Neck pain: modern approaches in non-pharmacological treatments. Part II

Abstract. Neck pain remains a common though underestimated problem of the modern medicine. The disease affects from one third to over half of the adult population of the planet, and it is associated with the impaired workability and quality of life. Neck pain treatment involves medical and non-medical approaches, but the evidence base for their efficacy and safety is currently being contested. The purpose of the second part of our article is to summarize the data on the effectiveness and safety of some physical therapy methods (physical exercises, kinesiotaping, neck collar braces) and combined methods of physical therapy, discuss the authors’ own experience of the complex treatment of patients, as well as to analyze the modern recommendations for the physical therapy methods used in the neck pain treatment. To achieve this goal, we’ve performed the analysis of reference sources published in the the MedLine, EMBASE, the Cochrane Library, Scopus, Web of Science, CyberLeninka and Russian Science Citation Index (RSCI) databases during the recent decade; those sources containing the results of different trials, meta-analyses and recent Cochrane reviews on the efficacy and safety of various non-pharmacological treatment methods reserved for the neck pain. The article presents the data of the efficacy and safety of physical exercises, kinesiotherapy, and neck collar braces in the neck pain treatment. Additionally, we have developed and tested our physical exercise complexes for the neck pain treatment at various stages (acute, subacute, chronic), which we recommend for use in clinical practice. There are also modern recommendations provided by medical societies and other organizations for the management of neck pain. The obtained results indicate the need for a customized and comprehensive approach to the management of neck pain, taking into account the stage of the disease, the patient’s age, comorbid risk factors, and the results of evidence-based medicine.

Keywords: neck pain; physical therapy; physical exercises; kinesiotaping; neck collars; non-pharmacological methods

Nowadays, the neck pain (NP) afflicts from a third to over a half of adult population throughout their life [1-3]; being an important, though underestimated medical issue. The NP treatment involves both pharmacological and non-pharmacological methods (methods of physical therapy) [4]. However, despite a major accumulated evidence base of its effectiveness in the NP treatment, there is no common approach to manage this category of patients. The issue is contended by various specialists (physical therapists, chiropractors, experts in the conservative and alternative medicine) both within their individual fields and as to the management of patients during various stages of disease.

The aim of the second part of this study is to summarize the data as to the efficacy and safety of some physical therapy methods (therapeutic exercises, kinesiotaping, neck collar braces), combination of various physical therapy methods in the NP treatment, discussion of the authors’ personal experience at to the effectiveness and safety of physical exercises in the complex treatment regimen as well as analysis of modern recommendations on the physical methods of NP treatment.

In order to achieve the given aim, we have performed the analysis of reference materials presented in the MedLine, EMBASE, The Cochrane Library, Scopus, Web of Science, CyberLeninka and Russian Science Citation
Index databases during the recent decade and based on the results of the modern controlled trial, metaanalyses and the latest Cochrane reviews as to the effectiveness and safety of the above-mentioned non-pharmacological NP treatment.

Physical training (Physical exercises, PE) is one of the non-pharmacological NP therapy methods involving PE performed both to the therapeutic and preventive purposes. It is based on the key biological function, the motion and its use. At the present time, the PE complexes involve various exercises: static and dynamic, active and passive, stretching and straining (strength and resistance training) etc.

The neck muscle apparatus includes four groups of muscles (suboccipital muscles, suprathyroid muscles, infrahyoid muscles, proprii colli muscles), the latter being in charge of the motion and bending (forward, backward, sidewise) of the head and neck. The proprii colli muscles are divided into 3 subgroups, namely lateral superficial muscles (platysma muscle, sternocleidomastoid muscle), deep lateral muscles (scalene muscles (anterior, middle, posterior, minimus)) and intermediate deep muscles (longus colli muscle (longus cervicis) and longus capitis muscle). The PE complexes differ in terms of the exercises being used, the neck muscle groups involved (deep or superficial) and shoulder girdle (shoulder joint, scapula, and thorax).

At the moment, there are a great number of studies on the use of the PE in the NP treatment, both as a monotherapy [5] and in combination with other pharmacological and non-pharmacological methods [6-10]. There are ongoing discussions as to the selection of exercises providing maximal effect in the NP treatment at the acute stage [7, 11].

In the recently published prospective cohort study [5] recruiting the chronic NP patients aged 18-65 years, the researchers studied the influence of various PE on the NP dynamics, anxiety and depression. The first patient group was performing exercises for the deep cervical flexor muscles (bending one’s head and neck at the exhalation, nodding movements (upwards-downwards) from the lying position; nodding movements from the sitting position near the wall etc.) and general health-improving exercises. The second patient group was performing exercises for the superficial cervical muscles (stretching one’s neck from the sitting position by means of a rubber strip; stretching one’s neck from the lying position, omnidirectional movements from the lying position, ‘cat movements’ or ‘camel movements’) and general health-improving exercises. The third patient group was performing only general health-improving exercises. The All the patients were exercising at home, during 40 minutes twice a week for 7 weeks. The most apparent positive dynamics of the neck pain syndrome was observed in the first group; however, the level of anxiety and depression dropped most noticeably in the first and second groups. The authors made a conclusion that exercising aimed at the improvement of deep and superficial neck muscles not only influences the chronic NP intensity positively but reduces the anxiety and depression, which is of a remarkable clinical value.

In 2015, the Cochrane review [11] analyzed the therapeutic physical training’s effect on the neck pain syndrome’s intensity, functioning and life quality of adults with a mechanical NP. There were 27 randomized clinical trials (RCTs) analyzed, recruiting 3,005 subjects. The authors did not reveal any evidence as to the therapeutic physical training’s effect in the acute neck pain treatment, while as to the chronic NP the evidence had various systemic error risks. This is why the authors grouped the findings obtained into three groups (moderate, low and very low levels of evidence).

For instance, in the patient group with chronic mechanical NP the evidence of moderate power reveal: strength exercises involving the cervical, thoracic spine level, scapula and upper limbs are affecting the post-treatment and short-term (up to 3 months) follow-up pain intensity positively though insignificantly (combined standardized mean difference (SMD) = -0.71; 95 % confidence interval (CI: from -1.33 to -0.10); combined exercises of strengthening and stretching the cervical, thoracic spine muscles and scapula have a positive effect of various extent (from weak to moderate) on pain intensity both immediately following treatment (1 day before; SMD = -0.33; 95 % CI: from -0.55 to -0.10) and in the long-term follow-up (over 1 year). The moderate effect was also found on the positive dynamics of the patients’ functional activity immediately after treatment and in the short-term (up to 3 months) follow-up (SMD = -0.45; 95 % CI: from -0.72 to -0.18); exercises of strengthening and stabilization the cervical, thoracic spine muscles and scapula promote the reduced pain syndrome intensity and function in the medium-term follow-up (from 1 day to 3 months; SMD = -14.9; 95 % CI: from -22.4 to -7.39); mindfulness exercises (Qigong) improve the muscle function at the minimal extent; however, they did not determine the overall effect in the shortest follow-up term (up to 3 months).

A range of claims with a low evidence power imply that: a) breathing exercises; b) general fitness training; c) exercises aimed only at stretching and d) feedback exercises combined with pattern synchronization do not affect the NP and function both immediately after the training or in the short-term follow-up.

The evidence of a very low power indicates that the exercises training coordination and improving the neuromuscle proprioception at the “eye-neck” level may reduce the neck pain syndrome intensity and improve the muscle function in the short-range follow-up.

According to the moderate-power evidence, the patients with a chronic cervicogenic headache when performing the static and dynamic exercises aimed at
strengthening/improving endurance of cervical, scapula muscles and shoulder girth, namely postisometric relaxation, reduce the pain intensity, improve the muscle function and demonstrate an overall positive effect in the long-term follow-up (over 1 year).

According to the low-power evidence, the patients with an acute radiculopathy report an insignificant effectiveness of exercises aimed at stretching/strengthening/stabilization of neck muscles to reduce the pain syndrome intensity immediately after treatment (during 1 day).

The authors made a conclusion that despite the absent high-quality evidence as to the therapeutic PE’s effect on the pain syndrome intensity, functioning and life quality, the recent findings permit us to recommend the specific strengthening exercises as a component of complex chronic NP, cervicogenic headache and radiculopathy treatment, while the exclusive use of stretching exercises did not provide any positive affect.

The effectiveness of PE in the NP treatment was explored by our department’s healthcare personnel in the recent 25 years [8, 9]. For instance, we have developed [9] our approach to the complex rehabilitation of the elderly patients suffering from the cervical degenerative diseases with various PE: isometric, Baduanjin qigong etc. The differentiated approaches were developed in order to prescribe the PE depending on the patient’s age, cerebral circulation and functional state of the autonomic nervous system.

At the moment, we have accumulated a copious experience of PE’s use in the complex treatment of the elderly patients suffering from the degenerative-dystrophic spine changes, developed approaches to their management depending on the stage (acute-subacute-chronic), pain rate,

Table 1. The physical exercises for patients with neck pain at the acute stage (up to 6 weeks).

| Exercise 1. | Aim: increasing endurance and improving the neck muscle function, namely sternocleidomastoid muscles, scalene muscles, longus colli muscles and longus capitis muscles. Increase of the shoulder joint mobility range, improvement of circulation and increase of the motion range. Improvement of back muscle endurance and function, both for the superficial and deep muscles (trapezius muscle, broad back muscle, rhomboid muscles, serratus muscles, including the lumbar spine) |
| Initial position (IP): standing by the wall, touching it with your lumbar spine, scapulae, buttocks and heels. Stretch your spine to a maximum point upwards (upper limbs raised). The exercise is to be repeated twice-three times. The duration of stretching is 20-40 sec. Breathing rate is voluntary |
| Exercise 2. | Aim: increasing the neck muscle endurance, stimulation of musculus longus colli and broad back muscle, namely the deep back muscle layer. Improvement of circulation and overall condition. Additional increase of the shoulder joint’s motion range |
| Initial position (IP): sitting (standing), with one’s palms on the back of one’s head. Try to bend one’s head backwards with a strong palm counteraction. The head is immobile. The exercise is to be performed with a moderate effort. At the muscle straining, please count to five, at the stretching – to ten. Repeat 3-5 times |

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Exercises 3. Aim: stimulation of head and neck muscles (occipito-frontal muscle, temporoparietal muscle, chin muscle, buccal muscle, platysma, sternocleidomastoid muscles, suprahylid muscles, infrahylid muscles, deep neck muscles), improvement of circulation, activation of the deltoid muscle and increase of the shoulder and elbow joint’s motion range.

IP: the same, palms on one’s forehead. Try to bend one’s head forward with a strong palm counteraction. Breathing rate is voluntary. Repeat 3-5 times.

Exercises 4. Aim: stimulation of the upper limb, neck, greater and smaller pectoral muscle, improvement of circulation.

IP: the same. Try to bend one’s head first to the right, then to the left, with a strong palm counteraction. While bending one’s head to the right, the counteraction is effected by the right palm pressing at the right parietal region. While bending one’s head to the left, the counteraction is effected by the left palm pressing at the left parietal region. Repeat once or twice to each side.

Note (for the tables 1-3). IP – initial position; the photo is released by the female’s written agreement.

The authors confirmed a positive ManT MT effect on the cervical level compared with manipulations at the thoracic level in combination with PE (moderate level of evidence) for the patients of acute/subacute neck pain syndrome. Furthermore, it is established that a MT technique combination (Group 3) at the cervical and thoracic level in combination with PE is more effective compared with Group 2 method (combination of MobT MT and SoT MT) in combination with PE or other non-pharmacological methods either during the short or long follow-up.

For the patients with a chronic neck pain syndrome, the MobT MT efficacy without SoT MT did not differ in terms of a clinical effect (influence on pain or function) for the patients with a symptomatic or asymptomatic pathology at the cervical level of the spine (high level of evidence). The evidence of moderate to high level of evidence indicates that ManT MT or its combination with other MT techniques at the cervical and thoracic level is more effective in the pain intensity reduction, function improvement and patient satisfaction compared with a monotherapy of one technique during the short or medium-term follow-up. The moderate level of evidence indicates the ManT MT advantage over MobT MT at the
cervical level while expanding the motion range and improving the workability in the short term after treatment. As a result of their analysis, the authors make a conclusion that a combination of various MT forms with PE is more effective than an exclusive use of MT or PE.

**Other physical therapy methods in the NP treatment**

At the moment, kinesiological taping is widely used both in sports and rehabilitation medicine. It is associated with the use of special elastic adhesive tapes (kinesiological tapes) stuck to a certain body part in order to affect various body systems — muscle, fascial, lymphatic etc.

In order to treat the non-specific NP, the healthcare providers use the muscle taping, by means of Y- and I- resembling tapes. The positive taping results are achieved via relaxing or stimulating muscles (depending on the stage (acute or chronic) and tasks), improving circulation of the damaged site by means of the reduced venous congestion and intensified lymph drainage, curbing the inflammation changes. The tape starts acting immediately after its application, the effect being maintained during its entire use (3-5 days on average).

**Table 2. The physical exercises for patients with neck pain at the subacute stage (from 6 weeks to 3 months)**

<table>
<thead>
<tr>
<th>Exercises 1, 2, 3, 4 used at the NP’s acute stage</th>
<th>(see the table above)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exercise 5.</strong> Aim: stimulating the head and neck muscles, upper limb and back muscles, namely the shoulder-blade-raising muscle, and thoracic muscles</td>
<td>IP: sitting in the chair, upper limbs bent at the elbow joints. Turn right and bend over the chair’s back, then turn left and do the same. Using the right elbow, try to touch the left edge of the chair’s back, and vice versa. Repeat 5-6 times to every side</td>
</tr>
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</table>

| **Exercise 6.** Aim: stimulating the upper limb, thoracic muscles, improving the functions of splenius muscle, stretching and intensification of the intercostal muscle (both superficial and deep) oxygenation, improving the function of diaphragm. Improving the function of the internal abdominal oblique muscle (increasing the trunk and spinal mobility) | IP: sitting in the chair, fingers crossed in front of one’s chest. Two tugging motions of the arms crossed in front of one’s chest first to the left, then to the right, maintaining one’s head in the initial position. Repeat 5-6 times. While the trunk is being turned to the side, breathe out; while returning to the initial position – breathe in. Please note that the spine is turning in the thoracic section, the cervical spine remains immobile |
Exercise 7. Aim: stimulating the upper limb, deltoid, shoulder-raising muscles, triceps, long and broad back muscle. Improving the mobility of shoulder joint.

IP: sitting in the chair, limbs hanging along the trunk, hands pushing at the chair’s edge. Draw your right shoulder forward and upward, do the same for the left shoulder. Repeat 5-6 times to every side. While performing this exercise, try to achieve the maximum extension of the spine upwards to the left and upwards to the right, straining the muscle groups.

Table 3. The physical exercises for patients with neck pain at the chronic stage (over 3 months)

Exercise 8. Aim: activating the neck and upper back muscles, shoulder girdle.

IP: sitting, the trunk immobilized. Perform the rotating movements of shoulder joints forwards and backwards (20 times in each direction).
The taping method is rather safe; however, its rare side effects include the local allergic reactions. Another taping method — biomechanical taping — is not used to treat the NP though recommended to treat the joint pathologies.

The recent comparative study [11] of kinesiotaping and acupuncture’s effect for the myofascial pain in the neck and upper trapezius muscle contrasted the pain intensity’s reduction, improvement of function immediately after their use and during the short or medium-term follow-up. The authors indicate a significant improvement of indices, with no significant differences between the groups, permitting them to make their conclusion about the kinesiotaping as a method of choice to treat the myofascial syndromes of patients who declined using the needle reflexotherapy or have contraindications to its use.

At present, the existing metaanalysis provide results both confirming [13] and contradicting [14] the positive effect of kinesiotaping to treat the back pain, requiring a further analysis.

The neck collar braces (namely Schanz’s collar) are used to fixate the neck vertebrae in a certain position (more often applied during the acute stage) and to increase the intervertebral spaces.

The neck collar braces are divided into the soft (made of foam rubber or other soft materials and used for the non-specific NP), semi-stiff (made of rather stiff materials with metal insertions and used for the vertebral dislocation, incomplete fractures) and stiff (made predominantly of metal and stiff plastic, completely immobilizing the cervical spine and used to treat the complex fractures, intense vertebral instability).
At present, the neck collar brace efficacy is not confirmed in the NP treatment and their use is restricted in the active patient management. Some researchers recommend them for the non-specific NP treatment; however, their use is restricted to no more than 4 hours a day, in order to prevent the negative outcomes associated with the reduced tone, muscle hypotrophy and other complications attributed to the enforced position.

**Modern recommendations on the neck pain management**


For instance, in 2017 the Journal of Orthopaedic & Sports Physical Therapy published the amended recommendations of the US physical therapists created in cooperation with the International Collaboration on Neck Pain [15, 16] on the use of non-pharmacological methods of the NP treatment, containing analysis of about 4,000 articles from 2007 to 2016. The previous recommendations published in 2008 contain the reference data from sources up to 2007. While evaluating their findings, the authors of new recommendations prefer the systemic reviews and metaanalyses and suggest their algorithm of the NP screening, diagnostics and treatment depending on the pain syndrome duration (acute, subacute and chronic) and associated conditions: 1) deficient mobility, 2) coordination disorders (injury-related, namely whip-lash), 3) headache (cervicogenic) and 4) irradiating (radicular) pain.

At the first stage (screening), it is recommended to determine the necessity of non-pharmacological therapy and other specialists’ consultations. Further on, depending on the condition evaluated according to the clinical test and, having determined its typology (4 above-mentioned types) and duration (acute, subacute and chronic) of neck pain syndrome and attending (biopsychosocial) NP factors, they suggest four strategies of treatment (Table 4). Their components may be repeated during the treatment course, depending on the obtained results and the pain syndrome course. The authors of given recommendations made their conclusion that manual therapy and therapeutic PE are effective tools of physical therapy to treat most neck pain syndromes.

In 2018, the Royal Dutch Society for Physical Therapy (KNGF) published a new recommendation [17] for the physical therapists on the evaluation and treatment of the primary care patients with a non-specific NP, including the cervical radiculopathy, based on the analysis of modern systemic reviews. The authors also emphasize the importance of detailed study of patient history, specific tests detecting the underlying causes of neck pain syndrome (Spurling test, traction-distraction test etc.) as well as search for the ‘red flags’ in order to distinguish the severe infectious, oncological, systemic diseases, spinal injuries, neck myelopathy, fractures etc. Based on their analysis, the authors describe four types of neck pain syndrome: 1) pain with no signs or symptoms, confirming the significant structural changes with minimal symptoms (or no symptoms at all) and impacting the daily life; 2) pain with no signs or symptoms, confirming the significant structural changes with pronounced symptoms, impacting the daily life; 3) pain with no signs or symptoms, confirming the significant structural changes attended by certain neurological symptoms (reduced deep tendinous reflexes, motion or sensory deficiencies); 4) signs and symptoms of the significant structural changes including though not restricted to the fracture, dislocated vertebra, spinal injury, infection, neoplasm, systemic diseases etc.

According to the pain syndrome causes, attending factors, clinical course, there are four possible scenarios of patient management:

In case of extended recovery with specific and/or dominant psychosocial prognosticating factors (C scenario), those factors should be rectified first of all by the physical therapist. If this option is unavailable, the patient should be referred to another specialist.

In case of extended recovery (B scenario), the physical therapist should recommend (besides the above mentioned options) the mobilization and/or manipulation technique MT combined with the therapeutic PE. It is vital for the patient to return to his/her usual activity mode in order to prevent the chronic course. There may be other interventions added; however, the physical therapists should not recommend the needle reflexotherapy, low-frequency laser therapy, electrotherapy (ET), ultrasound, traction therapy (TT) and/or neck collar braces.

In case of extended recovery with specific and/or dominant psychosocial prognosticating factors (C scenario), those factors should be rectified first of all by the physical therapist. If this option is unavailable, the patient should be referred to another specialist.

In case of Type III NP (see above, D scenario), the B scenario recommendations should be kept. Neck collar brace may be used, though only during short periods of time (during the day) and no longer than several weeks.

In 2016, the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders (Neck Pain Task Force) published their expert conclusions [18] as to the efficacy of various physical therapy methods in the NP treatment. Based on their analysis of RCTs present in 5 science-metric databases during the period of 2000-2014, they selected 38 trials, 22 out of them having a low risk of systemic error. The authors concluded that the MT (manipulation and stabilization technique) and classic massage are effective in the NP treatment. Electric acupuncture, relaxation massage and some passive physical therapy methods (heat, cold,
Table 4. Physical therapists' recommendations on neck pain diagnostics and treatment (2017) [16]

<table>
<thead>
<tr>
<th>Neck pain attended by motion deficiency</th>
<th>Neck pain attended by coordination disorders</th>
<th>Neck pain attended by headache (cervicogenic)</th>
<th>Neck pain attended by irradiation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General symptoms</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Central and/or unilateral pain;</td>
<td>• Injury (often whiplash);</td>
<td>• Continuous unilateral neck pain and reflected headache;</td>
<td>• Neck pain with irradiation into the injured limbs;</td>
</tr>
<tr>
<td>• Restricted motion range (RMR) with intensified symptoms;</td>
<td>• Reflected pain in the upper limb;</td>
<td>• Headache lessened or increased by certain neck motions or positions</td>
<td>• Paresthesia in the upper limb dermatomes, numbness, weakness in the myotomes</td>
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<tr>
<td>• May be attended by the reflected pain in the upper limb</td>
<td>• Lightheadedness/nausea;</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• Headache, lack of concentration and/or memory disorders, hypersensitivity, intensified affective distress</td>
<td></td>
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<tr>
<td><strong>Objective study findings</strong></td>
<td></td>
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<tr>
<td>• RMR of the neck;</td>
<td>• Positive test of head and neck bending;</td>
<td>• Positive test of neck turn rotation;</td>
<td>• Positive tests of radiculopathy (intensified symptoms at the upper limb movements, Spurling test, neck stretching, restricted neck motion range);</td>
</tr>
<tr>
<td>• Pain at completion of the RMR (active or passive);</td>
<td>• Positive test of the neck-bending muscle endurance;</td>
<td>• Intensified (segmentary) headache in response to provocation;</td>
<td>• Possible sensory, mobility or reflector deficiencies at the upper limb level, associated with the nerve which is engaged</td>
</tr>
<tr>
<td>• Restricted segmentary motion range (cervical or thoracic);</td>
<td>• Positive algometry results;</td>
<td>• Restricted motion range of the neck;</td>
<td></td>
</tr>
<tr>
<td>• Intensified (segmentary) pain in response to provocation;</td>
<td>• Neck muscle force and endurance deficiency;</td>
<td>• Restricted segmentary motion range of the upper neck;</td>
<td></td>
</tr>
<tr>
<td>• Deficient force or motion range attended by the subacute or chronic pain</td>
<td>• Neck pain at the medium-range motion, intensified at the end of the motion range;</td>
<td>• Deficient neck muscle force, endurance and coordination</td>
<td></td>
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<tr>
<td></td>
<td>• Sensitivity of the myofascial trigger points;</td>
<td></td>
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<td></td>
<td>• Sensomotory disorders;</td>
<td></td>
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<td></td>
<td>• Neck pain with a reflected pain</td>
<td></td>
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<tr>
<td>• Manipulation technique MT (thoracic traction): A-B</td>
<td>• Recommendations to stay active: A-C;</td>
<td>• Increased motion activity: A-B;</td>
<td>• Mobilization and stabilization exercises: A-C;</td>
</tr>
<tr>
<td>• Manipulation technique MT (cervical traction): A-C</td>
<td>• At-home therapeutic PE for the RMR and posture correction exercises: A-B;</td>
<td>• Manipulation technique MT (cervical traction) or mobilization MT technique at the cervical level: SA-B</td>
<td>• Low-frequency laser therapy: A-C;</td>
</tr>
<tr>
<td>• Neck mobilization: A-C</td>
<td>• Monitoring clinical course: A-F;</td>
<td>• Manipulation technique MT (thoracic traction): C-B;</td>
<td>• Possible short use of collar brace: A-C;</td>
</tr>
<tr>
<td>• Therapeutic PE for the RMR: A-B;</td>
<td>• Minimal use of the collar brace: A-B;</td>
<td>• Manual therapy combined with exercises to increase the endurance and force of the cervical, thoracic muscles, scapula: C-B</td>
<td>• Therapeutic physical training (stretching and power-training exercises) combined with MT for the cervical and thoracic regions: C-B;</td>
</tr>
<tr>
<td>• Recommendations to stay active: C-C;</td>
<td>• Combined PE and MT: A-B</td>
<td>• Instruction on prognostication, pain correction, self-recovery: C-C;</td>
<td>• Instruction and encouragement of physical and professional activities: C-B;</td>
</tr>
<tr>
<td>• At-home therapeutic PE for the RMR: A-B;</td>
<td>• therapeutic PE for the active expansion of motion range, exercises to improve endurance, force and functioning, posture correction, coordination, aerobic exercises: A-B;</td>
<td>• Neck mobilization combined with the customized exercises: low-dose increase of force, endurance, flexibility, functional training, principles of cognitive behavioral therapy, neuromuscular coordination: C-C</td>
<td>• Intermittent traction: C-B</td>
</tr>
<tr>
<td>• Controlled exercises to strengthen and improve the upper thoracic quadrant endurance: A-B</td>
<td>• TENS: A-C</td>
<td></td>
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</tr>
<tr>
<td>• Neck stretching: A-B;</td>
<td>• Instruction on neck stretching, posture correction, self-recovery: C-C;</td>
<td></td>
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</tr>
<tr>
<td>• General strengthening PE: C-B;</td>
<td>• PE for the cervical/thoracic region combined with traction manipulations /mobilization of those regions: C-B;</td>
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<tr>
<td>• PE for the cervical/thoracic region combined with traction manipulations /mobilization of those regions: C-B;</td>
<td>• Acupuncture, laser therapy, intermittent traction: C-B</td>
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</tbody>
</table>

Notes: Intervention strategies are encoded according to the stage (A – acute, SA – subacute, C – chronic) and degree of recommendation (A-F). For instance, A – B implies that there is evidence with a B level confirming the efficacy of intervention for the subjects with an acute pain syndrome. RMR – restricted motion range; MT – manual therapy; TENS – transcutaneous electrical nerve stimulation; PE – physical exercises.
diathermy, hydrotherapy and ultrasound) are not effective at all and should not be used for treatment of the NP patients.

Last year, another systemic review [4] was published, analyzing the existing data on diagnostics, prevention and treatment of non-specific NP. The analysis included 46 recommendations from various countries (93% from Australia, Canada, the USA and the UK), published from 1995 to 2018 and marked with various evidence levels. Among the authors, there were physicians, physical therapists, chiropractors, nurses, osteopaths, masseurs and researchers. The physicians wrote recommendations on treatment (n = 8), while physical and manual therapists authored principal recommendations on the whip-lash injury-related NP, non-specific pain and general recommendations (n = 28).

Out of all the analyzed NP recommendations, there was but one guideline which did not consider PE an effective NP treatment method (it did not include PE among the treatment options). All but two recommendations stick with a combination of therapeutic instruction. Most recommendations refer to the MT (manipulation and stabilization technique) as the NP treatment option. Most recommendations stick with a combination of therapeutic physical training, MT and multimodal approach (combination of various physical methods) as well as patient instruction. However, four of them do not consider the latter effective. The authors claim that at the present moment there is no common approach to such physical therapy methods prescription, as traction therapy (TT), electric, laser and needle reflexotherapy, as well as heat and cold treatment. Half the recommendations on general therapeutic approaches (n = 8) suggest the pharmacological treatment (nonsteroidal anti-inflammatory drug, paracetamol, opioids etc.) as an independent method or in combination with non-pharmacological treatment (most recommendations co-authored by physicians). Most guidelines do not include wearing the neck collar braces, 5 of them suggest impulse electromagnetic therapy. The authors concluded that there is a vital necessity of developing not only the NP treatment approaches but also the diagnostics and prognostication algorithms. The heterogeneity of existing recommendations is attributed to the groups of authors, quality of recommendations and other factors.

Thus, our analysis of modern reference sources has shown that despite an existing large evidence base on the effectiveness of various physical therapy methods, modern NP recommendations vary to a large extent. The effectiveness of PE and manual therapy as well as combined physical methods and pharmacological treatment is still considered the most reliable. The customized approach towards prescription of various methods of physical rehabilitation taking into account the pain syndrome level, subject’s physical condition, attending pathologies is still optimal as it provides the best therapeutic effect.

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**Резюме.** Біль у шиї залишається поширеною, але недооціненою проблемою сучасної медицини. Захворювання вражає від третини до більше половини дорослого населення планети, ії епідеміологічний масштаб визначається віком, полом, соціокультурними факторами, відносно низьким статистичним реєстраціонним наявністю та іншими. Біль у шиї може бути результатом різноманітних патологій, викликаних різними механізмами. У контексті цих проблем встановлюються різноманітні методи лікування, які можуть бути відносно ефективними, проте їх безпечність і ефективність потребують посилання на доказову медицину.

**Ключові слова:** біль у шиї; фізична терапія; фізичні вправи; неврологія; патофізіологія; лікувальні та профілактичні методи

**Література**
Боль в шее: современные подходы к использованию методов немедикаментозного лечения. Часть II

Резюме. Боль в шее остается распространенной, однако недооцененной проблемой современной медицины. Заболевание поражает от трети до более половины взрослого населения планеты и связано с нарушением работоспособности и качества жизни больных. Лечение боли в шее предусматривает использование медикаментозных и немедикаментозных подходов, однако доказательная база относительно их эффективности и безопасности в настоящее время противоречива. Целью второй части статьи является обобщение данных об эффективности и безопасности некоторых методов физической терапии (лечебная гимнастика, кинезиотерапия, шейные воротники), использования сочетания различных методик физической терапии в лечении пациентов с болью в шее, обсуждение собственного опыта авторов относительно эффективности и безопасности лечебной физкультуры в комплексном лечении больных, а также анализ современных рекомендаций по использованию физических методов лечения боли в шее. Для достижения цели проведен анализ литературных источников в базах данных MedLine, EMBASE, The Cochrane Library, Scopus, Web of Science, CyberLeninka и РИНЦ за последние 10 лет, содержащих результаты различных исследований, метаанализов и последних кокрановских обзоров по эффективности и безопасности использования указанных методов немедикаментозного лечения боли в шее. Представлены данные относительно эффективности и безопасности лечебной гимнастики, кинезиотерапии и шейных воротников в лечении лиц с болью в шее, а также разработанные и апробированные авторами комплексы физических упражнений для пациентов с болью в шее в разные периоды заболевания (острый, подострый, хронический), рекомендуемые к использованию в клинической практике. Также приведены современные рекомендации, предложенные как врачебными сообществами, так и другими организациями, по ведению пациентов с болью в шее. Полученные результаты свидетельствуют о необходимости индивидуализированного и комплексного подхода к ведению больных с болью в шее с учетом периода заболевания, возраста больного, сопутствующих факторов риска и результатов доказательной медицины.

Ключевые слова: боль в шее; физическая терапия; физические упражнения; лечебная гимнастика; кинезиотейпирование; шейные воротники; немедикаментозные методы