

# **Myopain 2010 Abstracts**

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**MYOFASCIAL PAIN SYNDROME: HERE WE ARE, WHERE MUST WE GO?** Gerwin R, Department of Neurology, John Hopkins University School of Medicine, Baltimore, Maryland, USA.

**OBJECTIVE:** To present the current state of knowledge of myofascial pain syndrome and to point the direction for new research.

**FINDINGS:** Myofascial pain syndrome [MPS] was first defined clinically by Janet Travell, MD, and later by David Simons, MD. Pain neurophysiology has only recently provided the basis for understanding the sensorimotor manifestations of MPS. This presentation reviews the current state of knowledge concerning MPS. Myofascial pain syndrome is a form of myalgia characterized by local regions of muscle hardness and tenderness that cause referred pain. The signature feature is the trigger point, a tender, taut band of muscle that can be painful spontaneously or when stimulated. The active trigger point has identifiable pathophysiologic changes. Levels of substance P, calcitonin gene related peptide, bradykinin, and assorted cytokines, are elevated, indicating a chemical inflammation. Trigger point milieu pH is low, about pH 5, consistent with hypoxia and ischemia. Persistent, low-amplitude, high frequency electrical discharges that look like endplate potentials are characteristic. The taut band can be visualized using high definition ultrasonography and magnetic resonance sonography. Central sensitization in MPS has been documented in humans by functional magnetic resonance image scanning. The role of MPS in headache and in pelvic pain has been extensively studied in the last few years.

**CONCLUSION:** Although great progress has been made, studies are still needed to substantiate the energy crisis hypothesis of trigger point formation, to understand the nature of sustained muscle contraction that forms the taut band and of referred pain in humans, and to develop a more rational and effective treatment.

**HOW DO MUSCLE LESIONS SUCH AS LATENT AND ACTIVE TRIGGER POINTS INFLUENCE CENTRAL NOCICEPTIVE NEURONS?** Mense S, Mediz. Fakultät Mannheim CBTM, Neuroanatomie Universität Heidelberg, Ludolf-Krehl-Str. 13-17, R. C614, 68167 Mannheim, Germany

**OBJECTIVES:** This presentation aims at explaining some of the features of active and latent trigger points [TrPs], namely spontaneous pain, allodynia/hyperalgesia, and referral of pain.

**FINDINGS:** Spontaneous pain is mainly due to ongoing activity in nociceptive neurons in the spinal cord. Allodynia and hyperalgesia can be explained by a sensitization of central nociceptive neurons [central sensitization]. One mechanism of central sensitization is the release of substance P together with glutamate from presynaptic terminals of nociceptive fibers from muscle. Other steps of sensitization are the opening of N-methyl-d-aspartate channels on postsynaptic neurons and the de-novo synthesis of ion channels. The current concept of pain referral assumes that the efficacy of synaptic connections of central dorsal horn neurons can change under the influence of a nociceptive input. Thus, ineffective synaptic connections can become effective. Pain referral appears to reflect the formation of new effective central nervous connections. One important characteristic of a latent TrP is that it does not elicit spontaneous pain but evokes referred pain. Pain referral from a latent TrP is probably due to the fact that the latent TrP has only ineffective connections with the central nervous system and that these synapses are located on neurons that supply regions remote from the TrP.

**CONCLUSIONS:** Myofascial TrPs are not merely a peripheral phenomenon, the input from TrPs leads to hyperexcitability of central neurons that manifests itself in allodynia, hyperalgesia, and pain referral. These central changes are mainly based on an increase in the synaptic efficacy of central connections induced by nociceptive input.

## **NEW EVIDENCE FOR TRIGGER POINT INVOLVEMENT IN TENSION TYPE**

**HEADACHE.** Fernández-de-las-Peñas C, Universidad Rey Juan Carlos, Alcorcón, Madrid, Spain.

**OBJECTIVES:** Objective: The current lecture will review evidence for trigger point (TrP) involvement in tension type headache (TTH).

**METHODS:** Methods: A review of evidence.

**RESULTS:** Findings: It seems that pressure pain hypersensitivity is a consequence not a causative factor of TTH, probably due to the presence of central sensitization. Recent evidence is demonstrating a relationship between muscle TrPs and TTH, suggesting a potential role of myofascial TrPs in the genesis of TTH. Active TrPs reproducing the headache attacks have been found in both episodic and chronic TTH in a similar percentage, supporting an etiologic role of active TrPs in TTH. Further, spatial and temporal summation of TrP activity is also present in TTH. A pain model for CTTH involving both peripheral sensitization of nociceptors by active muscle TrPs and central sensitization proposed that active TrPs located in those muscles innervated by C1-C3 segments and by the trigeminal nerve may be responsible for peripheral nociceptive inputs and may produce a continuous afferent barrage into the trigeminal nucleus caudalis, sensitizing the central nervous system in CTTH. According to this pain model, muscle tenderness is the consequence whereas muscle TrPs (referred pain) is one of the main causes (but not the only one) of TTH. In such scenario, headache perception can be explained by referred pain from active TrPs in the cranio-cervical muscles, mediated through the spinal cord and the trigeminal nucleus caudalis rather than tenderness of the muscles themselves.

**CONCLUSIONS:** Conclusions: Future studies investigating the effectiveness of TrP inactivation in the evolution of TTH are urgently needed.

**ANIMAL MODELS OF MYOFASCIAL TRIGGER POINTS.** Mizumura K<sup>1</sup>, Murase S<sup>2</sup>, Taguchi T<sup>3</sup>, RIEM, Nagoya Univ. Nagoya, Japan,<sup>2</sup>.RIEM, Nagoya Univ. Nagoya, Japan,<sup>3</sup>.RIEM, Nagoya Univ., Nagoya, Japan.

**OBJECTIVES:** One of the typical symptoms of myofascial pain syndrome is trigger points in a taut band. It has been reported that hyperalgesic muscle (DOMS) after lengthening contraction (LC) has similarities with clinical trigger points, such as mechanically sensitive spots in hardening of the muscle, and EMG activities. Using this model we studied the mechanism by which DOMS is generated and maintained.

**METHODS:** SD rats were used. DOMS was induced by contracting lower hindleg extensors (mainly extensor digitorum longus muscle) by electrical stimulation of the nerve, while the muscle were being stretched under light anesthesia. Mechanical hyperalgesia of the muscle was accessed by Randall-Selitto analgesiometer.

**RESULTS:** We found that bradykinin released during exercise triggers NGF up-regulation in the muscle through activation of B2 bradykinin receptors. NGF upregulation started 12 hr after LC, and lasted up to 1-2 days after LC, a compatible time course as muscle mechanical hyperalgesia. Injection of anti-NGF antibody into the exercised muscle 2 days after LC reversed the mechanical hyperalgesia. NGF sensitized muscle thin-fiber receptors recorded in vitro to mechanical stimulation after a short latency (10-20 min).

**CONCLUSIONS:** Sensitization of muscle nociceptors to mechanical stimulation by NGF upregulated in the muscle after LC is considered to be a mechanism for mechanical hyperalgesia after exercise. Determining whether there is any difference in expression of NGF or sensitivity of muscle nociceptors in the trigger point and in other areas will be an important key for clarifying the mechanism of trigger points.

**COGNITIVE DYSFUNCTION IN FIBROMYALGIA SYNDROME.** Glass JM, University of Michigan, Ann Arbor, MI 48109.

**OBJECTIVES:** Fibromyalgia syndrome is characterized by chronic, widespread, musculoskeletal pain, but symptoms other than pain are common. Dyscognition is a term used to refer to subjective feelings and objective performance measures of cognitive dysfunction.

**METHODS:** In this presentation, the evidence for dyscognition in fibromyalgia is reviewed.

**RESULTS:** Dyscognition is a prevalent symptom among patients with fibromyalgia that can be very disruptive. Studies using self-report measures support the patient reports of dyscognition, demonstrating perceived problems across a number of cognitive domains. Testing using performance based measures of cognitive function also support patient reports of dyscognition. Furthermore, these tests have thus far revealed a pattern of impairment in working memory and attention/executive control as well as memory impairment.

**CONCLUSIONS:** Dyscognition is a real and troubling symptom for many patients with fibromyalgia. However; the body of research on dyscognition in fibromyalgia is still quite small. More research is needed to understand the factors that contribute to dyscognition, treatment approaches that help with dyscognition, and to understand the cognitive symptoms that are affected, including neuroimaging studies.

### **FIBROMYALGIA SYNDROME TREATMENT FROM A MULTIDIMENSIONAL PERSPECTIVE.**

Spaeth M, Private Practice, Internal Medicine/Rheumatology, Graefelfing, Germany.

**OBJECTIVES:** Fibromyalgia syndrome [FMS] is a pain syndrome which is not due to tissue damage or inflammation, and is thus fundamentally different from rheumatic disorders and many other pain conditions. Presenting as a “prototype” of a “central pain” disease, FMS widespread pain is often associated with a wide range of other symptoms such as sleep disturbance, fatigue, cognitive disturbance, stiffness, and depressive symptoms. The underlying mechanisms involved in the development of central sensitization both explain the clinical variety of symptoms [heterogeneity] and provide targets for pharmacologic and non-pharmacologic treatment strategies.

**FINDINGS:** Non-pharmacologic therapies include education, exercise, cognitive behavioral therapy, and other multidimensional therapeutic approaches. These should enable the patient to develop his own disease management strategies, in which drugs can be incorporated. Today, pharmacologic treatment targets several mechanisms involved in the development of central sensitization. In particular, serotonin noradrenaline reuptake inhibitors such as duloxetine and milnacipran and  $\alpha 2\text{-}\delta$  receptor ligands such as pregabalin have been shown in a variety of placebo controlled studies to bring significant relief from pain and other symptoms. The role of non-restorative, unrefreshing sleep of has been underestimated for many years. Recently, clinical trials have been published, emphasizing the important role of improved sleep quality. There was significant benefit on many disease domains by giving sodium oxybate.

**CONCLUSIONS:** The complex symptomatology of FMS will continue to require a multidisciplinary approach including education and exercise in addition to drug therapy to achieve the most efficient management of FMS, thus indicating a strong need for further and more extended studies targeting the benefits from using combinations of pharmacologic and non-pharmacologic treatments.

**CLINICAL DOMAINS OF FIBROMYALGIA SYNDROME: DETERMINATION THROUGH THE OMERACT PROCESS.** Choy EH, Director, King's Musculoskeletal Clinical Trials Unit, Academic Department Rheumatology, King's College London, London, UK.

**OBJECTIVE:** The key objective of the Outcome Measures in Rheumatology [OMERACT] initiative is to improve outcome measurement through a data driven, interactive consensus process. With increasing research interest and emerging new therapies for treatment of fibromyalgia syndrome, there is a need to develop a consensus on a core set of outcome measures that should be assessed and reported in all clinical trials.

**METHOD:** At OMERACT 7, the Fibromyalgia working group was established to achieve this aim. Through patient focus groups and Delphi processes, potential domains to be included in the core data set were identified. A systematic review has shown that instruments measuring these domains are available and are at least moderately sensitive to change. Construct and content validity of these domains were established by data mining of 10 randomized control trials. The proposed core data set was supported by high consensus among attendees at OMERACT 9.

**CONCLUSIONS:** The OMERACT core data set should improve quality of clinical trials and facilitate meta-analysis and indirect comparison in fibromyalgia syndrome.

**NEUROIMAGING IN FIBROMYALGIA SYNDROME.** Wood PB, Clinical Physician, Pacific Rheumatology Associates, Inc., Renton, WA; Chief Medical Officer, Angler Biomedical Technologies, Inc., Jonestown, TX

**OBJECTIVES:** The objective of this review is to summarize findings from neuroimaging studies conducted in patients with fibromyalgia syndrome [FMS] and discuss their implications regarding pathophysiology and treatment.

**FINDINGS:** A variety of neuroimaging modalities have been used to explore abnormalities in brain structure and function associated with FMS. Single photon emission computerized tomography has been used to demonstrate abnormalities in regional cerebral blood flow and explore correlations between these findings and clinical parameters. Abnormalities in brain morphometry, tissue microstructure and metabolite contents have been described using magnetic resonance imaging techniques. Evidence of central sensitization characterized by abnormal brain activation in response to stimulation has also been reported. Studies using positron emission tomography have shown abnormalities in dopaminergic neurotransmission and mu-opioid receptor binding.

**CONCLUSIONS:** Fibromyalgia is associated with a variety of brain abnormalities demonstrable by neuroimaging that correlate with patients' symptoms. Future neuroimaging studies that take into account distinguishing characteristics among different populations of FMS patients may help to improve approaches to treatment and provide insight as to the pathophysiology of symptoms in addition to chronic widespread pain.

## **BIOMECHANICAL PROPERTIES OF FASCIAL TISSUES AND THEIR ROLE AS PAIN**

**GENERATORS.** Schleip R<sup>1</sup>, Zorn A<sup>1</sup>, Klingner W<sup>2</sup>, 1. Fascia Research Project, Institute of Applied Physiology, Ulm University, Ulm, Germany; 2. Department of Anesthesiology, Ulm University, Germany

**OBJECTIVES:** To highlight the load bearing functions of fascial tissues and their proneness to micro tearing during physiological or excessive loading; to review histological evidence for a proprioceptive as well as nociceptive innervation of fascia; and to emphasize the potential role of injury, inflammation, and/or neural sensitization of the posterior layer of the human lumbar fascia in non specific low back pain.

**FINDINGS:** In addition to a tensional load bearing function of tendons and ligaments muscles transmit a significant portion of their force via their epimysia to laterally positioned tissues such as to synergistic or antagonistic muscles. Fascial tissues are commonly used as elastic springs [catapult action] during oscillatory movements, such as walking, hopping, or running, in which the supporting skeletal muscles contract rather isometrically. They are prone to viscoelastic deformations such as creep, hysteresis, and relaxation. Such temporary deformations alter fascial stiffness and may take several hours for recovery. There is a gradual transition zone between reversible viscoelastic deformation and complete tissue tearing. Micro tearing of collagenous fibers and their interconnections have been documented in this zone. Fascia is densely innervated by myelinated nerve endings which are assumed to serve a proprioceptive function. These are Pacini [and paciniform] corpuscles, Golgi tendon organs, and Ruffini endings. In addition they are innervated by free endings, containing substance P, suggestive of a nociceptive function. New findings suggest that nociceptive activity of epimysial fasciae play a major role in delayed onset muscle soreness(DOMS) subsequent to repetitive concentric exercise.

**CONCLUSIONS:** Fascial tissues serve important load bearing functions. The innervation of fascia indicates a sensory role as an organ for proprioception, and also a potential nociceptive function. Micro tearing and/or inflammation of fascia can be a direct source of musculoskeletal pain. Fascia may be an indirect source of back pain.

**SKELETAL MUSCLE DAMAGE AND REPAIR.** Tiidus PM<sup>1</sup>, 1. Wilfrid Laurier University, Department of Kinesiology & PE and Faculty of Science, Waterloo, Ontario Canada.

**OBJECTIVES:** To provide an overview of the classic paradigm of the physiology of skeletal muscle damage, inflammation and repair mechanisms and to highlight some newer research in these areas.

**METHODS:** This is a brief review of the current literature pertaining to skeletal muscle damage and repair.

**RESULTS:** Skeletal muscle damage, inflammation and repair, with some exceptions progresses largely the same way regardless of the cause of damage. This review highlights findings primarily from animal models augmented by selected human studies based mainly on the contraction induced muscle damage model to outline the general paradigms of muscle damage and repair as well as muscle soreness mechanisms. Newer research related to the regulation and implications of post-damage neutrophil infiltration, potential effects of specific drug related interventions on muscle repair and influence of sex steroid hormones and their loss in older adults on muscle repair potential are also highlighted.

**CONCLUSIONS:** Ongoing research continues to refine our understanding of muscle repair regulation and will assist in refining our abilities to positively intervene to optimize muscle repair in human and aging human populations.

**VISCERAL REFERRED PAIN.** Giamberardino MA, Affaitati G, Costantini R, Chieti University, Italy.

**OBJECTIVES:** The perception of pain in regions other than the affected organ is the rule in visceral nociception. This lecture reviews the current knowledge about modalities of clinical presentation and pathophysiological mechanisms of visceral referred pain.

**METHODS:** Recent clinical and experimental studies in the field are reviewed.

**RESULTS:** Visceral referred pain occurs in somatic areas neuromerically connected with the affected organs where secondary hyperalgesia takes place mostly in deep body wall tissues, extending to superficial layers in repeated/prolonged visceral processes. When two internal organs sharing part of their central sensory projection are affected, visceral pain and referred hyperalgesia from each organ are significantly enhanced (“viscero-visceral hyperalgesia”); in this case, treatment of one visceral condition significantly improves symptoms from the other. Referred phenomena are mainly sustained by central sensitization processes, involving viscerosomatic or viscerovisceral-somatic convergent neurons, as shown by electrophysiological studies in animal models. A contribution by viscerosomatic reflexes is also present, which would account for the trophic changes of deep body wall tissues that often accompany the hyperalgesia. The expression of visceral referred pain is reduced with the aging process; contributing mechanisms probably involve reduced content/turnover of neurotransmitter systems involved in nociception.

**CONCLUSIONS:** Visceral referred pain and accompanying phenomena are being increasingly understood as regards their pathophysiology. This opens new avenues for treatment strategies that are more mechanism-based and not purely symptomatic.

**DRY NEEDLING TREATMENTS FOR MYOFASCIAL TRIGGER POINTS.** Mayoral del Moral, O, Physical Therapy, Hospital Provincial de Toledo, Toledo, Spain.

**OBJECTIVES:** To briefly describe myofascial trigger points and the different dry needling procedures that can be used in their treatment, and to discuss the effectiveness of dry needling techniques and their indications.

**FINDINGS:** There exist different dry needling techniques that can be used in the treatment of trigger points. These techniques seem to be effective in treating this condition. There seems to be an increasing number of indications of these techniques within the context of myofascial pain syndrome.

**CONCLUSIONS:** Dry needling techniques are rapidly expanding among healthcare providers. More research is needed to know the mechanisms of dry needling in order to improve its efficiency and the patients’ tolerance of the techniques.

**1. THE REMOTE ELECTROPHYSIOLOGICAL EFFECT OF DRY NEEDLING TO THE RABBIT MYOFASCIAL TRIGGER SPOT (MTRS) – THE INFLUENCE OF THE SPINAL CORD TRANSECTION.** Hsieh Y<sup>1</sup>, Chou L<sup>2</sup>, Hong C<sup>3</sup>, 1. China Medical University, Taichung, Taiwan, 2. China Medical University Hospital, Taichung, Taiwan, 3. Hungkuang University, Taichung, Taiwan.

**OBJECTIVES:** The remote effects of dry needling at a distal myofascial trigger spot (MTrS, equivalent to human myofascial trigger point) on the irritability of a proximal MTrS, but the neural mechanism is still unclear and needs further investigation. The aim of this study was to find the central neural circuit responsible for the effect.

**METHODS:** Adult rabbits (2.0-2.5 kg, n=20) were randomly divided into two groups (n=10 in each): Transection of T2-T4 (group T) and L5-S1 (group L). Continuous tracings of endplate noise (EPN) were recorded from the MTrS of the biceps femoris. Samples of EPN tracings were taken for the assessment of MTrS irritability before, during and 5 minutes after dry needling at the MTrS of ipsilateral or contralateral gastrocnemius before and 4 hours after spinal cord transection.

**RESULTS:** Before transection, EPN amplitudes decreased after distal dry needling. Four hours after spinal cord transection in both groups, EPN amplitudes were significantly lower than those before transection ( $P < 0.05$ ). After transection in group T, EPN amplitudes in both sides significantly increased ( $P < 0.05$ ) immediately after dry needling, followed by a significant decrease ( $P < 0.05$ ) of EPN amplitude. After transection in group L, EPN amplitudes in either side were not significantly different compared with pre-needling level ( $P > 0.05$ ) after dry needling.

**CONCLUSIONS:** An intact corresponding control in the spinal cord at lumbar level is essential for the suppressive effect on the proximal MTrS by dry needling of the distal MTrS.

**2. THE REMOTE ELECTROPHYSIOLOGICAL EFFECT OF DRY NEEDLING TO THE RABBIT MYOFASCIAL TRIGGER SPOT (MTRS): THE INFLUENCE OF THE PERIPHERAL NERVES TRANSECTION.** Chou L<sup>1</sup>, Hsieh Y<sup>2</sup>, Hong C<sup>3</sup>, 1. Dept. Phys Med Rehabil, China Medical University Hospital, Taichung, Taiwan, 2. Dept. Physical Therapy, China Medical University, Taichung, Taiwan, 3. Dept. Physical Therapy, Hungkuang University, Taichung, Taiwan.

**OBJECTIVES:** The remote effects of dry needling at a distal MTrS on the irritability of a proximal MTrS in the rabbit skeletal muscle has been reported, but the neuronal control mechanism is still unclear. The aim of this study was to find the peripheral neural circuit responsible for this effect.

**METHODS:** Continuous tracings of endplate noise (EPN) were recorded from biceps femoris muscle of 12 adult rabbits before and after transection of ipsilateral tibial nerve. Samples of EPN tracings were taken for the assessment of MTrS irritability before, during, and 3 minutes after dry needling at the MTrS of ipsilateral or contralateral gastrocnemius muscle (GM) before and after nerve transection.

**RESULTS:** Before nerve transection, the EPN amplitude increased immediately after dry needling, but few minutes later and after cessation of needling, it reduced to a level less than that before needling. During and after dry needling at the ipsilateral denervated GM, the EPN amplitude was not significantly different from the pre-needling level ( $P > 0.05$ ). But after dry needling at the contralateral GM (without denervation), the EPN amplitudes were significantly lower than the pre-treatment level ( $P < 0.05$ ).

**CONCLUSIONS:** An intact connection via the peripheral nerve (tibial nerve) between the innervated distal muscle (GM) and the spinal cord is essential for the suppressive effect on the proximal MTrS by dry needling of the MTrS in this distal muscle.



### **3. THREE-DIMENSIONAL REAL TIME SONOGRAPHIC MORPHOLOGIC ASSESSMENT OF HUMAN MYOFASCIAL PAIN DURING NEEDLING: A PILOT STUDY. Hsu H<sup>1</sup>, Hong C<sup>2</sup>,**

1. Department of Physical Medicine and Rehabilitation, Chang Gung Memorial Hospital, Putz City, ChiaYi County, Taiwan, 2. Department of Physical Therapy, Hungkuang University, Shalu, Taichung, Taiwan.

**OBJECTIVES:** The purpose of this study was to assess the reproducibility and real-time characteristics of 3-dimensional (3D) sonography of myofascial taut band and trigger points (MTrP) in human upper trapezius muscle during needling by using gray-scale histogram method.

**METHODS:** Twelve patients with myofascial pain involving the upper trapezius muscle clinically diagnosed by an experienced physician were evaluated by 2-D and 3-D sonography. The images of the myofascial taut bands and localized twitch responses before and after needling were recorded and analyzed by normalized segmental histograms and gray-scale values were calculated and analyzed to differentiate with normal muscle tissue.

**RESULTS:** The taut bands were hyperechoic in appearance. After normalized comparison, the density distribution curve of taut bands was distinctively from the normal muscle tissue in histogram. A left shift of higher density distribution curve was noted after needling, indicating the decrease of hyperechogenicity. More specifically, the localized twitch responses were observed near the epimysium of the upper trapzius muscle.

**CONCLUSIONS:** Three-dimensional sonography is a reproducible technique for morphologic assessment of myofascial taut band and localized twitch response, and is better visualized than the traditional 2-D ultrasound method in real-time. Analysis with normalized gray-scale histograms is an effective method in identifying taut band, and localized twitch responses within surrounding muscular tissues.

### **4. MORPHOLOGICAL FINDINGS OF MYOFASCIAL TRIGGER POINT IN HIGH**

#### **RESOLUTION ULTRASOUND STUDY. CHEN H<sup>1</sup>, Chou L<sup>2</sup>, Hong C<sup>3</sup>, Kao M<sup>4</sup>,**

1. Department of Physical Medicine and Rehabilitation, China Medical University, Bei-Gang Hospital, , Bei-Gang, Yun-Lin, Taiwan, 2. Department of Physical Medicine and Rehabilitation, China Medical University Hospital, Taichung city, Taiwan, 3. Department of Physical Therapy, Hungkuang University, Taichung City, Taiwan, 4. Department of Physical Medicine and Rehabilitation, Taipei City Hospital, Taipei City, Taiwan.

**OBJECTIVES:** To investigate the morphological findings of myofascial trigger point and taut band using high resolution ultrasound (HRUS).

**METHODS:** Fifteen subjects with neck or shoulder pain with active MTrP in the upper trapezius muscle were recruited for this study. The identification of active MTrP in the upper trapezius muscle was based on palpation examination and electromyographic (EMG) searching for endplate noise (EPN) performed by the same examiner. When the MTrP was identified, monopolar EMG needle stayed in the MTrP region as a mark for sonographic study. A GE logic series sonographic machine with lineal probe, 2D gray scale picture, and both color Doppler and power color Doppler were used.

**RESULTS:** In all 15 active MTrP, EPN could be recorded with increased amplitude. Echogenicity changes were noted in regions where EPNs were recorded.

**CONCLUSIONS:** High resolution US enable found echogenicity change in MTrP region.

## **5. THE STUDIES OF ELECTRICAL POTENTIALS AND HISTOMORPHOLOGY OF INJURY MODEL OF MYOFASCIAL TRIGGER POINTS IN RAT. Huang Q<sup>1</sup>, Ye G<sup>2</sup>, Zhao Z<sup>3</sup>, Lv J<sup>4</sup>,**

1. Department of Sports Medicine, Shanghai Sports University, Shanghai, China, 2. Tongji Hospital, Shanghai, China, 3. Department of Sports Medicine, Shanghai Sports University, Shanghai, China, 4. Department of Sports Medicine, Shanghai Sports University, Shanghai, China.

**OBJECTIVES:** To observe SEA and histomorphology in taut band from the animal model established by injuries

**METHODS:** 16 male SD rats into two groups (8 for each), A for control, B for modeling with three sections. For modeling, proximal medial femur in B were locally stroked with eccentric exercise for 8 w and rested for 4 w. A taut band was blindly palpated in striking muscle. One thin needle was used for checking LTR and placed and other was to examine SEA. With a stimulation, electrical activity was recorded in two groups. Biopsy in confirmed taut band was taken for a study of histomorphology.

**RESULTS:** Numbers of taut band were 2(12/8). The normal endplate potential presented in A with amplitude  $158.7 \pm 124.8$  uV. Intensive SEA kept over 30s in B with fibrillation ( $462.50 \pm 221.60$  uV) and positive phase ( $43.13 \pm 8.84$  uV). On stimulation, action potentials with mixed phases ( $675.00 \pm 53.45$  uV) occurred in A, and with polyphasic short spine ( $45.00 \pm 4.63$  uV) in B. Abnormal big ellipse fibers aggregated in cross section. Contracture knots were observed in longitudinal section.

**CONCLUSIONS:** An augment muscle injury can cause local active MTrPs at the involved muscle. An active MTrP induced by injury has two characteristics of intensive SEA with fibrillation and positive phase, and a heap of big ellipse accumulative contracture knots.

## **6. TRACKING OUTCOMES OF CARE FOR MYOFASCIAL PAIN IN CLINICAL PRACTICE. Friction J<sup>1</sup>, Velly A<sup>2</sup>, Jacko J<sup>3</sup>, Kang W<sup>4</sup>,**

1. University of Minnesota, Minneapolis, Minnesota, USA, 2. University of Minnesota, Minneapolis, Minnesota, USA, 3. University of Minnesota, Minneapolis, Minnesota, USA, 4. University of Minnesota, Minneapolis, Minnesota, USA.

**OBJECTIVES:** Myofascial pain and fibromyalgia are complex chronic conditions with a wide variation in care and outcomes. Understanding the factors that predict positive and negative outcomes are essential to personalized approach to successful care but systems to collect this data are not available. This abstract presents an integrated research information system (IRIS) to transform a clinic into a naturalistic research environment.

**METHODS:** IRIS allows for site, provider, and subject recruitment and management, multi-source data collection and management, specimen collection and repository management, data exports, reporting, and translation of results for clinicians. A set of interactive secure web pages allows a public internet page and secure intranet study portals that are personalized for investigators, health providers, subjects, and their family. It integrates data from electronic records, self report, and examination forms.

**RESULTS:** The system was used to study predictors of outcome for 487 patients with head and neck pain in clinical practice. A Symptom Severity Index was used to dichotomize the outcomes of the group into high pain and low pain on follow-up. Factors that were significant prognostic factors for high pain included fibromyalgia, chronic fatigue, depression, and anxiety.

**CONCLUSIONS:** The system was able to both track patients over time and determine predictors of outcomes of patients with head and neck pain. The project is funded by NIH/NIDCR N01-DE-22635 and NIH/NINR RC2 NR011942.

## 7. THE REMOTE EFFECT OF ACUPUNCTURE OF THE LOWER EXTREMITIES APPLIED ON PATIENTS WITH ACTIVE UPPER TRAPEZIUS MYOFASCIAL TRIGGER POINT.

Chuang Y<sup>1</sup>, Chen K<sup>2</sup>, Hsieh W<sup>3</sup>, Hong C<sup>4</sup>, Hsu H<sup>5</sup>, 1. Department of PM&R, Chang Gung Memorial Hosp., Chiayi, Chiayi, Taiwan, 2. Department of PM&R, Chang Gung Memorial Hosp., Chiayi, Taiwan, 3. Department of PM&R, Chang Gung Memorial Hosp., Chiayi, Taiwan, 4. Dept Physical Therapy, Hungkuang Univ, Taiwan, 5. Graduate Institute of Clinical Medical Science, Chang Gung Univ, College of medicine, Taoyuan, Taiwan.

**OBJECTIVES:** This controlled study was aimed to evaluate the remote effect of acupuncture of the lower extremities in patients with upper trapezius active myofascial trigger points [UTAMTrPs].

**METHODS:** Eight patients with bilateral UTAMTrPs were randomized to receive newly acupuncture manipulation (experimental group) or sham needling (control group) at Weizhong (UB-40) and Yanglingquan (GB-34) on either side. Each patient received one treatment weekly for 3 weeks. The pressure pain threshold in upper trapezius, the opposite range of motion of cervical lateral bending, the endplate noise [EPN] prevalence in the UTAMTrPs, and the score on a whole-body visual analogue scale were assessed before and after the 1st and 3rd treatments. Repeated measured ANOVA was used to analyze the values within each group. Paired t test was used to analyze the values between two groups.

**RESULTS:** A tendency toward reduced EPN prevalence after the 3rd treatment ( $P=0.057$ ) was demonstrated in the experimental group. No statistically significant differences in other parameters were noted.

**CONCLUSIONS:** The results of this study showed a tendency toward a remote effect when new acupuncture therapy of the lower extremities was administered in patients with UTAMTrPs.

## 8. DEVELOPMENT OF MYOFASCIAL TRIGGER POINTS IN CHILDREN. Kao MJ<sup>1</sup>, Han TI<sup>2</sup>,

Chou LW<sup>3</sup>, Hong CZ<sup>4</sup>, 1. Department of Physical Medicine & Rehabilitation, Taipei City Hospital, Taipei, TAIWAN, ROC, 2. Department of Rehabilitation Medicine, China Medical University Hospital, Taichung, TAIWAN, ROC, 3. Department of Rehabilitation Medicine, China Medical University Hospital, Taichung, TAIWAN, ROC, 4. Department of Physical Therapy, Hungkuang University, Taichung, TAIWAN, ROC.

**OBJECTIVES:** This study is designed to investigate the timing of the development of latent myofascial trigger points (MTrPs) and attachment trigger points (A-TrPs) in school children.

**METHODS:** Five hundred and five healthy school children (age 3- 11 years) were investigated. A pressure algometer was used to measure the pressure pain threshold (PPT) on 3 different sites in the brachioradialis muscle: the lateral epicondyle at elbow (site A, assumed to be a-TrP site), the mid-point of the muscle belly (site B, assumed to be MTrP site), and the muscle-tendon junction site (site C).

**RESULTS:** It was found that there were no significant differences ( $p > 0.05$ ) in the mean PPT values among 3 different measured sites for children with age of 5 years or younger. However, the mean PPT values was significantly lower ( $p < 0.05$ ) at the site A or B than that at site C for children at age of 6 years or older, and was significantly lower ( $p < 0.05$ ) at site A than site B for those at age of 7 years or older. These findings were similar for different sex, different dominant sides, and different activity levels.

**CONCLUSIONS:** It was concluded that children began to develop a MTrP and an A-TrP at the brachioradialis muscle since at the age of 6 years, with the A-TrP becomes more irritable than in the MTrP since at the age of 7 years. These findings are not related to the activity levels.

## **9. FOOT PATHOLOGY AND MYOFASCIAL PAIN SYNDROME IN CHILDHOOD. Karlov AV<sup>1</sup>,**

1. Moscow Medical Centre "Nevromed", Russia, Russia.

**OBJECTIVES:** To reveal the foot pathology as a real cause of myofascial pain syndrome development in childhood.

**METHODS:** The screening examination was done. 100 children at the age of 7 to 8 were examined by clinical, neurological, manual, roentgenological and orthopedic methods.

**RESULTS:** Foot pathology was revealed in 92% cases. The most common foot pathologies were platypodia (26%), valgus (9%) or varus (8%) foot, flat-valgus foot (34%), horse foot (6%), Morton`s foot (9%) and other unusual syndromes (8%). Myofascial pain syndrome of different localization and degrees was detected in all children with foot pathology.

**CONCLUSIONS:** Thus, the foot pathology is a risk factor of myofascial pain syndrome development in childhood. The cause of myofascial pain syndrome development in childhood is an abnormal locomotor pattern as a result of foot pathology. The ordinary treatment of such patients must be combined with orthopedic correction of foot pathology.

## **10. SECONDARY MYOFASCIAL PAIN SYNDROME AS A FACTOR SUPPORTING TRIGEMINAL NEURALGIA ACUITY. Karlov VA<sup>1</sup>,**

1. Moscow Medico-Stomatological University, Moscow, Russia.

**OBJECTIVES:** To elaborate complex therapy for old patients with trigeminal neuralgia.

**METHODS:** 9 patients over 75 with the first-second branches of the trigeminal nerve neuralgia were examined in acute disease stage by clinical, neurological, manual and cardiological methods. All patients were seriously ill with cardiovascular disorders.

**RESULTS:** Acute pain syndrome was conditioned not only by trigeminal neuralgia, but also by myofascial component in consequent of secondary spasm of the masticatory muscle group. Treatment: vigabatrine, antidepressants and drugs with unification analgetic and antispastic properties; we preferred tizanidine. After pain decrease, we found it possible to add manual therapy. As usual, muscle trigger points predominated on the trigeminal neuralgia side. Cutaneous and mucosal trigger zones sprinkled by an anesthetic. Puncture of muscle trigger points, light postisometric relaxation were used and then local warm application. Result was estimated by clinical data, pain scale and comparison with treatment outcome of the same patients` previous relapse, when manual therapy was not used. Common result was less relapse time: 14+<sub>2.3</sub> days vs. 17.3 (p0.05).

**CONCLUSIONS:** Trigeminal neuralgia relapse is accompanied by secondary myofascial pain syndrome of the masticatory muscle group. Use of therapeutic complex including combination of neuropathic drugs and antidepressants with tizanidine and manual therapy leads to good result.

**11. REFERRED PAIN FROM ACTIVE MYOFASCIAL TRIGGER POINTS AFTER TWO DIFFERENT BREAST CANCER SURGERY.** Fernández-Lao C<sup>1</sup>, Cantarero-Villannueva I<sup>2</sup>, Arroyo-Morales M<sup>3</sup>, Ortega-Santiago R<sup>4</sup>, Fernández-de-las-Peñas C<sup>5</sup>, 1. Universidad Granada, Spain, 2. Universidad de Granada, Spain, 3. Universidad de Granada, Spain, 4. Universidad Rey Juan Carlos, Spain, 5. Universidad Rey Juan Carlos, Spain.

**OBJECTIVES:** Our aim was to describe the differences in the presence of myofascial trigger points [TrPs] in neck and shoulder muscles after breast cancer surgery.

**METHODS:** Thirty-two women [age: 50 ± 7 years] who received lumpectomy and 16 women [age: 48 ± 10 years] who received mastectomy after breast cancer, participated. Myofascial TrPs in the upper trapezius, sternocleidomastoid, levator scapulae, scalene, infraspinatus and pectoralis major muscles were bilaterally explored by an assessor blinded to the women's condition.

**RESULTS:** The number of active TrPs between lumpectomy [mean ± SD: 4.5 ± 1] and mastectomy [mean: 4.6 ± 1] groups was not significantly different [P = 0.641]. No significant differences in the distribution of active muscle TrPs between groups was found [P > 0.210]. Active TrPs in the pectoralis major muscle were the most prevalent in both groups.

**CONCLUSIONS:** This study found multiple active TrPs in neck and shoulder muscles in women who had received lumpectomy or mastectomy. The induced local and referred pain pattern from active TrPs reproduced neck and shoulder/axillary symptoms and pain patterns in women after breast cancer surgery

**12. PREVALENCE OF MYOFASCIAL TRIGGER POINTS IN OFFICE AND MANUAL WORKERS: A COMPARATIVE STUDY.** Gröbli C<sup>1</sup>, Fernández-de-las-Peñas C<sup>2</sup>, Ortega-Santiago R<sup>3</sup>, Stebler-Fisher c<sup>4</sup>, Boesch D<sup>5</sup>, Stocker L<sup>6</sup>, Weissman R<sup>7</sup>, González-Iglesias J<sup>8</sup>, 1. David G Simons Academy, Switzerland, 2. David G Simons

Academy, Spain, 3. Universidad Rey Juan Carlos, Spain, 4. David G Simons Academy, Switzerland, 5. David G Simons Academy, Switzerland, 6. David G Simons Academy, Switzerland, 7. David G Simons Academy, Switzerland, 8. David G Simons Academy, Spain.

**OBJECTIVES:** To describe the differences in the prevalence of active and latent trigger points [TrPs] between manual and office workers

**METHODS:** Sixteen [62% female] manual workers and 16 [75 female] office workers [P = 0.352] were included. Patients were asked for drawing their pain pattern symptoms in an anatomical draw. TrPs were bilaterally explored within the temporalis, masseter, upper trapezius, sternocleidomastoid, splenius capitis, suboccipital, levator scapulae, scalene, pectoralis major, deltoid, infraspinatus, extensor carpi radialis brevis, extensor carpi radialis longus, extensor digitorum communis and supinator muscles by several experienced assessors blinded to the subjects' condition

**RESULTS:** Each manual worker showed a mean of 6 [SD: 3] active and 10 [SD: 5] latent TrPs, whereas office workers had a mean of 6 [SD: 4] active and 11 [SD: 6] latent TrPs [P > 0.548]. No significant differences in the distribution of active and latent TrPs in the analyzed muscles between groups were found [P > 0.128]. The most prevalent TrPs were located within the upper trapezius, infraspinatus, levator scapulae and extensor carpi radialis brevis muscles in both groups.

**CONCLUSIONS:** Manual and office workers showed similar number of active and latent TrPs in the upper quarter. The referred pain elicited by active TrPs reproduced the pain pattern in all subjects.

### **13. REFERRED PAIN AND TENDERNESS IN RELATIVES OF PATIENTS WITH MIGRAINE AND IN HEALTHY SUBJECTS. Calandre EP<sup>1</sup>, Garcia-Leiva JM<sup>2</sup>, Vilchez JS<sup>3</sup>**

1. Professor, Granada, Granada, Spain, 2. Technician, Granada, Granada, Spain, 3. Medical Doctor, Granada, Granada, Spain.

**OBJECTIVES:** Migraine's patients show increased referred pain in relation to healthy subjects. This may be due to the fact that repeated migraine attacks secondarily sensitize peripheral neurons. However, the possibility of increased myofascial vulnerability as a hereditary predisposing feature cannot be discarded.

**METHODS:** We examined the presence of referred pain and tenderness in the scalp and neck of 84 first-degree relatives of patients with migraine; forty-five (53.6%) of them experienced headaches and 39 (46.4%) did not. Thirty one healthy subjects whose relatives did not suffer headaches composed the control group. Presence and number of trigger and tender points were recorded in each group. Data were analyzed with  $\chi^2$  square test and analysis of variance.

**RESULTS:** Referred pain, with or without associated tenderness, was found in 31 (68.9%) relatives with headache, 8 (20.5%) relatives without headache, and 3 (9.7%) control subjects ( $p < 0.0001$ ). Mean number of trigger points was  $3.9 \pm 2$ ,  $1.9 \pm 1.1$  and  $1.3 \pm 0.6$  respectively ( $p = 0.006$ ). Tenderness without referred pain was found in 10 (22.2%) relatives with headache, 20 (51.3%) relatives without headache, and 12 (38.7%) controls ( $p < 0.021$ ). Mean number of tender points was  $3.9 \pm 2.6$ ,  $3.3 \pm 1.7$ , and  $2.1 \pm 1.7$  respectively ( $p = 0.032$ ).

**CONCLUSIONS:** Referred pain and tenderness were highest among patients' relatives with headache. Patterns of referred pain and tenderness among patients' relatives without headache were intermediate between the former and controls, suggesting that some degree of myofascial vulnerability can be present among healthy relatives of migraine's patients.

### **14. ANTHROPOLOGIC APPROACH TO MYOFASCIAL PAIN SYNDROME-A PROPOSAL FOR INTERVENTION. Aceituno J<sup>1</sup>, Muñoz A<sup>2</sup>, 1. PT HNS Prado, Talavera, Spain, 2. PT HN Paraplégicos, Toledo, Spain.**

1. PT HNS Prado, Talavera, Spain, 2. PT HN Paraplégicos, Toledo, Spain.

**OBJECTIVES:** Study the myofascial pain syndrome (MPS) from a different perspective to the clinical one. Approach chronic MPS by means of an interdisciplinary point of view. Develop a proposal for intervention in patients with chronic MPS considering anthropological aspects of pain

**METHODS:** Work has been divided into two parts: the first one in which you conduct a search of scientific literature related to the object of study and a second one in which, from the results obtained, conclusions are drawn up to propose intervention

**RESULTS:** Anthropological aspects of MPS have not been a regular subject of study. Therefore it has been necessary to use studies on pain in general: Pain goes beyond the personal and subjective experience of those who suffer, the expression, and validation by social environment respond to socio-cultural factors. Acute and chronic pain have a different socio-cultural connotations, scientific literature indicates the importance of finding causality for a more positive experience of pain. The attitude of the therapist and patient information are key elements in the process of recovery

**CONCLUSIONS:** Understand the pain not only as a natural and subjective fact but also as a socially learned and culturally transmitted behaviour, influenced by many external factors. Need to integrate empathy and estrangement in addressing the patient with MPS. Inform the patient clearly and concisely about his recovery process to become an active part of treatment. Need to develop lines of research so that the study of MPS interacts with social sciences in order to obtain a greater interdisciplinarity which results in a holistic conception of the patient.

**15. MUSCULO-ARTERIAL NOCICEPTIVE REFLEX.** Esin OR<sup>1</sup>, Nasyrtdinova AM<sup>2</sup>, 1. Kazan State Medical Academy, Kazan, Tatarstan Republic, Russia, 2. Republican clinical Hospital #2, Kazan, Tatarstan Republic, Russia.

**OBJECTIVES:** The aim is to determine if there is influence of Myofascial Trigger Points [MTP] in pericranial muscles to the cerebral arteries tone at patients with Myogenic Headache [MH].

**METHODS:** 1) MTP diagnostic by palpation; 2) MTP conformation by tensoalgometria; 3) ultrasound dopplerography extra- and intracranial blood vessels. We used Acuson Sequoia 512 with linear transducer 5-8 MHz and sector transducer 2-3.5 MHz. There was ultrasound dopplerography of common carotid arteries [CCA], internal carotid arteries [ICA], medial cerebral arteries [MCA]. We evaluated: linear blood speed [LBS], Time-averaged mean maximum blood flow velocity [TAMx], indexes of peripheral vessels resistance (pulse index [PI], resistance index) [IPVR].

**RESULTS:** 20 patients were examined. Patients with MH in quiescent state had: normal intima media thickness, LBS and TAMx were normal or a little beet higher. High figures of LBS, TAMx, IPVR were found in MCAs. High blood speed indices and IPVR were discovered in time while MTP compression and at once after 2-3 minutes later after compression LBS, TAMx, IPVR had lower figures than before MTP compression. Patient had positive reaction to the MTP compression, in other words CVR index was within the normal range. Patients with atherosclerosis had low changes in indices of cerebral blood flow while MTP compression, and there was negative reaction for MTP compression.

**CONCLUSIONS:** 1) there is musculo-arterial pressor reflex; 2) this reflex can play important role in neurological symptoms genesis at patients with MH; 3) musculo-arterial pressor reflex can be the valuation method of CVR.

**16. PHYSIOLOGICAL ACTIVATION OF THE MOTION UNIT IS THE OPTIMAL METHOD OF TREATING MYOGENIC TRIGGER ZONES.** Esin OR<sup>1</sup>, 1. Kazan State Medical Academy, Kazan, Tatarstan Republic, Russia.

**OBJECTIVES:** Myopain, which is caused by formation of a myogenic trigger zone (MTZ) in skeletal muscle causes wide spread suffering of man. It debuts in adolescence and accompanies man all his life. There are many methods of MTZ elimination and myopain treatment.

**METHODS:** Many theories consider skeletal muscle motor neuron dysfunction to be the cause of MTZ. Our theory lays the supposition that the initial cause of the MTZ is neuronal dysfunction with subsequent influences on the neuronal junction with the myofiber. The results are structural changes in the MTZ, such as muscle contraction, without electromyographical activity. Physiological activation of the motor unit is the basis for reconstruction of normal muscle structure and neuronal influences on the myofiber. To achieve this, we used the methods of T. DeLorme (1945) with 10 repetitions.

**RESULTS:** Eighty seven patients with myopain were treated by such methods. No other medicinal and non-medicinal treatment was allowed. A substantial decrease in pain was observed after the first session. The maximal decrease in pain symptoms was achieved after 7-10 exercise sessions.

**CONCLUSIONS:** However, reduction of pain was not always accompanied full reduction of the MTZ. The MTZ remained as a little painless infiltration zone in 27 patients. This occurred because there were irreversible dystrophic changes in the altered skeletal muscle. The effects of this treatment can be explained by activation neuronal influences on the muscle and reconstruction of normal neuron to myofiber unit structure.

**17. ROLE OF TREATMENT OF MYOFASCIAL PAIN AND DYSFUNCTION IN MANAGEMENT OF IDIOPATHIC SCOLIOSIS [IS].** Whyte Ferguson L<sup>1</sup>, 1. Priv. Pract., El Prado, NM, USA.

**OBJECTIVES:** To identify role of Myofascial Trigger Points [TrPs] and taut bands in pain and body organization of patients with IS or at risk for IS

**METHODS:** Series of case studies (9)

**RESULTS:** Patterns of myofascial dysfunction are remarkably similar in individuals in each of four IS categories: pre-adolescents developing curvatures, adolescents with IS, post surgical cases, older patients with uncorrected IS. Asymmetry in length of certain muscles has been found critical to treatment of IS: quadratus lumborum [QL], iliopsoas, latissimus dorsi [LD], anterior serratus [AS], and subscapularis. QL and iliopsoas affect tilt of the lumbar spine and pelvis due to their off center attachments. Different parts of the QL are shortened on convex and concave sides of the scoliosis. The LD, AS, and subscapularis affect rib cage mobility and tether the scapula, exerting mechanical force due to peripheral location. Over 80% of individuals treated for IS also have lax ligaments. Surgical placement of a rod to straighten the spine may fail to restore balance to the myofascially dysfunctional muscles. TrPs may play a significant role in post-surgical pain. Elongation of asymmetrically shortened muscles can result in decreased curvatures, improved joint function, and reduced pain.

**CONCLUSIONS:** Among factors that contribute to development of IS, myofascial dysfunction, especially in the presence of lax ligaments, plays a significant role in spinal curvatures and accompanying pain. Case histories are suitable for initial exploration of this field and further research is in order.

**18. SPECIFIC COGNITIVE DEFICITS IN PATIENTS WITH CHRONIC LOW BACK PAIN UNDER LONG-TERM SUBSTITUTION TREATMENT OF OPIOIDS.** Wang H<sup>1</sup>, Gantz S<sup>2</sup>, Schiltenswolf M<sup>3</sup>, 1. Orthopädie, Heidelberg Germany, 2. OK, HD, 3. OK, HD.

**OBJECTIVES:** Long-term effects under opioid use and the possibility of improvement in cognitive performance during long-term use have rarely been investigated in patients with chronic pain. We performed a comparative study investigating differences in cognitive functions to test the hypothesis that long-term use of opioid may impair cognitive function.

**METHODS:** Seventy patients with chronic low back pain were assessed after long-term treatment of opioid (group 1) or without (group 2) using the Cambridge Neuropsychological Test Automated Battery (CANTAB) on intelligence, learning and memory, attention and executive functions, compared to 35 controls (group 3). The test was repeated after 3-week multidisciplinary pain therapy and 6 months later.

**RESULTS:** There were no significant differences in multiple choice vocabulary test (MWT), choice reaction time (CRT), pattern recognition memory (PRM) between 3 groups, but significant difference in spatial span (SSP) and trail making test A/B (TMT-A/B) between group 1 and 2, group 1 and 3. After 3 weeks, the multidisciplinary pain therapy (MDPT) group 1 patients improved the CRT correct latency, PRM percent correct, span length and WIE scores, while group 2 patients only enhanced their TMT-A scores. Both patient groups increased the MWT scores. Six months after MDPT the TMT and WIE scores of both patient groups were further upgraded.

**CONCLUSIONS:** Our findings suggest there were significant differences in attentional functions and learning and memory between three groups. MDPT can ameliorate the impaired cognitive ability of patients due to long term chronic low back pain and opioid exposure.



## **19. MYOFASCIAL TRIGGER POINTS MAPPING AND ACUPUNCTURE FOR PLANTAR FOOT PAIN IN FIBROMYALGIA.** Ge H<sup>1</sup>, Xu Y<sup>2</sup>, Danneskiold-Samsøe B<sup>3</sup>, Graven-Nielsen T<sup>4</sup>, Arendt-Nielsen L<sup>5</sup>, 1. Aalborg University, Aalborg, Denmark, 2. Aalborg University, Aalborg, Denmark, 3. The Parker Institute, Frederiksberg Hospital, Copenhagen, Denmark, 4. Aalborg University, Aalborg, Denmark, 5. Aalborg University, Aalborg, Denmark.

**OBJECTIVES:** To map the locations of myofascial trigger points [MTPs] in plantar foot muscles and evaluate the effects of MTP acupuncture on plantar pain in fibromyalgia.

**METHODS:** Manual palpation was used to identify both the active and latent MTPs in plantar muscles on both feet in 28 patients with fibromyalgia and MTP acupuncture was then given to each active MTPs two times with three days in between and needle penetration in the skin served as control.

**RESULTS:** Eighteen out of 28 fibromyalgia patients reported plantar foot pain. Manual stimulation of active MTPs reproduced fibromyalgia plantar pain. There was a symmetrical distribution of MTPs bilaterally in the feet. In those patients with plantar foot pain, there were  $3 \pm 1.2$  latent MTPs and  $2 \pm 1.1$  active MTPs in each foot. MTPs were mostly observed in the abductor hallucis (55%), followed by flexor digitorum brevis (39%), quadratus plantae (9%), and abductor digiti minimi (4%). Most of the MTPs were present at the mid-region of each muscle. MTP acupuncture, but not by needle penetration in the skin in 9 patients, significantly relieved plantar pain in 9 patients (From  $7.6 \pm 1.4$  cm on VAS pre-acupuncture to  $1.6 \text{ cm} \pm 1.5$  post-acupuncture,  $P < 0.01$ ).

**CONCLUSIONS:** Active MTPs contribute to plantar pain in fibromyalgia and MTP acupuncture is effective for plantar pain.

## **20. MYOFASCIAL PAIN OF SCHOOLCHILDREN AND ASSOCIATED COLLAGEN TISSUE PATHOLOGY.** Khaibullina DK<sup>1</sup>, Maximov YN<sup>2</sup>, 1. Medical Rehabilitation Hospital of Tatarstan Republic, Kazan, Tatarstan, Russia, 2. Medical Rehabilitation Hospital of Tatarstan Republic, 420022 Kazan, Tatarstan, Russia.

**OBJECTIVES:** In this report we describe our medical investigations among Russian schoolchildren to reveal a relation between myofascial pain and collagen tissue pathology. 250 schoolchildren with myofascial pain were examined during 10 months.

**METHODS:** Clinical, radiological and genetics examinations were taken.

**RESULTS:** Different symptoms of collagen tissue pathology were found in 160 of the 250 cases. There were 95 boys and 65 girls with the following genetic syndromes: MASS-phenotype - 45 (18,0%) of the 160 cases, Hypermobility Syndrome - 32 (12,8%), Marfan phenotype - 15 (6,0%), Ehlers-Danlos phenotype - 9 (3,6%), Marfan Syndrome - 3 (0,12%) and Ehlers-Danlos Syndrome Type II - 1 schoolboy (0,04%). 55 (22,0%) patients of 160 have separate symptoms: tensility of the skin; hypermobility of joints, mitral valve prolapse, etc related to above pathology. 90 patients (36% compared to the total number of patients) did not have symptoms of collagen tissue pathology. A careful history and radiological examination diagnosed 10 cases of Scheuermann's disease, 6 cases of painful scoliosis and 5 cases of spondylolisthesis.

**CONCLUSIONS:** Clinical examination shows that more than the half of schoolchildren with myofascial pain reveals the symptoms of collagen tissue pathology. We recommend: (a) conservative management with the use of medication as well physical therapy and acupuncture in the cases of myofascial pain and collagen tissue pathology; (b) manipulative therapy in the cases with functional disorders.

**21. RANDOMIZED PILOT STUDY ON THE IMMEDIATE EFFECTIVENESS OF THE TREATMENT OF LATENT MYOFASCIAL TRIGGER POINTS IN INFRASPINATUS MUSCLE: ISCHEMIC COMPRESSION VERSUS SUPERFICIAL DRY NEEDLING.** Martínez JM<sup>1</sup>, Mayoral O<sup>2</sup>, Torres M<sup>3</sup>, Pontones M<sup>4</sup>, Gutiérrez C<sup>5</sup>, 1. Central de la Defensa Hospital, Madrid, Spain, 2. Provincial Hospital, Toledo, Spain, 3. Alcalá University, Madrid, Spain, 4. Central de la Defensa Hospital, Madrid, Spain, 5. Central de la Defensa Hospital, Madrid, Spain.

**OBJECTIVES:** To compare the immediate effectiveness of superficial dry needling (SDN) and ischemic compression (IC) in the treatment of latent myofascial trigger points (LMTrP), measured as changes in the pressure pain threshold (PPT) and dynamometry.

**METHODS:** Design: Randomized single-blinded pilot trial. Participants and setting: Forty subjects from the Central de la Defensa Hospital from Madrid, with LMTrP in infraspinatus muscle, were randomly allocated. Interventions: Twenty subjects were treated with SDN, and 20 with IC. All of them were assessed by algometry and dynamometry pre and post treatment. Statistical approaches: The t test for paired samples was applied to both groups to highlight the differences between pre and post data measurements. The t test for independent samples was applied to compare both interventions.

**RESULTS:** SDN increased the PPT ( $p < 0.001$ ). No statistically significant difference was found in dynamometry. IC did not show statistically significant difference in any of the assessments made. Finally, we found significant differences between both interventions. In the SDN group the PPT increased 0.4 units more (95% IC: 0.04 to 0.7) than in the IC group ( $p = 0.026$ ).

**CONCLUSIONS:** SDN significantly increases the PPT immediately after the treatment of LMTrP in infraspinatus muscle. In addition, SDN achieves a greater PPT than IC.

**22. DIAGNOSTIC TEST ASSESSMENT OF CUTANEOUS ALLODYNIA, MYOFASCIAL TRIGGER POINTS AND REDUCED PAIN THRESHOLDS IN ENDOMETRIOSIS AND VISCERAL DISEASE.** Jarrell JF<sup>1</sup>, 1. University of Calgary, Calgary, AB, Canada.

**OBJECTIVES:** This study is evaluate diagnostic test properties of cutaneous allodynia (CA), abdominal and perineal myofascial trigger points (aMFTP) and (pMFTP)] and reduced pain thresholds (RPT) in the detection of previous or current pelvic visceral disease and endometriosis.

**METHODS:** 67 Women with chronic pelvic had standardized tests for CA, aMFTP, pMFTP and RPT on the abdomen and perineum. CA testing has been previously described (Jarrell, Journal of Visualized Experiments, June 23, 2009). Pain thresholds were assessed with the Electronic von Frey Anesthesiometer (IITC Life Science). The study was approved by the Ethics Committee of the University of Calgary.

**RESULTS:** Data were evaluated for diagnostic test properties. The Positive Predictive Values for CA, aMFTP and pMFTP and RPT were 80%, 82%, 69% and 63% for diagnosed pelvic visceral disease and 63%, 63.0%, 53% and 51% for diagnosed pelvic endometriosis. The Positive Predictive Value of all four tests combined was 97% for visceral disease and 81% for endometriosis.

**CONCLUSIONS:** Standardized tests of neuroplasticity, including CA, aMFTP, pMFTP and RPT are of value is documenting the viscerosomatic reflex among women with chronic pelvic pain. The tests are simple to undertake and well tolerated. They assist in validating the pain experience of women with chronic pelvic pain and provide a basis to identify visceral disease and endometriosis.

**23. DOES HYPOTHYROIDISM AGGRAVATE THE ACTIVITY OF MYOFASCIAL TRIGGER SPOT IN SKELETAL MUSCLE? A PILOT STUDY.** Hsieh Wei Chi<sup>1</sup>, Hsu H<sup>1</sup>, Hong C<sup>2</sup>, Chen K<sup>3</sup>, 1. Chang Gung Memorial Hospital, Chiayi branch, Chiayi County, Taiwan, 2. Department of Physical Therapy, Hung Kuang University, Taichung, Taiwan, 3. Chang Gung Memorial Hospital, Chiayi branch, Chiayi County, Taiwan.

**OBJECTIVES:** An animal model to investigate the activity of Myofascial trigger spot (MTrS) in skeletal muscle of rabbit with hypothyroidism by monitoring endplate noise (EPN) prevalence.

**METHODS:** We use New Zealand male white rabbits as our subjects. Total twenty rabbits are included in our study. They are classified equally into experimental and control group by rule of randomization. The rabbits of experimental group are transferred into status of hypothyroidism with PTU in daily drinking water following model according to Arai et al. The control-group rabbits drink clean water for the same duration. The serum T4, T3 and TSH level were checked before and after study. We also check the prevalence of endplate noise (EPN) in myofascial trigger spot of bilateral gastronemius. Regression analysis is used to probe into the correlation of EPN prevalence and serum level of T4, T3, TSH.

**RESULTS:** In control group, paired T test was not significant in serum level of T3 T4, TSH and EPN prevalence rate; but it suggest significant findings in experimental group in comparing before and after drinking water with PTU. Otherwise, serum T3 T4 TSH have significant correlation results under regression analysis (R square: T3:0.32, T4:0.26, TSH: 0.38)

**CONCLUSIONS:** The EPN prevalence has correlation with serum level of T3 T4 TSH. Hypothyroidism status sharpen irritability of MTrS in rabbit's skeletal muscle

**24. THE INHIBITING EFFECTS OF SEA PREVALENCE IN MYOFASCIAL TRIGGER SPOTS OF RABBIT SKELETAL MUSCLE BETWEEN MIRE AND TRADITIONAL PHYSICAL THERAPY.** Kuan T<sup>1</sup>, Chien C<sup>2</sup>, Hong C<sup>3</sup>, 1. Dept PM&R, National Cheng Kung University, Tainan, Taiwan, 2. Department of Cell Biology and Anatomy, National Cheng Kung University, Tainan, Taiwan, 3. Department of Physical Therapy, Hungkuang University, Taichung, Taiwan.

**OBJECTIVES:** The prevalence of spontaneous electrical activity (SEA) has been proven to be highly correlated to the irritability of MTrP. Monochromatic infrared photo energy (MIRE), is one kind of photon therapy (890 nm of wave length). The objective of this study is to compare MIRE and traditional physical therapy (tPT) for their inhibiting effect on the prevalence of SEA of an MTrS in rabbit skeletal muscle.

**METHODS:** Twelve adult New Zealand rabbits were investigated. We randomly selected an MTrS in one side of femoris bicep as the MIRE group, and another MTrS on the other side as the tPT group. The protocol for MIRE consisted of a daily 40 mins treatment, three times per week for 2 wks. The same treating schedule was applied for tPT, which consisted of hot packing for 20 mins and electrical stimulation for 20 mins. The prevalence of SEA in an MTrS was assessed before, immediately after, and one week after completion of the intervention.

**RESULTS:** In the experimental group, the mean values of the prevalence of SEA in an MTrS before the intervention of MIRE, immediately after MIRE, and one week after MIRE were 13, 8, 9. respectively. In the control group, the corresponding mean values were 11, 11, 10, respectively. The decrease of SEA prevalence in an MTrS was statistically significant in the experimental group (P<0.01).

**CONCLUSIONS:** The result suggested that, compared to tPT, MIRE might be a more effective strategy for the management of MTrP.

**25. RANDOMIZED, DOUBLE BLIND, PLACEBO-CONTROLLED CLINICAL TRIAL ABOUT EFFECTIVENESS OF MYOFASCIAL TRIGGER POINTS DRY NEEDLING IN THE REDUCTION OF PAIN AFTER TOTAL KNEE ARTHROPLASTY.** Mayoral O<sup>1</sup>, Martín MT<sup>2</sup>, Martín S<sup>3</sup>, Santiago J<sup>4</sup>, Cotarelo J<sup>5</sup>, Rodríguez C<sup>6</sup>, Romay H<sup>7</sup>, 1. Provincial Hospital, Toledo, Spain, 2. Provincial Hospital, Toledo, Spain, 3. Provincial Hospital, Toledo, Spain, 4. Provincial Hospital, Toledo, Spain, 5. Provincial Hospital, Toledo, Spain, 6. Provincial Hospital, Toledo, Spain, 7. Castilla-La Mancha University, Toledo, Spain.

**OBJECTIVES:** To find out if myofascial trigger points (MTPs) dry needling (DN) is superior to placebo in the prevention of pain after total knee arthroplasty (TKA).

**METHODS:** 40 subjects (SJs) were examined for MTPs by an expert physical therapist (PT) 4-5 hours before undergoing TKA. SJs were assigned to a true DN group (tDNG) or to a sham DN group (sDNG). Right after the SJ was under anesthesia (uAN) and right before TKA started, SJs in tDNG were dry needled in all diagnosed MTPs, while SJs in sDNG received no treatment in their MTPs, although the PT applying DN was in the surgery room with the SJs during anesthesia procedure and simulated DN right afterwards. Since SJs were uAN, they were blinded to group allocation, as well as the examiner in pre-surgical and follow-up exams, performed 1, 3 and 6 months after TKA

**RESULTS:** Subjects in the tDNG had less pain after TKA, with statistically significant differences in post-surgery analgesics demand ( $P=0.02$ ) and in the rate of change of several VAS measurements 1 month after TKA: VAS,  $P=0.04$ ; VAS $>4$ ,  $P=0.03$ ; VAS=0,  $P=0.04$ . Differences were not significant in 3 and 6 months exams

**CONCLUSIONS:** A single MTPs-DN treatment uAN reduces pain after TKA in the first month after surgery, when pain is highest. Results show a superiority of DN Vs. placebo and present an interesting novel placebo methodology for DN

**26. RELIABILITY OF CLINICAL EXAMINATION IN THE DIAGNOSIS OF MYOFASCIAL PAIN SYNDROME.** Mayoral O<sup>1</sup>, Torres M<sup>2</sup>, Russell IJ<sup>3</sup>, Gutiérrez C<sup>4</sup>, 1. Provincial Hospital, Toledo, Spain, 2. Alcalá University, Madrid, Spain, 3. The University of Texas, San Antonio, Texas, USA, 4. Hospital Central Defensa, Madrid, Spain.

**OBJECTIVES:** 1. To determine whether a blinded clinician (BC) can agree on a diagnosis (Dx) of myofascial pain syndrome (MPS). 2. To evaluate inter-examiner reliability (IER) of clinical diagnostic criteria (CDC) for the Dx of MPS. 3. To evaluate IER in identifying MPS in neck and shoulder (N&S) muscles (Ms)

**METHODS:** A trained and expert examiner (E1) enrolled 20 MPS and 20 healthy normal controls (HNC) subjects (SBs). Ten bilateral Ms from the N&S were evaluated by E1 and, 3-4 days later, by a BC (E2). The MPS Dx required at least 1 M to have an active myofascial trigger point (aMTP). Ten tests were applied to each M. E2 couldn't ask if the SB had a "history of pain", or if referral reproduced a "familiar pain". The primary outcome measure was the frequency with which E1 and E2 agreed on Dx of MPS or HNC. The kappa statistic (K) was used to determine agreement between E1 and E2 for identifying MPS SBs and MPS Ms. K was considered excellent ( $\geq .75$ ), fair to good (.40-.74), or poor ( $< .40$ )

**RESULTS:** IER for identifying MPS SBs was excellent ( $K=1$ , agreement=100%). IER for identifying MPS Ms was good ( $K=.73$ ). MPS Ms with better results were levator scapulae ( $K=.77$ ), sternocleidomastoid ( $K=.77$ ), latissimus dorsi ( $K=.77$ ), and anterior deltoid ( $K=.76$ ). No MPS M obtained a  $K < .63$

**CONCLUSIONS:** MPS CDC showed an excellent IER to distinguish MPS from HNC SBs. MPS CDC showed a good IER for identifying MPS in N&S Ms. Future work is required to confirm MPS CDC validity

**27. NEEDLE ELECTRICAL INTRAMUSCULAR STIMULATION [NEIMS] THERAPY ON GLUTEAL PAIN.** Chan RC<sup>1</sup>, Lee SH<sup>2</sup>, 1. Taipei Veterans General Hospital, Taipei, Taiwan, 2. Taipei Veterans General Hospital, Taipei, Taiwan.

**OBJECTIVES:** To declare the effect of Needle Electrical Intramuscular Stimulation (NEIMS) on patients with gluteal muscle pain.

**METHODS:** This is a retrospective out-patient clinic treatment report. 143 patients with chief complaint of muscle pain on gluteal regions and treated with NEIMS were collected. The NEIMS was applied with monopolar needle inserted into the trigger point of gluteal muscle with electricity been delivered through the machine (NEIM-Stim). Each point was treated with 2Hz and 1-20 mA negative square wave current which inducing strong gluteal muscle twitch for 3 minutes. Frequency of treatment was once per week. The visual analogue scales (VAS) were obtained before and right after NEIMS. Two tailed Student's t-test was used for the comparison of VAS change before and after NEIMS.

**RESULTS:** 1. The averaged VAS of all patients including multiple courses before NEIMS was 6.60+1.98, and it reduced to 4.78+2.01 right after treatment ( $p < 0.0001$ ). The VAS of patients received the first NEIMS were 6.39+2.11 before and 4.45+2.36 after treatment ( $p < 0.0001$ ). 2. 62/143 patients also complained pain on lumbosacral paraspinal muscle(s). The NEIMS was applied to the paraspinal muscle(s) in addition. The outcome was as good as gluteal-pain-only group (VAS 6.72+2.13 before and 4.79+2.10 after NEIMS;  $p < 0.0001$ ).

**CONCLUSIONS:** NEIMS therapy can effectively and rapidly improve the muscle pain on gluteal region, with a VAS reduction of nearly 2 scales right after treatment. For patients complaining back and gluteal pain, the NEIMS therapy including back and gluteal muscles can also reach a successful outcome.

**28. EFFECTIVENESS OF TWO DIFFERENT COMBINED PHYSIOTHERAPEUTIC APPROACHES FOR TREATING CERVICAL MYOFASCIAL PAIN SYNDROME (MPS).**

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**OBJECTIVES:** The aim of this study was to investigate and compare the immediate effectiveness of two different combined physiotherapeutic programs for treating cervical myofascial pain syndrome (MPS).

**METHODS:** A total of 46 subjects diagnosed with MPS were randomly allocated in two treatment groups. Hot pack, massage and a home exercise program were applied to both groups. Mobilization techniques were additionally applied to these modalities in the second group. All subjects were assessed before and after treatment for pain intensity, number and sensitivity of trigger points, range of motion and disability.

**RESULTS:** The groups were not different from each other at baseline (all  $p$ 's  $> 0.05$ ). At the end of treatment, there were statistically significant improvements from baseline in all outcomes in both groups (all  $p$ 's  $< 0.05$ ). The interval estimates of the effect sizes for visual analog scale were varied from no treatment effect to a large treatment effect. The confidence intervals of effect sizes for the secondary outcome measures included zero.

**CONCLUSIONS:** The present study did not provide any clear evidence on the effectiveness of a combined physiotherapeutic approach including hot pack, massage and a home exercise program for treating cervical MPS. Adding cervical spine mobilization to this treatment protocol did not change patients' outcomes.

**29. PRESSURE PAIN THRESHOLD IN THE TRIGGER POINTS (TRP) OF THE INFRASPINATUS MUSCLE AND STERNOCLEIDOMASTOID MUSCLE.** PAGAN EJP<sup>1</sup>, Sánchez SH<sup>2</sup>, Marhuenda JVT<sup>3</sup>, Quijada CL<sup>4</sup>, 1. UNIVERSIDAD MIGUEL HERNÁNDEZ DE ELCHE (ALICANTE-SPAIN), SAN JUAN DE ALICANTE, COMUNIDAD VALENCIANA, ESPAÑA, 2. Universidad Miguel Hernández, San Juan de Alicante. España, 3. Universidad Miguel Hernández de Elche, San Juan de Alicante. España, 4. Universidad Miguel Hernández de Elche, San Juan de Alicante. España.

**OBJECTIVES:** To compare the pressure algometry of TrP active and not active in the sternocleidomastoid and infraspinatus muscles.

**METHODS:** An expert examiner examined 305 subjects (133 men and 172 women) from the University of Alicante and Elche (Spain). MTRPs has explored on the dominant side, examined the characteristics of a taut band, tenderness, family pain and values with the pressure algometry.

**RESULTS:** The sternocleidomastoid muscle for men with active trigger points in the side of use, we obtain values of 1.10 kg/cm<sup>2</sup> and values of 1.65 kg/cm<sup>2</sup> by failing to take active ( $p < 0.001$ ). For women with active trigger points in sternocleidomastoid muscle on the side of use obtain values of 1.0 kg/cm<sup>2</sup> and 1.2 kg/cm<sup>2</sup> values by failing to take active ( $p < 0.001$ ). The infraspinatus muscle, for men with active trigger points in the side of use, we obtain values of 3.75 g/cm<sup>2</sup> and values of 4.3 kg/cm<sup>2</sup> to not having active ( $p < 0.001$ ). For women, on the side of use in the infraspinatus muscle with active trigger points we obtain values of 2.35 kg/cm<sup>2</sup> and values of 2.65 kg/cm<sup>2</sup> by failing to take active ( $p = 0.006$ ).

**CONCLUSIONS:** Pressure algometry in MTRP active of sternocleidomastoid and infraspinatus muscles are statistically significant lower than the values when they are not active on the people working at the computer. More research is needed in other groups.

**30. EPIDEMIOLOGY OF ACTIVE TRIGGER POINTS (MTRPS) IN UPPER TRAPEZIUS, INFRASPINATUS AND GLUTEUS MEDIUS IN WORKERS AT THE UNIVERSITY OF ALICANTE AND ELCHE.** Pagán EJP<sup>1</sup>, Quijada CL<sup>2</sup>, Marhuenda JVT<sup>3</sup>, Sánchez SH<sup>4</sup>, 1. Universidad Miguel Hernández de Elche, San Juan de Alicante. España, 2. UMH de Elche, San Juan de Alicante. España, 3. UMH de Elche, San Juan de Alicante. España, 4. UMH de Elche, San Juan de Alicante. España.

**OBJECTIVES:** The prevalence of active MTPs in the upper trapezius, infraspinatus and gluteus medius in workers at the University of Elche and Alicante

**METHODS:** An expert examiner explored the muscles on both sides of 305 (133 men and 172 women) patients of the university workers. MTRPs features sought for active point were taut band, tenderness, and recognition of family pain.

**RESULTS:** The active trigger points of upper trapezius muscle on the dominant side of men was 22.6% and 54.7% women. The active trigger points in the infraspinatus muscle on the dominant side of the men was 11.3% and 27.9% women. The active trigger points of the gluteus medius muscle on the dominant side of the men was 7.5% and 13.4% women.

**CONCLUSIONS:** Women have a higher percentage of men active trigger points in muscles studied. The upper trapezius muscle is the most active in subjects working at the University of Alicante and Elche, affecting half of the women explored and over 20% of men.

### **31. PREVALENCE OF ACTIVE MYOFASCIAL TRIGGER POINTS IN CERVICAL-SCAPULAR REGION ON PATIENTS WITH MASTICATORY MYOFASCIAL PAIN.**

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**OBJECTIVES:** To study the prevalence of active myofascial trigger points (aMTrPs) in cervical-scapular musculature in patients with masticatory myofascial pain (MMFP).

**METHODS:** A prospective research has been made on 50 subjects with MMFP, 42 (84%) women and 8 (16%) men with an average age of 47.98, diagnosed at the orofacial pain and temporomandibular disorders unit of the University of the Basque Country. Subjects were examined for aMTrPs in the muscles which, according to Travell & Simons, may cause referred pain on craniofacial region. For evaluating the aMTrPs we used Simons, et al diagnostic criteria keeping the pressure over the aMTrPs during five seconds.

**RESULTS:** The most frequently affected muscles were the masseter muscle (96%), the trapezius muscle (86%), the temporal muscle (84%), the sternocleidomastoid muscle (74%) and the splenius capitis muscle (SC) (60%). The simultaneous presence of aMTrPs in masticatory musculature and neck and shoulder girdle musculature was found in 98% of subjects. Referred muscle pain patterns matched up with those described by Travell & Simons except for the one corresponding to the SC.

**CONCLUSIONS:** This research results show a high association between masticatory aMTrPs and cervical-scapular aMTrPs, that is why we suggest a wider muscle exploration protocol in MMFP. Since we did not find any conclusive match with regard to the referred pain of the SC, we also suggest more detailed study of this muscle's pain pattern.

### **32. MYOFASCIAL PAIN SYNDROME AFTER CARDIAC SURGERY: INCIDENCE OF ACTIVE MYOFASCIAL TRIGGER POINTS IN INFRASPINATUS MUSCLE AND STUDY OF EFFECTIVENESS OF CONSERVATIVE PHYSICAL THERAPY TECHNIQUES. A PILOT STUDY.**

Segura M<sup>1</sup>, Hernández T<sup>2</sup>, González S<sup>3</sup>, Ginestal M<sup>4</sup>, Selma AJ<sup>5</sup>, 1. Hospital La Princesa, Madrid, Spain, 2. Hospital La Princesa, Madrid, Spain, 3. Hospital La Princesa, Madrid, Spain, 4. Hospital de Basurto, Bilbao, Pais Vasco, Spain, 5. Centro Argüelles, Madrid, Spain.

**OBJECTIVES:** To establish the incidence of active myofascial trigger points (aMTPs) in infraspinatus muscle (IM) after cardiac surgery (CS) and to evaluate the effectiveness of its treatment by means of conservative physical therapy (CPT) techniques for MTPs.

**METHODS:** Sixteen subjects admitted to the CS department of the Hospital La Princesa for a coronary artery bypass or valve repair surgery were evaluated of the presence of aMTPs in IM using Simons, et al diagnostic criteria. Visual analog scale (VAS), active and passive range of motion (ROM) of the shoulder were assessed before and 72 hours after CS. Subjects with an aMTP in IM received a treatment consisting of three sessions of MTP pressure release, deep massage to the taut band and spray and stretch. After the three sessions, a final assessment was performed.

**RESULTS:** The incidence of aMTPs in the IM after CS was 75%. After CPT, subjects with an aMTP, showed a reduction in VAS of  $5 \pm 1$  to  $1.1 \pm 0.7$ . 83% of patients recovered the normal passive ROM for abduction of the shoulder and showed normal active ROM.

**CONCLUSIONS:** aMTPs in IM seem to be an important cause of postoperative pain in patients undergoing CS. CPT could be useful to achieve a reduction in pain intensity and to recover shoulder mobility in these patients. The validity of these results should be tested in a more extensive controlled clinical trial.

**33. DEVELOPMENT OF THE FIBROMYALGIA SURVEY DIAGNOSTIC CRITERIA, A MODIFICATION OF THE ACR (2010) PRELIMINARY DIAGNOSTIC CRITERIA FOR FIBROMYALGIA.** Mease P<sup>1</sup>, Clauw D<sup>2</sup>, Fitzcharles M<sup>3</sup>, Goldenberg D<sup>4</sup>, Hauser W<sup>5</sup>, Katz R<sup>6</sup>, Russell A<sup>7</sup>, Russell IJ<sup>8</sup>, Winfield J<sup>9</sup>, Wolfe F<sup>10</sup>; 1. Swedish Med Ctr and U of WA, Seattle, 2. U of MI, Ann Arbor, 3. Montreal General Hosp, McGill U, Montreal, 4. Newton Wellesley Hosp and Tufts U, Boston, 5. Klinikum Saarbrucken gGmbH, Saarbrucken, Germany, 6. Rush U Med Center, Chicago, 7. U of Alberta, Edmonton, Canada, 8. UTHSC, San Antonio, 9. U of NC, Chapel Hill, 10. Natl Data Bank for Rheum Dis and U of KS, Wichita.

**OBJECTIVES:** To develop the Fibromyalgia Survey Diagnostic Criteria (FSDC), a modification of the Diagnostic Criteria for Fibromyalgia (FDC), for the purpose of survey research by eliminating the physician evaluation component and rendering a self-administered patient questionnaire.

**METHODS:** The ACR (2010) Preliminary Diagnostic Criteria for Fibromyalgia (FDC)<sup>1</sup> were developed to complement the 1990 ACR Criteria for the Classification of Fibromyalgia (FM) by establishing a set of diagnostic criteria that did not rely on a tender point examination. These were developed by physicians asking patients about the presence of pain or tenderness in 19 areas of the body, yielding a 0-19 Widespread Pain Index (WPI) and a 0-12 Symptom Severity Scale (SS) (0-3 severity of 3 symptom domains: fatigue, trouble thinking or remembering, waking up tired/unrefreshed and a 0-3 assessment of the number (zero to many symptoms) of multiple other symptom domains described by FM patients. A positive FDC score is either WPI  $\geq 7$  and SS  $\geq 5$  or WPI between 3-6 and SS  $\geq 9$ . The FDC is based upon physician interview and thus cannot be used in purely patient-reported outcome surveys.

To develop the FSDC, a 0-31 fibromyalgianess scale (FS) was created by summing the Widespread Pain Index (WPI) and SS scale. Fulfillment of the criteria is based on the same scoring system as the FDC.

The questionnaire was administered to 7223 patients participating in the National Data Bank for Rheumatic Diseases (NDB): 729 who were previously diagnosed with FM, 845 with osteoarthritis or with other non-inflammatory rheumatic conditions (OA), 439 with lupus, and 5,210 with RA.

**RESULTS:** FSDC were fulfilled by 60% percent with a prior diagnosis of FM, 21.1% with RA, 16.8% with OA, and 36.7% with SLE. The criteria properly identified diagnostic groups according to FM severity variables. An FS score  $\geq 13$  best separated criteria (+) and criteria (-) patients, classifying 93.0% correctly, with a sensitivity of 96.6% and a specificity of 91.8% in the study population.

**CONCLUSION:** The FSDC, a modification of the recently developed FDC, is completely patient self-administered, and thus will allow their use in epidemiologic and clinical studies without the requirement for an examiner. Both the FDC and FSDC may be useful for primary care physicians or others not confident with the tender point examination. Furthermore, the FS may have broad utility in assessment of widespread pain, fatigue, cognitive dysfunction, sleep disturbance and other somatic symptoms in rheumatic diseases and other medical disorders in general.



**34. CAN PAIN PHYSIOLOGY EDUCATION CHANGE PAIN COGNITIONS AND DESCENDING NOCICEPTIVE PROCESSING IN FIBROMYALGIA? A RANDOMISED CONTROLLED TRIAL.** Van Oosterwijck J<sup>1</sup>, Nijs J<sup>2</sup>, Meeus M<sup>3</sup>, Paul L<sup>4</sup>, 1. Vrije Universiteit Brussel, Brussels, Belgium, 2. Vrije Universiteit Brussel, Brussels, Belgium, 3. Vrije Universiteit Brussel, Brussels, Belgium, 4. University of Glasgow, Glasgow, UK.

**OBJECTIVES:** To examine whether pain physiology education is capable of changing pain cognitions and descending nociceptive processing in Fibromyalgia [FM].

**METHODS:** Twenty-five FM-patients were randomly allocated to either the experimental group or the control group, resp. receiving education about pain physiology or pacing self-management techniques. Health status, pain behavior and cognitions, pressure pain thresholds [PPTs], and the efficacy of the diffuse noxious inhibitory control mechanism [DNIC] were assessed at baseline, 2 weeks and 3 months follow-up.

**RESULTS:** After the intervention the experimental group presented a significant better knowledge on pain physiology ( $p < .001$ ), compared to the control group. The experimental group presented a significant improvement in mental ( $p = .006$ ) and general health ( $p = .001$ ) status, and a significant reduction ( $p = .042$ ) was found on the passive coping strategy “magnification” of the Pain Catastrophizing Scale. No significant effects were established for the PPTs or the efficacy of DNIC.

**CONCLUSIONS:** These results suggest that FM-patients are able to understand and remember the complex material about pain physiology. They reported an improvement of their mental and general health and showed a decreased intention to catastrophize by magnifying the threat of their pain complaints. Although pain education seems a useful component in the treatment of FM-patients by improving pain cognitions, it has no direct effect on pain inhibition.

**35. SENSORY PROFILING OF FIBROMYALGIA-PATIENTS.** Koroschetz J<sup>1</sup>, Rehm SE<sup>2</sup>, Baron R<sup>3</sup>, 1. Division of Neurological Pain Research and Therapy, Kiel, Germany, 2. Division of Neurological Pain Research and Therapy, Kiel, Germany, 3. Division of Neurological Pain Research and Therapy, Kiel, Germany.

**OBJECTIVES:** Fibromyalgia syndrome [FMS] patients complain about a variety of sensory abnormalities, which seem to be generated by continuous input from sensitized peripheral nociceptors and central sensitization phenomena. The sensory phenotypes of FMS subjects were analyzed by application of quantitative sensory testing [QST]. Furthermore we examined whether psychiatric co-morbidities were associated with somatosensory abnormalities.

**METHODS:** We performed QST according to the protocol of the German Research Network on Neuropathic Pain on 81 FMS patients. These subjects also completed questionnaires to detect possible psychiatric co-morbidities.

**RESULTS:** In our patient-group a specific somatosensory profile could be found. Patients presented a hypersensitivity to noxious stimuli like heat pain, cold pain and mechanical pain. They showed hyposensitivity towards non-noxious mechanical and vibration stimuli. No differences in the somatosensory profiles could be found between patients regarding the additional presence of psychiatric comorbidities.

**CONCLUSIONS:** FMS subjects present a specific somatosensory profile, which is characterized by a hypersensitivity to heat pain, cold pain and mechanical pain and a hyposensitivity to non-noxious mechanical stimuli. This profile seems to be independent of the additional presence of affective disorders. We conclude that despite the apparent heterogeneity of patients, there are common abnormalities in pain processing underlying sensory symptoms.

**36. POSITIONAL CERVICAL SPINAL CORD COMPRESSION (PC3) AS A COMORBIDITY IN PATIENTS WITH FIBROMYALGIA (FM): FINDINGS FROM A ONE-YEAR RETROSPECTIVE STUDY AT AN FM REFERRAL UNIVERSITY.** Hryciw CA<sup>1</sup>, Holman AJ<sup>2</sup>

1. OHSU, Portland, OR, USA, 2. Pacific Rheumatology, Renton, WA, USA.

**OBJECTIVES:** PC3, documented by dynamic MRI, was identified in 65% of community-based patients with FM (J Pain 2008; 9(7):613-22.). This study examines the prevalence of PC3 at an academic FM referral center.

**METHODS:** Sagittal flexion and extension images with measurement of the cervical canal diameter at each disk level were added to a traditional C-spine MRI to identify PC3. The prevalence and characteristics of FM+PC3+ patients seen in 2007 were assessed by retrospective chart analysis. PC3 was defined as abutment and/or compression of the cervical spinal cord with a canal diameter of <10mm.

**RESULTS:** Of 380 patients with FM by ACR criteria, 129 patients (9 M, 120 F, mean age 48.1 yrs.) received a dynamic MRI. 61 patients (47.3%) had PC3. There were 2 Chiari malformations. The extension view was required to document cord compression for 40/61 (67%). Most common disc herniations were found at C5-6 (38/61), C4-5(21/61), C6-7 (15/61) and C7-T1 (2/61). Most PC3 patients had single level compression (61%), while 31% had two, and 8% had three levels. 11/61 had surgical decompression. Exam features included + Romberg (49.6%), + Hoffman's (25.9%), Beighton score  $\geq 5/9$  (37.3%), hyporeflexia (14.8%), hyper-reflexia (46.7%), obstructive sleep apnea (48.1%). Pearson correlation and Chi-square analysis revealed a strong association with compression and positive Romberg ( $p < 0.001$ ), but not with other exam features.

**CONCLUSIONS:** These findings confirm PC3 as a common FM comorbidity in a referral cohort and the relative insensitivity (33%) of standard MR imaging to identify it.

**37. SEXUAL FUNCTIONING IN WOMEN WITH FIBROMYALGIA.** Molina-Barea R<sup>1</sup>, Rico-Villademoros F<sup>2</sup>, Rodriguez-Lopez CM<sup>3</sup>, Garcia-Leiva JM<sup>4</sup>, Hidalgo-Tallon J<sup>5</sup>, Calandre EP<sup>6</sup>,

1. Medical Doctor, Granada, Granada, Spain, 2. Medical Doctor, Madrid, Madrid, Spain, 3. Professor of Pharmacology, Almeria, Almeria, Spain, 4. Psychologist, Granada, Granada, Spain, 5. Medical Doctor, Granada, Granada, Spain.6. Professor, Granada, Granada, Spain.

**OBJECTIVES:** To study the sexual functioning of women with fibromyalgia (FMS)

**METHODS:** Observational and cross-sectional study including 276 women with FMS (ACR criteria) and 72 healthy women. The Changes in Sexual Functioning Questionnaire (CSFQ) was administered in both groups. Additional patients' evaluations were the Fibromyalgia Impact Questionnaire (FIQ), the Beck Depression Inventory (BDI) or the Hospital Anxiety Depression Scale (HADS), and the Pittsburgh Sleep Questionnaire (PSQI).

**RESULTS:** Age was  $49 \pm 9$  years in patients and  $46 \pm 10$  years in controls; FIQ-total range was 10-99 ( $73 \pm 15$ ). Frequency of sexual dysfunction (CSFQ-total  $\leq 41$ ) was 86.9% in patients as compared to 23.6% in controls (RR 3.7, 95%CI 2.4 a 5.6,  $p < 0.0001$ ). Patients showed a much lower score than controls in every dimension of CSFQ: pleasure (range 1-5)  $2.1 \pm 1.0$  vs  $3.51 \pm 0.75$ ,  $p < 0.0001$ ; desire/frequency (range 2-10)  $4.5 \pm 1.9$  vs  $6.6 \pm 1.4$ ,  $p < 0.0001$ ; desire/interest (range 3-15)  $4.5 \pm 1.9$  vs  $7.5 \pm 2.3$ ,  $p < 0.0001$ ; arousal (range 3-15)  $6.3 \pm 2.7$  vs  $9.9 \pm 2.6$ ,  $p < 0.0001$ ; and orgasm (range 3-15)  $6.8 \pm 3.0$  vs  $10.9 \pm 2.1$ ,  $p < 0.0001$ . CSFQ-total had a moderate and significant correlation with age (-0.30 in patients; -0.42 in controls); correlation was significant but low with VAS-pain (-0.15), BDI (-0.18), HADS-depression (-0.29), HADS-anxiety (-0.22) and PSQI (-0.13).

**CONCLUSIONS:** Women with FMS have a 3-fold increased risk of exhibiting sexual dysfunction.

**38. IS FASCIA THE SOURCE OF PAIN IN FIBROMYALGIA?** Liptan GL<sup>1</sup>, 1. Oregon Health and Science University, Portland, OR USA.

**OBJECTIVES:** Recent evidence suggests that muscle afferent input maintains the central sensitization in fibromyalgia [FM], however no consistent muscle pathology has been described (Staud 2009). Evidence of inflammatory mediators in the intramuscular connective tissue, or fascia, of FM muscles, similar to that seen in muscles strained by eccentric muscle action is presented. The connective tissue surrounding the muscles, not the muscle itself, may be the source of peripheral nociceptive input that leads to and maintains the central sensitization in FM.

**METHODS:** Hypothesis

**RESULTS:** The fascia has abundant free nerve endings (Stecco 2007) and is highly sensitive to pain (Kellgren 1938). After eccentric exercise, surrounding fascial tissue is more pain-sensitive than the muscle belly itself (Gibson 2009). Spaeth et al. found an increase in collagen IV surrounding the muscle cells of FM patients compared to controls (Spaeth 2005). Ruster et al. reported increased levels of collagen in the fascia of FM muscles, in addition to elevated levels of N-carboxymethyllysine [CML], a marker of oxidative stress and tissue damage. The increased CML staining was stronger in the fibromyalgia patients, and was primarily found in the interstitial tissue between the muscle fibers. They also found elevated fascial levels of CD-68 positive macrophages and activated NF-kB, a transcription factor that regulates cytokine release in inflammation (Ruster 2005).

**CONCLUSIONS:** There may be a dysfunctional healing process of the fascia in FM, causing muscle pain and leading to central sensitization. Inadequate repair of fascial micro-trauma from daily activity could be due to poor deep sleep and insufficient growth hormone release in FM.

**39. THE EFFECTS OF SODIUM OXYBATE ON MULTIPLE SYMPTOMS OF FIBROMYALGIA: RESULTS FROM TWO PHASE 3, RANDOMIZED, DOUBLE-BLIND, CONTROLLED TRIALS.** Spaeth M<sup>1</sup>, Russell IJ<sup>2</sup>, Perrot S<sup>3</sup>, Choy E<sup>4</sup>, Benson B<sup>5</sup>, Wang YG<sup>6</sup>, Lai C<sup>7</sup>,

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**OBJECTIVE:** Fibromyalgia [FM] is characterized by chronic widespread pain, sleep disturbance, fatigue, and poor physical function. Data from two Phase 3 controlled trials demonstrated the effects of sodium oxybate [SXB] on multiple FM symptoms.

**METHODS:** In the two trials, a total of 1121 FM patients (548 and 573) were randomized to SXB 4.5g/night [SXB4.5g], 6g/night [SXB6g], or placebo [PBO]. The primary outcome measure in both studies was the percent of patients reporting  $\geq 30\%$  reduction in pain using the Pain Visual Analog Scale [PVAS]. Secondary measures in both studies included: Fatigue VAS, FM Impact Questionnaire [FIQ], Jenkins Sleep Scale, and patient global impression of change [PGIC] at endpoint (week14). Analysis: LOCF.

**RESULTS:** Compared to PBO, treatment with SXB4.5g and SXB6g resulted in significantly more patients reporting a reduction in  $\geq 30\%$  in PVAS and in total FIQ score, a reduction in fatigue, and an improvements in sleep quality, and global status (all  $p < 0.001$ ). Of the most common adverse events ( $\geq 5\%$  in SXB-treated patients and 2X PBO), nausea, dizziness, vomiting, and anxiety were common to both studies.

**CONCLUSIONS:** Results from both Phase 3 studies demonstrated that SXB was efficacious and well tolerated in FM. In addition to its substantial effect on pain, SXB produced clinically meaningful improvements in function, fatigue, sleep, and patient global status.

**40. SPECT IMAGING OF THE BRAIN: REGIONAL CEREBRAL BLOOD FLOW BEFORE AND AFTER TREATMENT OF PATIENTS WITH PRIMARY FIBROMYALGIA.** Osman M<sup>1</sup>, Haji O<sup>2</sup>, Abdul Aziez O<sup>3</sup>, Khodair A<sup>4</sup>, AlSaraf N<sup>5</sup>,

1. Rheum.Reh.A.Sham.Univ., Cairo, 2. Rheum.Reh.A.Sham.Univ., Cairo, 3. Rheum. Reh.A.Sham.Univ., Cairo, 4. Rad.A.Sham. Univ., Cairo, 5. Int.med.Cairo Univ., Cairo.

**OBJECTIVES:** Whether regional cerebral blood flow (rCBF) is affected by duloxetine HCl in Egyptian women with primary fibromyalgia (FM) & if it correlates with clinical findings.

**METHODS:** 30 untreated women with FM (group I) & 10 healthy controls (group II) were studied with brain SPECT after intravenous infusion of Tc-99m HMPAO as a cerebral perfusion agent. The resting state rCBF was measured for thalamus, caudate & cerebral cortices (anterior, lateral, posterior) of both sides. 15 patients( group Ia) received the conventional therapy of FM & the other 15 (group Ib) received duloxetine HCl 60 mg daily for 3 months followed by measuring rCBF.

**RESULTS:** A statistically significant lower rCBF in thalamus & caudate nucleus in patients compared to controls but no such difference in anterior, lateral & posterior cerebral cortices. No significant difference clinically or radiographically was found comparing group Ia results before & after 12 weeks. Significant improvements regarding fatigue, neck pain, headache, generalized body ache & morning stiffness in group Ib results after 12 weeks. rCBF to thalamus & caudate nucleus showed significant increase in group Ib after 3 months. A significant difference in number of tender points, duration of morning stiffness, as well as thalamic & caudate blood flow comparing the change in Ia & Ib.

**CONCLUSIONS:** The decrease of rCBF to thalamus & caudate nucleus in patients with primary FM may be the cause of their symptoms. Improvement of symptoms by administration of duloxetine HCl may be due to improvement of CBF.

**41. BREST FIBROMYALGIA QUESTIONNAIRE.** MIMASSI NG<sup>1</sup>, MARCHAND F<sup>2</sup>, BARON D<sup>3</sup>, BARAER C<sup>4</sup>, 1. CHU, BREST, FRANCE, 2. CHU, BREST, FRANCE, 3. LANNION HOSPITAL, FRANCE, 4. LANNION HOSPITAL, FRANCE.

**OBJECTIVES:** To identify an easy diagnostic approach for patient and practitioner in fibromyalgia [FM].

**METHODS:** To obtain a core set of responses covering the multidimensional aspects of FM: pain, neurologic and autonomic symptoms, temporo-mandibular pain and dysfunction, cervicgia, fatigue, disturbed sleep, dyscognition, anxiety, depression and quality of life were evaluated. Heart rate analysis was investigated.

**RESULTS:** Two groups are distinguished: the first divided in two subgroups. The first subgroup, large, in which, patients present a considerable domain of differential diagnosis. The pathology causing diffuse chronic pain is individualized. Several symptoms are expression of autonomic nervous system [ANS] dysfunction. These patients have signs which can only evoke FM but are not suffering generalized allodynia and hyperalgesia. The FM diagnosis is not retained. In the second subgroup, less than 2% of patients suffer pain sensibilisation with generalized allodynia and hyperalgesia and are considered as FM. In the second group, 1.4 % of patients indicate signs and symptoms of FM. The majority of patients of this group express a clinical diffuse pain or a multilocalized signs and symptoms of chronic pain also with generalized allodynia and hyperalgesia (0.9%) or not (0.5%). The questionnaire pointed out a dominant chronic psychological disease and social distress.

**CONCLUSIONS:** The clinical presentation of FM is heterogeneous, with higher self-reported FM severity of signs. The questionnaire permits a new clinical approach. Further investigation into understanding implication of ANS in FM severity is necessary.

**42. ABNORMAL OVEREXPRESSION OF MASTOCYTES IN SKIN OF FIBROMYALGIA PATIENTS.** Blanco I<sup>1</sup>, 1. Hospital Valle del Nalón, Langreo, Asturias SPAIN.

**OBJECTIVES:** To test if a soft-tissues low grade inflammation can underlay in fibromyalgia (FMS).

**METHODS:** Open skin biopsies from non-tender point areas of the gluteal region were collected from a matched cohort of 63 FMS females and 49 normal volunteers. Formalin-fixed, paraffin-embedded sections were examined for the expression of the broad spectrum inhibitor alpha1-antitrypsin (AAT), the proteinases elastase and tryptase, the inflammatory cytokines MCP-1 and TNF $\alpha$ , the endothelium biomarker VEGF, and the nociception-related receptor PAR2.

**RESULTS:** The most relevant finding was a significantly increased number of mast cells (MCs) in the papillary dermis of 100% FMS patients (5-14 per microscopic high power field) compared to 0-3 in controls ( $p < 0.001$ ). MCs strongly stained with tryptase, AAT and PAR2 antibodies, and were distributed around blood vessels and appendages. MCs also stained with Toluidine blue and Bismark brown. Subsequently, a double staining with the cell activation marker CD63 and the C-kit receptor marker CD117 showed activation in about 50% of MCs. No significant differences for the remaining biomarkers neither histological difference between AAT deficiency and normal AAT samples were found.

**CONCLUSIONS:** Our results indicate that FMS is a MC associated condition. MCs are present in skin and mucosal surfaces throughout the human body, and are easily stimulated by a number of physical, psychological, and chemical triggers to degranulate, releasing several products which are able to generate nervous peripheral stimuli causing CNS hypersensitivity, local and systemic symptoms. Our findings open new lines of research on FMS mechanisms, diagnosis and therapy.

**43. ON THE INCIDENCE OF VISUAL FUNCTION DISORDERS IN FIBROMYALGIA SYNDROME.** . Wild J<sup>1</sup>, Grosskopf P<sup>2</sup>, Mueller W<sup>3</sup>, von Hanstein K<sup>4</sup>, 1. Rehaklinikum, Bad Säckingen, Germany, 2. Ophthalmology practice, Bad Säckingen, Germany, 3. Hochrheininstitut, Basel, Switzerland, 4. Rehaklinikum, Bad Säckingen, Germany.

**OBJECTIVES:** Fibromyalgia syndrome is a very common pain disease exhibiting associated functional disorders. Visual function disorders and muscular dysfunctions of the eye may also develop in connection with fibromyalgia syndrome. As yet, there are no studies available.

**METHODS:** For that reason, we recorded the incidence of visual function disorders in 101 rheumatological in-patients, diagnosed by ACR-criteria. We used a questionnaire.

**RESULTS:** 95% of fibromyalgia patients reported visual function disorders or eye problems. Only in 55.6% could the complaints be satisfactorily compensated by means of glasses, in 40.4% however, this did not lead to satisfying results. 50,5% of the fibromyalgia patients displayed function disorders of the eye, whereas in 70% of the patients, frequent changes in visual acuity. These variables could also be differentiated by factor analysis. We identified two factors which we called 1. "ocular irritation symptoms" (including blurred vision, a burning or dry sensation in the eye) and 2. "muscular dysfunctions of the eye". The influence parameters can therefore be determined as one being a neurovegetative and another being a muscular disturbing variable.

**CONCLUSIONS:** To date, however, treatment methods are not satisfactory, there is further need of research. In individual cases it helps to perform visual acuity tests at different measuring times in order to determine an approximate value. In some cases even the controversial method used to correct associated heterophoria can be effective.

#### **44. EFFECT OF A MULTIMODAL TREATMENT PROGRAM (MTP) IN WARM VERSUS COLD CLIMATE FOR PATIENTS WITH FIBROMYALGIA (FM).** Clarke-Jenssen A<sup>1</sup>, Forseth KØ<sup>2</sup>, Mengshoel AM<sup>3</sup>, Strumse YS<sup>4</sup>, Bråthen T<sup>5</sup>, 1. Rikshospitalet, Oslo,

Norway, 2. Section for treatment abroad, Rikshospitalet, Oslo Norway, 3. Section for health science, UIO, Oslo, Norway, 4. Section for treatment abroad, Rikshospitalet, Oslo, Norway, 5. Section for treatment abroad, Riskhospitalet, Oslo, Norway.

**OBJECTIVES:** To study the differences in long-term effect on symptoms and physical function in patients with FM if a MTP was given in warm or cold climate. MTP was also compared to no intervention.

**METHODS:** 132 Norwegian patients with FM were randomized to 4 weeks MTP in warm climate, cold climate or to a control group. The MTP consisted of aerobic exercise on land and in warm water, stretching, relaxation and patient education. The patients were evaluated before and after intervention, after 3, 6, 12 and 24 months (m). The main outcome measures were 6 minutes walking test (6MWT), grip strength (GS), tender point count (TPC), Fibromyalgia Impact Questionnaire (FIQ) and pain mannequin. The comparison between groups was analysed by Independent Samples T-tests.

**RESULTS:** Both treatment groups showed statistical significantly improvements compared to the control group in physical function (6MWT, GS) 3 and 12 m after the intervention. Treatment in warm climate had also significantly improvements on pain (TPC, FIQ and mannequin) after 3 m compared to the control group, and on pain (TPC and mannequin) after 3 and 6 m compared to the cold climate group. The improvement in TPC remained at 12 m.

**CONCLUSIONS:** In this study MTP had positive long-term effect on physical function for patients with FM. Treatment given in warm climate differed from that in cold climate in having additional positive long-term effect on pain.

#### **45. PILOT STUDY OF NEW TOOLS FOR THE DIAGNOSIS OF FIBROMYALGIA (FM) IN PRIMARY CARE.** . Alegre C<sup>1</sup>, Avila G<sup>2</sup>, Brat M<sup>3</sup>, Acosta M<sup>4</sup>, Molina C<sup>5</sup>, Quesada E<sup>6</sup>, 1. Hospital Universitario Vall d'Hebron, Barcelona, Spain, 2. Hospital Universitario Vall d'Hebron, Barcelona, Spain, 3. Hospital Universitario Vall d'Hebron, Barcelona, Spain, 4. Hospital Universitario Vall d'Hebron, Barcelona, Spain, 5. Hospital Universitario Vall d'Hebron, Barcelona, Spain, 6. Hospital Universitario Vall d'Hebron, Barcelona, Spain.

**OBJECTIVES:** Assess the likely utility of the Symptoms Inventory (SI) scale for the diagnosis of FM and its applicability in our population.

**METHODS:** An observational, prospective study has been performed with woman who attended the rheumatology clinic. We included women over 18. The SI scale is self-Admin and consists of two parts: an analogue scale to measure the intensity of fatigue and the second presents 19 anatomical areas. The SI scale is calculated according to the following formula: (Analogue scale of fatigue + pain value areas / 2) / 2. For a diagnosis of FM the value has to be higher or equal to 5.75.

**RESULTS:** 40 consecutive patients, 20 were diagnosed as FM and 20 other rheumatic diseases. The SI scale value was positive ( $\geq 5.75$ ) in 5 p. without FM, 3 with RA and 5 of FM the value of the scale was negative. The sensitivity and specificity of this scale in our population was 75%, and positive and negative predictive value was 75% for both. The kappa index was 1, correspond with a good agreement.

**CONCLUSIONS:** False positives and negatives could be due to the following reasons: False positive: Diseases associated with fatigue (eg AR) False negative: FM patients who are undergoing treatment and are stable in the process. As the N of this study is small (40 patients), for future studies it would be recommended to increase the N.

**46. INTERLEUKIN LEVELS (IL) IN PLASMA OF FIBROMYALGY (FM) PATIENTS.** Alegre c<sup>1</sup>, Acosta M<sup>2</sup>, Avila G<sup>3</sup>, Molina C<sup>4</sup>, Quesada E<sup>5</sup>, 1. Hospital Universitario Vall d'Hebron, Barcelona, Spain, 2. Hospital Universitario Vall d'Hebron, Barcelona, Spain, 3. Hospital Universitario Vall d'Hebron, Barcelona, Spain, 4. Hospital Universitario Vall d'Hebron, Barcelona, Spain, 5. Hospital Universitario Vall d'Hebron, Barcelona, Spain.

**OBJECTIVES:** To detect the existence or not of alterations in levels of ILs in the plasma of FM patients, especially the ILs 10 and 6.

**METHODS:** Descriptive, transversal study. The study included diseased individuals of both sexes aged between 18 and 70 fulfilling the clinical criteria proposed by the ACR for diagnosis and classification of FM (ACR 1990 Criteria for fibromyalgia) and who were willing to sign written informed consent to participate. The blood was collected from all patients that met the inclusion criteria and analyzed through ELISA technique. The median of each one was evaluated.

**RESULTS:** 12 patients were studied, a man and 11 women of media age 47, 4 (+/-6.7).

**CONCLUSIONS:** Values out of range in order of frequency from IL -10, IL-2, IL-6, IL-1B, INF-gamma, and IL-8 were detected. The major alterations found were IL-10 and IL-2. The IL-10 in all patients and the IL-2 in 10 patients. The average value in IL-10 was 4 times the normal value +/- 7 and in IL-2 was 2, 5 +/- 7 of normal value. In isolated cases we have detected up to almost 30 times the normal values of these two ILs. These findings corroborate former studies leading to the need of confirmation in large populations associated with clinical and the responses to treatments.

**47. THE EXCITOTOXIN ELIMINATION DIET: A NOVEL DIETARY INTERVENTION FOR FIBROMYALGIA PATIENTS.** Holton KF<sup>1</sup>, Taren DL<sup>2</sup>, Bennett RM<sup>3</sup>, Jones KD<sup>4</sup>, 1. Oregon Health & Science University, Portland, OR, USA, 2. University of Arizona, Tucson, AZ, USA, 3. Oregon Health & Science University, Portland, OR, USA, 4. Oregon Health & Science University, Portland, OR, USA.

**OBJECTIVES:** The objective of this study was to test a novel dietary intervention in patients with fibromyalgia [FM] to examine whether symptoms could be mediated through the exclusion of dietary excitotoxins.

**METHODS:** Subjects were recruited from the Portland, OR area and then given detailed dietary information on how to exclude the free form of excitotoxins from their diet for 4 weeks. Responders with >30% improvement in total symptom score were randomized onto a 2-wk double-blind placebo-controlled crossover challenge with MSG or placebo for 3 days each week. T-tests and repeated measures ANOVA were used to compare pre-post dietary measures and crossover challenge results respectively.

**RESULTS:** Thirty-seven people (mean age 52±14 years, 92% female) completed the diet and 84% of those improved by ≥30%. Total symptom score (11.4, p<0.0001) was significantly reduced, as were the visual analog pain change scores [VAS] for FM (5.4, p<0.0001) and the Fibromyalgia Impact Questionnaire-Revised Scores [FIQR] (22, p<0.0001). Diet responders worsened when challenged with MSG as compared to placebo (total symptom score, p=0.02; FIQR, p=0.03) and the VAS for FM worsened, but to a lesser degree (2.5 (p=0.07)).

**CONCLUSIONS:** Results suggest that the excitotoxin elimination diet, with wider food choices than a living foods diet, can significantly improve symptoms in patients with FM. Future large scale testing of the dietary intervention is warranted.

**48. COMPUTERIZED DYNAMIC POSTUROGRAPHY REVEALS BALANCE DEFICITS IN FIBROMYALGIA PATIENTS COMPARABLE TO HEALTHY PERSONS IN THEIR EIGHTH DECADE.** Jones KD<sup>1</sup>, Mist SD<sup>2</sup>, Bennett RM<sup>3</sup>, Horak FB<sup>4</sup>, King LA<sup>5</sup>, 1. Oregon Health & Science University, Portland, OR, US, 2. Oregon Health & Science University, Portland, OR, US, 3. Oregon Health & Science University, Portland, OR, US, 4. Oregon Health & Science University, Portland, OR, US, 5. Oregon Health & Science University, Portland, OR, US.

**OBJECTIVES:** We evaluated the role of strength, proprioception, lower extremity tender points, total symptom burden, dyscognition and medication usage in the etiology of imbalance in fibromyalgia (FM) patients.

**METHODS:** We compared 28 healthy controls (HC) (mean age 46.5, BMI=26.3, FIQR =5.0) with 25 FM patients (mean age 50.8, BMI=30.1, FIQR =54.1) using dynamic posturography for evaluating balance under 6 sensory conditions also yielding a balance summary score (SOT-COMP).

**RESULTS:** FM patients fell more often than HCs during the past 6 months (mean 3.6 falls versus 0.2) ( $p<0.0001$ ). FM patients had significantly worse balance than HCs: SOT-COMP (77.3 vs. 50.7,  $p<0.0001$ ), with marked deficits in all subcomponents: visual (0.87 v 0.69,  $p<.017$ ), vestibular (0.67 vs. 0.41,  $p<.013$ ) and somatosensory (0.98 vs 0.91,  $p< .025$ ). The average FM patient had SOT-COMP scores comparable to HCs in their eighth decades. The SOT-COMP was best predicted by the Verbal Memory, Visual-Spatial Memory (Multiple Ability Self-Report Questionnaire), Total FIQR score and BMI ( $R^2 = 0.569$ ,  $p<0.0001$ ). Pain levels and medication use did not significantly impact balance.

**CONCLUSIONS:** FM patients, compared to controls, are more likely to experience falls and have poor balance related to impaired use of visual, vestibular and somatosensory inputs. Deficits are related to FM severity, an elevated BMI and impaired cognition.

**49. YOGA OF AWARENESS PROGRAM FOR FIBROMYALGIA: RESULTS FROM A RANDOMIZED TRIAL.** Carson J<sup>1</sup>, Carson K<sup>2</sup>, Jones KD<sup>3</sup>, Mist SD<sup>4</sup>, Wright C<sup>5</sup>, Bennett RM<sup>6</sup>, 1. Oregon Health & Science University, Portland, OR, US, 2. Oregon Health & Science University, Portland, OR, US, 3. Oregon Health & Science University, Portland, OR, US, 4. Oregon Health & Science University, Portland, OR, US, 5. Oregon Health & Science University, Portland, OR, US, 6. Oregon Health & Science University, Portland, OR, US.

**OBJECTIVES:** To test the feasibility and effectiveness of a novel 2 hour, once-weekly, 8 week small-group yoga program that included gentle modified yoga poses, meditation, breathing exercise, coping presentations and group discussions.

**METHODS:** 53 women (mean age 53.7+/-11.5) with FM were randomized to the yoga program or a wait list.

**RESULTS:** The completion rate was 91% with no adverse events. Compared to wait listed subjects, those in the yoga arm improved on FIQ-R (35.5 (17.9) v 48.7 (18.9),  $p<.0003$ ), Coping Strategies Questionnaire-Pain Catastrophizing (.09 (.87) v 1.62(1.0),  $p=.015$ ) and multiple items on the Vanderbilt Multidimensional Pain Coping Inventory and Chronic Pain Acceptance Questionnaire (range  $p<.01-.05$ ). Seven day daily diaries immediately post intervention were significantly improved compared to wait-list (range  $p<.0001-.0005$ ) for pain, fatigue, emotional distress, vigor, acceptance and relaxation.

**CONCLUSIONS:** The yoga intervention was clinically meaningful in improving FM symptoms and in shifting patients toward greater use of adaptive pain coping strategies (ie problem solving, positive reappraisal, use of religion, activity engagement despite pain, acceptance, relaxation) and less use of maladaptive strategies (ie catastrophizing, self-isolation, disengagement, distancing, confrontation). Physical function improved as well.



**50. IMPACT OF FIBROMYALGIA ON THE QUALITY OF LIFE IN A SAMPLE OF PUERTO RICAN WOMEN.** Rohena M<sup>1</sup>, 1. University of Puerto Rico, San Juan, PR.

**OBJECTIVES:** The purpose of this study was to describe the impact of FM on the QOL and occupational participation in a sample of thirty Puerto Rican women with FM. The study also aims to identify the factors that have the largest impact on the quality of life.

**METHODS:** The study design is descriptive-quantitative and methodological. The sample of the study consisted of 30 Puerto Rican women, between 30 and 50 years old, diagnosed with FM. The Spanish Fibromyalgia Impact Questionnaire (S-FIQ) (Monterde et al. 2004) was culturally adapted to create the Cuestionario de Impacto de Fibromialgia de Puerto Rico (CIF-PR). The CIF-PR and the Checklist of Occupational Areas Affected by FM based on Occupational Therapy Framework were administered to the participants to meet the study aims. Quantitative data were analyzed using descriptive and analytical statistics.

**RESULTS:** The data analysis suggests the morning tiredness (80.0%), fatigue (66.7%), stiffness (63.4%) and pain (56.7 %) as the factors that affect the most the QOL. In addition, participants indicated that the symptom of FM limits their participation in the basic daily activities, instrumental daily life activities, education, work, leisure and social participation. It was found a significant correlation between CIF-PR and Activities of Daily Living ( $r = .497$ ,  $p \leq 0.01$ ), CIF-PR and Instrumental Activities of Daily Living ( $r = .460$ ,  $p \leq 0.05$ ), and CIF-PR and Work activities ( $r = .380$ ,  $p \leq 0.05$ ) of the Checklist of Occupational Areas Affected by FM.

**CONCLUSIONS:** The study results show that FM impacts the functional capacity, women's occupations and consequently QOL.

**51. TRANSLATION AND CROSS-CULTURAL ADAPTATION OF THE REVISED FIBROMYALGIA IMPACT QUESTIONNAIRE [FIQ-R].** Rohena-Pagan MdIA<sup>1</sup>, Mendiola S<sup>2</sup>, 1. University of Puerto Rico, San Juan, Puerto Rico, 2. University of Puerto Rico, San Juan, Puerto Rico.

**OBJECTIVES:** Currently, there exists a great need in Puerto Rico to develop cultural adaptations of instruments that measure health status in order to assess intervention outcomes. The Revised Fibromyalgia Impact Questionnaire [FIQ-R] is a self-administered questionnaire suited to measure physical function, overall impact and symptoms experienced by fibromyalgia patients (Bennett, Friend, Jones, Ward, Han & Ross, 2009). The FIQ-R is one of the most accepted instruments worldwide for the purpose of research. The purpose of this study is to translate and create a cultural adaptation of the FIQ-R with authorization from the author and by means of a panel of experts. This panel will be comprised of 10 professionals and 10 individuals diagnosed with fibromyalgia in order to create the Spanish FIQ-R, Puerto Rico version [FIQR-PR]. The professional group will be constituted by rheumatologist, physiatrist, occupational therapists, physical therapists, psychologist, health educator, translators and linguist.

**METHODS:** A methodological design will be used in this study to determine whether the translated and adapted version retains its semantic, idiomatic, empirical and conceptual equivalence.

**RESULTS:** The final version of the Spanish FIQR-PR will be administered online to 50 adults diagnosed with fibromyalgia.

**CONCLUSIONS:** Descriptive and inferential statistics will determine the psychometric properties of the questionnaire.

**52. IMPACT OF FIBROMYALGIA ON INSTRUMENTAL ACTIVITIES OF DAILY LIVING, LEISURE AND SOCIAL ACTIVITIES IN A SAMPLE OF PUERTO RICAN WOMEN AND MEN.** Sandoval M<sup>1</sup>, Rohena-Pagan MdlA<sup>2</sup>, Cajigas X<sup>3</sup>, Torres V<sup>4</sup>, Rivera MdM<sup>5</sup>, 1. University of Puerto Rico, San Juan, Puerto Rico, 2. University of Puerto Rico, San Juan, Puerto Rico, 3. University of Puerto Rico, San Juan, Puerto Rico, 4. University of Puerto Rico, San Juan, Puerto Rico, 5. University of Puerto Rico, San Juan, Puerto Rico.

**OBJECTIVES:** The purpose of this study was to describe the impact of FM on functional capacity and occupations participation.

**METHODS:** The study design was descriptive and quantitative. The sample of the study consisted of 40 participants of both gender between 45 and 65 years old with FM. The Spanish Fibromyalgia Impact Questionnaire-Puerto Rico version (Lebrón, Martínez, Quintero & Rohena, 2008) and the Activity Cards Sort [ACS] (Baum & Edwards, 2001) adapted for Puerto Rico (Irizarry & Orellano, 2007) were administered.

**RESULTS:** 62.5% of participants were severely affected by the FM. Participants retained 60% to 63% of the previous activities in all area of ACS-PR, except high physical demand leisure activities, which was 25% of the previous level. Significant correlation between percentages retained social activities level from ACS-PR and total score of the SFIQ-PR. As a higher percentage retained of social activities smaller the impact of FM on participants ( $r = -.325$  ( $p = 0.041$ )  $p \leq 0.05$ ). Significant correlation between total percentage retained from ACS-PR and total score of the SFIQ-PR. As a higher total percentage retained in the ACS-PR lower is the impact of the condition on participants ( $r = -.365$  ( $p = 0.021$ )  $p \leq 0.05$ ). There were no significant differences between gender.

**CONCLUSIONS:** Impact is revealed in functional capacity and occupational participation.

**53. PREGNANCY IN 7 WOMEN WITH FIBROMYALGIA [FM].** Pachas WN<sup>1</sup>, 1. Massachusetts General Hospital, Boston, MA USA.

**OBJECTIVES:** To assess the course of pregnancy in women with FM

**METHODS:** Clinical observation throughout the pregnancy

**RESULTS:** The course of pregnancy in women with FM is unknown. 7 women with FM became pregnant over a 10 year period among 400 attending FM clinic. All met FM ACR criteria. None had difficulty conceiving, youngest 21, oldest 41. All had full-term delivery and healthy babies except 1 (Hyperaldosteronism). All, but the 41 y/o woman, experienced spontaneous partial or full remission in the 2nd or 3rd trimester. One has been in remission for 8 years. 5 went into remission post partum. Those with recurrent FM months later, had milder symptoms. 1 pt. with mitochondrial disorder is on her 3rd trimester, doing well. 2 pts. became pregnant a 2nd time also with benign outcome. The 41 y/o woman had severe FM throughout, pp, FM was minimal. 4 yrs later had B 19 arthropathy after which FM went into remission, thus far. 1 drug addicted patient took Methadone for 8 mos. DC all drugs in the 9th month, baby has hyperaldosteronism controlled medically. She is pregnant now, doing well in 2nd trimester. 1 pt. with A-V malformation, left temporal lobe was brought to term successfully. Massive leg edema occurred in 1 pt. 1 day pp, resolved spontaneously in 2 wks. No cause found.

**CONCLUSIONS:** Each pt. offered special challenges to the caregivers. Fertility is not impaired in FM. Pregnancy decreases Sx's for last 2/3 of the course. FM does not affect the health of the babies. The role of hormones eg progesterone or placental factors may be the subject of further research. Aged women may face difficulties not seen in younger women.

**54. FIBROMYALGIA [FM] IN MALES.** Pachas WN<sup>1</sup>, Risk C<sup>2</sup>, 1. Massachusetts General Hospital, Boston, MA USA, 2. Marlborough Medical Center, Marlborough, MA USA.

**OBJECTIVES:** To determine the course of FM in males

**METHODS:** Clinical observation over time with special attention to associated disorders

**RESULTS:** FM affects males 1/10. The clinical features of 15 male pts. with FM are described. All met ACR criteria of FM...Age at onset 41-67 y/o. 6 presented severe symptoms, 9 mild-moderate symptoms. 8/15 had sleep disorders eg: insomnia, hypersomnia, OSA or disturbed sleep by pain. 3 had costochondritis, 1 was with HIV+ in remission, well controlled. 2 had simultaneous onset of FM and SLE. One had SLE myopathy and the other; arthralgias, cutaneous ulcers and Raynaud's. One pt. had mild FM before gastric by-pass, and severe post surgery. 1 developed FM post surgery for Chiari-1 syndrome. 1 had FM after traumatic brain injury. Severe but treatable depression in 1, 4 with moderate reactive depression. 2 had renal leak hypophosphatemia. 12/15 responded favorably to Rx. One poor responder also has tertiary Lyme disease. The other manages his symptoms with daily exercise and the other has neuropsychiatric disorder, recently responding to Seroquel. 8 had cognitive and memory problems.

**CONCLUSIONS:** This study raises questions regarding the role of the associated disorders on the symptoms and course of FM in males and vice versa.

**55. EVALUATE THE APPROPRIATENESS OF MULTI-DRUG COMBINATION THERAPY IN THE TREATMENT OF FIBROMYALGIA.** Figueroa JP<sup>1</sup>, 1. Harrington Mem. Hosp., Southbridge, MA, USA.

**OBJECTIVES:** Demonstrate how the sequential determination of the triad of Fibromyalgia Impact Questionnaire – Revised [FIQR], tenderpoint [TP] exam and quality of occupational function can be used so as to support therapeutic appropriateness of combination drug therapy in a patient with fibromyalgia [FIBRO].

**METHODS:** Present a clinical case; sequentially calculate the FIQR, evaluate TP severity and assess the quality of occupational activity before therapy and during progressive combination therapy ie. after providing tramadol + quietapine fumerate (to augment sleep), again with modafinil (to augment alertness) and again after the addition of milnacipran.

**RESULTS:** A progressive decrease in FIQR was seen – ie. 79.9, 47, 16 and 1; 2) a gradual decrease in TP discomfort from 3+ to trace tenderness; 3) a significant improvement in occupational activity – ie. from requesting disability status to gradually becoming a top performer in her competitive office situation.

**CONCLUSIONS:** Monodrug therapy represents a minority of patients being treated for fibro as it does for hypertension and diabetes mellitus. The challenge to the treating physician becomes what medications, when and how much is appropriate. The parameters discussed, when taken as a whole, can offer subjective, objective and functional insights as to the clinical efficacy and therefore appropriateness of the degree of combined fibrositic therapy used. Limited focused assessments can result in uncertainty. Taken as a whole these parameters can be used as instruments to improve patient confidence and compliance, as well as offer a coherent argument to insurance companies as to their justification.

**56. A CROSS SECTIONAL SURVEY IN 3035 PATIENTS WITH FIBROMYALGIA: SUBGROUPS OF PATIENTS WITH TYPICAL CO-MORBIDITIES AND SENSORY SYMPTOM PROFILES.** Rehm SE<sup>1</sup>, Koroschetz J<sup>2</sup>, Gockel U<sup>3</sup>, Brosz M<sup>4</sup>, Freynhagen R<sup>5</sup>, Toelle T<sup>6</sup>, 1. Division of Neurological Pain Research and Therapy, Kiel, Germany, 2. Division of Neurological Pain Research and Therapy, Kiel, Germany, 3. Pfizer Pharma GmbH, Berlin, Germany, 4. StatConsul GmbH, Magdeburg, Germany, 5. Department of Neurology, Tutzing, Germany, 6. Department of Neurology, München, Germany.

**OBJECTIVES:** The aim of this study was to (1) describe characteristic epidemiological data and co-morbidities in a large cohort of FMS patients and (2) to detect subgroups of patients with typical clinical profiles, i.e. typical constellations of sensory symptoms and co-morbidities.

**METHODS:** 3035 FMS subjects were questioned in regard to epidemiological data, their somatosensory symptoms (painDETECT) and additional affective co-morbidities.

**RESULTS:** Relevant sensory abnormalities included pressure pain (58%), prickling (33%), burning (30%), and thermal hypersensitivity (24%). Pain attacks were complained by 40% of patients. Moderate to severe co-morbid depression occurred in 66%. Only about 30% of the patients had an optimal sleep. A hierarchical cluster analysis revealed five distinct subgroups of patients showing a characteristic clinical profile. Four subgroups of patients suffer from severe sensory disturbances in various combinations but lack pronounced co-morbidities. In one subgroup severe co-morbidities dominate the clinical picture.

**CONCLUSIONS:** The results indicate that FMS patients can be classified on the basis of their sensory symptoms and co-morbidities by the use of patient-reported questionnaires. Subgrouping of patients with FMS may be used for future research and to tailor optimal treatment strategies for the appropriate patient.

**57. DOES A MULTIDISCIPLINARY TREATMENT IMPROVE THE PHYSICAL ACTIVITY IN WOMEN WITH FIBROMYALGIA [FMS]?** Salvat I<sup>1</sup>, Monterde S<sup>2</sup>, Zaldivar P<sup>3</sup>, Miralles I<sup>4</sup>, Montull S<sup>5</sup>, Castel A<sup>6</sup>, Salvat M<sup>7</sup>, Fontova R<sup>8</sup>, Poveda M<sup>9</sup>, Perrián R<sup>10</sup>, Castro S<sup>11</sup>,

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**OBJECTIVES:** To assess patients' functional capacity, level of exercise performance and exercise regularity after a multidisciplinary treatment program in FMS.

**METHODS:** Assessment: Fibromyalgia impact questionnaire [FIQ], Six-minute walking test and pedometer Yamax Digi-walker SW-200. Subjects: Sixty four women; mean age 49.62 years [SD 6.55]. Intervention: multidisciplinary treatment program of 24 sessions, two days a week for three months.

**RESULTS:** The mean of initial FIQ was higher than final, 65.24 [SD 14.21], and 48.05 [SD 16.52] respectively [p<0.001]. Means of initial and final distance walked show an improvement of 32.19 m [DS 40.91] [p<0.001]. The number of steps at the beginning was lower than at the end [8691 and 9060], without statistical significance [p=0.354]. However we observed statistical significance [p=0.006] when comparing initial and final steps' standard deviation [2887 and 2392].

**CONCLUSIONS:** After an effective multidisciplinary program, patients with FMS show an increase of the physical function capacity and exercise regularity, without significant changes in the activity level.

**58. QIGONG EXERCISE BENEFITS PEOPLE DIAGNOSED WITH FIBROMYALGIA IN PAIN AND QUALITY OF LIFE.** Liu W<sup>1</sup>, Zahner L<sup>2</sup>, Wang Y<sup>3</sup>, Pasnoor M<sup>4</sup>, Dimachkie D<sup>5</sup>, Barohn R<sup>6</sup>, 1. University of Kansas Medical Center, Kansas City, Kansas, USA, 2. University of Kansas Medical Center, Kansas City, Kansas, USA, 3. University of Kansas Medical Center, Kansas City, Kansas, USA, 4. University of Kansas Medical Center, Kansas City, Kansas, USA, 5. University of Kansas Medical Center, Kansas City, Kansas, USA, 6. University of Kansas Medical Center, Kansas City, Kansas, USA.

**OBJECTIVES:** Fibromyalgia is a disabling disorder with no clear consensus on the choice of treatment. The purpose of this on-going clinical study is to determine a home-based daily qigong exercise on the symptoms of fibromyalgia.

**METHODS:** Patients with diagnosed fibromyalgia were recruited into this study and randomly assigned into an intervention and a control group. The intervention group completed 6-week home and once per week group qigong exercise. The control group completed mild body movement exercise at home and weekly in group also for 6 weeks. Outcomes were measured using Short-form McGill Pain Questionnaire, Multidimensional Fatigue Inventory, Fibromyalgia Impact Questionnaire, Pittsburgh Sleep Quality Index, and Beck Depression Inventory pre and post the exercise programs.

**RESULTS:** The qigong exercise reduced significantly in the intervention group in pain (32 to 17), fatigue (82.5 to 64), fibromyalgia impact (65.4 to 29.3), sleep problem (14.5 to 7), and depression (18.5 to 7). Those changes are significantly greater than the changes in the control group in pain (28 to 22.5), fatigue (70.5 to 67.5), fibromyalgia impact (50.3 to 45.7), sleep problem (13 to 12.5), and depression (7.25 to 1.5).

**CONCLUSIONS:** The data so far support the effectiveness of qigong exercise in managing the symptoms in patients with fibromyalgia.

**59. A BRAIN-DERIVED NEUROTROPHIC FACTOR [BDNF] POLYMORPHISM IDENTIFIES A FIBROMYALGIA SYNDROME [FMS] SUBGROUP WITH HIGHER BODY MASS INDEX [BMI] AND C-REACTIVE PROTEIN.** Xiao Y<sup>1</sup>, Russell IJ<sup>2</sup>, Haynes WL<sup>3</sup>, Michalek JE<sup>4</sup>, 1,2,3,4. The University of Texas Health Science Center at San Antonio, Texas, USA.

**OBJECTIVES:** Objectives: A common single nucleotide polymorphism [SNP] in the gene of BDNF results from a substitution at position 66 from valine [Val] to methionine [Met] and may predispose to human neuropsychiatric disorders. We proposed to determine whether these BDNF gene SNPs [genotypes] were associated with FMS, and/or any of its typical phenotypes.

**METHODS:** Methods: Patients with FMS [N=95] and healthy normal controls [HNC, N=58] were studied. Serum high-sensitivity C-reactive protein [hsCRP] levels were measured using an enzyme linked immunosorbent assay [ELISA]. The BDNF SNPs were determined using polymerase chain reaction-restriction fragment length polymorphism [PCR-RFLP].

**RESULTS:** Results: The BDNF SNP distribution was 65 [58%] Val/Val, 28 [30%] Val/Met, and 2 [2%] Met/Met for FMS and 40 [69%], 17[29%], and 1 [2%] for HNC, respectively. The serum hsCRP and BMI in FMS were higher than in HNC. The FMS with BDNF Val66Val had significantly higher mean BMI [p = 0.0001] and hsCRP [p = 0.02] than did FMS carrying the Val66Met genotype. This pattern was not found in HNC. Phenotypic measures of subjective pain, pain threshold, depression, or insomnia did not relate to either of the BDNF SNPs in FMS.

**CONCLUSIONS:** Conclusions: The relative distribution BDNF SNPs did not differ between FMS and HNC. The BDNF Val66Met polymorphism is not selective for FMS. The BDNF Val66Val SNP identifies a subgroup of FMS with elevated hsCRP and higher BMI. This is the first study to associate a BDNF polymorphism with a FMS subgroup phenotype.

## **60. FIBROMYALGIA (FM) AND FUNCTIONAL SYNDROME (FS) IN THE ELDERLY**

**POPULATION.** Weissbrod D, Stonski E, Cano GA, Camera LA, All from GADA, Hospital Italiano de Buenos Aires, Buenos Aires, Argentina

**OBJECTIVES:** FM is a condition usually difficult to diagnose and perhaps the main syndrome of the FS. Until recently there was no concept of FS and made it difficult diagnosis of all this courtship syndromes.

**METHODS:** 200 patients were taken over 65 years who attended to their primary health care physician for any reason, who were held on Symptom Intensity Scale (SIS), proposed by Wolfe and was taken as cutoff value for FM a regional pain scale greater than or equal to 8, a visual analogue scale of fatigue greater than 6 and an SIS  $> = 5.75$ . Patients who applies FM criteria, were then evaluated with diagnostic criteria for assessing the presence of insomnia (I), depression/anxiety (DA), chronic daily headache (CDH), temporomandibular joint disorders (TMJD), irritable bowel syndrome (IBS), multiple chemical sensitivity (MCS), myofascial syndrome (MS), vulvodynea or perineal pain (VP).

**RESULTS:** We evaluated 200 patients over 65 (56.16% females), 33 patients (16.5%) meet criteria for FM by SIS (30 (90.91%) female; average age 77.3). These patients were assessed for presence of I (93.94%), DA (100%), CDH (57.58%), TMJD (30.30%), IBS (96.97%), MCS (45.45%), MS (93.94%), VP (54.55%).

**CONCLUSIONS:** FM is a condition frequently under diagnosed and often associated to other Central Sensitivity Syndromes as described by Yunus. The assessment of this population group shows a higher prevalence of FM compared to published reports and a high association with other syndromes. A better understanding of these patients is need, and interpreting them as FS would be of great help.

## **61. USEFULNESS OF SYMPTOM INTENSITY SCALE (SIS) FOR DIAGNOSIS AND MONITORING OF PATIENTS WITH FIBROMYALGIA (FM).**

Cano GA, Stonski E, Weissbrod D, Camera LA All from GADA, Hospital Italiano de Buenos Aires, Buenos Aires, Argentina

**OBJECTIVES:** FM is a condition difficult to diagnose and usually requires a high clinical suspicion to fetch if the patient meets the criteria of the American College of Rheumatology (ACR). Also, sometimes the same patient cannot meet the criteria at the moment of evaluation and meet them in another. The published prevalence is about 2-7% of the general population and 8% in elderly population. In 2006 Wolfe published the SIS which is a test easy to perform to diagnose FM with high sensitivity and specificity.

**METHODS:** 200 patients were taken over 65 years who attended to their primary health care physician for any reason, undergo the SIS and was taken as a cutoff value for FM a regional pain scale greater than or equal to 8, a visual analogue scale for fatigue of 6 or more and an SIS  $> = 5.75$ . Patients who meet FM criteria were then compared with the diagnostic criteria of the ACR.

**RESULTS:** We evaluated 200 patients over 65 (56.16% females), 33 patients (16.5%) presented criteria for fibromyalgia by SIS (30 (90.91%) female; average age 77.33). These patients meet 87.88% diagnosis of fibromyalgia by ACR criteria.

**CONCLUSIONS:** FM is an under diagnosed disease and criteria of the ACR is impractical. The use of SIS is an important diagnostic aid and very simple to use, with high specificity and sensitivity and good correlation with the diagnostic criteria of ACR. The SIS it's a simple test and is a user-friendly application in the field of primary care. This may help to accurate diagnose of FM in the primary care field.

**62. THERAPEUTIC APPROACH FOR TREATMENT OF FIBROMYALGIA (FM) IN TERMS OF MVASFIQ.** Stonski E, Weissbrod D, Cano GA, Camera LA, All from GADA, Hospital Italiano de Buenos Aires, Buenos Aires, Argentina

**OBJECTIVES:** FM is a condition often difficult to diagnosis and to choose a good treatment. Until recently, no approved drugs were available for treatment. Currently, it remains unclear which patients should use each therapeutic strategy.

**METHODS:** 200 patients were taken over 65 years who attended to their primary health care physician for any reason, undergo on Symptom Intensity Scale (SIS), proposed by Wolfe. Patients who meet FM criteria were then evaluated with a modified visual analog scale of the FM impact questionnaire (mVASFIQ) proposed by Boomershine et al. Depending on the results we select the therapeutic strategy.

**RESULTS:** We evaluated 200 patients over 65 (56.16% females), 33 (16.5%) presented criteria for FM by SIS (30 (90.91%) female; average age 77.33). These patients were evaluated with mVASFIQ (with a cutoff value of 5) presenting: Fatigue 100%, Insomnia 93.94%, Depression 93.94%, Anxiety 96.97%, Rigidity 75.76%, Pain 100% (VAS average 86.70); Interference to work 90.91%. The therapy indicated were pregabalin (69.70%), duloxetine (15.15%), venlafaxine (12.12%) or other antidepressants (30.30%), paracetamol (60.61%), tramadol (33.33%). 100% of the patients received education and indication of physical activity. The therapeutic regimens were combined as patient's needs. **CONCLUSIONS:** FM has polymorphism of symptoms and it's not easy to select which treatment scheme to start with. The use of SIS for the diagnosis and mVASFIQ may help to assess the impact of the disease and to choose the best treatment scheme to start with.

**63. PERFORMANCE-BASED ASSESSMENT OF FUNCTIONAL ABILITY AMONG WOMEN WITH CHRONIC WIDESPREAD PAIN.** Wæhrens E<sup>1</sup>, Amris K<sup>2</sup>, Fisher A<sup>3</sup>, 1. Parker Institute, Frederiksberg DK, 2. Parker Institute, Frederiksberg DK, 3. Umeå University, Umeå SE.

**OBJECTIVES:** Functional ability, including the ability to perform activities of daily living (ADL), is considered a core outcome domain in chronic pain clinical trials and usually assessed through self-report. Research, however, indicates that self-report and performance-based assessment of ADL offer distinct but complementary information. The study validated a performance-based measure of ADL ability, the Assessment of Motor and Process Skills (AMPS), in women with chronic widespread pain (CWP) and investigated the relationship to self-reported ability

**METHODS:** Investigated psychometric properties of the AMPS included discrimination, stability and sensitivity to change based on data from a pre-, pre-, post and follow-up test design. ANOVAs and Spearman correlations were applied

**RESULTS:** ADL motor ability measures of the included 50 women with CWP were significantly lower than those of healthy women, the ADL motor and ADL process ability measures remained stable when no intervention was provided and the ADL motor ability measures were sensitive to change following interdisciplinary rehabilitation. The correlation ( $r_s = -0.35$ ) between self-reported ADL ability as measured by the physical function subscale of the FIQ and performance-based ADL motor measures was weak. No correlation ( $r_s = -0.02$ ) was found between FIQ and ADL process ability

**CONCLUSIONS:** The study provides evidence of sound psychometric properties of the AMPS when applied to women with CWP. Furthermore the low correlations between self-reported and observed ability emphasize the need for both performance-based and self-reported assessment of ADL.

**64. DYSFUNCTION OF THE AUTONOMIC NERVOUS SYSTEM WAS NOT AFFECTED BY DISEASE SEVERITY OF FIBROMYALGIA.** Yoon C<sup>1</sup>, Kang KY<sup>2</sup>, Park SH<sup>3</sup> 1. Uijungbu St. Mary's hospital, Uijungbu, Kyungkido, South Korea, 2. Chungbuk National University hospital, Cheonju, Chungbuk, South Korea, 3. Seoul St. Mary's Hospital of Catholic University of Korea, Seoul, South Korea.

**OBJECTIVES:** To investigate the relationships between autonomic dysfunction, emotional distress and clinical symptom of Korean patients with fibromyalgia

**METHODS:** We evaluated 50 female patients who visit fibromyalgia clinic consecutively between January, 2008 and March, 2008. Clinical data (age, sex, disease onset age, disease duration, comorbidity, symptoms, and tender point count) were evaluated. Fibromyalgia impact questionnaire (FIQ), visual analogue scale (VAS) of pain, the scales of depression and anxiety (HDS, MADRS and HAS) were measured. Autonomic dysfunction is investigated using the heart rate variability.

**RESULTS:** The mean age of patients was 45.7 years and the mean disease duration was 36 months. Frequency of the symptoms were as followed; myalgia 91.8%, memory impairment 89.8%, arthralgia 83.7%, sicca symptom 83.7%, fatigue 79.6%, anxiety 79.6%, sleep disturbance 77.6%. The mean tender point count is 11.4 and the FIQ score is 51.2±18.5 (mean±SD). The number of tender point is correlated with FIQ, VAS and depression scales ( $r=0.607, 0.634, 0.321, p < 0.05$ ). Heart rate variability was significantly decreased in patients with fibromyalgia compared with healthy controls. The tender point count, VAS and FIQ were not correlated with Heart rate variability.

**CONCLUSIONS:** In patients with fibromyalgia, decreased activities of the autonomic nervous system were not correlated with tender point count, FIQ, and VAS. These data show that autonomic dysfunction was not influenced by disease severity of fibromyalgia.



**65. INCIDENCE AND NATURAL HISTORY OF SELF REPORTED CHRONIC MUSCULO-SKELETAL PAIN. RISK FACTORS FOR ONSET OF PAIN. A 17 YEAR FOLLOW UP STUDY OF A FEMALE COHORT IN NORWAY.** Nitter AK<sup>1</sup>, Forseth KO<sup>2</sup>, 1. Rikshospitalet University Hospital, Oslo, Norway, 2. Rikshospitalet University Hospital, Oslo, Norway.

**OBJECTIVES:** To describe the course of self reported musculoskeletal pain [MSP] in a female population through a follow-up period of 17 years. To calculate the incidence and recovery rate of MSP. To investigate if health complaints and sleep problems may be predictive factors for development of MSP.

**METHODS:** A prospective population-based study with 17 years of follow-up of a female cohort born 01.01.1940 – 31.12.1969, initially 2498 women. In 2007, 2261 were traced. The women received a questionnaire consisting of questions about chronic MSP, modulating factors for pain, sleep problems and nine defined health complaints in 1990, 1995 and 2007. The possible association between health complaints and/or sleep problems and onset of MSP was assessed by using univariate analysis and logistic regression model.

**RESULTS:** The response rate in 2007 was 73%. Of these, 40% reported no pain, 40% chronic regional pain and 20% chronic widespread pain [CWP]. Forty five per cent were in the same pain status group in 1990 and 2007. The annual incidence of chronic pain [CP] was 2.6%, while the recovery rate was 1.5%. Impaired sleep quality, fatigue or regular headache was associated with onset of CP. Non-restorative sleep prevented recovery from CWP.

**CONCLUSIONS:** The overall prevalence of CP was stable through the follow-up time, but individual changes in pain status group were frequently. Sleep disturbances seems to predict onset of pain and prevent recovery from pain. This indicates that sleep disturbances may play a role in the pathogenesis of pain.

**66. THE INFLUENCE OF RESILIENCE ON FM PAIN AND PHYSICAL FUNCTION [PF] IN OLDER ADULTS.** Torma LM<sup>1</sup>, Jones KD<sup>2</sup>, Messecar D<sup>3</sup>, 1. OHSU SON, Portland, OR, 2. OHSU SON, Portland, OR, 3. OHSU SON, Portland, OR.

**OBJECTIVES:** Examine resilience, the ability to recover and adapt to stress as a moderator of the impact of FM pain on PF in older adults.

**METHODS:** Descriptive correlational design explored relationships between demographic and health-related variables in older adults with FM (N=224, M (age) = 62.1 yrs, SD = 6.75). Hierarchical multiple regression examined resilience as a moderator of pain and PF.

**RESULTS:** The convenience sample was mostly female (94%), Caucasian (92%), married (68%), well-educated, had low levels of physical activity and moderate levels of income and tangible social support. Three fourths (75%) were overweight or obese. Despite impaired PF (Late Life Function and Disability Index) and moderate pain (NRS 5.47, SD 2.16), resilience was moderately high. Advanced age, higher levels of PF, low level of depressive symptoms, low pain rating and low overall FM impact were significant correlates of resilience (range  $p < .001-.005$ ). The model accounted for 48% of PF variance (31%-age, education, income, BMI, and physical activity; 14%-pain; 3%-resilience). Resilience was not a moderator; it contributed uniquely to PF variance.

**CONCLUSIONS:** Older adults with FM, low resilience, and high pain levels are at risk for impaired PF. Resilience, a novel FM variable, should be tested in younger and older adults with FM to determine if it predicts PF or moderates the impact of symptom burden on PF. Further research is needed to determine if resilience is malleable or predicts adherence or efficacy in FM interventions.

**67. EFFECTIVENESS OF CLASSIC VERSUS MYOFASCIAL PAIN APPROACH IN TENNIS ELBOW PATIENTS. DOUBLE-BLIND RANDOMIZED TRIAL.** Kuncewicz E<sup>1</sup>, Samborski W<sup>2</sup>. 1. Dept of Physiotherapy, 2. Dept of Physiotherapy, Rheumatology, and Rehab, Medical University of Poznan, Poland.

**OBJECTIVES:** The aim was to check usefulness of classic (C) or myofascial pain (MFP) approach in low level laser therapy (LLLT) or ultrasound therapy (UD) for the patients with tennis elbow (TE), independently of presence of trigger points (TrP).

**METHODS:** 80 patients (38 males, 42 females) with TE, in acute or sub acute states were randomly divided into four groups: LLLT-C, LLLT-MFP, UD-C, UD-MFP. Doses of LLLT were 1 J/cm<sup>2</sup> in classic group, 5J/cm<sup>2</sup> for each TrP related to TE in MFP group. Ultrasound: 0,5 W/cm<sup>2</sup> 3MHz for classic and 0,7 W/cm<sup>2</sup> 1 MHz on each TrP and each taut band. Evaluation of each patient, (beginning and end of therapy, 10 interventions): presence and sensitivity of TrPs (algometer), level of pain (VAS), DASH questionnaire, and hand grip strength (dynamometer). After one year of therapy patients were rechecked.

**RESULTS:** Improvement of VAS (n=80) was: 36,7% LLLT-C; 36,9% UD-C; 48,4% LLLT-MFP and 55,4% UD-MFP (p<0,005). Outcome of DASH correlated to VAS (r=0,464). Improvement of grip strength was respectively: 5,1%/ 16%/9,5% and 109% for UD-MFP (only UD-MFP p<0,01). The only worsening of grip strength was after LLLT classic (-2,8%) among TrP-positive patients. Active TrPs were confirmed in 40% of patients. In that group MFP methods were more effective than classic. After one year in 37.5% of patients symptoms reappeared.

**CONCLUSIONS:** We suggest that both agents and both approaches for therapy of TE patients are equally effective, UD-MFP seemed the best.

**68. GLIAL-CELL-LINE-DERIVED NEUROTROPHIC FACTOR (GDNF) IS INCREASED IN THE MUSCLE AFTER LENGTHENING CONTRACTION (LC) AND INDUCES MUSCULAR MECHANICAL HYPERALGESIA.** Mizumura K<sup>1</sup>, Murase S<sup>2</sup>, Queme F<sup>3</sup>, Kato K<sup>4</sup>, Taguchi T<sup>5</sup>, 1. RIEM, Nagoya Univ., Nagoya, Japan, 2. RIEM, Nagoya Univ., Nagoya, Japan, 3. RIEM, Nagoya Univ., Nagoya, Japan, 4. Nagoya Univ. Sch. Med., Nagoya 466-8550, Japan, 5. RIEM, Nagoya Univ., Nagoya 464-8601, Japan.

**OBJECTIVES:** GDNF has been reported to induce hyperalgesia or analgesia depending on the conditions used. We examined whether GDNF was up-regulated in mechanical hyperalgesia after LC (delayed onset muscle soreness, DOMS), and whether it played any role in DOMS.

**METHODS:** DOMS was induced in rats by applying LC to hind leg extensors under light anesthesia, and the extensor digitorum longus muscle (EDL) was sampled 6, 12 hrs, 1, 2 days after exercise and its mRNA expression was evaluated by RT-PCR. GDNF or anti GDNF antibody was injected into the lateral head of gastrocnemius muscle (GL), and muscular mechanical withdrawal threshold was measured by Randall-Selitto apparatus equipped with a larger probe (□ 2.6 mm).

**RESULTS:** mRNA of GDNF increased 12 hrs and 1 day after exercise, a similar time course as nerve growth factor (NGF). I.m. injection of GDNF induced muscular mechanical hyperalgesia from 1 hr up to 1 day after injection and anti-GDNF antibody injected into the GL reversed DOMS in 3 hrs, and this effect lasted up to 1 day after injection.

**CONCLUSIONS:** These results suggest that GDNF up-regulated in the muscle after LC plays an important role in DOMS. We have previously observed NGF up-regulated in the muscle through activation of B2 bradykinin receptor plays a pivotal role in DOMS. Present observation showed an additional factor. How GDNF and NGF interact is an interesting topic to study.

**69. MUSCULAR MECHANICAL HYPERALGESIA AFTER NERVE INJURY AND INVOLVEMENT OF NGF PRODUCED IN THE MUSCLE.** Mizumura K<sup>1</sup>, Murase S<sup>2</sup>, Suzuki M<sup>3</sup>, 1. RIEM, Nagoya Univ., Nagoya, Japan, 2. RIEM, Nagoya Univ., Nagoya, Japan, 3. Dept. Hand surgery, Grad. Sch. Med., Nagoya Univ., Nagoya, Japan.

**OBJECTIVES:** Nerve growth factor (NGF) is known to produce mechanical hyperalgesia when injected in the muscle. It is also known that NGF is produced after nerve transection or damage. We asked whether NGF produced in the muscle in a neuropathic pain model (L5 spinal nerve ligation/cut model) played any role in mechanical hyperalgesia.

**METHODS:** Male SD rats were used. Muscular mechanical hyperalgesia was evaluated at gastrocnemius medialis muscle (GM, L5 innervated) and extensor digitorum longus muscle (EDL, L4 innervated) with Randall Selitto analgesiometer equipped with a larger probe (□ 2.6 mm) than the commercially available one. L5 spinal nerve ligation/cut was done under anesthesia (SNL group). A group of rats received sham surgery (L5 spinal nerve was exposed, but not injured).

**RESULTS:** Muscular mechanical hyperalgesia appeared 3 days after SNL surgery at both GM and EDL and lasted up to 2 weeks. NGF mRNA was up-regulated both in GM and EDL. Intramuscular injection of anti-NGF antibody (30 □g/20 □l) into GM partially but significantly reversed mechanical hyperalgesia in GM but not in EDL 3 hrs after injection and this effect lasted up to 1 week after injection.

**CONCLUSIONS:** The effect of anti NGF antibody was observed only in the muscle received antibody injection and this effect was rather quick, therefore, it is suggested that NGF produced in the muscle locally sensitized nociceptors to induce mechanical hyperalgesia.

**70. VALIDITY OF CROSS FRICTION ALGOMETRY OF REFERRED PAIN IN PATIENTS WITH NON-SPECIFIC LOW BACK PAIN.** Farasyn AD<sup>1</sup>, 1. VUB, Brussels.

**OBJECTIVES:** The objective of this study is to explore the validity of cross-friction algometry [CFA] of referred muscle pain [RP] in patients with low back pain [LBP].

**METHODS:** The new method consists of inducing an experimentally CFA by using a Fischer algometer [kg/cm<sup>2</sup>]. Forty-two patients with LBP participated in a prospective clinical trial. The outcome was assessed by means of the standard [perpendicular] pressure pain thresholds [PPT] measured on the Gluteus medius of both sides, and provoked referred pressure pain thresholds [PPT-RP] at the location of the medial Cluneal nerve [MCN] .

**RESULTS:** In the group we found 22 cases without RP [52%], and 20 presenting a unilateral RP in the leg [48%] as defined by their pain chart drawings. The inter-observer reliability was sufficient for both sides with and without RP [ICC > 0.97]. The PPT measurement of the Gluteus medius revealed no significant differences between the subgroups with and without RP. The PPT-RP in the subgroup with RP, was significantly higher [MD = 3.5 kg/cm<sup>2</sup>] than in the subgroup without RP. The clinically important difference between provoked and clinical presence of RP was found to be higher or lower than 5.6 kg/cm<sup>2</sup>. The test-retest, independent of the range of observers, and the good inter-observer reliability of the CFA to determine the PPT-RP, correspond with the reliability demands of standard algometry procedures.

**CONCLUSIONS:** The experimentally provoked PPT-RP values of MCN lower than 6 kg/cm<sup>2</sup> correspond clinically with the presence of RP in the leg. Further studies of a similar kind are nevertheless needed to confirm those conclusions.

## 71. DEVELOPMENT OF A SPANISH VERSION OF THE “BACKACHE INDEX”..

Farasyn AD<sup>1</sup>, Cuesta-Vargas A<sup>2</sup>, Gonzalez-Sanchez M<sup>3</sup>, 1. Free University Brussels (VUB), Brussels, Belgium, 2. University of Malaga (UMA), Malaga, Spain, 3. University of Malaga (UMA), Malaga, Spain.

**OBJECTIVES:** To explore [1] reliability, validity, and responsiveness of “Backache Index” [BAI] in patients with low back pain [LBP] as a new physical impairment index, and [2] to develop a Spanish version of it: “Indice de Dolor de Espalda” [IDE].

**METHODS:** [1] 75 patients participated in a randomized controlled study. The validity of the BAI was explored through correlation with Oswestry LBP Disability Index [ODI] and Visual Analogue Scale [VAS]. The BAI consisted of a scoring system that includes pain factors and stiffness estimation at the end of a series of 5 different lumbar movements of a patient standing in an erect position. [2] Translating the BAI to Spanish by 2 independent translators and using the IDE in patients with LBP [n=46] twice with a gap of 3 days between the 1st and 2nd session without treatment.

**RESULTS:** [1] Inter-observer reliability for outcome scores was good [ICC > 0.86] and perfect for BAI [ICC = 0.96]. A BAI change of one unit is able to exclude a measurement error. A significantly good correlation [p < 0.001] was found between the BAI at baseline, ODI [r = 0.62] and VAS [r = 0.47]. [2] The Spanish version does not present any conceptual problem of semantics. The test-retest after 3 days of the same group revealed a good reliability for 5 outcome scores [ICC > 0.73] and perfect for IDE [ICC = 0.97].

**CONCLUSIONS:** [1] The Backache Index or BAI appears to be a reliable and valid assessment of a patient with LBP. [2] The BAI document translated into Spanish present no semantic problems and showed maximal levels of internal validity and reliability.

## 72. STRESS AND STRAIN DISTRIBUTION IN MUSCLE TISSUE DURING PRESSURE STIMULATION: A 3D FINITE-ELEMENT ANALYSIS.

Finocchietti S<sup>1</sup>, Arendt-Nielsen L<sup>2</sup>, Graven-Nielsen T<sup>3</sup>, 1. Aalborg University, Denmark, 2. Aalborg University, Denmark, 3. Aalborg University, Denmark.

**OBJECTIVES:** Pressure algometry is a method for assessing deep tissue pain sensitivity in painful musculoskeletal conditions. It was suggested that muscle pain evoked by pressure stimulation was mainly caused by strain within the muscle. This study evaluates the effect of different probe shape on the strain and stress distribution in the muscle during pressure stimulation.

**METHODS:** A 3D finite-element model was developed to describe the stress and strain distribution in muscle tissues during pressure algometry with different probe shapes (1.0 cm diameter, flat or rounded) at different locations along the tibialis anterior muscle (belly and next-to-bone). To validate the computer model, the relation between tissue indentation and pressure stimulation intensity was extracted and compared with the data obtained by an experimental session where pressure pain thresholds [PPTs] were recorded in 8 subjects.

**RESULTS:** PPTs were associated with skin indentations in the range of 0.8-1.2 cm. The principal stress peaked in the skin layer and was reduced to about 10% in the muscle tissue. The principal strain peaked in the adipose tissue. The peak value was almost double for the rounded probe compared to the flat one (0.24 and 0.12). In the muscle tissue the strain was reduced to about 66% (flat probe) and 80% (rounded probe).

**CONCLUSIONS:** The results suggest that muscle pain evoked by pressure stimulation is related to the strain and that rounded probes induce muscle pain most efficiently. This is clinical relevant and has to be taken into consideration when pressure pain assessments are performed.

**73. PAIN IN PRIMARY CERVICAL DYSTONIA (PCD) PATIENTS.** Sung DH<sup>1</sup>, Kim D<sup>2</sup>, Cho N<sup>3</sup>, 1-3. Samsung Medical Center, Seoul, Korea.

**OBJECTIVES:** This study aims to investigate the prevalence, characteristics, and the site of pain in PCD and to clarify what causes the pain.

**METHODS:** Forty patients complaining cervical dystonia were enrolled. Using retrospective reviewing of medical records and radiologic and nuclear tests, the presence, intensity, characteristics, and site of pain, relationship between pain and severity of cervical dystonia, and the response to botulinum toxin injection was evaluated.

**RESULTS:** Three patients were dropped out because of no objective cervical dystonia. 32 patients were torticollis, 3 were laterocollis, and 2 were retrocollis. 14 patients showed mixed patterns of PCD. 29 patients complaint combined pain. Among 29 patients with pain, 23 patients complained their pain on their posterior neck area and 2 on their anterior neck area, and 4 had no exact comments. Most common pain sites were the dystonic posterior neck area. Among 29 patients with pain, 17 patients showed that their pain was relieved by sensory trick. Botulinum toxin injections were done in 19 patients. 17 patients among were evaluated by TWSTRS (The Toronto Western Spasmodic Torticollis Rating Scale). These 17 patients were analyzed. Statistically, significant reduction of post-injection pain score, degree of rotational angle, and disability due to pain were observed. Relationship between degree of cervical dystonia and pain severity ( $p=0.013$ ) and pain and disability ( $p=0.007$ ) showed statistically significant.

**CONCLUSIONS:** Pain is common clinical feature in PCD and the most common pain site is the dystonic posterior neck area. Mostly patients with pain are relieved by sensory trick. Therefore abnormal neck posture is related with pain in PCD than dystonia itself.

**74. UNRAVELLING THE NATURE OF POST-EXERTIONAL MALAISE IN CHRONIC FATIGUE SYNDROME: THE ROLE OF ELASTASE, COMPLEMENT C4A AND INTERLEUKIN-1BETA.**

Nijs J<sup>1</sup>, Paul L<sup>2</sup>, Van Oosterwijck J<sup>3</sup>, Meeus M<sup>4</sup>, 1. Vrije Universiteit Brussel, Artesis University College Antwerp, Brussel/Antwerp, Belgium, 2. Nursing and Health Care, Faculty of Medicine, University of Glasgow, Glasgow, U.K., 3. VUB, Belgium, 4. VUB, Belgium.

**OBJECTIVES:** Too vigorous exercise or activity increase frequently triggers post-exertional malaise in people with Chronic Fatigue Syndrome [CFS]. The present study aimed at examining whether 2 different types of exercise results in changes in health status, circulating elastase activity, interleukin [IL]-1beta and complement C4a levels.

**METHODS:** Twenty-two women with CFS and 22 healthy sedentary controls were subjected to a baseline assessment (day 1), a submaximal exercise (day 8) and a self-paced, physiologically limited exercise (day 16). Each bout of exercise was preceded and followed by blood sampling, actigraphy and assessment of their health status.

**RESULTS:** Both submaximal exercise and self-paced, physiologically limited exercise resulted in post-exertional malaise in people with CFS. However, neither exercise bout altered elastase activity, IL-1beta or complement C4a split product levels in people with CFS or healthy sedentary control subjects ( $p>.05$ ). Post-exercise complement C4a level was identified as a clinically important biomarker for post-exertional malaise in people with CFS.

**CONCLUSIONS:** Submaximal exercise as well self-paced, physiologically limited exercise triggers post-exertional malaise in people with CFS, but neither types of exercise alter acute circulating levels of IL-1beta, complement C4a split product or elastase activity.

**75. AN EVIDENCE-BASED MODEL OF CHRONIC WIDESPREAD PAIN IN CHRONIC FATIGUE SYNDROME.** Nijs J<sup>1</sup>, Van Oosterwijck J<sup>2</sup>, Meeus M<sup>3</sup>, 1. Vrije Universiteit Brussel, Artesis University College Antwerp, Brussel/Antwerp, Belgium, 2. VUB, Belgium, 3. VUB, Belgium.

**OBJECTIVES:** Although fatigue is the primary characteristic of chronic fatigue syndrome [CFS], the majority of CFS patients experience chronic widespread pain. Pain appears to be equally debilitating as fatigue to patients with CFS. Until recently, there was a dearth of knowledge on chronic widespread pain in CFS. At present, a series of studies have provided more insight into the nature of chronic widespread pain in CFS. The present study aimed at critically assessing the existing knowledge on chronic widespread pain in CFS.

**METHODS:** Systematic literature review.

**RESULTS:** First, various studies have provided evidence indicating that a number of psychological factors like pain catastrophizing, depressive symptoms and coping strategies influence chronic widespread pain in those with CFS. These factors may contribute to pain facilitation. Second, impairments in pain inhibitory mechanisms at rest and during physical activity have been observed. Impaired pain inhibition accounts in part for post-exertional malaise as typically seen in CFS. Third, exercise-mediated increases in oxidative stress contribute to pain in patients with CFS. Finally, cognitive therapies like cognitive behaviour therapy and pain neurophysiology education are able to improve chronic widespread pain in those with CFS.

**CONCLUSIONS:** Based on the available evidence, a model of chronic widespread pain in CFS was constructed. This pain model for CFS can be used to steer treatment. Further study of pain mechanisms and pain treatment for those with CFS are warranted.

**76. PAIN INHIBITION AND POSTEXERTIONAL MALAISE IN MYALGIC ENCEPHALOMYELITIS/CHRONIC FATIGUE SYNDROME [ME/CFS]: AN EXPERIMENTAL STUDY.** Van Oosterwijck J<sup>1</sup>, Nijs J<sup>2</sup>, Meeus M<sup>3</sup>, Lefever I<sup>4</sup>, Huybrechts L<sup>5</sup>, Lambrecht L<sup>6</sup>, Paul L<sup>7</sup>, 1. Vrije Universiteit Brussel, Brussels, Belgium, 2. Vrije Universiteit Brussel, Brussels, Belgium, 3. Vrije Universiteit Brussel, Brussels, Belgium, 4. Vrije Universiteit Brussel, Brussels, Belgium, 5. Artesis University College Antwerp, Antwerp, Belgium, 6. CVS Contactgroep, Bruges, Belgium, 7. University of Glasgow, Glasgow, UK.

**OBJECTIVES:** To examine the efficacy of the pain inhibitory systems in ME/CFS patients during two different types of exercise and to examine whether there was an association with symptom increases following exercise.

**METHODS:** Twenty-two women with ME/CFS and 22 healthy sedentary controls performed a submaximal exercise test and a self-paced, physiologically limited exercise test on a cycle ergometer with continuous cardiorespiratory monitoring. Subjects their health status and pressure pain thresholds [PPTs] were assessed before and after each exercise bout. Activity levels were assessed using accelerometry. Possible changes in any of the outcome measures in response to exercise were compared using repeated measures ANOVA.

**RESULTS:** In ME/CFS patients, PPTs decreased following both types of exercise, whereas they increased in healthy subjects. This was accompanied by a worsening of the ME/CFS symptom complex post-exercise. Decreased pressure thresholds during submaximal exercise were associated with postexertional fatigue in the ME/CFS group ( $r=.454$ ;  $P=.034$ ).

**CONCLUSIONS:** These observations indicate the presence of abnormal central pain processing during exercise in ME/CFS patients and demonstrate that both submaximal exercise and self-paced, physiologically limited exercise trigger postexertional malaise in these patients.

**77. THE RELATIONSHIP BETWEEN LOWER BACK AND LIMB PAIN WITH POSTURE, AND KINEMATIC GAIT FUNCTION IN YOUNG ADULT WOMEN.** Rachmawati MR<sup>1</sup>, 1. Faculty of Medicine, Trisakti University, Jakarta, Indonesia.

**OBJECTIVES:** The purpose of this study was to examine the relationship between lower back and limb pain, with posture, average step length and differences mean of right and left step length.

**METHODS:** Cross sectional analysis of data from 49 healthy young women. The mean of age was 22,2 (SD 0,7) years old, in order to assessed the variables of lower back and limb pain, posture, the average step length, and differences mean of right and left step length. Step length was measured by using a tool to train gait Biodex Gait Trainer 2 (230 VAC).

**RESULTS:** The result obtained a significant relationship between pain and the differences mean between right and left step length ( $p = 0.018$ ), as well as between posture and the left step length ( $p = 0.003$ ), but there was no significant relationship between pain and average right and left step length and also between posture and pain. The results of multiple regression analysis showed the posture was the greatest influence on left step length ( $b = 4135$ ; 95% CI 0.292 to 7.977)

**CONCLUSIONS:** Posture, step length, and the differences mean of step length should be evaluated in the examination of lower back and limb pain both for treatment and evaluation guidelines.

**78. THE IMMEDIATE EFFECT ON NEIMS OF INFRA-SPINATOUS MUSCLE IN SHOULDER PAIN PATIENTS WITH OR WITHOUT MYOFASCIAL PAIN SYNDROME.** Lee SH<sup>1</sup>, Chan RC<sup>2</sup>, 1. PMR, Taipei Veterans General Hospital, Taipei, Taiwan, ROC, 2. PMR, Taipei Veterans General Hospital, Taipei Taiwan, ROC.

**OBJECTIVES:** To evaluate whether there's a differential effect of needle electrical intramuscular stimulation [NEIMS] treatment on patients with shoulder pain caused by myofascial pain syndrome [MPS] or other non-myofascial pain [non-MPS] etiologies.

**METHODS:** 133 adult patients with shoulder pain were recruited from the outpatient clinic. The cause of shoulder pain was determined by clinical and echographic findings as MPS and non-MPS. NEIMS treatment was performed in the infraspinatus muscle of the affected shoulder. Visual analog scale [VAS] pre and post treatment was recorded for comparison. Information on the covariates associated with shoulder pain was also collected. Univariate comparison and logistic regression was used for multivariate analysis. Outcomes were presented as box plots displaying medians and 25th to 75th percentile values.

**RESULTS:** There were 95 MPS patients and 38 non-MPS patients. The VAS score decreased significantly after NEIMS treatment in the MPS patients ( $6.94 \pm 1.82$  vs.  $5.03 \pm 2.12$ ,  $p < 0.001$ ) and non-MPS patients ( $7.71 \pm 1.95$  vs.  $5.47 \pm 2.20$ ,  $p < 0.001$ ). Multiple logistic regression analysis did not find a significant difference in the proportion of VAS change greater than 2 between two groups ( $p = 0.64$ , odds ratio 1.30, 95 CI% 0.44-3.84), controlling for gender, pre-treatment VAS, diabetes mellitus, trauma, and disease onset duration.

**CONCLUSIONS:** Our study supports a positive immediate treatment effect of NEIMS on both groups without significant difference. Long term effect and mechanism of NEIMS on these two distinct groups of shoulder pain patients is not clear and requires further study in the future.

**79. EFFECT OF TAPING FOR PATIENTS WITH TENNIS ELBOW AND MOTION TRACKING BY ULTRASONIC IMAGE SEQUENCE.** Chen S<sup>1</sup>, 1. Physical Medicine & Rehabilitation, National Cheng Kung University, Tainan, Taiwan.

**OBJECTIVES:** This pilot study was designed to investigate the effect of Kinesio tape for patients with tennis elbow.

**METHODS:** Eleven subjects with tennis elbow were enrolled. Six subjects were assigned for the Kinesio tape (experimental) group, and 5 subjects for the 3M tape (control) group. Both groups were underwent clinical evaluation, including visual analogue scale [VAS], pressure pain threshold [PPT] & maximal pain threshold [MPT] and grip power [GP], as well as the ultrasonic assessment. The Dynamic ultrasonic motion tracking of extensor carpi radialis muscle was based on optical flow method. Two stages MultiFeature Block Matching with Kalman prediction was used to perform motion tracking from 3D (2D+t) muscular ultrasound images. The data was collected before and after treatment.

**RESULTS:** The data showed decrement in VAS ( $p = 0.016$ ) & increment in PPT ( $p = 0.383$ ) & MPT ( $p = 0.017$ ) in both groups after treatment. There was little change in GP of kinesio tape group & increment of 3M tape group ( $p = 0.458$ ). Limitation of ultrasonic muscle motion after taping was noted in both groups, especially the 3M tape group. There were significant differences between groups in the change of VAS, MPT & ultrasonic muscle motion.

**CONCLUSIONS:** Subjects with tennis elbow improved clinically after kinesio and 3M taping. Restriction of muscle motion noted by ultrasonic tracking in both groups, more restriction motion was noted in the 3M tape group in our pilot study.

**80. TRIGGER POINT DRY NEEDLING FOR PLANTAR FASCIITIS: A MODIFIED DELPHI PROCESS TO DEFINE A TREATMENT PROTOCOL.** cotchett mp<sup>1</sup>, 1. La Trobe University, Melbourne, Victoria, Australia.

**OBJECTIVES:** Plantar heel pain (plantar fasciitis) is a common and disabling condition. A wide variety of treatment options are available to patients with plantar heel, however the evidence for these treatments is generally weak and the best way to manage plantar heel pain remains unclear. Trigger point dry needling is increasingly used as an adjunct therapy for musculoskeletal pain. However, there have been no randomised controlled trials that have evaluated the efficacy or effectiveness of dry needling for plantar heel pain. Prior to undertaking a randomised clinical trial to evaluate the effectiveness of dry needling for plantar heel pain a treatment protocol is required. Hence, the aim of our study was to invite experts (participants) worldwide to help develop a consensus for the use of dry needling for plantar heel pain.

**METHODS:** A modified Delphi process was used to develop a consensus. The data from the completed surveys were analysed for their central tendency (mode, mean and mean).

**RESULTS:** Thirty experts completed the survey over three iterations. In the final iteration, twenty-eight of thirty participants indicated that the protocol was adequate for a clinical trial to evaluate the effectiveness of dry needling for plantar heel pain.

**CONCLUSIONS:** In preparation for a randomised clinical trial to evaluate the effectiveness of dry needling for plantar heel pain we conducted a modified Delphi process to develop a treatment protocol. Ninety-three percent of participants indicated that the dry needling protocol would be adequate for a clinical trial to evaluate the effectiveness of dry needling for plantar heel pain.



**81. CELL IMPLICATIONS OF DRY NEEDLING INJURY TO MUSCLE TISSUE. A PILOT STUDY.** Mayoral O<sup>1</sup>, Santafé M<sup>2</sup>, Salvat I<sup>3</sup>, Monterde S<sup>4</sup>, Pérez C<sup>5</sup>, 1. Provincial Hospital, Toledo, Spain, 2. Rovira i Virgili University, Reus, Spain, 3. Rovira i Virgili University, Reus, Spain, 4. Rovira i Virgili University, Reus, Spain, 5. Provincial Hospital, Toledo, Spain.

**OBJECTIVES:** To evaluate the cellular implications of dry needling [DN] with acupuncture needles [AN]. To find out the way muscle injuries caused by a 0.16mm AN get repaired

**METHODS:** Both sternocleidomastoid muscles [SCMs] of 2 Sprague-Dawley male rats [RS] (40 days; CRIFFA, Barcelona, Spain) were used. RS were cared for following European Community's Council Directives. RS were anesthetized with 2% tribromoethanol. 40 insertions of AN were performed in each SCM. RS were killed by exsanguination while anesthetized 4-5 days after DN. SCMs were pinned on Silgard® in Petri dishes and then fixed in 10% neutral formalin for 3 days, embedded in paraffin and sectioned on 10µm. Hematoxylin and eosin were used to stain specimens. Images were obtained at 100X, 200X and 400X magnifications using an Olympus BX41 microscope. Microphotographies were taken with a camera Nikon DSFi1 coupled to imaging software

**RESULTS:** DN induced focalized muscle cell degeneration and regeneration. We could see variable amounts of cellular debris, interstitial fluid, mononuclear phagocytes, intact satellite cells showing 'blastic' transformation. The involved muscle fibers lost the characteristic striated look. Blood vessels and connective interstitial elements showed the structural variations that normally occur in an inflammatory environment. The first shapes of regeneration like myotubes with the first sarcomeres could also be seen

**CONCLUSIONS:** DN causes minor muscle injury that seems to degenerate and regenerate quickly and without complications

**82. PREVALENCE OF MYOFASCIAL PAIN SYNDROME IN LATERAL EPICONDYLE ENTHESOPATHY.** Mayoral O<sup>1</sup>, De-Felipe JA<sup>2</sup>, Velasco S<sup>3</sup>, Jiménez F<sup>4</sup>, Miota J<sup>5</sup>, López P<sup>6</sup>, 1. Provincial Hospital, Toledo, Spain, 2. FREMAP, Toledo, Spain, 3. FREMAP, Toledo, Spain, 4. Castilla-La Mancha University, Toledo, Spain, 5. Castilla-La Mancha University, Toledo, Spain, 6. Castilla-La Mancha University, Toledo, Spain.

**OBJECTIVES:** To evaluate the prevalence of myofascial pain syndrome [MPS] in patients diagnosed of lateral epicondyle enthesopathy [LEE]

**METHODS:** Subjects were included if they felt pain in the lateral epicondyle and diagnostic ultrasound showed enthesopathic changes without bursitis, intramuscular haematoma, calcifications or partial or high grade tears. A total of 20 subjects were included, mean age 38.25 (SD 5.73), 15 male, 5 female; VAS= 5.61 (SD 1.75). A trained and expert examiner used Simons, et al. diagnostic criteria to exam all subjects for myofascial trigger points [MTPs] in the following muscles of the LEE side: C5-C6 multifidus [MF], scalenus medius [SM], supraspinatus [SS], triceps [TR], supinator [SU], brachioradialis [BR], extensor carpi radialis brevis [ECRB] and longus [ECRL], and extensor digitorum [ED]. The MPS diagnosis required at least one muscle with an active MTP

**RESULTS:** Overall prevalence of MPS in our sample was 90% (18/20). Of these, 2 (11,11%) had a single muscle MPS, affecting TR and ECRB respectively. The mean number of muscles involved was 4.38 (1-9). The most frequently involved muscles, i.e. with active MTPs, were ECRB and ED in 83.3% of subjects with MPS (15/18). Other muscles' rate of involvement were ECRL 72,2%; BR 66,6%; SU 50%; TR 38%; SM 5.5%; SS and MF 0%

**CONCLUSIONS:** Prevalence of MPS in LEE is very high. Treatment of involved MTPs could benefit patients with ELE. The high involvement of ECRB and ED could support Simons's idea of central/attachment MTPs

### **83. RELATIONSHIP BETWEEN PATIENTS' PAIN SENSATION AND THE PRESSURE PAIN THRESHOLD FROM THE TRAPEZIUS IN CHRONIC NECK PAIN. Pecos-Martin**

D<sup>1</sup>, Montanez-Aguilera J<sup>2</sup>, Gomez-Conesa A<sup>3</sup>, Plaza-Manzano G<sup>4</sup>, 1. UAH, Spain, 2. CEU, Spain, 3. UM, Spain, 4. UCM, Spain.

**OBJECTIVES:** To establish the relationship between the sensation of pain measured with a visual analogue scale (VAS) with the pressure pain threshold (PPT) of the trapezius muscle in patients with chronic neck pain

**METHODS:** Methods Prevalence study which relates the intensity of pain expressed by the patient with a VAS and PPT recorded by a blinded evaluator. Sample: 49 patients, 43 women and 6 men with a mean age of 39,51 affected chronic neck pain. Material. The patients completed a visual analogue scale, which indicates its current sensation of pain and is measured with a Fisher algometer pressure on myofascial trigger point number 1 (PGM 1) and 3 (PGM3) muscle trapezius by a physiotherapist who does not know what the value of the scale. Statistical analysis to obtain an estimate of the correlation coefficient was obtained linear correlation (Pearson) to compare if there are significant differences between the average pain threshold pressure in different trapezius were made for each combination of interest is a paired samples t test.

**RESULTS:** PPT the four values (PGM1 y PGM2 right and left) are positively correlated. We can also see that these four variables are negatively correlated with VAS. The p-values for assessing the linear relationship are all (well) below 0.05 (indicating that in all cases there is a significant linear relationship).

**CONCLUSIONS:** In patients with chronic neck pain, the PPT from the trapezius muscle is inversely proportional to the value reported by the patient pain VAS. -The PPT from the upper trapezius PGM1 has a linear relationship PGM3.

### **84. TEMPORO-MANDIBULAR DISEASES ASSOCIATED WITH TRIGGER POINTS**

**FOLLOWING WHIPLASH INJURY. Marini I. Bartolucci M.L. Russo M. Bortolotti F. Alessandri Bonetti G.** All from School of Dentistry, University of Bologna, Bologna, Italy.

**OBJECTIVES:** the aim of this study is to show the correlation between chronic cranio-cervico-mandibular pain and trigger points following whiplash injury.

**METHODS:** Fifty-seven patients (22 males and 35 females) ranging from 16 to 65 years were examined and reported. They had developed cranio-cervico-mandibular discomfort 8 months to 3 years after injury. Patients that only had symptoms of temporomandibular joint [TMJ] clicking without pain, previous disc disease, facet joint denervation, or that were involved in litigation were excluded from the study. Examination of the patients included the following: palpation/inspection of all masticatory muscles (temporalis, masseter, buccinator, pterigoideo lateralis, pterigoideo int.) and three neck muscles, auscultation of jaw sounds, functional movements of the mandible, and frequency of headaches. In addition, each patient's myofascial trigger points [MTrPs] were mapped out.

**RESULTS:** 35% of patients registered had TMJ clicking with pain and 61% of them presented alterations in dynamic movements during mouth opening. MTrPs in the cranio-cervical area were found in 95% of the subjects.

**CONCLUSIONS:** the incidence of clicking with TMJ pain in whiplash patients was found to be quite low. All the subjects had at least one MTrP in the muscles of neck and face. The presence of MTrPs can explain the pain in the cranio-cervico-mandibular area. Moreover, the MTrPs in masticatory muscles modify the dynamic opening movement of the mandible.

**85. PREVALENCE OF LOW BACK PAIN AMONG HEALTH SCIENCES UNIVERSITY STUDENTS IN TOLEDO'S CAMPUS.** Miota Ibarra J<sup>1</sup>, Martínez Galán I<sup>2</sup>, 1. Physical Therapy School of Castilla La Mancha University, Toledo, Spain, 2. Physical Therapy School of Castilla La Mancha University, Toledo, Spain.

**OBJECTIVES:** - To estimate the prevalence of low back pain (LBP) among students in health careers Toledo Campus. - To assess the correlation between LBP and different factors.

**METHODS:** Desing: Cross-sectional study. A self-reported validated questionnaire the occurrence of LBP (Gil Del Real, Kovacs, Gestoso, Mufraggi & Diéguez, 1999).

**RESULTS:** Of the 320 college students who completed the questionnaire, the majority were women (75.6%). Among all responders, 43,1% presented LBP often or almost constantly. In addition to the association of LBP with gender, we could observe how there is this interaction between the year of study and a sedentary lifestyle, increasing to 69% chance of getting LBP being sedentary in last course. Sleep disturbances due to pain were reported in 37% of the office clerks with chronic low back pain. Multiple logistic regression models have revealed that significant determinants for predicting LBP occurrence are age, gender, body mass index, body distance from computer screen, adjustable back support, clerk body position while sitting, sitting time of greater than 6 hours, job satisfaction, repetitive work, and anger during last 30 days

**CONCLUSIONS:** The demonstrated effect of a sedentary lifestyle, increasing the likelihood of LBP as the years of student progress, the high percentage of female students in health careers back sufferers more often than men, highlights the importance of physical activity as an habit of healthy life to develop and tone the musculature as an essential preventive measure against LBP.

**86. THE RELATIONSHIP BETWEEN ACTIVE MYOFASCIAL TRIGGER POINTS AND STRUCTURAL ALTERATIONS IN THE SUBACROMIAL SPACE IN THE SHOULDER.** López-Lapeña E<sup>1</sup>, de la Torre-Beldarraín ML<sup>2</sup>, Ara-Loriente V<sup>3</sup>, Pérez-Benito M<sup>4</sup>, Gaspar-Calvo E<sup>5</sup>, Pérez-Palomares S<sup>6</sup>, Oliván-Blázquez B<sup>7</sup>, 1. Aragonés Health Science Institute, Zaragoza (Spain), 2. Aragonés Health Science Institute, Zaragoza (Spain), 3. Aragonés Health Science Institute, Zaragoza (Spain), 4. Aragonés Health Science Institute, Zaragoza (Spain), 5. Aragonés Health Science Institute, Zaragoza (Spain), 6. Aragonés Health Science Institute, Zaragoza (Spain), 7. Aragonés Health Science Institute, Zaragoza (Spain).

**OBJECTIVES:** Objectives: To relate the existence of active myofascial trigger point (aMTrP) with different structural lesions, such as decreased subacromial space, sprain of the rotator cuff and degenerative changes in the subacromial joint.

**METHODS:** Cross sectional study that evaluates the correlation between the presence of aMTrP and the existence of structural alterations in the shoulder joint complex, evidenced by ultrasonography in subacromial region. The statistical analysis was based in a descriptive analysis of the studied variables and multivariate analysis using logistic regression.

**RESULTS:** We evaluated 80 patients with shoulder pain and dysfunction. All patients have active MTrPs, and the most frequent were in supraespinatus and infraespinatus muscles.

**CONCLUSIONS:** We emphasize the importance of MTrPs in any type of shoulder joint dysfunction, even if there are structural lesions coexisting with them. It is questionable the direction of cause-effect relationship between the pathological condition of the shoulder mechanics and structural damage. It would be possible the prior existence of MTrPs which would lead to a structural lesion, being even a previous disability.

**87. EFFECTIVENESS IN THE TREATMENT OF IMPINGEMENT SYNDROME THROUGH THE DRY NEEDLING OF THE MYOFASCIAL TRIGGER POINTS.** Gaspar-Calvo E<sup>1</sup>, Pérez-Benito M<sup>2</sup>, Ara-Loriente V<sup>3</sup>, Pérez-Palomares S<sup>4</sup>, Oliván-Blázquez B<sup>5</sup>, de la Torre-Beldarraín ML<sup>6</sup>, López-Lapeña E<sup>7</sup>, 1. Aragon Health Science Institute, Zaragoza (Spain), 2. Aragon Health Science Institute, Zaragoza (Spain), 3. Aragon Health Science Institute, Zaragoza (Spain), 4. Aragon Health Science Institute, Zaragoza (Spain), 5. Aragon Health Science Institute, Zaragoza (Spain), 6. Aragon Health Science Institute, Zaragoza (Spain), 7. Aragon Health Science Institute, Zaragoza (Spain).

**OBJECTIVES:** To evaluate the effectiveness of dry needling [DN] of aMTPs in the physiotherapy treatment of IS and tendinitis of the rotator cuff versus the usual protocol.

**METHODS:** Randomized clinical trial. 80 subjects were recruited from physiotherapy units of primary care with a diagnosis of tendinitis of the rotator cuff and/or IS. Subjects were randomized to two treatment arms: 1. Protocolized treatment based on active and passive joint repositioning, stabilization exercises, stretching and postural reeducation. 2. The previously-described protocolized treatment, with the addition of DN applied to aMTPs of the supraspinatus, infraspinatus, teres minor, subscapularis, and anterior, middle and posterior deltoid muscles. The outcome variables were: active joint mobility of the glenohumeral joint, perceived pain, functionality, and activation of MTPs. Subjects were followed-up for 3 months.

**RESULTS:** In the group of DN treatment, improvement in the perception of pain (VAS) has been a 1'007 higher ( $p = 0'054$ ) and in the improvement of the functionality (Constant test) was 0'73 ( $p = 0'57$ ).

**CONCLUSIONS:** There is no difference in improvement of functionality but the perception of pain is significantly better in DN group with a significance of 0.1.

**88. INTRODUCING THE CONCEPT OF "FUNCTIONAL MYOFASCIAL TRIGGER POINT (MTRP)"** Müller-Ehrenberg H<sup>1</sup>, 1. Orthopaedic Office, Münster, NRW, Germany.

**OBJECTIVES:** Introduction: In daily routine therapeutic's work MTRPs that fulfill the diagnostic criteria of taut band and tender nodule are found, while diagnosing myofascial pain syndrome. Not all of the latent MTRPs (no recognition and no referred pain) are considered to be relevant for the patient's pain problem. Active MTRPs are defined by the diagnostic criteria of recognition and referred pain. The specific treatment and release of active MTRPs usually gives a pain relief to the patient. However, although mechanical instruments like focused shockwaves are a notable improvement in diagnosing the criteria of active MTRPs, often the therapist is not able to elicit the diagnostic criteria of recognition and referred Pain, although after exact treatment the pain improves significantly.

**METHODS:** Problem: In the clinical concept of treating patients with an important component of myofascial pain in their "pain process", the therapeutic and diagnostic approach is very much limited if we treat mainly active MTRPs.

**CONCLUSIONS:** The anatomical attachment and the function of the muscle will lead the therapist to recognize the importance of MTRPs that have been classified as latent. The concept of a functional MTRP for these trigger points will point out the importance of these structures in the patient's pain process, and bring a classification, that is easy to understand and a reasonable addition to the established system of active and latent MTRPs.

**89. EFFECTIVENESS OF DRY NEEDLING IN ACTIVE MYOFASCIAL TRIGGER POINTS OF TRAPEZIUS MUSCLE IN OFFICE WORKERS: RANDOMIZED, SINGLE BLINDED, PILOT CLINICAL TRIAL.** Cerezo E<sup>1</sup>, Fuentes I<sup>2</sup>, Rodrigo B<sup>3</sup>, Gutiérrez C<sup>4</sup>, 1. Alcalá University, Madrid, Spain, 2. AP Área 3, Madrid, Spain, 3. Ejercicio Libre, Guadalajara, Spain, 4. Central de la Defensa Hospital, Madrid, Spain.

**OBJECTIVES:** To find out the effectiveness of deep dry needling [DDN] of active myofascial trigger points [aMTrP].

**METHODS:** Design: Randomized, single blinded, clinical trial pilot study. Setting: Physical Therapy research unit in Alcalá University from Alcalá de Henares, Madrid, Spain. Participants: Twenty office workers with aMTrP in Trapezius Muscle [TM], were randomly allocated to either the DDN, or the control group [CG] between January and May 2009. Intervention: The subjects in the DDN group were treated with DDN of all aMTrP found in TM. They also received a passive analytic stretching [PAS] of the TM. The CG received the same PAS of TM only. Main outcome measure: The primary outcome was a change in subjective pain intensity. Measures were taken at baseline, after every treatment session, after intervention, then at 15 days. Statistical approaches: Within-group change was analysed using a dependant t-test. The differences between groups were tested by ANOVA/mixed model.

**RESULTS:** Both, DDN ( $p < 0,01$ ); and PAS ( $p = 0,01$ ) had significantly reduced pain. DDN was more effective than PAS ( $p < 0,01$ ). The effects of DDN were maintained at least 15 days after intervention ( $p = 0,015$ ).

**CONCLUSIONS:** DDN and PAS can both reduce aMTrP pain. DDN is more effective than PAS, and that effects are maintained in the short term. This would support the use of DDN in the management of trapezius myofascial pain syndrome.

**90. MYOFASCIAL PAIN [MP] IMPAIRING MIGRAINE TREATMENT.** Jacob M<sup>1</sup>, Jacob b<sup>2</sup>, 1. Pain Clinic, Campinas Brasil, 2. FMJ, Jundiaí Brasil.

**OBJECTIVES:** Migraine [MG] is a common chronic pain with multiple triggers. Current theories suggest central neuronal hyperexcitability as the fundamental physiological disturbance probably with multifactorial and genetic basis. Trials show that about 2/3 of patients have 50% reduction in MG attacks with preventive treatment. We started treating patients that had been submitted to standard prophylactic treatment, referring improvement in their pain but still complaining of MG attacks, with trigger points [TP] inactivation.

**METHODS:** 28 patients that fulfilled the ICHD-II for modified MG, 24 female, 4 male, average age between 46 year old (11 to 74) that had been submitted to preventive treatment, were studied from 2000 to 2009. We looked for head and neck TP painful at digital pressure and started TP inactivation with 0.5cc of lidocaine 0.5% without vasoconstrictor per point, every 15 days, until they were no more painful. Preventive medication was maintained. The numerical rating scale was used as pain parameter evaluation. 90% pain relief was considered ideal.

**RESULTS:** At 1st return appointment, 22 patients referred 53,2% pain relief [0% to 100%], 2 had no relief. At the end of the study 24 patients obtained 90% of pain relief in 7 months [0,5 to 30 months]. 1 patient reached 40% of relief, 2 had 50 % of relief and 1 had no relief.

**CONCLUSIONS:** MP seems to be a MG trigger. It is essential to inactivate active TPs for a significant persistent pain relief. Patients would benefit much more and in a shorter period of time if preventive medication and TP inactivation were done simultaneously.

**91. DISTANT SURGERY SCAR POINTS AND FASCIAL ADHESIONS PERPETUATE PECTORALIS MINOR TRIGGER POINTS IN TWO CASES OF SEVERE CHRONIC PALMAR PAIN.** Marquis RK<sup>1</sup>, Borrero M<sup>2</sup>, 1. Tandem Point Therapy, Haddonfield, NJ USA, 2. Medical House Calls PLLC, New York, NY USA.

**OBJECTIVES:** Report cases of one man and one woman, aged 44 and 40 at treatment, who developed severe chronic palmar pain following pectoral muscle stress (pain 5/10 and 7/10, pain durations of 11 months and 4 years, much earlier inguinal hernia surgery and cesarean section, respectively). The male patient declined ulnar nerve transposition. The female patient had an unsuccessful carpal tunnel release.

**METHODS:** In each case, an active pectoralis minor trigger point (TrP) was located, and a fascial pull was palpated that originated at a surgery scar point and extended to the TrP. Acupressure to (a) the scar point and (b) fascial adhesions in acupuncture channels facilitated complete TrP release when treatment of the TrP alone failed. Patients consumed a high-protein diet including fresh seafood prior to treatment and consumed water or water plus electrolytes during application of acupressure.

**RESULTS:** In both cases, one treatment ended severe chronic pain. Patients remained pain-free (0/10) four years post-treatment.

**CONCLUSIONS:** In these cases, the distant scar points and fascial adhesions on acupuncture channels acted as trigger point perpetuating factors: when these factors were successfully treated, the trigger points resolved and did not return. This is believed to be the first report of scar points and fascial adhesions as distant trigger point perpetuating factors.

**92. PREVALENCE AND EPIDEMIOLOGICAL PROFILE OF HYPERMOBILITY JOINT IN AN INTERDISCIPLINARY PAIN TREATMENT CENTER IN SÃO PAULO.** Braga KR<sup>1</sup>, Botteon MC<sup>2</sup>, Pedutto AA<sup>3</sup>, Yeng LT<sup>4</sup>, 1. Interdisciplinary Pain Treatment Center at São Paulo University, São Paulo, SP, Brazil, 2. Interdisciplinary Pain Center at Sao Paulo University, Sao Paulo, SP, Brazil, 3. Interdisciplinary Pain Treatment Center at São Paulo University, Sao Paulo, SP, Brazil, 4. Interdisciplinary Pain Treatment Center at São Paulo University, São Paulo, SP, Brazil.

**OBJECTIVES:** The aim is to determine the prevalence of hypermobility joint [HJ] in patients that attend a pain center associated with age, gender, the region affected. And the presence or not of HJ, myofascial pain, if the pain started before the age of 30 years

**METHODS:** We reviewed 220 medical records collected between 2008/2009 in a reference Pain Center at University of São Paulo. The Beighton criteria were used to diagnose the HJ

**RESULTS:** Among 81 male and 139 female (mean age was 52,2 years), 98 with HJ(44,5%);192 myofascial pain(87,3%);71generalized pain(32.3%),101 back pain(46%),32 lower limbs pain(14,5%),16 superior limbs pain(7.3%).The statistical analysis used wasT-test to compare the mean age of ones with and without HJ.The mean age with HJ was 44.5(CI 95%41.6-47.4).In male group 30(37%,mean age:40,4), female group 68(49%,mean age:46,3),while the mean age among the subjects without HJ was 59,2(CI 95%55.2-61.7),it's statistically significant. The association between HJ and pain before 30 years showed an Odds Ratio of 5.52

**CONCLUSIONS:** The prevalence of HJ is high and associated with age. This research points the HJ is important factor related with chronic pain and myofascial pain, specially in onset age of the first complaint. Consider HJ as a risk factor for pain before 30 years, prevention strategies should be discussed.

### **93. TREATMENT OF MYOFASCIAL TRIGGER POINTS IN SHOULDER DISORDERS...**

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**OBJECTIVES:** Physical therapy treatment to inactivate MTrPs within a 3 months' period is as effective as a "wait and see" approach of patients with chronic shoulder complaints. Outcome measures were DASH, VAS for Pain and Global Perceived Effect. The number of muscles with MTrPs was counted.

**METHODS:** An examiner-blinded RCT was conducted. Sixty-five patients with shoulder pain were randomized to either intervention group or control group. All patients from the intervention group were treated once a week for 12 weeks. The treatment was aimed to inactivate MTrPs and to eliminate perpetuating factors.

**RESULTS:** The intervention group showed a statistical significant and clinically important change in the DASH score (mean change 11.9; 95% CI 6.5 to 17.4;) versus the control group (mean 4.7; 95% CI 1.2 to 8.2) after 12 weeks. The change in VAS-P1, VAS-P2, and VAS-P3 scores (respectively 14.7; 18.8; 20.8) was significant. After 12 weeks significantly more patients were improved than in the control group. The number of muscles with active MTrPs decreased (mean 2), while it increased in the control group (mean 3).

**CONCLUSIONS:** Inactivation of MTrPS in patients with chronic shoulder pain showed important benefits. We believe that MTrP therapy offer an alternative treatment approach for patients with shoulder pain.

**94. TREATMENT OF MYOFASCIAL PAIN SYNDROME.** Saggini R<sup>1,\*</sup>, Di Pancrazio L.<sup>\*\*</sup>, Dodaj I.<sup>\*\*\*</sup>, Iodice P.<sup>\*\*</sup>, Piscella V.<sup>\*\*</sup>, Bellomo R.G.<sup>\*\*</sup> <sup>1</sup>Chair of Physical Medicine and Rehabilitation, University "G. d'Annunzio ", Chieti (Italy). \*Department of Neuroscience and Imaging, University "G. d'Annunzio ", Chieti (Italy). \*\* Department of Human Movement Sciences, University "G. d'Annunzio ", Chieti (Italy)\*\*\* Sports Medicine University Center, University "G. d'Annunzio ", Chieti (Italy)

**OBJECTIVES:** The aim of this report is to compare two different therapies of myofascial pain syndrome (MPS): Extracorporeal Shock Wave Therapy [ESWT] with local acoustic vibration [MiTh].

**METHODS:** 120 patients suffering from trapezius, gastrocnemius and gluteus medius muscle myofascial syndromes, will be divided into two homogeneous groups. Group A [ESWT]: treated with Extracorporeal Shock Wave defocused, 800 pulsed for week, 5 treatment without physiotherapy. Group B [MiTh]: treated with a local vibratory therapy (MiTh, Visscom, Italy) at 90 Hz for 3 min on TrPs for 4 subsequent sittings.

In all subjects we reported: 1) point-thresholds [PaTh] subsequent to pressure with Fischer algometer on TrPs; 2) maximum pain intensity [VAS] measured with the Scott-Huskinsson visual analog scale; 3) muscle parameters [BiM] measured with biometry (Myoton, Diagnostic Support, Italy).

Tests were carried out before the beginning of the therapy and after 30 and 60 days.

**RESULTS:** VAS decreased in Group A [ESWT] ( $8,5 \pm 0,7$  to  $4,5 \pm 0,4$ ,  $p < 0,01$ ) and in Group B [MiTh] ( $8,2 \pm 0,9$  to  $5,2 \pm 0,6$ ,  $p < 0,05$ ) and lasted for 30 days from the beginning of the therapy. A reduction of PaTh was registered in Group A [ESWT] after every sitting ( $2,1 \pm 0,4$  to  $3,1 \pm 0,5 \text{ kg/cm}^2$ ). A reduction at the end of the treatment was registered in Group B [MiTh] ( $1,9 \pm 0,6$  to  $3,3 \pm 0,2 \text{ kg/cm}^2$ ).

BiM has shown a reduction in muscular tone in Group A [ESWT] ( $31,4 \pm 3,3$  to  $22,9 \pm 4,5 \text{ Hz}$ ,  $p < 0,05$ ), an increment in muscular elasticity ( $1,73 \pm 0,47$  to  $1,06 \pm 0,23$ ,  $p < 0,05$ ), a reduction in muscular stiffness ( $657 \pm 121$  to  $445 \pm 103 \text{ N/m}$ ,  $p < 0,01$ ). A significant reduction only of the muscular stiffness has been registered in Group B [MiTh] ( $597 \pm 158$  to  $461 \pm 203 \text{ N/m}$ ,  $p < 0,05$ ).

**CONCLUSIONS:** The pain threshold gradually increases mainly in group A [ESWT]. This shows long term muscular tone and muscular elasticity improvement.