



European Journal of Osteopathy & Related Clinical Research



ORIGINAL ARTICLE

Fibromyalgia: General Considerations. Review

Lérida-Ortega MA (PhD, DO)¹, Escarabajal-Arrieta MD (PhD)², Oliva-Pascual-Vaca J (PhD)³, Peña-Salinas M (PhD)³

1.- Professor, Department of HealthSciences. Universidad de Jaén. Jaén(Spain).

2.- Professor, Department of Psychology. Universidad de Jaén. Jaén.(Spain).

3.- Professor, Department of Physical Therapy. Universidad de Sevilla. Seville. (Spain).

Received: February 14th, 2012, accepted: March 19th, 2012

ABSTRACT

Keywords:

Fibromyalgia;
Rheumatic diseases;
Health status;
Osteopathic medicine.

Introduction: Fibromyalgia is a clinical syndrome of an unknown etiology, characterized by the presence of diffuse and incapacitating chronic musculoskeletal pain that is normally accompanied by other symptoms like fatigue, sleep alterations, stiffness, severe headache, irritable bowel syndrome, depression, anxiety or paresthesia of the extremities and possible balance disorders.

Objectives: To present an updated description of the relevant clinical aspects of fibromyalgia.

Material and methods: We performed a literature search using Medline, ProQuest and Scopus databases, and the terms “fibromyalgia”, “manual therapy” and “osteopathy”.

Results: A retrospective, systematic review study with a sample for literature analysis, comprising 15 articles (n=15) and satisfying the screening criteria in two phases of analysis. These 15 articles represent 4.54% of the total number of found articles (n=330), and 12% of the articles fulfilling the screening criteria (n=120) (inclusion and exclusion). Fibromyalgia is a disease of an unknown cause that manifests multiple symptoms, particularly the onset of pain. The prevalence of the disease is between 1% and 5% of the population. One possible cause could be the alteration of the various levels of pain processing and modulation in the central nervous system. The diagnostic criteria used since 1990 are being questioned.

Conclusions: The treatment approach is currently based on reducing the intensity of the symptoms. At present, no one’s treatment presents outstanding effectiveness with respect to the others used, and the patient, thus, requires a treatment applied by a multi-disciplinary team.

INTRODUCTION

Fibromyalgia is a clinical syndrome of an unknown etiology, characterized by the presence of diffuse and incapacitating chronic musculoskeletal pain that is normally accompanied by other symptoms like fatigue, sleep alterations, stiffness, severe headache, irritable bowel syndrome, depression, anxiety or paresthesia of the extremities¹⁻³ and possible balance disorders⁴⁻⁷.

Pain can be considered the most common symptom, and, in fact, as explained below in further detail, is the only symptom used as a diagnostic criterion⁸.

In 1976, Hench⁹ proposed the current term, which etymologically stems from: fibro- (fibre), myo- (muscle), -algos (pain) and -ia (condition). This term is currently accepted internationally, but various authors have also employed other terms in reference to this syndrome¹⁰, such as muscular rheumatism, myalgia rheumatica, myogelosis, myofibrositis, myopathic syndrome, etc.

MATERIALS AND METHODS

The literature review was conducted using the PubMed (MEDLINE), Sciondirect (Scopus) and ProQuest databases. The search terms entered were "fibromyalgia", "osteopathy" and "manual therapy", and all searches were restricted to publications written in English or Spanish up to 2011.

Eligibility and screening criteria

Our review consisted of two search phases. We established the eligibility criteria (inclusion and exclusion) in the first phase and the screening-specific criteria for the second phase.

Eligibility criteria. In phase 1 of the search, the following inclusion criteria were applied: articles published in the indexed scientific journals, in Spanish and/or English regarding any clinical, diagnostic, therapeutic, physiological, epidemiological or socio-

economic aspect of fibromyalgia, articles related to any aspect of fibromyalgia and manual, alternative or osteopathic therapies.

Moreover, from our review, we excluded all articles published in any language other than Spanish or English, in indexed scientific and non-scientific journals, as well as any that did not meet the minimum standards for quality, such as the absence of paired reviews, the lack of a control group, and those that were not randomized.

Screening criteria. In phase 2 of our review, we applied screening criteria to the selected articles according to the Title, Abstract and Keywords, the Full Text and Bibliographic citations of the articles included in Phase 1 (Figure 1).

Data analysis

Phase 1.- We performed an initial general search to obtain the published studies that generically addressed fibromyalgia in the framework of osteopathy, manual therapy and/or alternative therapies, and we developed a template for collecting general information based on the following factors: language of the publication, number of authors, public or private institution, paired review of the source journal, existence of a control group, blinded and randomized studies on fibromyalgia.

We obtained a total of 330 studies (n=330), once we had filtered out duplicates. To these, we applied the inclusion and exclusion criteria, which allowed for an initial selection of 120 articles (n=120) (Figure 1).

Phase 2.- Then, our objective was to determine the association between the specific aspects of Fibromyalgia and Osteopathy. To that end, we applied additional filters to all of the articles previously obtained in the initial search (n=330), to identify fibromyalgia studies related to osteopathy, manual techniques and alternative therapies. Thus, we screened by Title,

Abstract and Keywords, which excluded 52 (n=52) of the initially selected articles. We then filtered by full text, which resulted in the definitive inclusion of 15 studies (n=15). Lastly, we analyzed the bibliographical citations of those 15 articles to ascertain whether we could obtain additional information. This was not the case; therefore, we did not obtain any complementary studies (n=0). Considering the above, the sample for this review comprised 15 articles selected in accordance with the PRISMA criteria for systematic reviews (Figure 1).

Of all the journals we used in Phase 1 of this review, *Reumatología Clínica* was noteworthy for its articles addressing the treatments that could be employed in fibromyalgia. In Phase 2, the journals *Manual Therapy* and *Journal of Manipulative and Physiological Therapeutics* with three (n=3) and two (n=2) results, respectively, were the two publications that most contributed to our topic.

RESULTS

Our literature analysis was made up of a total of 15 articles (n=15), satisfying the eligibility and screening criteria in two phases of analysis. These 15 articles represent 4.54% of the total number of articles found, and 12% of the articles fulfilling the eligibility criteria (inclusion and exclusion).

Our search and subsequent analysis of the various publications regarding fibromyalgia provided us information on the following aspects of the disease:

Etiology

Though the cause of the disease is unknown, the studies found suggest nervous system alterations, with the possible involvement of supraspinal centers, such as the thalamus or somatosensory cortex^{8,11}, affecting the mechanisms of transmission, modulation and processing of the nociceptive stimuli at the central nervous system level.

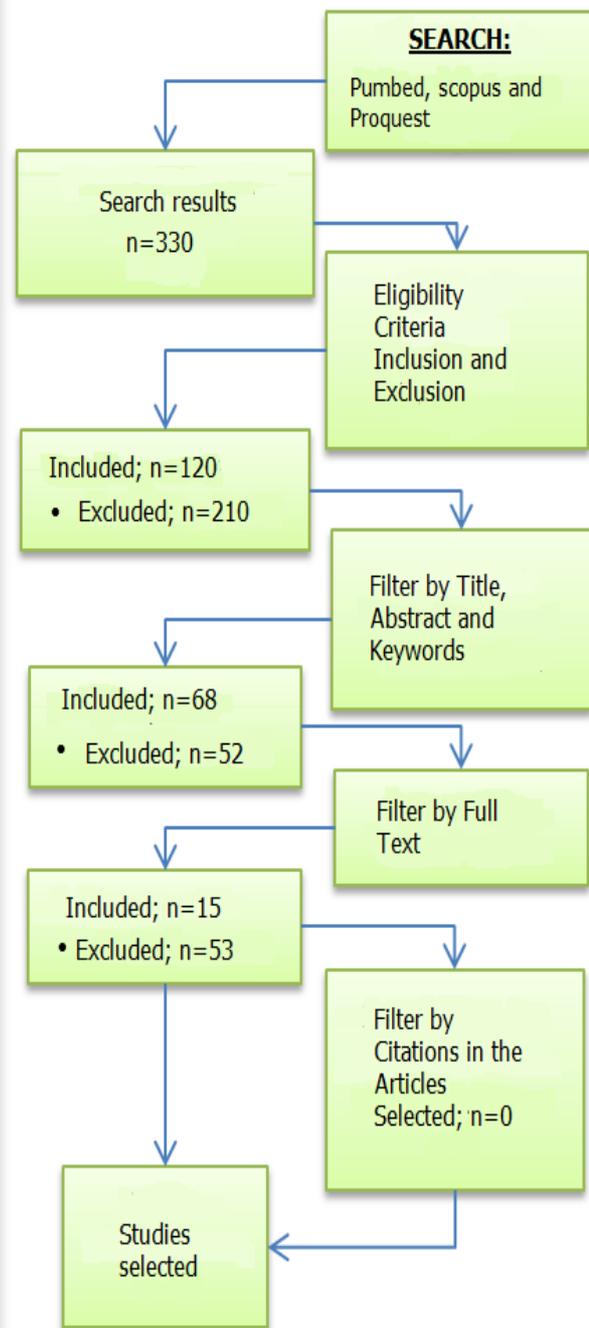


Figure 1.- Flowchart for Article Selection, according to the PRISMA Statement¹² for Reporting Systematic Reviews and Meta-Analyses of Studies that evaluate Health Care Interventions.

These disorders of the processing of central pain are associated with other pathophysiological alterations that lack a clear causal relationship between them, such as the hyporeactivity of the hypothalamus-pituitary-adrenal axis, growth hormone system

alterations, elevated pro-inflammatory cytokine profiles and reduced anti-inflammatory profiles, and changes in the dopaminergic and serotonergic systems¹³⁻¹⁶.

Although the majority of the current research on fibromyalgia tends to seek for a systemic explanation for the generalized muscle pain, Gerdle et al.¹⁷, in a recent study, have discovered that in muscles with pain in the fibromyalgic syndrome there is a greater objective concentration of lactate and pyruvate, thus yielding one possible explanation for the decrease in the pressure threshold.

Other suggestions include the increased probability of developing the disease in those subjects with physical or emotional stress at work, or those with a depressed demeanor¹⁴. Affective alterations constitute a risk factor for the development and maintenance of the fibromyalgic syndrome¹⁵.

There are even schools of thought that point to a possible correlation between a hormone imbalance in females and fibromyalgia pain¹⁸.

Epidemiology

The prevalence of the disease in the population is between 1% and 5%^{8,19,20}, and in Spain, in people over 20 years of age, between 2% and 2.7%^{1,2,21,21,22}.

A recent study²³ on disease prevalence in 5 European countries (France, Italy, Germany, Portugal and Spain) placed it at between 2.9% and 4.7% of the population.

In terms of gender, females suffer this disease more than males, at a 21:1 ratio²¹.

A total of 75% of patients are females between the ages of 35 and 55 years²⁴.

Diagnostic criteria

This disease, classified as such by the WHO in 1992, has become conceptualized, due to its difficulties

in diagnosis, as a syndrome from the clinical perspective that is difficult to explain, and is occasionally considered by professionals and the public alike as a psychological disorder, due to the complexity of objectifying the findings of the physical examination, laboratory results and imaging tests³. The first formal definition of the disease was established in 1977, by Smythe and Moldofsky, and since then, several other definitions have arisen that vary in terms of the emphasis placed on the different concomitant symptoms and in the number of tender points in the syndrome²⁵. Many rheumatologists, neurologists and pain specialists consider the disease to be a combination of pathological changes in the muscles, connective tissues and the central nervous system¹⁹.

As it has been suggested previously, generalized pain is the primary symptom of fibromyalgia, which, when combined with others, in addition to the feeling of incomprehension and uncertainty suffered by these patients, can lead the patients to a situation of anxiety and depression. These, in turn, could further aggravate their symptoms^{1,26}. The intensity of the pain experiences appears to be related to the level of physical activity and the emotional state of the patients²⁷.

The pain suffered by fibromyalgic patients, in addition to being generalized, is chronic and incapacitating. Together with these characteristics, multiple previously-defined points at which moderate pressure triggers pain are confirmed in the physical examination. These are known as "Fibromyalgia Tender Points" (FTP), and at least eighteen have been detected to date²⁸⁻³⁰.

The sites of the FTPs are as follows³¹:

- Occiput: bilateral at suboccipital muscle insertions.
- Low cervical region: bilateral, at the anterior aspect of the interspaces, between the transverse processes of C5-C7.

- Trapezius muscle: at the midpoint of the upper border.
- Supraspinatus muscle: bilateral, above the medial border of the scapular spine.
- Second rib: bilateral, at second costochondral junctions.
- Lateral epicondyle: bilateral, 2 cm distal to the lateral epicondyle.
- Gluteal: bilateral, at the upper outer quadrant of the buttocks, near the anterior fold of the muscle.
- Greater trochanter: bilateral, posterior to the greater trochanteric prominence.
- Knee: bilateral, at the medial fat pad proximal to the joint line.

In order to diagnose fibromyalgia, several criteria^{26,30} were established in 1990, by The American College of Rheumatology, which include: the presence of generalized pain for at least 3 months and, at least, the presence of 11 FTPs^{11,28,32}. In the assessment of points, 4kg/cm²^{33,34} of pressure is applied on each, though, according to Marquet³¹, there may be differences in the assessment pressure of the different points depending on their location.

The ACR criteria are currently being questioned by some parties because they were defined 20 years ago and, since then, new symptoms of the disease have been identified that should be considered in its diagnosis, such as anxiety, sleep disorders, etc.

According to Wolfe et al.³⁵, without the need to perform a physical examination of the FTPs, but using an interview to obtain a Widespread Pain Index (WPI) and a severe symptoms scale (SS scale) value, we could achieve a more accurate diagnosis of fibromyalgia. These researchers have confirmed that these criteria identify 25% of the diagnoses excluded with the 1990 criteria. Of those patients diagnosed

using the ACR criteria, 88.1% are also diagnosed using these new criteria.

However, due to the absence of standardized tests for evaluation, caution should be exercised when diagnosing this syndrome²⁶.

Treatment

Given that the disease's origin is currently unknown, the treatment must be based on the improvement of the various clinical manifestations.

Therefore, there is no defined treatment available at this time, and treatments range from various drugs to physical activity, physical agents, psychotherapy, acupuncture, thermal therapy, homeopathy, osteopathy, etc.^{21,25,36-42}.

Osteopaths are the most highly demanded healthcare professionals by the fibromyalgic patients, in addition to the primary care physician, rheumatologist, rehabilitation physician and psychiatrist⁴³.

As a result of the very heterogeneous clinical presentation of this syndrome, optimized personal treatment is required for each patient, in order to attain better results⁴⁴, and said treatment must be multi-disciplinary⁴⁵⁻⁴⁷.

Primary symptoms

According to our literature search, in addition to pain, which we mentioned above, other symptoms manifested in fibromyalgia include:

- **Fatigue.** After pain, this is the second symptom patients hope to be improved after treatment⁷. It also holds the second place for the frequency of onset in patients⁴⁸.

- **Cognitive impairment.** Some studies reveal the existence of a cognitive impairment in fibromyalgic patients. It seems that this impairment could depend on the chronic pain presented in the syndrome⁴⁹. Patients

with fibromyalgia report memory alterations⁸, though other studies conclude that there are no modifications in the cognitive performance of these patients⁵⁰.

- **Sleep alterations.** This symptom affects between 75% and 86% of all patients and is one of the most common symptoms^{20,51}. It includes insomnia with 3 potential forms of manifestation: sleep maintenance insomnia, sleep onset insomnia or early-wakening insomnia. The joint manifestation of the three possibilities is the most common among fibromyalgic patients (65.6%). On the individual level, sleep maintenance insomnia is reported in the greatest number of cases (16.1%)^{8,46}. Antidepressants are the most commonly used drugs for improving sleep quality²⁰. These sleep alterations play an essential role in the exacerbation of other fibromyalgia symptoms⁵².

- **Headaches.** A total of 80% of the patients report suffering from this symptom regularly. And 48.7% of this group presents this symptom 15 or more days a month⁸.

- **Depression.** Although it is continuously mentioned in the list of fibromyalgia syndrome symptoms^{26,28,32}, one study states that only 7.1% of patients included in the study fulfilled the diagnostic criterion of depression⁵³, while other studies state (using the PRIME-MD questionnaire) that 40% of fibromyalgia patients suffer depression⁵⁴. Nevertheless, the reciprocal relationship between depression and pain has been studied, and one can increase the severity of the other, and vice versa⁵⁵.

- **Balance alterations.** Some studies propose studying this variable to determine the risk of falling among these patients⁵⁶. Certain studies demonstrate a decrease of balance with fibromyalgia⁴, suffered by 63% of the subjects in this group⁵.

- **Joint stiffness.** This appears in 2 of every 3 fibromyalgia patients^{57,58}. This stiffness, which in other rheumatic diseases seems to be related to the increase

of hyaluronic acid levels, may not bear any association with the fibromyalgia syndrome⁵⁷.

- **Irritable bowel syndrome.** Irritable bowel syndrome is commonly presented in fibromyalgia and affects between 63% to 81% of all patients^{54,59,60}, while in the general population, in which it is the most common gastrointestinal pathology, it is presented at 10-15%⁶¹. It is characterized by the onset of the abdominal pain and the alteration of bowel rhythm.

- **Sexual dysfunction.** Some studies suggest the correlation of fibromyalgia with sexual dysfunction, once the disease has been established⁶².

- Other symptoms described by some authors include hemorrhoids, epistaxis, paresthesia⁴⁸, irritable bladder⁶¹, photophobia⁵ and diverse symptoms of the cardiorespiratory, endocrine, allergy and otorhinolaryngological¹⁰ spheres.

We also found that half of the patients with fibromyalgia are obese and that 30% of the rest are overweight⁶³.

The same study that defends that data identified an important relationship between said obesity and a greater sensitivity to pain, reduced sleep quality and a decrease of physical strength and flexibility.

Recently, women with polycystic ovary syndrome have been discovered to also present fibromyalgia with greater frequency⁶⁴.

Socio-economic aspects

We can also state that due to the high prevalence of fibromyalgia syndrome and the fact that it is a disease whose treatment requires a large number of professionals as a result of its complex manifestation and course^{2,3,19,21,26,28,32,53,65}, this disease involves an elevated financial cost and resource burden⁶⁶⁻⁶⁹. Therefore, it is essential that the most effective diagnostic and treatment measures be established²⁶.

In Spain, fibromyalgia is one of the chronic processes that require the greatest number of treatments⁴³. Despite all of this, it is difficult to quantify the healthcare expenses arising from fibromyalgia care, because the patients frequently present other simultaneous diseases, and work leaves are often classified as the cause of other syndromes⁷⁰.

In other countries, where the expenses arising from the disease have been determined, we found figures that range from \$606 in Canada and \$3,056 in the US⁴³.

From the standpoint of fibromyalgia's impact on work, we can confirm, after the literature review, that in our country there is no generalized legal recognition of the disease as the cause of work disability.

Of the 139 rulings issued between 1978 and 2008 in the Supreme Court, only 35 were in favour of the worker, and 60% of the cases resulted in permanent total disability, 22.9% permanent absolute disability, 8.6% permanent partial disability and another 8.6% of the cases were recognized as major disability⁷¹. However, one important piece of data with an economic and labor impact is the fact that 11.5% of people with fibromyalgia are found to be temporarily or permanently disabled, versus 3.2% of people without this disease⁴³.

Reisine et al., in 2008, ensure that working women have a better state of health than those who do not work, but their symptoms evolve in the same way as those who do not work outside of the home; this initial advantage is, thus, maintained constant⁷².

DISCUSSION

It is clear that fibromyalgia is a highly prevalent disease, but we remain unsure about its etiology even though, as mentioned above, fibromyalgia does not appear to be a rheumatic disease, but rather a disease originating in the central nervous system, which makes it a neurological disease.

Moreover, one of the aspects to highlight is the fact that, to date, pain has been the symptom that has been taken as reference to diagnose the disease.

However, another set of symptoms should be included, for example, fatigue and sleep alterations, to name a few.

These symptoms are as important as pain for establishing reliable diagnostic criteria. On the one hand, do not leave patients without a positive diagnosis of fibromyalgia, and, on the other, do not diagnose the disease in patients who actually do not suffer from it.

Not having the clear etiology makes it difficult to be able to act on the root of the problem; this explains why numerous different treatments that are presented only alleviate disease symptoms, but this situation, to date, have not been truly effective in treating all symptoms. Thus, the current approach for fibromyalgia requires the involvement of a wide number of different professionals, and alternative medicine such as Osteopathy is in high demand among these patients.

The need to establish reliable diagnostic criteria and effective treatments for fibromyalgia will not only serve for the purpose of providing patients with a better life quality, but it is also in demand due to the very elevated cost it involves from the perspectives of social-healthcare and pharmaceutical expenses, and temporary work leaves resulting from this disease.

CONCLUSIONS

We can conclude this review paper by highlighting that fibromyalgia is a disease, to date, whose causes remain unknown, and therefore, for which no effective treatments that act on all triggering agents can be established, such that the current treatments are multi-disciplinary and act on the symptoms manifested by the patients.

These symptoms may manifest in very diverse ways, and the diagnostic criteria used to date are being

questioned by the scientific community, due to their exclusive focus on pain-related symptoms.

CONFLICT OF INTEREST

The authors of the manuscript declare no conflict of interest.

ACKNOWLEDGMENTS

The authors thank the participants in this study for their generous collaboration.

REFERENCES

- 1 Escudero-Carretero MJ, García-Toyos N, Prieto-Rodríguez MA, Pérez-Corral O, March-Cerdá JC, López-Doblas M. Fibromyalgia: Patient perception on their disease and health system. Qualitative research study. *Reumatol Clin* 2010;6(1):16-22.
- 2 Martín ÁP, Lanza JRL, Fernández AA. Evidences in fibromyalgia. *FMC Formacion Med Continuada Aten Prim* 2007;14(8):465-473.
- 3 Chong Y-, Ng B-. Clinical aspects and management of Fibromyalgia syndrome. *Ann Acad Med Singapore* 2009;38(11):967-973.
- 4 Russek LN, Fulk GD. Pilot study assessing balance in women with fibromyalgia syndrome. *Physiother Theory Pract* 2009;25(8):555-565.
- 5 Watson NF, Buchwald D, Goldberg J, Noonan C, Ellenbogen RG. Neurologic signs and symptoms in fibromyalgia. *Arthritis Rheum* 2009;60(9):2839-2844.
- 6 Tomas-Carus P, Gusi N, Häkkinen A, Häkkinen K, Raimundo A, Ortega-Alonso A. Improvements of muscle strength predicted benefits in HRQOL and postural balance in women with fibromyalgia: an 8-month randomized controlled trial. *Rheumatology (Oxford)* 2009;48(9):1147-1151.
- 7 Bennett RM, Russell JI, Cappelleri JC, Bushmakina AG, Zlateva G-, Sadosky A. Identification of symptom and functional domains that fibromyalgia patients would like to see improved: A cluster analysis. *BMC Musculoskeletal Disorders* 2010 Jun 28;11:134.
- 8 Gómez-Argüelles JM, Anciones B. Prevalence of neurological symptoms associated with fibromyalgia. *Rev Soc Esp Dolor* 2009;16(4):222-229.
- 9 Hench PK. Nonarticular Rheumatism. 22nd rheumatism review. Review of the American and English literature for the years 1973 and 1974. *Arthritis Rheum* 1976;19:1081-1089.
- 10 Casanueva F. B. Tratado de fibromialgia. 1ª ed. Santander: Cantabria Imagen; 2007.
- 11 Cazzola M, Atzeni F, Sarzi-Puttini P. Pain in fibromyalgia syndrome. *J Func Syndromes* 2002;2(1):57-68.
- 12 Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and metaanalyses of studies that evaluate health care interventions: explanation and elaboration. *J Clin Epidemiol.* 2009;62:e1–34.
- 13 Meeus M, Nijs J. Central sensitization: A biopsychosocial explanation for chronic widespread pain in patients with fibromyalgia and chronic fatigue syndrome. *Clin Rheumatol* 2007;26(4):465-473.
- 14 Häuser W, Eich W, Herrmann M, Nutzinger DO, Schiltenswolf M, Henningsen P. Fibromyalgia Syndrome. *Dtsch Arztebl Int* 2009;106(23):383-391.
- 15 Sommer C, Häuser W, Gerhold K, Joraschky P, Petzke F, Tölle T, et al. Etiology and pathophysiology of fibromyalgia syndrome and chronic widespread pain. *Schmerz* 2008;22(3):267-282.
- 16 Cordero MD, Alcocer-Gómez E, Cano-García FJ, de Miguel M, Sánchez-Alcázar JA, Moreno Fernández AM. Low levels of serotonin in serum correlates with severity of fibromyalgia. *Med Clin* . 2010 Nov 13;135(14):644-6.
- 17 Gerdle B, Söderberg K, Puigvert LS, Rosendal L, Larsson B. Increased interstitial concentrations of pyruvate and lactate in the trapezius muscle of patients with fibromyalgia: A microdialysis study. *J Rehabil Med* 2010;42(7):679-687.
- 18 Bramwell BL. The role of sex hormones on fibromyalgia pain mediators. *Int J Pharm Compd* 2010;14(3):193-199.

- 19 Häuser W, Eich W, Herrmann M, Nutzinger DO, Schiltenswolf M, Henningsen P. The Fibromyalgia syndrome: Classification, diagnosis, and treatment. *Dtsch Arztebl* 2009;106(23):383-391.
- 20 Ware MA, Fitzcharles M-, Joseph L, Shir Y. The effects of nabilone on sleep in fibromyalgia: Results of a randomized controlled trial. *Anesth Analg* 2010;110(2):604-610.
- 21 Rivera J, Alegre C, Nishishinya MB, Pereda CA. Therapeutic evidence in fibromyalgia. *Reumatol Clin* 2006;2:34-37.
- 22 Arias Gómez M. Is fibromyalgia a neurological disease? *Neurologia* 2008;23(9):593-601.
- 23 Branco JC, Bannwarth B, Failde I, Abello Carbonell J, Blotman F, Spaeth M, et al. Prevalence of fibromyalgia: A survey in five European countries. *Semin Arthritis Rheum* 2010;39(6):448-453.
- 24 Collazo Chao E. Effectiveness of acupuncture therapy for pain relief in patients with fibromyalgia. *Rev Int Acupunt* 2010;4(1):52-58.
- 25 Baranowsky J, Klose P, Musial F, Haeuser W, Dobos G, Langhorst J. Qualitative systemic review of randomized controlled trials on complementary and alternative medicine treatments in fibromyalgia. *Rheumatol Int* 2009;30(1):1-21.
- 26 Goldenberg DL. Diagnosis and Differential Diagnosis of Fibromyalgia. *Am J Med* 2009;122(12):S14-21.
- 27 Ekici G, Cavlak U, Yalci N, Aslan UB, Can T, Çobankara V. Comparison of emotional status and physical activity between women with chronic widespread pain and fibromyalgia. *Agri* 2010;22(2):61-67.
- 28 Andreu JL, Sanz J. Fibromyalgia and its diagnosis. *Rev Clin Esp* 2005;205(7):333-336.
- 29 Gil Yubero J, Llensa Cubarsí I, Mas Marquès M, Buñuel Álvarez JC. Comorbilidad registrada en los pacientes diagnosticados de fibromialgia en un centro de atención primaria. *Atención Primaria* 2007 4;39(4):217-217.
- 30 Wolfe F, Smythe HA, Yunus MB, Bennett RM, Bombardier C, Goldenberg DL, et al. The American College of Rheumatology 1990. Criteria for the classification of fibromyalgia. Report of the Multicenter Criteria Committee. *Arthritis Rheum* 1990;33(2):160-172.
- 31 Maquet D, Croisier J-, Demoulin C, Crielaard J-. Pressure pain thresholds of tender point sites in patients with fibromyalgia and in healthy controls. *Eur J Pain* 2004;8(2):111-117.
- 32 Chackrabarty S, Zoorob R. Fibromyalgia. *Am Fam Physician* 2007 2007;76:247-254.
- 33 Ge H-, Nie H, Madeleine P, Danneskiold-Samsøe B, Graven-Nielsen T, Arendt-Nielsen L. Contribution of the local and referred pain from active myofascial trigger points in fibromyalgia syndrome. *Pain* 2009;147(1-3):233-240.
- 34 Montoya P, Pauli P, Batra A, Wiedemann G. Altered processing of pain-related information in patients with fibromyalgia. *Eur J Pain* 2005;9(3):293-303.
- 35 Wolfe F, Clauw DJ, Fitzcharles M-, Goldenberg DL, Katz RS, Mease P, et al. The American College of Rheumatology preliminary diagnostic criteria for fibromyalgia and measurement of symptom severity. *Arthritis Care Res* 2010;62(5):600-610.
- 36 Sarac AJ, Gur A. Complementary and alternative medical therapies in fibromyalgia. *Curr Pharm Des* 2006;12(1):47-57.
- 37 Kalichman L. Massage therapy for fibromyalgia symptoms. *Rheumatol Int* 2010 Jul;30(9):1151-7.
- 38 Gunnarsdottir TJ, Peden-McAlpine C. Effects of reflexology on fibromyalgia symptoms: A multiple case study. *Complement Ther Clin Pract* . 2010 Aug;16(3):167-72.
- 39 Patel G, Euler D, Audette JF. Complementary and Alternative Medicine for Noncancer Pain. *Med Clin North Am* 2007;91(1):141-167.
- 40 Matsumoto S, Shimodozono M, Etoh S, Miyata R, Kawahira K. Effects of thermal therapy combining sauna therapy and underwater exercise in patients with fibromyalgia. *Complement Ther Clin Pract*. 2011 Aug;17(3):162-6
- 41 Wang C, Schmid CH, Rones R, Kalish R, Yinh J, Goldenberg DL, et al. A randomized trial of tai chi for fibromyalgia. *New Engl J Med* 2010;363(8):743-754.

- 42 Sañudo Corrales B, Galiano Orea D, Carrasco Pez L, Saxton J, De Hoyo Lora M. Autonomous nervous system response and quality of life on women with fibromyalgia after a long-term intervention with physical exercise. *Rehabilitacion* 2010;44(3):244-249.
- 43 Munguía D, Legaz A, Alegre C. Guía de práctica clínica sobre el síndrome de fibromialgia para profesionales de la salud. 1ª ed. Madrid: Elsevier; 2007.
- 44 Arnold LM. The Pathophysiology, Diagnosis and Treatment of Fibromyalgia. *Psychiatr Clin North Am* 2010;33(2):375-408.
- 45 González Larrabe I, Torre Mollinedo F, Telletxea Benguria S, Arizaga Maguregi A. Update in the multidisciplinary treatment of fibromyalgia. *DOLOR* 2008;23(4):194-206.
- 46 Mínguez Martí A, Villanueva Pérez VL, Cerdá Olmedo G, Monsalve Dolz V, Bayona Bauset MJ, de Andrés Ibáñez J. Pharmacological treatment of sleep disorders in fibromyalgia. *Pharm Care Espana* 2006;8(3):137-144.
- 47 Collado Cruz A. Fibromyalgia: Multidisciplinary complaint. *DOLOR* 2006;21(2):95-99.
- 48 Zoppi M, Maresca M. Symptoms accompanying fibromyalgia. *Reumatismo* 2008;60(3):217-220.
- 49 Munguía-Izquierdo D, Legaz-Arrese A, Moliner-Urdiales D, Reverter-Masía J. Neuropsychological performance in patients with fibromyalgia syndrome: Relation to pain and anxiety. *Psicothema* 2008;20(3):427-431.
- 50 Castel A, Cascón R, Salvat M, Sala J, Padrol A, Pérez M, et al. Cognitive performance and memory complaints in chronic patients: with fibromyalgia versus without fibromyalgia. *Rev Soc Esp Dolor* 2008;15(6):358-370.
- 51 Mayorga Buiza MJ, Fernández Muñoz I, Bullón Barrera F, Morales Muñoz C, Herrera Silva J, Echevarría Moreno M. Impact of a health education program on patients with fibromyalgia. *Rev Soc Esp Dolor* . (2010); 17(5) :227 - 232
- 52 Cropley M, Theadom A. Sleep disturbance in fibromyalgia syndrome. *Future Rheumatol* 2008;3(6):533-535.
- 53 Gormsen L, Rosenberg R, Bach FW, Jensen TS. Depression, anxiety, health-related quality of life and pain in patients with chronic fibromyalgia and neuropathic pain. *Eur J Pain* 2010;14(2).
- 54 Kurland JE, Coyle WJ, Winkler A, Zable E. Prevalence of irritable bowel syndrome and depression in fibromyalgia. *Dig Dis Sci* 2006;51(3):454-460.
- 55 Plesniar BK. Depression and pain. *Farm Vestn* 2010;61(2):59-62.
- 56 Rutledge DN, Cherry BJ, Rose DJ, Rakovski C, Jones CJ. Do fall predictors in middle aged and older adults predict fall status in persons 50+ with fibromyalgia? An exploratory study. *Res Nurs Health* 2010;33(3):192-206.
- 57 Kim J-, Lee S-, Kim T-, Park Y-. Serum hyaluronic acid levels do not explain morning stiffness in patients with fibromyalgia. *Clin Rheumatol* 2010;29(5):535-539.
- 58 Dierick F, Detrembleur C, Desenfans E, Masquelier E. Is it possible to quantify muscle stiffness in patients with fibromyalgia? *Douleur Analg* 2007;20(4):257-263.
- 59 Cassisi G, Sarzi-Puttini P, Alciati A, Casale R, Bazzichi L, Carignola R, et al. Symptoms and signs in fibromyalgia syndrome. *Reumatismo* 2008;60 Suppl 1:15-24.
- 60 Helfenstein Jr. M, Heymann R, Feldman D. Prevalence of irritable bowel syndrome in patients with fibromyalgia. *Rev Bras Reumatol* 2006;46(1):16-23.
- 61 Reitblat T, Zamir D, Polishchuck I, Novochatko G, Malnick S, Kalichman L. Patients treated by tegaserod for irritable bowel syndrome with constipation showed significant improvement in fibromyalgia symptoms. A pilot study. *Clin Rheumatol* 2009;28(9):1079-1082.
- 62 Sadrediny S, Molaeehpard M, Mir-Ahmadi M. Sexual disorder improvement: A target or a way in treatment of fibromyalgia. A case report and brief review. *Mod Rheumatol* 2010;20(1):74-76.
- 63 Okifuji A, Donaldson GW, Barck L, Fine PG. Relationship Between Fibromyalgia and Obesity in Pain, Function, Mood, and Sleep. *J Pain* . 2010 Dec;11(12):1329-37.
- 64 Soyupek F, Yildiz S, Akkus S, Guney M, Mungan MT, Eris S. The frequency of fibromyalgia syndrome in

patients with polycystic ovary syndrome. *J Musculoskelet Pain* 2010;18(2):120-126.

65 Mense S, Schiltewolf M. Fatigue and pain; what is the connection? *Pain* 2010;148(2):177-178.

66 Evans CJ, Parthan A, Le K. Economic and humanistic burden of fibromyalgia in the USA. *Expert Rev Pharmacoecon Outcomes Res* 2006;6(3):303-314.

67 Spaeth M. Epidemiology, costs, and the economic burden of fibromyalgia. *Arthritis Res Ther* 2009;11(3).

68 White LA, Birnbaum HG, Kaltenboeck A, Tang J, Mallett D, Robinson RL. Employees with fibromyalgia: Medical comorbidity, healthcare costs, and work loss. *J Occup Environ Med* 2008;50(1):13-24.

69 Burckhardt CS, Clark SR, Bennett RM. The fibromyalgia impact questionnaire: development and validation. *J Rheumatol* 1991;18(5):728-733.

70 García López A, Campos Sánchez S. Impacto socioeconómico de la fibromialgia. *Rev Esp Reumatol* 2000;27(10):447-449.

71 Restrepo-Medrano JC, Ronda-Pérez E, Vives-Cases C, Gil-González D, Ballester-Laguna F. Comparison of rulings on permanent disability due to fibromyalgia in Spain: differences according to whether the resolution is favorable to the patient or to the National Institute of Social Security. *Reumatol Clin* 2010;6(4):233-234.

72 Reisine S, Fifield J, Walsh S, Forrest DD. Employment and health status changes among women with fibromyalgia: A five-year study. *Arthritis Care Res* 2008;59(12):1735-1741.

ISSN online:2173-9242

© 2012 – Eur J Ost Rel Clin Res - All rights reserved

www.europeanjournalosteopathy.com

info@europeanjournalosteopathy.com