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Acupuncture Plus Dry Needling, an Effective Treatment Method for Chronic Neck Pain

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Background: In recent years, acupuncture has attracted much attention as a complementary therapy in the management of chronic neck pain, but the definite effect of this method has not yet been proven in reducing pain and improving function.
Objectives: This study was conducted to evaluate the effects of acupuncture plus dry needling in relieving chronic neck pain and its lasting effects for up to 3 months after treatment.
Patients and Methods: Thirty-eight patients with chronic neck pain were included in this study. Each patient received 10 minutes of acupuncture in two forms (acupoints and trigger point needling), twice a week for 6 weeks. The acupoints were GB20, GB21, BL10, BL12, BL 18, DU14, SI11, and SI13. Simultaneously, trigger points in trapezius muscles also took needle. The neck disability index (NDI) and neck pain and disability scale (NPDS) questionnaires were completed by the patients before performing intervention and again at 6 weeks and 3 months after the intervention, and the obtained data were statistically analyzed.
Results: Mean NPDS score upon admission was 56.3 ± 16.1, which dropped to 20.9 ± 19.4 at the end of 6 weeks of treatment ($P < 0.001$). At the end of 3 months, the score reached 20.3 ± 26.6; although recovery was significant compared to the start of treatment, it was not significant compared to the end of 6 weeks ($P = 0.84$). Mean NDI score at pre-intervention was 20.3 ± 7.5, which reduced to 7.3 ± 6.7 after 6 weeks of treatment ($P < 0.001$). After 3 months, it decreased to 5.9 ± 8.4; and although recovery was significant ($P < 0.001$) compared to the time of admission, it was not statistically significant compared to the end of 6 weeks of treatment ($P = 0.27$).
Conclusions: Acupuncture plus dry needling is an effective short- as well as mid-term treatment method for chronic neck pain. The result of this study seems to be the cornerstone of further researches, which evaluate the new effective treatments for chronic neck pain.

Keywords: Neck Pain; Acupuncture; Trigger point; Complementary Therapies

1. Background

As a major medical problem, neck pain is a fairly common problem that is experienced by one third of the population at least once in their lifetime (1). Neck pain can result in the imposition of health costs, disabilities, and absence from work (2). Its prevalence, alone or in combination with upper extremity pain, varies from 9% to 18% in different communities. The annual incidence is equal to 15%, being 1.5 times higher in women than men. The pain occurs in 25% of women and 20% of men between the ages of 45 and 75 years (3, 4). Chronic neck pain lasts for more than 12 weeks and is usually caused by diseases of the cervical spine and soft tissues of the neck (3). Some common factors responsible for the pain include damage to the nerve roots in the spinal cord, inflammation of the soft tissues around the vertebral joints, poor head and shoulder posture, arthritis, disc and diseases caused by muscle cramps and ligament sprains (5).

Treatment of neck pain includes a wide range of drug therapies (such as anti-inflammatory, analgesic, and opioid drugs) and non-drug therapies (including massage therapy, physiotherapy, exercise, regional and epidural injection, and psychology) (6).

Complementary therapies such as acupuncture are increasingly used. According to the theory of acupuncture, point stimulation of certain areas of the skin can release of substances in the body that have specific therapeutic effects such as anti-inflammatory and analgesic properties (7). Results of the studies have shown that complementary therapies such as acupuncture are more effective than no treatment, physiotherapy, or routine treatments in relief of chronic neck pains and disability (8-10). On the other hand, the impact of these treatments on chronic neck pain has not yet been established in some studies (11-13).

2. Objectives

With regard to high prevalence of neck pain, severe disabilities it can cause, and the lack of definitive effect of acupuncture treatment in previous studies, this study aimed to examine the effects of acupuncture on chronic

neck pain, as a method to enhance therapeutic effects in these patients, reduce their disabilities, and ultimately improve their quality of life and satisfaction.

3. Patients and Methods

This interventional study was performed at the Sports Medicine Clinic and Sports Medicine Assessment Clinic of Rasoul Akram Hospital in Tehran during 2012 - 2013. Inclusion criteria were as follows: having neck pain for more than 3 months, not receiving acupuncture, physiotherapy, manipulation, or physical therapy for neck and shoulders within the past 6 weeks, having no history of previous neck surgery in the past year, no indication for surgery, no fracture and dislocation of cervical spine, absence of neurological damage, absence of inflammatory neck pain (e.g. rheumatoid arthritis or ankylosing spondylitis), no fibromyalgia, not receiving anticoagulants and lack of bowel or bladder dysfunction. Patients were asked to decline other treatments during their 12 weeks of treatment, data collection, and follow up periods.

Exclusion criteria included presence of muscle weakness in a known myotome, sensory changes or pain in one of the known dermatomes, continued radicular symptoms despite medical treatment for 6 to 8 weeks, also the patients who were prohibited from receiving the treatment or/and those unwilling to continue treatment. Among 56 patients who were assessed, 38 people were eligible to be included in the study. After obtaining written informed consent, eligible patients were assessed by the examiner through physical examination and collection of data on age, sex, weight, height, smoking, and duration of symptoms. Before the intervention, the NDI (Neck Disability Index), consisting of 10 questions with scores varying from zero to five points (0 - 4 = no disability, 5 - 14 = mild disability, 15 - 24 = moderate disability, 24 - 34 = severe disability, 50 - 35 = complete disability) and NPDS (Neck Pain and Disability Scale) questionnaire consisting of 20 five-point questions (with a total of one hundred points) were completed by the patients in the presence of the examiner (9).

Treatment started 1 week after the evaluation. In each session, the distant points (acupoints) and trigger points of trapezius muscles were inserted by 25 - 30 gauge needles. The intervention was done by one researcher who had 6 years' experience in acupuncture. Acupuncture sessions were 10 minutes, 2 times a week for 6 weeks. The distant points included GB20, GB21, BL10, BL12, BL18, DU14, SI11 and SI13. All of trigger points in trapezius muscles were treated simultaneously. Patients who had severe pain were allowed to use only acetaminophen up to 2 g/d. After completion of the treatment (sixth week), the patients were not treated until the end of the 12th week, and all the patients were asked to decline any other methods of treatment so that it was possible to follow up them. In addition, all participants were assured that other necessary methods of treatment would be given after the end of 12 weeks, if the pain continued. At 6 weeks and 12 weeks after the start of the intervention, the patients were evaluated by the examiner, and the NDI and NPDS questionnaires were completed in both stages. Collected information was entered into SPSS version 21.0. We used the paired-samples t test and repeated measurement analysis to examine the relationship between the amount of pain before and after the intervention, and the bivariate correlation test to evaluate the correlation between quantitative variables. $P < 0.05$ was considered a statistically significant level. In this study, the principles of the Declaration of Helsinki were observed and were approved by the Ethics Committee of the Iran University of Medical Sciences.

4. Results

This interventional study was performed to evaluate the effects of acupuncture on the treatment of chronic neck pain on 38 patients, of them 34 patients were finally analyzed, because of the unavailability of 3 patients in the provided follow-ups as well as the lack of cooperation by 1 patient who wanted to receive treatment in the interval between two follow ups. Table 1 shows the demographic characteristics of the patients. According to the data, 88.2% of the patients were female and 50% of the patients were between 41 and 59 years old. In 44.2% of patients, the Body Mass Index (BMI) was in the overweight range. Only 2.9% were smokers, and 58.8% have had chronic neck pain for less than a year. Table 2 shows the results of scores of the two NPDS and NDI questionnaires. Mean NPDS score upon admission was 56.3, which reached 20.9 at the end of 6 weeks of treatment and recovery was statistically significant ($P < 0.001$). At the end of the 3-month follow-up, this figure reached 20.3; and although recovery was significant compared to the start of treatment ($P < 0.001$), the changes were not significant compared to the end of 6 weeks ($P = 0.84$). Mean NDI score upon patients admission was 20.35, which reduced to 7.3 after 6 weeks of treatment, and recovery was statistically significant ($P < 0.001$). At the end of the 3-month follow-up, this figure reached 5.9, and recovery was significant compared to the time of admission ($P < 0.001$), but the changes were not statistically significant compared to the end of six weeks of treatment ($P = 0.27$).

There was no relationship between age and NPDS at 6 weeks after treatment ($r = - 0.23$, $P = 0.19$). The age of the patients also showed no significant relationship with NPDS three months later ($r = - 0.08$, $P = 0.64$). No relationship was found between age and NDI at 6 weeks and 3 months after the intervention ($r = 0.007$, $P = 0.97$) ($r = 0.015$, $P = 0.93$), respectively. The relationship between BMI and NDI 6 weeks after treatment ($r = -0.14$, $P = 0.41$), and three months later ($r = - 0.21$, $P = 0.25$) was both non-significant. With increasing BMI number, NPDS at 6 ($r = - 0.51$, $P = 0.002$) and 12 weeks ($r = - 0.37$, $P = 0.031$) after treatment reduced significantly.

The results of the repeated measurement analysis showed that the trend of differences was significant in NDI and NPDS questionnaires after intervention compared to pre-intervention ($P < 0.001$).

Table 1. The Demographic Characteristics of the Patients Treated With Acupuncture [a]

Variable	No. (%)
Gender	
Male	4 (11.8)
Female	30 (88.2)
Total	34 (100)
Age, y	
20 - 40	16 (47.1)
41 - 59	17 (50)
≥ 60	1 (2.9)
BMI, kg/m^2	
< 18.5	3 (8.9)
18.5 - 24.9	8 (23.5)
25 - 29.9	15 (44.2)
≥ 30	8 (23.5)
Smoking	
Yes	1 (2.9)
No	33 (97.1)
Duration of neck pain	
< 1 year	20 (58.8)
> 1 year	14 (41.2)

[a] Data are presented as No. (%).

Table 2. The Results of Scores on Two NPDS and NDI Questionnaires

Questionnaire	Mean ± SD	Min	Max
NPDS			
Before intervention	56.3 ± 16.1	19	85
6 weeks after intervention	20.9 ± 19.4	0	58.5
3 months after intervention	20.3 ± 26.6	0	91.5
NDI			
Before intervention	20.3 ± 7.5	4	36
6 weeks after intervention	7.3 ± 6.7	0	22
3 months after intervention	5.9 ± 8.4	0	32

5. Discussion

The findings of this study showed that acupuncture plus dry needling can alleviate chronic neck pain. A number of studies (8, 14-17) have already revealed the effectiveness of acupuncture in reducing pain, point tenderness, and improving daily function in patients with chronic neck pain. It is widely accepted that acupuncture stimulates nervous system and causes neurochemicals release. Endogenous opioids, segmental and autonomic nervous system regulation, local effects on brain function and other effects related to the nervous system can reduce pain (8, 14-17). The present study demonstrated that acupuncture and dry needling reduced pain and improved different kind of activities (e.g., activities of daily living as well as social and occupational activities). The results of the final follow-up at the third month showed a marked pain relief compared to start point of the study. Since the subjects of this study were not allowed to take acupuncture or needling from 6th to 12th week, it seems that the pain reduction in final follow up could be mostly related to the long-lasting effect of acupuncture plus dry needling. These findings are consistent with the study of Hurwitz et al. (18), which showed the positive effects of physical therapy and acupuncture in controlling chronic neck pain and improving the ability of patients. In Hurwitz et al. study, it was reported that acupuncture, supervised physical therapy and manual techniques are more effective than no treatment or other alternative therapies for neck pain without radicular symptoms (18). The results of a meta-analysis study of Furlan et al. (8) discovered that complementary therapies such as acupuncture, shortly after treatment and during the follow-up, were more effective than no treatment, physiotherapy, or routine treatments in reducing pain and disability, but their long-term effects were not much greater than other methods. If our study lasted for 6 months or more, the long-term effects of acupuncture could be examined, but it was impossible to assess long-term effects in the present study. Irnich et al. showed that there is little evidence on the long-term effects of acupuncture in reducing chronic neck pain, although studies have shown that they are very effective in the short term (9). On the other hand, there are studies indicating that combination therapy is more effective than treatment alone with either method; and the combination of medication and acupuncture (and/or the combination of acupuncture, exercise, and massage therapy or physiotherapy) has better results (19).

Contrary to our findings, a study showed that acupuncture had no significant effect on pain relief (13). In addition, other studies have shown that acupuncture has not been more effective than placebo in reducing chronic neck pain (20-22). It seems that different results obtained from multiple studies can be attributed to the problems with studying the pain itself, which is a personal emotional impression, and examining its reduction in the studies can give different results in different cultures. On the other hand, the indexes used to measure pain are different in the studies, so that in this study, we used the NPDS and NDI questionnaires, which was different from other studies. If the patients in different studies were matched on the same cause of neck pain the various results could be less. According to a recent systematic review there is a strong evidence to support dry needling

in the treatment of chronic neck pain related to multiple trigger points in upper trapezius muscle (23). The results of another study (24) showed that acupuncture at distant points improved pain and range of motion more than dry needling in trapezius trigger points. Since, we used combination therapy for neck pain in this study, then it is not possible to compare dry needling with acupuncture in the present study. Therefore, the result of this study can only indicate that combination therapy is a good strategy to reduce chronic neck pain. Certainly, further studies about complications of each treatment method as well as their costs can be very valuable in management of chronic neck pain. Unlike previous surveys, patients with radicular neck pain without any specific dermatome or myotome involvement were also included in this study. Hence from this point of view, the present study is unique. In conclusion, acupuncture plus dry needling can be used as a successful conservative treatment for radicular as well as non-radicular neck pain.

The present study indicated that acupuncture plus dry needling is an effective treatment method for chronic neck pain in the short- (6 weeks) and medium-term (12 weeks) periods. Radicular neck pain without presence of red flags can also be treated by combination therapy of acupuncture and dry needling.

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Authors' Contributions

All of authors equally contributed in this study.

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References

1. Yun KW, Cho EY, Hong KB, Choi EH, Lee HJ. Streptococcus pneumoniae type determination by multiplex polymerase chain reaction. *J Korean Med Sci*. 2011;**26**(8):971–8.
2. Cho JH, Nam DH, Kim KT, Lee JH. Acupuncture with non-steroidal anti-inflammatory drugs (NSAIDs) versus acupuncture or NSAIDs alone for the treatment of chronic neck pain: an assessor-blinded randomised controlled pilot study. *Acupunct Med*. 2014;**32**(1):17–23.
3. Kanchanomai S, Janwantanakul P, Pensri P, Jiamjarasrangsi W. Risk factors for the onset and persistence of neck pain in undergraduate students: 1-year prospective cohort study. *BMC Public Health*. 2011;**11**:566.
4. Hakala P. Back, neck, and shoulder pain in Finnish adolescents: national cross sectional surveys. *Bmj*. 2002;**325**(7367):743.
5. Kallenberg LAC, Hermens HJ, Vollenbroek-Hutten MMR. Distinction between computer workers with and without work-related neck–shoulder complaints based on multiple surface EMG parameters. *Int J Industrial Ergonomics*. 2006;**36**(10):921–9.
6. Aker PD, Gross AR, Goldsmith CH, Peloso P. Conservative management of mechanical neck pain: systematic overview and meta-analysis. *Bmj*. 1996;**313**(7068):1291–6.
7. Kotani N, Hashimoto H, Sato Y, Sessler DI, Yoshioka H, Kitayama M, et al. Preoperative intradermal acupuncture reduces postoperative pain, nausea and vomiting, analgesic requirement, and sympathoadrenal responses. *Anesthesiology*. 2001;**95**(2):349–56.
8. Furlan AD, Yazdi F, Tsertsvadze A, Gross A, Van Tulder M, Santaguida L, et al. A Systematic Review and Meta-Analysis of Efficacy, Cost-Effectiveness, and Safety of Selected Complementary and Alternative Medicine for Neck and Low-Back Pain. *Evidence-Based Complementary and Alternative Medicine*. 2012;**2012**:1–61.
9. Irnich D, Behrens N, Molzen H, Konig A, Gleditsch J, Krauss M, et al. Randomised trial of acupuncture compared with conventional massage and "sham" laser acupuncture for treatment of chronic neck pain. *BMJ*. 2001;**322**(7302):1574–8.
10. David J, Modi S, Aluko AA, Robertshaw C, Farebrother J. Chronic neck pain: a comparison of acupuncture treatment and physiotherapy. *Br J Rheumatol*. 1998;**37**(10):1118–22.
11. White A. A systematic review of randomized controlled trials of acupuncture for neck pain. *Rheumatol*. 1999;**38**(2):143–7.
12. Smith LA, Oldman AD, McQuay HJ, Moore AR. Teasing apart quality and validity in systematic reviews: an example from acupuncture trials in chronic neck and back pain. *Pain*. 2000;**86**(1):119–32.
13. Douglass AB, Bope ET. Evaluation and treatment of posterior neck pain in family practice. *J American Board Family Practice*. 2004;**17**(suppl 1):S13–22.
14. Eslamian F, Hajalilou M, Mohammadi L. Effects of acupuncture and laser therapy in the treatment of cervical pain syndrome Myofascial. *Tebeh Jonoub*. 2013;**16**:380–93.
15. Tan MG, Win MT, Khan SA. The use of complementary and alternative medicine in chronic pain patients in Singapore: a single-centre study. *Ann Acad Med Singapore*. 2013;**42**(3):133–7.
16. Heydarnia MA. *Practical principles and theories in acupuncture*. Tehran: Horufieh; 2000.
17. Fathi Najafi T, Hejazi M, Meshkat M, Hajibabakashani S. Quality of life and performing acupuncture on 150 patients suffering from chronic pains: a randomized and intervention study before and after performing. *Iran Red Crescent Med J*. 2013;**15**(3):269–71.
18. Hurwitz EL, Carragee EJ, van der Velde G, Carroll LJ, Nordin M, Guzman J, et al. Treatment of neck pain: noninvasive interventions: results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. *Spine (Phila Pa 1976)*. 2008;**33**(4 Suppl):S123–52.
19. Sterling M, Valentin S, Vicenzino B, Souvlis T, Connelly LB. Dry needling and exercise for chronic whiplash - a randomised controlled trial. *BMC Musculoskeletal Disorders*. 2009;**10**(1):160.
20. Zhang SP, Chiu TT, Chiu SN. Long-term efficacy of electroacupuncture for chronic neck pain: a randomised controlled trial. *Hong Kong Med J*. 2013;**19 Suppl 9**:36–9.
21. Ezzo J, Berman B, Hadhazy VA, Jadad AR, Lao L, Singh BB. Is acupuncture effective for the treatment of chronic pain? A systematic review. *Pain*. 2000;**86**(3):217–25.
22. White P, Lewith G, Prescott P, Conway J. Acupuncture versus placebo for the treatment of chronic mechanical neck pain: a randomized, controlled trial. *Ann Intern Med*. 2004;**141**(12):911–9.
23. Cagnie B, Castelein B, Pollie F, Steelant L, Verhoeyen H, Cools A. Evidence for the Use of Ischemic Compression and Dry Needling in the Management of Trigger Points of the Upper Trapezius in Patients with Neck Pain: A Systematic Review. *Am J Phys Med Rehabil*. 2015.
24. Irnich D, Behrens N, Gleditsch JM, Stor W, Schreiber MA, Schops P, et al. Immediate effects of dry needling and acupuncture at distant points in chronic neck pain: results of a randomized, double-blind, sham-controlled crossover trial. *Pain*. 2002;**99**(1):83–9.