico). Depende del punto de partida del paciente.

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PMID: 17206652 DOI: 10.1002/jemt.20413



¿Qué es la posturología?

7.- IMPORTANCIA DE LAS MANIPULACIONES Y, LOS FÁRMACOS Y LA BIOQUÍMICA POR ALIMENTACIÓN EN EL CONTROL DE LA INFLAMACIÓN Y EL DOLOR TENDINOSO:

Effects of Upper and Lower Cervical Spinal Manipulative Therapy on Blood Pressure and Heart Rate Variability in Volunteers and Patients With Neck Pain: A Randomized Controlled, Cross-Over, Preliminary Study.

Win NN¹, Jorgensen AM¹, Chen YS², Haneline MT³.

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CONCLUSION: Upper cervical SMT enhances dominance of parasympathetic and lower cervical SMT enhances dominance of sympathetic activity in this young volunteer group. However, dominance of parasympathetic activity was found in patients with neck pain that received both upper and lower cervical SMT.

7.1.- MANIPULACIONES SENSIBILIZACIÓN-GLUTAMATO-SUPLEMENTACIÓN..

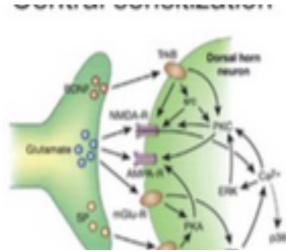
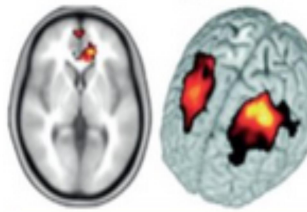
7.2.- FÁRMACOS Y BIOQUÍMICA ALIMENTACIÓN.



¿Qué es la posturología?



Cortical reorganization

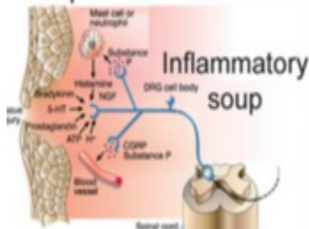


SENSIBILIZACIÓN: Tomado de EOM

Proceso por el que un estímulo normalmente inofensivo es percibido como doloroso (hiperalgesia), por disminución de los umbrales nociceptivos, debido a la amplificación progresiva de la respuesta neuronal tras administraciones repetidas de un estímulo (Erik Kandel, 2000, Premio Nobel).

- Sensibilización periférica
- Sensibilización central
- Los trenes de impulsos de los nociceptores periféricos tienen la capacidad de desencadenar a largo plazo circuitos en el SNC y pueden causar estados prolongados de hipersensibilidad.

Peripheral sensitization





¿Qué es la posturología?

Sensibilización: qué aporta la Osteopatía .

- Inhibe el dolor o **impide el desarrollo del dolor crónico a través de la supresión de las sumas temporales** (una medición aproximada de la excitabilidad del cuerno posterior de la médula) **Ricard y Oliva : Osteopatía Basada en la evidencia pp 23.**(George et al, 2006; Coronado et al, 2012; Bishop et al, 2011; Bialosky et al, 2008)



¿ qué OFRECE LA OSTEOPATÍA? *Tomado de F. Ricard.*

Reduce la magnitud de los potenciales cerebrales evocados (Zhu et al 2000) , estimula la circunvolución **prerrolándica** (Meier et al) modificando la plasticidad cortical.

- Que la manipulación vertebral genera hipoalgesia, actúa sobre el sistema nervioso actuando sobre los receptores propioceptivos paravertebrales , elimina aferencias aberrantes (George et al 2006, Pickar 2002),
- Trabajando sobre sensibilización central y periférica.



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