THE EFFECT OF OSTEOPATHIC TREATMENT ON PEOPLE WITH SUB-CHRONIC & CHRONIC NECK PAIN

Osteopathic Medicine

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Abstract

Background and Objectives: Neck pain can be severely disabling and costly, it is a common problem in the general population with point prevalence ranging between 10% and 15%. The aim of this single cohort study was to investigate if Osteopathic management of neck pain would reduce patients' perceived pain.

Methods: Twenty one participants were recruited. Four participants presented for the initial visit but did not attend for further treatments or to complete any post-treatment questionaries, so they were excluded from the study, leaving a final sample of 17(mean age 34.8 ± 11.9, 7 male, 10 female). Participants were included if they had experienced intermittent or constant neck pain for a duration longer than one month, and were excluded if they had experienced constant unremitting neck pain for greater than twelve months, had any neurological signs and symptoms, suffered from cervical intervertebral disc prolapse, or had a neck trauma such as whiplash. The participants were offered a six-week course of Osteopathic treatment at the Victoria University Osteopathic Medicine Clinic. McGill pain questionnaires (MPQ) and visual analogue scales (VAS), were completed prior to the initial treatment and after treatments on weeks 2 and 4.

Results: Analysis with repeated measures ANOVA revealed statistically significant difference between pre and post scores ($F_{2,32} = 17.35$, $p = 0.001$) for the Mc Gill pain questionnaire. T-test analysis (paired sample tests) showed significant differences between pre and post4 week groups ($p=0.005$), pre and post 2 weeks ($p=0.005$) and post2 and post4 weeks ($p=0.008$). Similarly analysis of the VAS data revealed significant differences between pre and post scores ($F_{1.62, 25.92} = 36.007$, $p= 0.000$) and T-test analysis

(paired sample tests) showed the difference to be between pre and post4 week groups (p=0.00) and pre and post 2 week groups (p=0.00).

Conclusion: Both outcome measures demonstrated a significant reduction in the perceived quality and intensity of neck pain with Osteopathic management. This pilot study suggests that Osteopathic treatment is effective for the management of neck pain.

INTRODUCTION

Neck pain is a common problem within our society and has been shown to have a point prevalence between 10% and 15%.[1] It is most common at approximately 50 years of age and is more common amongst women than in men. Neck pain can be severely disabling and costly.[1,2]

Limited range of motion and a subjective feeling of stiffness may accompany neck pain, that may be precipitated or aggravated by neck movements or sustained neck postures. Headache, brachialgia (pain in the brachium of the arm), dizziness, and other signs and symptoms may commonly present together with neck pain.[2] Most neck complaints are not regarded as life threatening, but patients may endure pain and/or stiffness, which may affect their physical and social functioning considerably. Neck pain is a common cause for work absence and in some industries it even accounts for as many absences as lower-back pain.[2]

Chronic pain has been defined as being pain present for at least three months, or when a patient suffers a continuous, or essentially continuous, but with low level exacerbations of pain, each of which may be referred to as "acute", recurrent for a period greater than 12 months.[7] The temporal parameters that denote the change over from acute to chronic pain range from 3 to 12 months, and the ambiguity in definition has led to the proposal of clinical terms like sub-acute and sub-chronic pain. [7,8] Sub chronic pain is characterised as constant pain for a duration of five to seven weeks but no longer than 12 weeks or recurrent pain for a period less than 12 months. [7,8]

Bogduk proposed the aetiology of neck pain is a disorder of the cervical spine, and it can refer from various anatomical structures that are nociceptive and, thus, capable of producing pain. Studies have confirmed that pain can be evoked in fascia, tendons, periosteum, aponeurosis, joint capsules, synovium and the outer 1/3 of the anulus. [4] Other than injury to these structures, other causes of neck pain include systemic arthritic disease, thoracic outlet syndrome, blunt trauma, upper respiratory tract infection, fibromyalgia and congenital agenesis.[5] Osteopathic treatment of the cervical spine has been claimed to assist healing of injury, pathology, or dysfunction of the cervical region.[6]

There is limited evidence to substantiate that manual medicine is in fact effective in reducing neck pain. A study by Hoving et.al. suggested that neck pain was more readily reduced by manual therapy than with other treatment modalities.[10] They compared the effectiveness of manual therapy (passive mobilization) on non-specific sub-acute neck pain, physical therapy (in which neck exercises were prescribed and guided by the therapist), and ongoing medical treatment (pain and anti-inflammatory medication, hot compresses, rest, and home exercises) on 183 patients aged from 18 to 70 with non-specific neck pain of at least two weeks duration. All patients were allowed to continue their medications and self-care previously prescribed by their own personal Physicians. Patients rated perceived recovery on a 6-point ordinal transition scale, ranging from "much worse" to "completely recovered." In addition, the severity of physical dysfunction was rated on a numeric 11-point scale ranging from 0 (no physical

dysfunction) to 10 (maximal dysfunction), on the basis of the systematic assessment of spinal mobility, palpation, and pain reported by the patient. Functional disability was measured according to the Neck Disability Index (NDI). At the end of 7 weeks, the researchers found that 68.3% of the manual therapy patients felt "much improved" or "completely recovered" compared with 50.8% in the physical therapy group and 35.9% in the usual medical care group. Although physical therapy scored slightly better than continued care, none of the differences were statistically significant. Unfortunately this study did not provide a true indication of the effectiveness of each single intervention, for example, physiotherapy alone, as each group's intervention was contaminated by interventions of the other groups.

Osteopaths are trained to use a variety of treatment techniques.[6] High Velocity (HVLA) manipulation is commonly used in Osteopathic practice.[6] There is evidence to state that manipulation can benefit patients with neck pain.[11] Pikula's pilot study found that a single cervical manipulation produced less pain intensity (VAS), and a greater range of motion by using the cervical range of motion (CROM) instrument as a measuring tool, in patients with acute neck pain. They found that HVLA applied to the side of neck pain was more effective that applied to the side opposite the pain or to a placebo group.[11]

Osteopaths are eclectic in the management of neck pain, incorporating a wide range of treatment approaches. Strengthening exercises are commonly prescribed in conjunction with manual therapy itself.[6] Jordan and colleagues[12] compared physical therapy, intensive

strengthening of the cervical musculature, and high velocity manipulation on 119 adults with chronic neck pain. All treatment interventions demonstrated meaningful improvement in self-reported pain (VAS), disability (NDI) and medication use. Patients were assessed at the enrolment and completion of the study. Secondary outcome measures included active range of motion of the cervical spine as well as strength and endurance measurements of the cervical musculature. These measurements were also carried out at enrolment and completion of the study. Postal questionnaires were used to carry out four and 12 month follow-up assessments which indicated that the improvements were maintained. However it must be acknowledged that whether or not the improvement was a result of treatment or simply a result of time is unknown. Significant pre and post improvements were found in all treatment groups but there was no significant difference, in pain, disability, medication use or cervical range of motion between groups.[12] While this study suggests that the different approaches individually had a significant influence on reducing neck pain, it is not clear whether, if all were used in conjunction with each another, even greater changes may have been observed.

Bronfort a physiotherapist used a randomized, single-blinded clinical trial to examine the effect of exercise and spinal manipulation on 191 patients with chronic mechanical neck pain.[13] The patients were randomized to receive 20 sessions of spinal manipulation (specifically HVLA) combined with rehabilitative neck exercise (spinal manipulation with exercise), MedX rehabilitative neck exercise, or spinal manipulation alone.[11] After a 1-week baseline period, patients were randomized to 11 weeks of therapy, with post treatment follow-up assessment 3, 6, and 12 months later. The main outcome measures

were patient-rated neck pain (VAS), neck disability (NDI), general health-related quality of life (measured using the Medical Outcomes Study 36-item Health Survey [SF-36]), global improvement, satisfaction with care, and medication use. Range of motion, muscle strength, and muscle endurance were assessed by examiners blinded to patients' treatment assignment. All three groups showed significant improvement in all outcome measures that were maintained at 1 year of follow-up. Statistically significant differences between groups were seen only for satisfaction ratings, which were highest in patients in the combination manipulation and exercise group.[13]

The available literature suggests that manual therapy is an effective alternative therapy to orthodox medical treatment in the management of neck pain, and may too be a more cost effective option.[11] Ingeborg[11] examined the cost effectiveness of physiotherapy (including active and postural or relaxation exercises, stretching, and functional exercises), manual therapy (including passive joint mobilisation, specific articular mobilisation, coordination or stabilisation exercises) and general practitioner care (including self care heat application, home exercises and ergonomic considerations) for neck pain on 183 patients. They found that the manual therapy group showed a significantly faster improvement than the physiotherapy group and the general practitioner care group up to 26 weeks, but differences were negligible by follow up at 52 weeks. Manual therapy (spinal mobilisation) is more effective and less costly for treating chronic neck pain than physiotherapy or care by a general practitioner.[14]

Osteopathic treatment usually consists of a combination of a wide range of manual techniques, including soft tissue technique, passive mobilisation (articulatory) technique, HVLA, functional (indirect) technique, myofacial release technique, craniosacral technique and muscle energy technique.[15] Although some studies have investigated the effect of specific techniques, such as mobilisation on neck pain, there has been little investigation of the effect of Osteopathic management, incorporating many of the above mentioned techniques. The aim of this pilot study was to examine the effect of osteopathic management of people with neck pain.

METHODOLOGY

Participants

Twenty one participants were recruited from Victoria University including staff and students and from businesses in the Melbourne CBD. Four participants presented for the initial visit but did not attend for further treatment or complete any post-treatment questionaries, so they were excluded from the study, leaving a final sample of 17 people (mean age 34.8 ± 11.9, 7 male, 10 female). Participants were included if they were suffering intermittent or constant neck pain for a duration longer than one month and excluded if they had suffered constant unremitting neck pain for greater than twelve months, had any neurological signs and symptoms, suffered from cervical intervertebral disc prolapse or trauma such as whiplash. For the purpose of this study, the cohort was divided into two sub-groups for further analysis of the effectiveness of treatment on varying durations of symptoms. One was the chronic pain sub-group (symptoms lasting

greater than 12 months), and the other sub-group being sub-chronic (symptoms less than 12 months duration).[7, 8]

Measures

Outcomes of treatments were measured using the McGill Pain Questionnaire (MPQ) and Visual Analogue Scale (VAS). The MPQ was developed from theoretical consideration of three separate components of the experience of pain, namely sensation of pain and the emotional effect it has and the cognitive assessment the participant makes. This McGill pain questionnaire has been established as a highly valid and reliable 'gold standard' against which other measures of pain should be tested.[16] Participants are presented with 80 adjectives in groups and have to select one from each group that best describes their own pain. The words are given a numerical scale rating from the mildest to the worst, and the sum of these scores give the total pain rating index (PRI). Present pain intensity (PPI) is also determined with a scale ratio of 0 to 5.[16]

A VAS was used to measure the quantity of perceived pain. The VAS consists of a 10 cm horizontal line with two endpoints, being "no pain" and "worst pain ever." Participants were requested to place a mark corresponding to the pain level that they averaged during a one week interval as this has been shown to be more reliable when compared to measuring the present pain alone.[17] This technique eliminates bias which may result from the initial effects, or potential adverse reactions from treatment, by accessing the average over time as opposed to a single point in time. The distance from the low end is measured to give a numerical index of pain severity. This tool can introduce some bias, but advantages are the ease and brevity of the administration and scoring.[18] The VAS is a

very reliable and valid measure for pain intensity[19] and has been shown to be highly responsive to clinical changes.[17]

Procedures

Advertising flyers were posted to local businesses in the CBD and global emails were circulated to all Victoria University students and staff. Interested individuals were posted information sheets and then signed consent forms. The Victoria University Faculty of Human Development Ethics committee granted ethics approval for this study.

The participants were offered a six-week course of osteopathic treatment at the Victoria University Osteopathic Medicine Clinic (OMC). Participants were requested to fill out the McGill pain questionnaires and VAS to indicate their perceived pain prior to the initial treatment, and following treatments at week two and four. The first consultation of the trial replicated an initial consultation for any new patient presenting to the (OMC). The practitioners were senior Osteopathic students (5th year) who performed the treatment under the supervision of a registered Osteopath. Participants were screened for vertebral artery insufficiency as described by Gibbons and Tehan.[20]

A semi-standardised treatment protocol included the following elements:

1. Soft Tissue technique to trapezius, cervical/thoracic erector spinae, levator scapulae, and sub occipital muscles.[15]

2. Articulation technique (passive mobilisation) to the cervical and thoracic spine.[15]

3. Muscle energy technique to the scalenes, levator scapulae, trapezius, SCM muscles.[15]

4. Counterstrain technique at the discretion of the treating practitioner.[15]

5. HVLA to the cervical and thoracic vertebrae at the discretion of the treating practitioner.[20]

All the techniques in the treatment protocol are commonly referred to in the osteopathic literature.[6, 15, 19]

Participants were requested to undertake osteopathic treatment twice a week for 2 weeks, and once a week for a further 2 weeks. Participants were requested to complete the questionnaires prior to the initial treatment and post weeks 2 and 4. After the 4 week trial period, the scores from the questionnaires were analysed and compared for pre and post differences.

RESULTS

Subject details:

The group (N=17) total mean age was 34.8 (± 11.9) years and the mean duration of symptoms was 168.8 (±292) weeks, with a range from 4 to 1040 weeks. To examine the effect of treatment on duration of symptoms, the cohort group was sub-divided into a sub-chronic sub-group (N=10) where duration of symptoms was less than 52 weeks, and a chronic sub-group (N=7) where duration of symptoms was greater than 52 weeks, to further analyse the effectiveness of the treatment. The mean age of the sub-chronic sample was 33.6 (±11) years and the gender ratio was 1:1. The mean age of the chronic

sample was 36.5 (±13.7) years and the mean duration of symptoms was 376 (±376) weeks and included 5 F and 2 M (Table 1).

McGill pain questionnaire (MPQ) Pain Rating Index total):

There was a large reduction in mean MPQ scores over time from pre treatment (14.6 ±8), post 2 weeks (9.6±7.4) and post 4 weeks (4.3±4.6) for the cohort. The Sub-chronic sub-group had a reduction in means pre treatment (13.2 ±6.6), post 2 weeks (10.4±7.8) and post 4 weeks (4±5). The chronic sub-group had a reduction in means pre treatment (16.7 ±9.9), post 2 weeks (8.6±7.2) and post 4 weeks (4.5±5.3).

Analysis of the sample for the cohort group with a repeated measures ANOVA determined there were significant differences between times ($F_{2,32} = 17.35$, $p=0.001$), (the subscript resembles the degrees of freedom). T-tests (paired sample tests) showed the differences to be significant between pre and post2 week groups ($p=0.005$), pre and post4 week groups ($p=0.005$) and post2 and post4 weeks ($p=0.008$). There is a large effect size (Cohen's d) for the MPQ in the cohort group ($d = 1.28$). Cohen's d values of 0.2 are considered a small effect size, 0.5 is considered a medium effect size and 0.8 and greater a large effect size.[21]

Analysis of the sub-chronic sub-group MPQ scores with a repeated measures ANOVA determined that there were significant differences between time groups ($F_{2,18} = 10.062$, $p=0.001$). T-test (paired sample tests) showed the differences to be between pre and post4 week groups ($p=0.001$) and post2 and post4 weeks ($p= 0.025$). No significant difference

was seen between the mean group's scores pre and post2 weeks (p=0.190). A large effect size (Cohen's d) was noted for the MPQ in the sub-chronic sub-group (d = 1.53).

Analysis of the chronic sub-group MPQ scores with a repeated measures ANOVA determined there were significant differences between time groups ($F_{2,12} = 7.896$, p= 0.006). T-test (paired sample tests) showed the differences to be between pre and post2 week groups (p=0.006) and pre and post4 weeks (p= 0.026). No significant difference was seen between the groups post2 and post4 weeks (p=0.218). There is a medium to large effect size (Cohen's d) for the MPQ in the chronic sub-group (d = 0.69).

Visual Analogue Scale:

The mean VAS for the cohort group reduced over time, for pre treatment (6.5±3.09), post 2 weeks (2.4±2) and post 4 weeks (1.4±2). The Sub-chronic sub-group had a reduction in means pre treatment (6.02 ±3.4), post 2 weeks (2.31±1.8) and post 4 weeks (1.5±1.9). The chronic sub-group had a reduction in means pre treatment (7.2 ±2.7), post 2 weeks (2.4±2.5) and post 4 weeks (1.5±2.5).

Analysis of the data for the cohort group with a repeated measures ANOVA showed Mauchly's test of sphericity to be violated (p=0.047) and, thus, indicated that there was not a normal distribution of the data. The Huynh-Feldt adjustment of degrees of freedom was then used to analyse the ANOVA, showing significant differences between times ($F_{1.62,25.92} = 36.007$, P= 0.00). T-test (paired sample tests) showed the differences to be between pre and post2 week groups (p=0.00) and pre and post4 weeks (p= 0.00). No

significant difference was seen between the groups post2 and post4 weeks (p=0.055). There was a large effect size (Cohen's d) for the VAS in the cohort group (d = 1.57).

Analysis of the data for the sub-chronic sub-group with a repeated measures ANOVA showed Mauchly's test of sphericity to be violated (p=0.024) indicating that there was not a normal distribution of the data. The Huynh-Feldt adjustment to degrees freedom was utilised for the analysis of the ANOVA. This determined there were significant differences between times ($F_{1.35,12.14} = 18.755$, p= 0.00). T-test (paired sample tests) showed the differences to be between pre and post2 week groups (p=0.01) and pre and post4 weeks (p= 0.001). No significant difference was seen between the groups post2 and post4 weeks (p=0.081). A large effect size (Cohen's d) was observed for the VAS in the sub-chronic sub-group (d = 0.87).

Analysis of the data for the chronic sub-group with a one-way repeated measures ANOVA determined there were significant differences between time groups ($F_{2,12} =$ 25.706, P= 0.00). T-test (paired sample tests) showed the differences to be between pre and post2 week groups (p=0.00.) and pre and post4 weeks (p= 0.001). No significant difference was seen between the groups post2 and post4 weeks (p=0.077). There is a medium effect size (Cohen's d) for the VAS in the sub-chronic sub-group (d = 0.07).

Present Pain intensity (PPI):

Analysis of the data for the total group with a one-way repeated measures ANOVA showed Mauchly's test of sphericity to be violated (p=0.00) thus the Huynh-Feldt

adjustment of the degrees freedom was used for the analysis of the ANOVA. This determined there were still no significant differences between times ($F_{1.14,14.8} = 0.515$, P= 0.505).

Table 1 – Participant age (years) and duration of symptoms (weeks)

Mean	N	age	duration of symptoms
Total	**17**	**34.8±11.9**	**168.8±292**
Sub Chronic	**10**	**33.6±11**	**23.8±17**
Chronic	**7**	**36.5±13.7**	**376±376.6**

Table 2 – Mc Gill Pain Questionnaire scores

MPQ	Pre	2weeks	4weeks
Cohort	**14.6±8**	**9.6±7.4**	**4.3±4.6**
Sub Chronic	**13.2±6.6**	**10.4±7.8**	**4±5**
Chronic	**16.7±9.9**	**8.6±7.2**	**4.8±5.3**

Table 3 – VAS scores

VAS	Pre	2weeks	4weeks
Cohort	**6.5±3.09**	**2.4±2**	**1.4±2**
Sub Chronic	**6.02±3.4**	**2.31±1.8**	**1.5±1.9**
Chronic	**7.2±2.7**	**2.4±2.5**	**1.5±2.5**

DISCUSSION

This study demonstrated that Osteopathic treatment significantly reduced neck pain in sub-chronic and chronic sufferers. The results showed significant reductions in pain intensity (VAS) and quality (MPQ) throughout the course of the trial. At 4 weeks, the mean pain intensities (VAS) and quality (MPQ) had dropped significantly when compared to pre treatment scores which suggest strong, clinically relevant changes.

The sub-chronic and chronic sub-groups followed the same patterns as for the cohort group. Significant reductions were found in pain intensity (VAS) and quality (MPQ) when comparing pre and post 4 week measures. Both sub-groups demonstrated significant reductions in pain intensity (VAS) and quality (MPQ) as there was a significant reduction when compared to the baseline measure from the initial treatment.

The chronic sub-group did show a decrease in mean scores for pain intensity and quality between post week2 and post week4, but the difference in means was not statistically significant. Possibly if more participants were involved within the study a greater power would have been achieved and thus the differences may have been significant at those stages. These results are consistent with the past literature associated with manual therapy and neck pain, [3, 10, 11, 12, 13, 14] confirming Hoving's findings that manual therapy is superior to other treatment modalities.

Both the VAS and the PPI (with in the MPQ) measure the perceived intensity of pain. The PPI has a scale marking system from 0 to 5, whereas the VAS consists of a 10 cm line. There was no significant reduction of the PPI over time when analysed with ANOVA, whereas there was with the VAS. The VAS has been proven to be a valid and reliable measure of pain,[19] whereas PPI has not been researched and validated on its own. When using the PPI an individual would have to select a number between 0 and 5, and not anywhere between these points; this may lead to selection of a slightly higher or slightly lower score as there are only six possible choices. On the VAS, the subject marks the position on a straight line where their perceived pain intensity lies. In contrast the PPI

provides only six response integrals making it possible for the subject to remember the numerical values of previous PPI scores and thus potentially create some bias with in the measuring tool. In the present study both the VAS and MPQ significantly decreased, where as the PPI did not, which suggests the PPI is not a reliable indication of pain intensity.

A pragmatic approach was utilised throughout this study and because of this a full standardised treatment regime was not used. This method was selected because the field needs to foster a more productive collaboration between clinician and researcher; studying theoretically integrated interventions, while using process research findings to improve therapy.[21] Because the present study was a clinical trial it was more effective to try and simulate the reality of clinical practice.[22] As a clinician, it is understandable that there is never a standardised treatment for any one area of the body. In fact, treatment always depends on the clinical findings and thus treatment is adjusted to the clinical situation. Taking this in to account, a full standardised treatment regime would have been subject to criticism within the profession, and thus not be a true indication of the effect of Osteopathic treatment on neck pain.

The main limitation of this study is the lack of a follow up to track the improvement in outcomes over a longer period of time. Due to this it is unknown how long the benefit of treatment will be in these subjects. A control group (no treatment or standard medical care) would have been beneficial to eliminate the possibility of the placebo affect.

A control group could have also been utilised to eliminate the possibility of regression toward the mean being an influencing factor. When a selected group base their scores on a test, it can be expected that they will score closer to the mean on a retest than they did on the original test.[21] This counter-intuitive phenomenon is called regression toward the mean.[21]In contrast the participants all had a well established pattern of symptoms (mean duration 168.8 weeks, 41.2% had symptoms for greater than a year) with large decreases in pain perception signifying that the strong initial effects were associated with the statistically significant results and large effect sizes, suggesting that regression toward the mean was not an influencing factor in this study.

For future research in this area it is recommended that a larger sample size is used, and a control group is utilised, while potentially comparing Osteopathic management to other forms of physical therapy.

CONCLUSION

Osteopathic treatment was found to significantly decrease the quality and intensity of neck pain over a 4 week treatment regime. Both MPQ and VAS demonstrated a significant reduction in the perceived quality and intensity of neck pain with osteopathic management. This pilot study suggests that osteopathic treatment is effective for the management of sub-chronic and chronic neck pain. Future research using a control group is recommended, as well as a longer follow up period to monitor the long term improvement offered by Osteopathic medicine.

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Raw data of the total group

Subject No	Age	Sex	DOS	VAS1	VAS2	VAS3	PRIT1	PRIT2	PRIT3
1	42	M	4	0.4	0.1	0.05	8	6	4
2	40	F	6	9.6	0.7	0.5	8	5	1
6	22	F	52	2.4	1.3	0.9	10	5	4
7	23	M	20	1.7	0.3	0.4	12	2	1
8	44	M	24	6.7	4.8	5.5	22	17	12
13	37	F	32	5.3	0.9	0.2	11	1	0
14	20	M	20	8.6	3	3.2	13	12	10
15	50	F	52	8.7	4.7	X	28	22	X
17	21	F	12	9.2	4.2	X	9	12	X
21	37	M	16	7.6	3.1	1	11	22	0
9	27	F	208	8.8	0.6	0.4	6	1	2
10	22	F	260	7.4	2	X	12	6	X
11	58	F	1040	7.4	1.3	0.2	35	16	0
12	38	F	104	7.9	1	X	13	7	X
16	24	M	136	8.6	3.7	0.5	9	0	2
19	36	M	780	1.4	0.7	0.2	20	11	13
20	51	F	104	9.3	7.6	6	22	19	7
Mean	34.823		168.823	6.521	2.352	1.465	14.647	9.647	4.307
SD	11.912		292.053	3.092	2.081	2.068	7.999	7.407	4.679

DOS = Duration of symptoms in weeks
VAS = Visual analogue scale
PRIT = Pain rating Index from McGill Pain questionnaire
X = scores that were not recorded, these scores were replaced with a series means.

Raw data of the sub-chronic group

Subject No	Age	Sex	DOS	VAS1	VAS2	VAS3	PRIT1	PRIT2	PRIT3
1	42	M	4	0.4	0.1	0.05	8	6	4
2	40	F	6	9.6	0.7	0.5	8	5	1
6	22	F	52	2.4	1.3	0.9	10	5	4
7	23	M	20	1.7	0.3	0.4	12	2	1
8	44	M	24	6.7	4.8	5.5	22	17	12
13	37	F	32	5.3	0.9	0.2	11	1	0
14	20	M	20	8.6	3	3.2	13	12	10
15	50	F	52	8.7	4.7	X	28	22	X
17	21	F	12	9.2	4.2	X	9	12	X
21	37	M	16	7.6	3.1	1	11	22	0
Mean	33.6		23.8	6.02	2.31	1.468	13.2	10.4	4
SD	11.067		16.982	3.392	1.859	1.908	6.579	7.848	5

DOS = Duration of symptoms in weeks
VAS = Visual analogue scale
PRIT = Pain rating Index from McGill Pain questionnaire
X = scores that were not recorded, these scores were replaced with a series means.

Raw data of chronic group

Subject No	Age	Sex	DOS	VAS1	VAS2	VAS3	PRIT1	PRIT2	PRIT3
9	27	F	208	8.8	0.6	0.4	6	1	2
10	22	F	260	7.4	2	X	12	6	X
11	58	F	1040	7.4	1.3	0.2	35	16	0
12	38	F	104	7.9	1	X	13	7	X
16	24	M	136	8.6	3.7	0.5	9	0	2
19	36	M	780	1.4	0.7	0.2	20	11	13
20	51	F	104	9.3	7.6	6	22	19	7
Mean	36.571		376	7.257	2.414	1.46	16.7	8.57	4.8
SD	13.733		376.687	2.680	2.522	2.541	9.860	7.184	5.263

DOS = Duration of symptoms in weeks
VAS = Visual analogue scale
PRIT = Pain rating Index from McGill Pain questionnaire
X = scores that were not recorded, these scores were replaced with a series means.

Effect size calculations

d = mean diff/SD of mean diff

Mc Gill cohort

d = 10.33/8.05 = 1.28

Mc Gill sub-chronic

d = 9.20/6.03 = 1.53

Mc Gill chronic

d = 4.8/7 = 0.689

VAS cohort

d = 5.06/3.22 = 1.57

VAS sub-chronic

d = 1.48/1.68 = 0.86

VAS chronic

d = 4.46/2.07 = 2.15

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