

MYOFASCIAL PAIN SYNDROME IN FARMERS - A COMPREHENSIVE APPROACH TO TREATMENT

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Abstract: There is evidence that chronic pain disorders such as Myofascial Pain Syndrome (MPS), resulting from repeated biomechanical stress caused by ergonomic hazards. e.g. trauma and overuse of the muscles, often occur in agricultural workers. Hypothetically, the neuropathic character of MPS makes the disease unresponsive to the typical analgesics. Accordingly, in this study three trials of treatment in patients with MPS were performed and compared. The first trial (I) was based on rehabilitation, while the second (II) was based on treatment with sertraline, an antidepressive, serotonergic drug. For third trial (III), rehabilitation plus the above-mentioned administration of sertraline, were applied. Altogether, 49 patients were recruited to the trials. Control group consisted of 23 persons. Response to the treatment was assessed according to the criteria of neuropsychological tests MADRS and BDI. The MPS syndrome was found to be relatively common in Polish farmers and formed 12.7% of all chronic pain syndromes diagnosed in the Institute of Agricultural Medicine during 18 months. All the patients with MPS showed mood disorders in the baseline assessment by the neuropsychological tests. Patients from groups I, II, and III declared improvement after two months of the treatment (77%, 80% and 93% respectively). In the neuropsychological tests, only patients treated with rehabilitation and sertraline (group III) showed statistically significant improvement in comparison with baseline assessment both after one month and after two months of the observation. Thus, rehabilitation and serotonergic system modification might be a good solution in the management of MPS.

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INTRODUCTION

Recently published data suggest that accidents at work in Polish agriculture, caused by different events, are relatively common [25]. The incidence of nearly 29.3 per 100 thousand persons employed, ranks agriculture as the fourth among state industries for accidents [16]. While the agricultural accident rate in Poland is less than for industry and construction, it is almost three times the rate for transport and communication. Moreover, the numbers of fatal trauma in agriculture, accounting for 33.6% of all accidents at work, indicate that safety deserves increased

attention in Polish agriculture. On the other hand, only occupational accidents or fatal traumas are reported in statistics [15].

Accidents and diseases reported by farmers to the Agricultural Social Insurance Fund (KRUS) in order to claim compensation are only those concerning acute exposure to occupational physical hazards [6]. However, many syndromes occur a long time after the episode of trauma, microtrauma, repeated trauma or simply overexertion [7, 9, 10, 12, 13]. It seems obvious that the problem may be underestimated not only by health care authorities in Polish agricultural regions, but also by

Polish statistics. According to the literature, data concerning such cases appear to be increasing faster than any other category of occupational illness [4].

Among these non-fatal post accidental problems musculoskeletal disorders dominate. They may affect muscles, tendons, joints, nerves and related soft tissues anywhere in the body. The lower back and upper extremities, including the neck and shoulders, are the most common sites. Because repeated risk factor exposure of the same muscle, tendon, or region may result in injury and inflammation to the affected area, names such as cumulative trauma disorder, repetitive motion injury, repetition strain injury, and occupational overuse syndrome have been applied to these disorders. Silverstein *et al.* [20] demonstrated a relationship between occupational exposures (specifically those with high force repetitive tasks) and pathology [20]. Reviews of the literature indicate that heavy physical work, repeated lifting and twisting are consistently associated with greater risk [2, 4, 6]. An analysis of the data of injury in American agricultural workers [1] reveals a similar pattern, 43% of all reported agricultural non-fatal disabling injuries were sprains and strains. Over-exertion as a cause of injury for this group accounted for 25% of reported injuries. Moreover, work-related musculoskeletal disorders in farmers have increased in incidence, and have become higher than the average in all industries [13], and account for a significant proportion of workers' compensation costs [12].

Concern is also growing about cumulative injuries to nerves and soft tissues resulting from repetitive motions. Cumulative injuries claims comprise a share that is twice the size of any other specific injury category [6]. The number of work-related cases of cumulative trauma disorders has significantly increased and accounted for more than half of all work-related illness cases in agriculture [17].

Myofascial Pain Syndrome (MPS) is a musculoskeletal disorder, the kind of chronic pain syndrome always connected with trauma. This is a cumulative trauma that evokes the image of vague, generalized pain and dysfunction [7, 13, 23]. An effort was made done to differentiate the MPS from other musculoskeletal disorders and diagnostic criteria were established [21, 24].

Not only diagnostic procedures but also management of Myofascial Pain Syndrome create numerous problems [9, 14]. To date, only a few data suggest that rehabilitation and intensive stretching are helpful in the treatment of this disease [14].

On the other hand, mood disturbances are frequent in the chronic pain syndrome of any origin. The results of medical research show that the use of medicines that modify, the serotonergic system can influence and change both emotional reaction to pain and neuropathic pain itself [5, 7, 8]. Because of the chronic and neuropathic character of MPS, the serotonergic, antidepressive treatment should be taken into consideration. Early intervention in MPS is needed to prevent the development of long-lasting neuropathic illness. A comprehensive approach to the

problem, including rehabilitation and serotonergic system modification, might be a good solution.

Traumas of the muscles are common in Polish farmers, and the MPS syndrome was found to be relatively common among the patients treated in the Outpatients Department and Clinics of the Institute of Agricultural Medicine in Lublin. In the majority of the MPS cases, the disorders directly followed the injury, especially repeated trauma, accidents, etc.

The aim of this study was to evaluate the effectiveness of the treatment of MPS. Three trials of treatment were applied and compared in patients with MPS. The first trial was the classical procedure based on rehabilitation. The second trial was treatment with sertraline, a new antidepressive drug. The third trial, rehabilitation plus the above-mentioned antidepressive treatment with sertraline were performed.

PATIENTS AND METHODS

Patients. During 18 month period (May 1998–October 1999), 368 farmers with chronic pain due to musculoskeletal disorders were diagnosed and treated. Among this group, 51 persons (12.7%) were diagnosed as suffering from MPS because all the below-mentioned criteria of the Myofascial Pain Syndrome were fulfilled. Two persons were excluded because of an undesirable side effect (dizziness) after sertraline administration.

Thus, 49 patients were recruited to the trial. The examined group of patients comprised both men (22) and women (27) at the mean age of 50.8 (38–65). Data were compared to the control group consisted of 23 persons, both men (11) and women (12) at the mean age of 47.7 (40–62).

Criteria for diagnosis of MPS. The recommendations made by Simons *et al.* [21] were applied, with some modification.

Major criteria.

- 1) Localized spontaneous, chronic pain.
- 2) Tender points in muscles are likely to be myofascial trigger points; non-muscular tender points. Clearly not myofascial trigger points, but may be areas of tenderness referred from such trigger points.
- 3) Palpable band in the longitude of the muscle.
- 4) Reduced possibility of movement.

Minor criteria.

- 1) Possibility of reproducing spontaneous pain in the trigger point after multiple pressing.
- 2) Relief of the pain by muscle stretching and by injection into the muscle.

Medical history. MPS lasted at least 6 months in the history of all the patients. All the patients underwent pharmacological treatment, including anti-inflammatory drugs plus myorelaxants according to the routines in

chronic pain treatment. Rehabilitation and/or sertraline (50 mg/day) were applied parallelly.

Trauma of the muscles was noticed but no injury and destruction of tissue was documented. Endogenous depression was excluded. Mood disturbances were noticed according to the criteria of neuropsychological tests, MADRS and BDI.

Treatment methods. The patients were treated with three different methods. Patients of group I (n=18) were given placebo treatment and parallel rehabilitation was performed. Rehabilitation was based on electrical nerve stimulation (ENS) therapy and electrical muscle stimulation (EMS) therapy. It was performed for 2 weeks in parallel with analgesic pharmacological treatment. Patients of group II (n=15) were given only sertraline, 50 mg a day. Patients recruited to group III (n=16) were given sertraline (50 mg a day) plus above-mentioned rehabilitation and classical pharmacological procedures. First evaluation of the treatment was made after a month and the second after two months of the treatment.

Neuropsychological tests applied for the assessment of the treatment effects. All the patients were asked about improvement after the treatment. The Montgomery-Asberg Depression Rating Scale (MADRS) [18] and Beck Depression Inventory (BDI) [3] were also performed.

In MADRS Depression Rating Scale 10 parameters were assessed by the physician. The parameters were: apparent sadness, reported sadness, inner tension, reduced sleep, reduced appetite, concentration difficulties, lassitude, inability to feel, pessimistic thoughts, suicidal thoughts. After finishing the test, the total score was counted and taken into consideration.

In the BDI scale, the 13 items (sadness, pessimism, sense of failure, dissatisfaction, guilt, self-dislike, self-

harm, social withdrawal, indecisiveness, self-image change, work difficulty, fatigability, anorexia) were assessed by the patients themselves.

Statistical analysis. Data were expressed as mean \pm S.E. The significance of differences between groups was determined using analysis of variance (MANOVA). Differences between groups were considered as significant with $p < 0.05$.

RESULTS

MPS syndrome seems to be relatively common in Polish farmers. It formed 12.7% of all chronic pain syndromes treated. All the patients with MPS showed mood disorders in the neuropsychological tests compared to control subjects (Fig. 1-2).

Patients from groups I, II, and III declared improvement after 2 months of the treatment (77%, 80% and 93% respectively).

In the MADRS tests, only patients treated with rehabilitation and sertraline (group III) showed statistically significant improvement ($p < 0.05$) in comparison to the pre-treatment period, both after 1 month and after 2 months of the treatment (Fig. 1)

Similarly, in the BDI test only group III showed statistically significant improvement in comparison with pre-treatment assessment after 2 months of the treatment (Fig. 2).

DISCUSSION

A growing body of evidence suggests a high proportion of ergonomic risk factors and musculoskeletal disorder incidence in agriculture. This could be apparent from the admission profile in clinics. According to the literature,

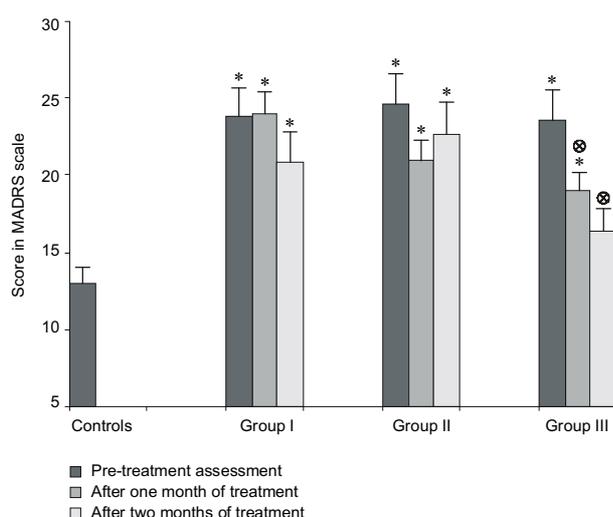


Figure 1. Effects of treatment in patients with MPS assessed by the MADRS test. Data are shown as the mean score \pm S.E.

* $p < 0.05$ as compared to control group.

⊗ $p < 0.05$ as compared to pre-treatment assessment.

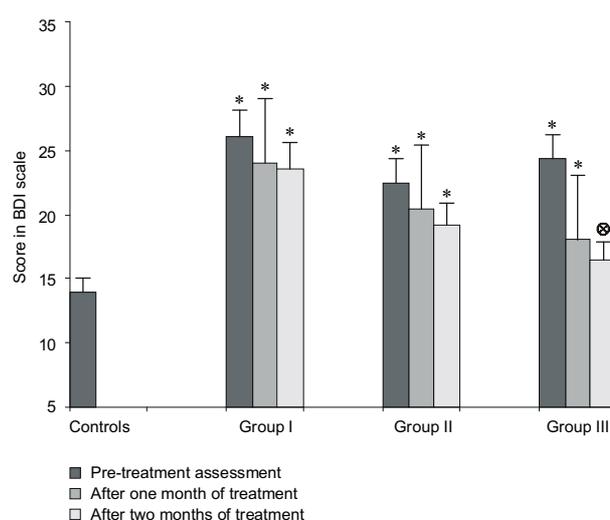


Figure 2. Effects of treatment in patients with MPS assessed by the BDI test. Data are shown as the mean score \pm S.E.

* $p < 0.05$ as compared to control group.

⊗ $p < 0.05$ as compared to pre-treatment assessment.

the reasons for more than 60% of all injury visits to specialists, were "sprains and strains of joints and adjacent muscles" [11, 12, 27]. Similarly, in the current practice of the Outpatients Neurological Department of the Institute of Agricultural Medicine in Lublin more than half a cases are musculoskeletal disorders. When cumulative trauma disorder, repetitive motion injury, repetition strain injury, and overuse occurred in the history of the patients, the development of chronic, neuropathic pain syndromes was found in the majority of cases.

Thus, MPS always associated with trauma and cumulative trauma seems to be relatively common in farmers as it constitutes 12.7% of all chronic pain syndromes treated.

Because of the coincidence with trauma, the hyperalgesic mechanism of the MPS is suggested [8, 9, 13]. This hypothesis seems to be reliable because hyperalgesia is defined as an augmented response to a repeated noxious stimulus and can occur secondary to local tissue injury. While the mechanism underlying this increased responsiveness is not completely understood, accumulating evidence indicates that in addition to a change in peripheral afferent terminal sensitivity, peripheral afferent stimulation leads to an increased excitability of spinal cord neurons. It was demonstrated that repetitive activation of C fibres evokes a sustained augmentation of activity in dorsal horn wide-dynamic-range (WDR) neurons, a phenomenon referred to as "wind-up". Besides, a growing body of evidence suggests that modification of the serotonergic system may prevent the development of pathological neuropathic mechanisms and diseases [5, 7, 21]. Causes include discrete trauma, repetitive microtrauma and injury resulting from reconditioning of the functional muscle unit. Besides, MPS is seen in a wide variety of trauma and overuse of muscles [19, 21] and is characterized by the myofascial trigger point (MTrP). These points are defined as tender areas deep within a band of muscle tissue. Mechanical stimulation of the MTrP by palpation or by needling also produces the phenomenal of referred pain that is felt at a distance from the point of stimulation. Trigger points of Myofascial Pain Syndrome occur in the same sites as the tender points of fibromyalgia. A difference is that trigger points can also cause referred pain in a distinct and characteristic area remote from the trigger point site. Referred pain is absent in the tender points of fibromyalgia [14].

In this study, all the above-mentioned phenomena were present at the beginning of the trial. Moreover, at the time of admission all the patients gave history of long-lasting symptoms. In all the cases, chronic MPS lasted more than 6 months. Thus, in all cases the criteria of chronic illness were fulfilled. Besides, in all patients the mood disturbances were noticed secondary to the episodes of injury and pain.

It is well documented that disorders of mood are common if chronic, neuropathic pain is present [5]. The origin of these disorders is probably secondary to the existence of the pain. Difficulty of suppressing neuropathic pain is related to its relatively low sensitivity to

pharmacological methods, even to opioids [7, 21]. Based on this observation and on suggestions that the serotonergic system may be involved in the mechanism of neuropathy, a good response to the new antidepressive drug sertraline was highly possible. In this study, sertraline was chosen because of its good pharmacokinetic profile and limited amount of side effects.

The neuropsychological test seemed to be a good criterion in the assessment of the response to treatment trials. In this study, the effectiveness of the treatment was assessed with MADRS and BDI [3, 18] tests.

Montgomery-Asberg Depression Rating Scale (MADRS) was published in 1979 [18]. It was designed to be particularly sensitive to treatment effects and includes 10 commonly occurring symptoms, which show the largest changes with treatment, and the greatest correlation with overall change. The authors claim that the scale is appropriate for use by physicians, and reveals significant differences between different treatments in relatively small numbers of patients, an important factor for clinical trials. Because of the relatively small number of cases, this test was chosen for the present study.

The rating should be based on a clinical interview, which moves from broad questions about symptoms to more detailed ones that permit rating of severity. The rater should decide whether the rating lies on the defined scale (0, 2, 4, 6) or between them (1, 3, 5). The time interval between ratings should be recorded.

The BDI is among the longest-established self-rating scales for depressive illness [3]. In its original form it tested for 21 items and was intended to provide a "quantitative assessment of the intensity of depression". More recently, a shorter form of the Beck test has been developed, consisting of 13 items from the original 21. It is designed to measure the depth of depression as well as to provide a rapid screening method for depressed patients [5].

In the present study, all the patients declared improvement after long-lasting (two months) treatment. The highest percentage of persons who declared improvement was noted in the group where both rehabilitation and sertraline were administered. This result corresponded to the after-treatment interview. Both in the MADRS and BDI tests, only patients treated with rehabilitation and sertraline (group III) showed statistically significant improvement in comparison with the baseline pre-treatment period.

The results of this study show that a comprehensive approach to the MPS syndrome, including rehabilitation and serotonergic system modification, might be a good solution in the management of this neuropathic illness. Moreover, early intervention in the pain occurring after cumulative trauma is needed to prevent the development of long-lasting neuropathic illness. Although farm workers are concerned about health and safety, they frequently lack the information or resources to make changes in work practices or equipment that could prevent trauma. The lack of information is subject to numerous types of uncertainty and may underestimate the true extent of disease and injury occurrence. MPS and other chronic

pain syndromes are a serious problem and this study points out those types of injuries most common in farmers. This area calls for preventive action and continuation of the study.

REFERENCES

1. AgSafe: Occupational injuries in California agriculture 1981-1990. **In:** *UCDANR 1992, Suppl 1*, Oakland 1992.
2. Armstrong TJ: Ergonomics and cumulative trauma disorders. *Hand Clinics* 1986, **3**, 553-565.
3. Beck AT, Ward CH, Mendelssohn M, Mock J, Draught J.: The depression self assessment scale. *Arch Gen Psychiatry* 1965, **4**, 561-571.
4. Bureau of National Affairs: Trauma at work references. *Occupational Health and Safety Reporter* 1991, **11/18**, 2.
5. Burton SW: Symptoms as predictors of response in depression. *J Psychopharmacol* 1993, **Suppl 1**, 135-138.
6. California Department of Insurance, Research and Special Projects: *Lowering Workers' Compensation Insurance Costs by Reducing Injuries and Illnesses at Work*. Los Angeles 1993.
7. Carette S: Chronic pain syndromes. *Pain* 1996, **55**, 497-501.
8. Crockett DJ, Foreman ME, Alden L, Blasberg B: A comparison of treatment modes in the management of myofascial pain dysfunction syndrome. *Biofeedback Self Regul* 1986, **11**, 279-291.
9. Fishbain DA, Goldberg M, Meagher BR, Steele R, Rosomoff H: Male and female chronic pain patients categorized by DSM-III psychiatric diagnostic criteria. *Pain* 1986, **26**, 181-197.
10. Gerwin RD, Shannon S, Hong C, Hubbard D, Gevirtz R: Inter rater reliability in myofascial trigger point examination. *Pain* 1997, **69**, 65-73.
11. Glisan B: Customized prevention programs play vital role in back protection process. *Occup Health and Safety* 1993, **62(12)**, 21-26.
12. Guo HS, Tanaka D: Back pain among workers in the United States: National estimates and workers at risk. *Am J Ind Med* 1995, **28**, 591-602.
13. Goldenberg DL: Fibromyalgia, chronic fatigue syndrome, and myofascial pain syndrome. *Curr Opin Rheumatol* 1993, **5**, 199-208.
14. Hsueh TC, Cheng PT, Kuan TS, Hong CZ: The immediate effectiveness of electrical nerve stimulation and electrical muscle stimulation on myofascial trigger points. *Am J Phys Med Rehabil* 1997, **76**, 471-476.
15. Indulski A, Starzyński Z: *Occupational Diseases in Poland in the Years 1991-1993*. The Nofer Institute of Occupational Medicine, Łódź 1994 (in Polish).
16. Kobielski W: Effect of selected physical hazards in agriculture on the incidence of occupational accidents and diseases among farmers insured by agricultural social insurance fund (KRUS). **In:** Solecki L (Ed): *Physical Hazards in Agriculture*, 21-32. Institute of Agricultural Medicine, Lublin 1999 (in Polish).
17. Meyers J, Bloomberg L, Faucett J, Janowitz I, Miles J: Using ergonomics in the prevention of musculoskeletal cumulative trauma injuries in agriculture: learning from the mistakes of others. *J Agromedicine* 1995, **2**, 11-24.
18. Montgomery A, Asberg M: A new depression scale designed to be sensitive to change. *Br J Psychiatry* 1979, **134**, 382-389.
19. Ronfeld RA, Tremaine LM, Wilner KD: Evaluation of pharmacokinetic properties of sertraline and N-desmethylsertraline in elderly and young normal volunteers. *Clin Pharmacokinetics*, in press.
20. Silverstein B, Fine L, Armstrong T: Hand wrist cumulative trauma disorders in industry. *Br J Ind Med* 1986, **43**, 779-784.
21. Simons DG: Fibrositis/fibromyalgia: a form of myofascial trigger points? *Am J Med* 1986, **89**, 3-8.
22. Sjøflot L: Research program on ergonomics in agriculture in Norway. *Proceedings of the 1984 International Conference on Occupational Ergonomics*, 1984. **Suppl 1**, 33-38.
23. Skootsky SA, Jaeger B, Oye RK: Prevalence of myofascial pain in general internal medicine practice. *West J Med* 1989, **151**, 157-160.
24. Tunks E, McCain GA, Hart LE, Teasell RW, Goldsmith CH, Rollman GB, McDermid AJ, DeShane PJ: The reliability of examination for tenderness in patients with myofascial pain, chronic fibromyalgia and controls. *J Rheumatol* 1995, **22**, 944-952.
25. Wypadki przy pracy w gospodarstwach indywidualnych w rolnictwie według wydarzeń powodujących urazy (Accidents at work in Polish agriculture. Trauma) **In:** *Rocznik Statystyczny GUS*, 1999, 150 (in Polish).