Short-term effects of dry needling with a standard exercise programme on pain and quality of life in patients with chronic mechanical neck pain

Submitted by
Muhammad Abdulrahman Almushahhim

21-01-2022
Introduction

Neck pain is considered a common public health issue in the general population, with prevalence rates ranging from 16.7% to 75.1% (mean: 37.2%) and a lifetime prevalence rate of 48.5% (Onat et al., 2019). Chronic mechanical neck pain (CMNP) is a type of pain in the neck and/or shoulder region that has mechanical characteristics, such as symptoms exacerbated by cervical movements and maintenance of neck posture for a prolonged period. Cervical pain with or without radiation and that has not been recognised by pathological etiology is known as CMNP and also as non-specific neck pain. Among the most commonly affected muscles are the upper trapezius, elevator scapulae, splenius and multifidi (Cerezo-Téllez et al., 2016).

Neck pain is the most prevalent musculoskeletal condition in the general population after lower back pain. According to Cote et al., at least 64% of the total population experience neck pain. Chronic pain affects 20% of adults on a mean prevalence weighted level and increases with age (62% of adults above 75 years, 32% of adults aged 25–34 years). This is higher than the percentage of people in the same population with diabetes or asthma (Geneen et al., 2017). Moreover, CMNP related to disability, with long-term follow-up, is becoming more common. Around 50% of neck pain patients suffer from chronic symptoms with mild disabilities, which causes considerable economic expenses (Javanshir et al., 2010) and may lead to poor quality of life. Geneen et al. (2017) and Leadley et al. (2014) found that CMNP patients have a lower quality of life than people with lumbar disorders and that lifestyles appear to be changing the prevalence rates of cervical disorders.

The specific pathology of CMNP remains unclear, however, because there are few known cases of CMNP, even of trauma or severe degenerative conditions. It is assumed that neck pain has many causes (Ylinen et al., 2003). CMNP is also a common feeling of hyperalgesia in the skin, muscles and ligaments in both active and passive movements and on palpation; medical examinations or diagnostic imaging often shows the precise source and cause of neck pain (Ylinen, 2007).
Physical therapists use various treatment methods for CMNP, such as exercise therapy, mobilisation, manipulation (Gross et al., 2010; Cross et al., 2011), traction (Graham et al., 2008) and electrotherapy (Llamas-Ramos et al., 2014). One of the most widely used treatment methods for mechanical neck disorders is exercise therapy. Exercise therapy involves a wide range of approaches with the patient’s active involvement, such as stretching, mobilising exercises, static/isometric exercises, proprioceptive exercises and endurance training (Sarig-Bahat, 2003). It has been proven to be beneficial for non-specific chronic neck pain irrespective of the exercise type, including isotonic or isometric neck endurance or strengthening exercises (Hurwitz et al., 2008). Moderate-quality evidence from two studies indicates that neck pain exercise programmes, including active cervical rotations, resistance training and stretching, may have positive impacts on pain and function, but not immediately on quality of life (Gross et al., 2015). Specific moderate- and high-intensity exercises of the neck muscles will reduce the pain in the neck. CMNP patients’ intensive regular training will increase their neck muscle strength and range of motion, leading to less impairment and better function (Ylinen, 2007). There is moderate evidence of the efficacy of exercise when done alone for both short- and long-term subacute and chronic mechanical neck disorders, and good evidence when it is paired with mobilisation or manipulation (Kay et al., 2005; Ylinen, 2007).

Trigger point dry needling (TrP-DN) is an invasive procedure involving the insertion of a solid-filament needle into a trigger point characterised as a hyperirritable part or nodule of exquisite tenderness to palpation, which is known as the myofascial trigger point (MTrP). According to Borg-Stein (2004) and Andersen et al. (2011), TrP can exist in the upper trapezius muscle and the cervical and shoulder muscles in neck pain patients. Some authors argue that MTrPs are the leading cause of neck pain (Pecos-Martín et al., 2015). Dry needling (DN) is a non-pharmacological procedure widely used for MTrP-associated pain relief in myofascial pain syndrome. It helps reduce pain secondary to MTrPs by eliciting one or more local twitch responses (LTRs) (Gerber et al., 2015). Several studies (Ay et al., 2010; Cummings & White, 2001; Venancio Rde et al., 2008) have found that the effects of DN generally stem from the mechanical disruption of the muscle fibres and nerve endings caused by the needle prick, and some authors have reported that an LTR is evoked during DN. Recent studies have indicated that DN into the upper-quarter trapezius muscle relieves myofascial pain syndromes, especially neck pain. In the study by Perreault et al. (2017), TrP-DN resulted in immediate pain relief and improvement of the range of motion with a 4-week follow-up.

Several studies indicated that TrP-DN is more effective than sham needling in alleviating neck pain (Itoh et al., 2007; Tekin et al., 2013). According to a meta-analysis by Kietrys et al. (2013), DN is beneficial for rapid pain alleviation in neck pain patients after 4-week treatment and follow-up. The motor endplate hyperactivity and sympathetic nervous irritability were reduced after only one session of DN into the active MTrPs (Abbaszadeh-Amirdehi et al., 2017). DN seems effective for symptom alleviation and active MTrP deactivation (Abbaszadeh-Amirdehi et al., 2017). Although there have been a few studies on the advantages of DN and exercise therapy in the treatment of CMNP, it is unknown whether the benefits of TrP-DN with exercise exceed those of neck exercise alone (Gattie et al., 2021).
Research question:

Does DN in addition to exercise have a better effects than exercise alone in treating chronic mechanical neck pain?

Significance of the study

Dry needling is considered easy and safe to apply without any hazard or harmful effect; if the therapist knows how to apply it, it will reduce the treatment cost and effort. Moreover, to guide the physical therapist to choose the proper and further impact treatment program effectively and improve the pain and quality of life to the patient with mechanical neck pain.

The aim of the study

To determine the short-term effects of dry needling (DN) with a standard exercise programme on pain and quality of life in patients with chronic mechanical neck pain (CMNP)
Null hypothesis:

Dry needling in addition to a standardised exercise protocol has similar short-term effect in quality of life and pain in comparison to standardised exercise protocol alone in patients with "chronic mechanical neck pain".

Alternate Hypothesis

Dry needling in addition to standardised exercise protocol can cause a short-term improvement in pain and quality of life in patients with CMNP in comparison to standardised exercise protocol alone.
Material and Methods:

Study design

“Single blinded Randomised control trial, pre-test and post-test-control group design”.

Subjects

Eighteen participants between the ages 18 to 60 with chronic mechanical neck pain will be allocated randomly into a control group and an experimental group. The subjects will be recruited from physical therapy clinic in king Fahad hospital of the university.

Sampling

Participant will be selected non-random (nonprobability) and will use sample of convenience in which available subjects that fit criteria will be taken.

Randomization

Participant will be randomly allocated into two groups by using a toss of coin.

Ethics approval

Ethical approval was obtained from Imam Abdulrahman bin Faisal university.
Sample size

The sample size was calculated as 18 ie. nine in each group on the basis of a previous study that investigated the effects of DN injection and kinesiotaping on pain and quality of life in CMNP patients (Onat et al., 2019), by calculating following details: Group 1 mean = 13.4, SD = 4.9; Group 2 mean = 6.9; ratio between the two groups = 1:1 ($p = 0.05$), 80% power and 0.05 type 1 error.

The following website link was used for the sample size calculation.

Figure 1: Sample Size Calculation

CONSORT 2010 Flow Diagram

Final number of participants assessed for eligibility (n= 18)

Randomised (n= 18 )

Experimental Group (9)
Received dry needling and exercise
Exercise Mentioned in Table 1

Control group (9)
• Received only exercise
• Mentioned in Table 1

“NPS-11, Neck Disability Index (NDI), Quality of Life (SF-36 QOLS), Beck Depression Inventory (BDI)”

Participant in experimental group will receive dry needling + exercise.

Participant in control group will receive standard physical therapy exercise

Participant will be reassessed after 10 minutes after finishing the last intervention

Allocation

Baseline

Intervention

Post test
Inclusion criteria

1- Participants medically diagnosed having chronic mechanical neck pain by a primary physician or by an orthopaedic consultant which will be screened by primary investigator
2- Participants classified to have neck pain and is chronic in nature provoked by movement of the neck, neck postures, and cervical palpation
3- Chronic neck pain from lasting more than 12 weeks
4- Participants when recruited for the study must be not under any treatment for their chronic neck pain

Exclusion criteria

1- Radiculopathy symptoms; neurologic deficits as reported by participants
2- Confirmed cervical myelopathy or radiculopathy medical diagnosis
3- Fear of needles
4- Reported history of shoulder injury, whiplash injury or cervical spine injury
5- Any ‘red flags’ (malignancy, inflammatory arthritis, fracture, osteoporosis, and others).
6- Patient with congenital problem
7- Any treatment that might be received by the participants at the time of recruitment in the study
Procedure

The participants will be screened by the primary investigator to make sure that they are fit to participate in the study based on inclusion criteria.

All participants will be explained to them the idea of the research (including benefits, risks, time needed, source of funding) and will be explained to the participant. If the subject is ready to participate in the study, a consent form will be provided to them and upon their approval, participant will be included in the study. The participants will be randomised into two groups "experimental group and control group". In experimental group, participants will be provided synergistic interventions, including exercise and dry needling within the duration of 2 weeks. Only exercise will be conducted as the intervention for the participants in the control group (Table 1) within 2 weeks as well (Onat et al.2019.). The participants of the study will be blinded regarding the intervention.

Pre-test

Participants after allocation to one of the two groups and before receiving the first intervention they will be assessed by answering questioners about their pain intensity, quality of life, neck functional disability, and depression
Outcome Measures

Questionnaires will be used for patient evaluations and progression during the experiment. Numeric Rating Scale (NPS-11) will be used to assess the intensity of the pain. The NPS-11 ranges between 0 and 10 (0: minimum pain, 10: maximum pain). NPS-11 has been identified as an effective tool for the analysis and intensity of pain among patients (Jensen et al., 1999)[appendix A]. The Arabic version of the NPS11 will be used in the current study which is also found reliable and valid (Alghadir, Anwer and Iqbal, 2016).

In order to detect the functional disability, Neck Disability Index (NDI) will be used. NDI has been designed to assess the pain intensity of the neck and how it affects the quality of life by affecting the daily activities. Total NDI score is 0 and 54 and consists of 10 questions (MacDermid et al., 2009). The NDI form in holds significant reliability and validity in Arabic version (Shaheen, Omar and Vernon, 2013)[appendix B]. To assess the quality of the patients, "Short Form-36 Quality of Life Scale (SF-36 QOLS)" will be used (Ware and Sherbourne, 1992). 8 sub-scores are contained in the SF-36 QOLS assessing the physical functions of the body through analysis of body pain, physical role difficulties (PRD), vitality/energy, general perception of health, social functions and mental health. The sub-scores will be calculated separately between 0 and 100 (0: the worst, 100: the best health status). The study will also assess the scores of two main components of health i.e., mental and physical health. The Arabic validation was performed (Khoudri et al., 2007)[appendix C]. To assess patient depression “Beck Depression Inventory (BDI)” will be used (Beck et al., 1961). An Arabic version of BDI will be used in the current study (Fawzi, Fawzi and Abu-Hindi, 2012). The total score of BDI will be evaluated between 0 and 63. BDI scores near to high range or above than that indicate more sever forms of depression (Beck et al., 1961) [appendix D].
Intervention

Dry Needling

Dry needling addition to the exercise protocol will be applied in experimental group while the control group will be receiving exercise protocol only. Dry needling will be applied overactive trigger points of the upper trapezius muscle. Needling on trigger points will be performed in the upper trapezius muscle. Patients will be in a prone position; needle will be inserted into the skin until the first local twitch response obtained after that needle will be moved for 25 to 30 second. The needle will move up and down at approximately 1Hz (2- to 3-mm vertical motions with no rotations. According to healthcare evidence, TrPDN is most effective practice if, during the needle therapy, local twitch response (LTR) is elicited (Onat et al., 2019.; Sterling et al., 2009).

The trigger point will be identified by using the following criteria:

1. Visible or palpable local twitch upon insertion of the needle on pincer palpation
2. Appearance of a hypersensitive spot in the palpable taut band
3. Pain recurrence at the sensitive spot upon palpation

Stainless-steel disposable needles ((0.3 × 30 mm; Novasan, S.A.)) will be used for the TrP (Trigger point) DN. Fast-in and fast-out needle insertion method, reported by Hong (Hong, 1994) will be used and a TrP area will be palpated and marked for needle insertion in the upper trapezius muscle. After performing the needle insertion, alcohol swabs will be used to sterilise the TrP area. Needle insertion will be performed until a local twitch response is obtained as the needle inserted to penetrate into the skin for up to 10 to 15 mm. In order to regain the homeostasis, the injected area will be firmly compressed for less than 10 minutes, DN injection will be performed once at the first session and before starting the exercise (Onat et al., 2019.) and participant will be followed for two weeks. The day after needling participant will start the exercises for two weeks one time a day (table1). Applying needles session will be achieved by the researcher which is qualified and certified as (DN practitioners).
Infection control in DN application:

**Standard precautions include:**

1) Hand Hygiene before and after the needling
2) Wearing a gloves before start needling.
3) Cleaning the environment before and after
4) Before needling patient will be swabbed by alcohol swab.
5) After finishing the needling procedure, needle will be disposed at medical trash.
6) Patient will be swabbed again by alcohol swab.

(“ASAP_Guidelines_2013.pdf,” .)

**Needling risk factors:**

Evidence on the safety of needling techniques comes primarily from prospective studies investigating Adverse Events following acupuncture. Results from acupuncture Adverse Events studies cannot be extrapolated and applied to TrP-DN as it differs from acupuncture in the points treated and the method and depth of needle stimulation. Witt et al conducted a study on 229233 patients with 2.2 million needle treatments, most were mild, including bleeding, hematomas, and pain. (witt et al.2009).

**Adverse effects include:**

- Bruising
- Minor bleeding at needling site
- Pain during or following treatment at needling site.
- Skin irritation

In case any of the study subjects have any complication with needling intervention he will be transverse immediately to emergency department in the same hospital at king Fahad hospital
Neck exercise protocol:

Both the experimental and control groups will be underwent a 2-week standardised neck exercise programme consisting of three sessions a week and three sets within ten repetitions of strengthening exercise and, stretching exercise within thirty second of holding for the neck and upper-back muscles, re-education of the neutral posture and retraining of the scapular muscles (Onat et al., 2019). The details of the exercise programme are shown in Table 1. The primary investigator will be supervised all the exercise sessions.
<table>
<thead>
<tr>
<th>Exercise</th>
<th>Description</th>
</tr>
</thead>
</table>
| Cranio-cervical spine flexion | - For the neck and upper-back muscles  
- Neck flexors’ holding capacity training  
- Cranio-cervical movement re-education  
- Re-education and retraining of “cranio-cervical flexors” eccentric control in “upright postures”  
- 3 sets with 10 repetitions |
| Cranio-cervical spine extension | - For the neck and upper-back muscles  
- Education and training of staff for extension of cranio-cervical muscles  
- Neck extensors’ training holding capacity  
- 3 sets with 10 repetitions |
| Shoulder elevation exercise | - For upper-back muscles  
- Shoulder elevation toward the ceiling  
- 3 sets with 10 repetitions |
| Scapular muscles retraining | - For the upper-back muscles  
- Endurance capacity training of the “scapular stabilisers”  
- Scapular orientation retraining in neural posture  
- Scapular control retraining with load and arm movement  
- 3 sets with 10 repetitions |
| Right Side bending and Left Side bending through con contraction of neck muscles | - For the neck muscles  
- Use of “self-resisted isometric rotation” for facilitated rotation in either correct upright sitting posture or in supine posture  
- 3 sets with 10 repetitions |
| Neck protrusion exercise | - For the neck and muscles  
- By pushing the head forward and isometric self- resisted  
- 3 sets with 10 repetitions |
| Stretching exercise | - By pulling the head to the contralateral side  
- Stretched for 30sec |

*Table 1: Exercise protocol for control group and experimental group*
Post-test

Participant will be assessed again 10 minutes after the last intervention by using the same questioner that’s used before the first intervention.

Statistical Analysis

SPSS 23.0 version will be used for the statistical analysis of the data., For the normality distribution of the data will be checked by Kolmogorov–Smirnov test. Paired t-test will be used to find out the effectiveness of each intervention and between group comparison will be done by independent t test and the chi-square test will be used to compare the distribution of categorical variables. The significance level will be set at p≤0.05 with a 95% confidence interval.

Confidentiality:

Data will be kept confidently, and it will be kept in a computer with a password, no identity of the individual will be expose, data will be collected collectively.

Significance of the study

Dry needling considers being easy and safe to apply without any hazard or harmful effect if the therapist well known how to apply it, it will contribute for reducing the treatment cost and effort. Moreover, to guide the physical therapist to choose the proper and further impact treatment program effectively and improve the pain and quality of life to the patient with mechanical neck pain.


Appendixes B

Neck Disability Index

This questionnaire has been designed to give us information as to how your neck pain has affected your ability to manage in everyday life. Please answer every section and mark in each section only the one box that applies to you. We realise you may consider that two or more statements in any one section relate to you, but please just mark the box that most closely describes your problem.

Section 1: Pain Intensity
☐ I have no pain at the moment
☐ The pain is very mild at the moment
☐ The pain is moderate at the moment
☐ The pain is severe at the moment
☐ The pain is the worst imaginable at the moment

Section 2: Personal Care (Washing, Dressing, etc.)
☐ I can look after myself normally without causing extra pain
☐ I can look after myself normally but it causes extra pain
☐ It is painful to look after myself and I am slow and careful
☐ I need some help but can manage most of my personal care
☐ I need help every day in most aspects of self care
☐ I do not get dressed, wash with difficulty and stay in bed

Section 3: Lifting
☐ I can lift heavy weights without extra pain
☐ I can lift heavy weights but it gives extra pain
☐ Pain prevents me lifting heavy weights off the floor, but I can manage if they are conveniently placed, for example on a table

Section 4: Reading
☐ I can read as much as I want to without any distress
☐ I can read as much as I want to with slight pain in my neck
☐ I can read as much as I want to with moderate pain in my neck
☐ I cannot read at all because of moderate pain in my neck
☐ I cannot read at all

Section 5: Headaches
☐ I have no headaches at all
☐ I have slight headaches which come infrequently
☐ I have moderate headaches, which come infrequently
☐ I have severe headaches, which come frequently
☐ I have headaches almost all the time

Section 6: Concentration
☐ I can concentrate fully when I want to with no difficulty
☐ I can concentrate fully when I want to with slight difficulty
☐ I have a fair degree of difficulty in concentrating when I want to

Section 7: Work
☐ I can do as much work as I want to
☐ I can only do my usual work, but no more
☐ I cannot do my usual work
☐ I can hardly do any work at all
☐ I can't do any work at all

Section 8: Driving
☐ I can drive my car without any neck pain
☐ I can drive my car as long as I want with slight pain in my neck
☐ I can drive my car as long as I want with moderate pain in my neck
☐ I can't drive my car as long as I want because of moderate pain in my neck
☐ I can hardly drive at all because of severe pain in my neck
☐ I can't drive my car at all

Section 9: Sleeping
☐ I have no trouble sleeping
☐ My sleep is slightly disturbed (less than 1 hr sleepless)
☐ My sleep is moderately disturbed (1-2 hr sleepless)
☐ My sleep is severely disturbed (2-3 hrs sleepless)
☐ My sleep is completely disturbed (3-5 hrs sleepless)
☐ My sleep is extremely disturbed (6-7 hrs sleepless)

Section 10: Recreation
☐ I am able to engage in all my recreation activities with no neck pain at all
☐ I am able to engage in all my recreation activities, with some pain in my neck
☐ I am able to engage in most, but not all of my usual recreation activities because of pain in my neck
☐ I am able to engage in a few of my usual recreation activities because of pain in my neck
☐ I can hardly do any recreation activities because of pain in my neck
☐ I can't do any recreation activities at all

Score: __/50

Transform score as a percentage: score x 100 = %

Scoring: For each section the total possible score is 5; if the first statement is marked the section score = 0, if the last statement is marked it = 5. If all ten sections are completed the score is calculated as follows:

Score = (total score) x 100 = %

If one section is missed or not applicable the score is calculated:

Score = (total score) / 5 = %

Minimum Detectable Change (90% confidence): 5 points or 10 %

Appendix C

SF-36 QUESTIONNAIRE

<table>
<thead>
<tr>
<th>Name:</th>
<th>Ref. Dr:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID#:</td>
<td>Age:</td>
<td>Gender: M / F</td>
</tr>
</tbody>
</table>

Please answer the 36 questions of the Health Survey completely, honestly, and without interruptions.

GENERAL HEALTH:
In general, would you say your health is:
- □ Excellent
- □ Very Good
- □ Good
- □ Fair
- □ Poor

Compared to one year ago, how would you rate your health in general now?
- □ Much better now than one year ago
- □ Somewhat better now than one year ago
- □ About the same
- □ Somewhat worse now than one year ago
- □ Much worse than one year ago

LIMITATIONS OF ACTIVITIES:
The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

- Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports.
  - □ Yes, Limited a lot
  - □ Yes, Limited a Little
  - □ No, Not Limited at all

- Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf
  - □ Yes, Limited a Lot
  - □ Yes, Limited a Little
  - □ No, Not Limited at all

- Lifting or carrying groceries
  - □ Yes, Limited a Lot
  - □ Yes, Limited a Little
  - □ No, Not Limited at all

- Climbing several flights of stairs
  - □ Yes, Limited a Lot
  - □ Yes, Limited a Little
  - □ No, Not Limited at all

- Climbing one flight of stairs
  - □ Yes, Limited a Lot
  - □ Yes, Limited a Little
  - □ No, Not Limited at all

- Bending, kneeling, or stooping
  - □ Yes, Limited a Lot
  - □ Yes, Limited a Little
  - □ No, Not Limited at all

- Walking more than a mile
  - □ Yes, Limited a Lot
  - □ Yes, Limited a Little
  - □ No, Not Limited at all

- Walking several blocks
  - □ Yes, Limited a Lot
  - □ Yes, Limited a Little
  - □ No, Not Limited at all

- Walking one block
  - □ Yes, Limited a Lot
  - □ Yes, Limited a Little
  - □ No, Not Limited at all
Bathing or dressing yourself
☐ Yes, Limited a Lot  ☐ Yes, Limited a Little  ☐ No, Not Limited at all

PHYSICAL HEALTH PROBLEMS:
During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

Cut down the amount of time you spent on work or other activities
☐ Yes  ☐ No

Accomplished less than you would like
☐ Yes  ☐ No

Were limited in the kind of work or other activities
☐ Yes  ☐ No

Had difficulty performing the work or other activities (for example, it took extra effort)
☐ Yes  ☐ No

EMOTIONAL HEALTH PROBLEMS:
During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

Cut down the amount of time you spent on work or other activities
☐ Yes  ☐ No

Accomplished less than you would like
☐ Yes  ☐ No

Didn’t do work or other activities as carefully as usual
☐ Yes  ☐ No

SOCIAL ACTIVITIES:
Emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?
☐ Not at all  ☐ Slightly  ☐ Moderately  ☐ Severe  ☐ Very Severe

PAIN:
How much bodily pain have you had during the past 4 weeks?
☐ None  ☐ Very Mild  ☐ Mild  ☐ Moderate  ☐ Severe  ☐ Very Severe

During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?
☐ Not at all  ☐ A little bit  ☐ Moderately  ☐ Quite a bit  ☐ Extremely
ENERGY AND EMOTIONS:
These questions are about how you feel and how things have been with you during the last 4 weeks. For each question, please give the answer that comes closest to the way you have been feeling.

Did you feel full of pep?
☐ All of the time
☐ Most of the time
☐ A good Bit of the Time
☐ Some of the time
☐ A little bit of the time
☐ None of the Time

Have you been a very nervous person?
☐ All of the time
☐ Most of the time
☐ A good Bit of the Time
☐ Some of the time
☐ A little bit of the time
☐ None of the Time

Have you felt so down in the dumps that nothing could cheer you up?
☐ All of the time
☐ Most of the time
☐ A good Bit of the Time
☐ Some of the time
☐ A little bit of the time
☐ None of the Time

Have you felt calm and peaceful?
☐ All of the time
☐ Most of the time
☐ A good Bit of the Time
☐ Some of the time
☐ A little bit of the time
☐ None of the Time

Did you have a lot of energy?
☐ All of the time
☐ Most of the time
☐ A good Bit of the Time
☐ Some of the time
☐ A little bit of the time
☐ None of the Time
Have you felt downhearted and blue?
- All of the time
- Most of the time
- A good Bit of the Time
- Some of the time
- A little bit of the time
- None of the Time

Did you feel worn out?
- All of the time
- Most of the time
- A good Bit of the Time
- Some of the time
- A little bit of the time
- None of the Time

Have you been a happy person?
- All of the time
- Most of the time
- A good Bit of the Time
- Some of the time
- A little bit of the time
- None of the Time

Did you feel tired?
- All of the time
- Most of the time
- A good Bit of the Time
- Some of the time
- A little bit of the time
- None of the Time

SOCIAL ACTIVITIES:
During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?
- All of the time
- Most of the time
- Some of the time
- A little bit of the time
- None of the Time
GENERAL HEALTH:
How true or false is each of the following statements for you?

I seem to get sick a little easier than other people
☐ Definitely true    ☐ Mostly true    ☐ Don't know    ☐ Mostly false    ☐ Definitely false

I am as healthy as anybody I know
☐ Definitely true    ☐ Mostly true    ☐ Don't know    ☐ Mostly false    ☐ Definitely false

I expect my health to get worse
☐ Definitely true    ☐ Mostly true    ☐ Don't know    ☐ Mostly false    ☐ Definitely false

My health is excellent
☐ Definitely true    ☐ Mostly true    ☐ Don't know    ☐ Mostly false    ☐ Definitely false
Appendix D

Beck’s Depression Inventory

This depression inventory can be self-scored. The scoring scale is at the end of the questionnaire.

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully and then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including item 16 (Changes in Sleeping Pattern) or item 18 (Changes in Appetite.)

1. 0 I do not feel sad.
   1 I feel sad.
   2 I am sad all the time and I can't snap out of it.
   3 I am so sad and unhappy that I can't stand it.

2. 0 I am not particularly discouraged about the future.
   1 I feel discouraged about the future.
   2 I feel I have nothing to look forward to.
   3 I feel the future is hopeless and that things cannot improve.

3. 0 I do not feel like a failure.
   1 I feel I have failed more than the average person.
   2 As I look back on my life, all I can see is a lot of failures.
   3 I feel I am a complete failure as a person.

4. 0 I get as much satisfaction out of things as I used to.
   1 I don't enjoy things the way I used to.
   2 I don't get real satisfaction out of anything anymore.
   3 I am dissatisfied or bored with everything.

5. 0 I don't feel particularly guilty.
   1 I feel guilty a good part of the time.
   2 I feel quite guilty most of the time.
   3 I feel guilty all of the time.

6. 0 I don't feel I am being punished.
   1 I feel I may be punished.
   2 I expect to be punished.
   3 I feel I am being punished.

7. 0 I don't feel disappointed in myself.
   1 I am disappointed in myself.
   2 I am disgusted with myself.
   3 I hate myself.
### Questionnaire Items

<table>
<thead>
<tr>
<th>Question</th>
<th>Response Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td></td>
</tr>
</tbody>
</table>

**Q8.** I don’t feel I am any worse than anybody else.

- 0
- 1 I am critical of myself for my weaknesses or mistakes.
- 2 I blame myself all the time for my faults.
- 3 I blame myself for everything bad that happens.

**Q9.** I don’t have any thoughts of killing myself.

- 0
- 1 I have thoughts of killing myself, but I would not carry them out.
- 2 I would like to kill myself.
- 3 I would kill myself if I had the chance.

**Q10.** I don’t cry any more than usual.

- 0
- 1 I cry more now than I used to.
- 2 I cry all the time now.
- 3 I used to be able to cry, but now I can’t cry even though I want to.

**Q11.** I am no more irritated by things than I ever was.

- 0
- 1 I am slightly more irritated now than usual.
- 2 I am quite annoyed or irritated a good deal of the time.
- 3 I feel irritated all the time.

**Q12.** I have not lost interest in other people.

- 0
- 1 I am less interested in other people than I used to be.
- 2 I have lost most of my interest in other people.
- 3 I have lost all of my interest in other people.

**Q13.** I make decisions about as well as I ever could.

- 0
- 1 I put off making decisions more than I used to.
- 2 I have greater difficulty in making decisions more than I used to.
- 3 I can’t make decisions at all anymore.

**Q14.** I don’t feel that I look any worse than I used to.

- 0
- 1 I am worried that I am looking old or unattractive.
- 2 I feel there are permanent changes in my appearance that make me look unattractive.
- 3 I believe that I look ugly.

**Q15.** I can work about as well as before.

- 0
- 1 It takes an extra effort to get started at doing something.
- 2 I have to push myself very hard to do anything.
- 3 I can’t do any work at all.

**Q16.** I can sleep as well as usual.

- 0
- 1 I don’t sleep as well as I used to.
- 2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
- 3 I wake up several hours earlier than I used to and cannot get back to sleep.
17. 0 I don't get more tired than usual.
    1 I get tired more easily than I used to.
    2 I get tired from doing almost anything.
    3 I am too tired to do anything.

18. 0 My appetite is no worse than usual.
    1 My appetite is not as good as it used to be.
    2 My appetite is much worse now.
    3 I have no appetite at all anymore.

19. 0 I haven't lost much weight, if any, lately.
    1 I have lost more than five pounds.
    2 I have lost more than ten pounds.
    3 I have lost more than fifteen pounds.

20. 0 I am no more worried about my health than usual.
    1 I am worried about physical problems like aches, pains, upset stomach, or constipation.
    2 I am very worried about physical problems and it's hard to think of much else.
    3 I am so worried about my physical problems that I cannot think of anything else.

21. 0 I have not noticed any recent change in my interest in sex.
    1 I am less interested in sex than I used to be.
    2 I have almost no interest in sex.
    3 I have lost interest in sex completely.

INTERPRETING THE BECK DEPRESSION INVENTORY

Now that you have completed the questionnaire, add up the score for each of the twenty-one questions by counting the number to the right of each question you marked. The highest possible total for the whole test would be sixty-three. This would mean you circled number three on all twenty-one questions. Since the lowest possible score for each question is zero, the lowest possible score for the test would be zero. This would mean you circled zero on each question. You can evaluate your depression according to the Table below.

<table>
<thead>
<tr>
<th>Total Score</th>
<th>Levels of Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>These ups and downs are considered normal</td>
</tr>
<tr>
<td>11-15</td>
<td>Mild mood disturbance</td>
</tr>
<tr>
<td>16-20</td>
<td>Borderline clinical depression</td>
</tr>
<tr>
<td>21-30</td>
<td>Moderate depression</td>
</tr>
<tr>
<td>31-40</td>
<td>Severe depression over 40</td>
</tr>
<tr>
<td>Over 40</td>
<td>Extreme depression</td>
</tr>
</tbody>
</table>
We are Muhannad Abdualrhamn Almushahhim master’s student of Musculoskeletal physiotherapy in Imam Abdulrahman Bin Faisal University at Dammam and Dr. Shibili Nuhmani. It is our pleasure to invite you to participate in this research. We are researching the **short-term effects of dry needling in addition to standardized exercise protocol in pain and quality of life in patients with chronic mechanical neck pain**. The research sample size is 18 adults with chronic neck pain, randomly allocated to an experimental and a control group. The experimental group contains nine participants who are going to be involved in the needling and exercise program consisting of 2 weeks follow up, three times weekly. The other nine participants in the control group are not involved in the dry needling program only they are going to have exercise for two weeks as well, three times weekly.; The participants in the two groups have to be examined and measured twice before and after the training program and the researcher will collect the data. In this research, all the participants should be with chronic neck pain for more than 3 months, with no current injury in neck or the shoulders.

**Study risks** None

**Study conducting:** The experiment is going to take place at king Fahd University hospital both groups will receive the dry needling and/or exercise inside the physical therapy department.

**Study’s potential benefits** Will help the clinicians to determine which treatment methods is more effective for patient with chronic mechanical neck pain.
**Protection of confidentiality** Everything related to the participants’ personality and identity will never be disclosed except to researchers. The data will be saved in a secure computer with a personal password.

**In the event of injury** In the case of injury, while practicing the task (which is very unlikely), we will help you to obtain the medical care needed. But without cost responsibilities of medical care.

**Compensations** There are no compensations at any time or under any conditions.

**Data gained as a result of the study** All the data that is collected will be presented and published in journals or international conferences. However, the participants’ identity will never be revealed.

**Voluntary participation** Participating in this research is completely voluntary. Participants are allowed to withdraw at any time without any consequences or rights. It is essential to state this clearly to the participants. Therefore, we will be very thankful for individuals agreeing to participate.

**Study funds** This study is funded by imam Abdulrahman bin Faisal university.
<table>
<thead>
<tr>
<th>Time frame to finish the Masters:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Time frame</th>
<th>24</th>
<th>23</th>
<th>22</th>
<th>21</th>
<th>20</th>
<th>19</th>
<th>18</th>
<th>17</th>
<th>16</th>
<th>15</th>
<th>14</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethical approval</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data collection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thesis writing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thesis submission</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>