

Therapeutic Exercise for office employees: Handbook with guidelines adapted for exercise and rehabilitation specialists



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Therapeutic Exercise for office employees-Guidelines for exercise and rehabilitation specialists

Points of interest:

- Office employees sit on a chair for prolonged periods of time
- Incorrect sitting posture can damage spinal structures and contribute to worsening back and neck pain.
- Accommodations must be made for exercise and easy mobilization in the workplace



Office workers need to incorporate an exercise program in their daily routine

Introduction

Chronic or recurrent neck pain can be severely devastating and can also be accompanied by upper back pain, shoulder and scapula pain and headaches. These symptoms, along with tight neck muscles and stiff joints can make even the simplest daily activity painful for the office worker.

Therefore, strength and conditioning professionals, athletic trainers, and physical therapists often come across ongoing or recurrent complaints of neck pain. William J. Hanney, DPT, ATC, CSCS, who is an instructor in the program in Physical Therapy at the University of Central Florida and a staff physical therapist with the Florida Hospital Sports Medicine and Rehabilitation, says that “neck is a remarkable mobile joint that acts as a crossroad for the trunk, upper extremities, and head. Therefore, fluent movement and orientation of the head and neck are required to position senses to our surroundings. For these mechanisms to work, considerable muscular and sensory control is necessary.” (2)

The novelty of THEWS exercise protocol

The novelty of THEWS exercise protocol is that it is designed by a group of experts (orthopedic doctors, physical therapists and exercise specialists) to help the office worker correct its head positioning and gradually attain appropriate head repositioning (neutral position).

The protocol does not require any special equipment, so anyone can use it while seated with office clothes. This can be achieved through strengthening, stretching of the corresponding muscles and enhancing the functional ability of the neck muscles. Finally, it gives the exercise specialist valuable information and guidelines about how to communicate and teach the protocol to the office employees.

Description of the problem

Jobs entailing the use of a computer input device and video display terminal (VDT) often expose workers to awkward and sustained postures as well as repetitive motions of the upper extremities, which have been established as causes of work-related shoulder and neck pain. (1)

In particular, office workers suffering from neck pain usually demonstrate excessive and prolonged deep flexors muscle activity of the head while at the same time their range of motion at the neck joint is limited (3). They may also exhibit altered postural behaviors such as drift in and out of scapular protraction associated with different muscle activation in the diverse trapezius band, producing mechanical stresses and pain on sensitive cervicobrachial structures (7).

Studies have also shown that people suffering from neck pain have demonstrated proprioception disturbances, position sense abnormalities, balance deficits and altered eye movement control (5, 6).

Dealing with the problem

It has been proved (electromyographic process) that the altered trapezius activity presented in individuals experiencing neck pain (compared to the trapezius activity of pain-free individuals) can come back to optimal muscle activity levels when the individuals follow some scapular postural correction exercise during typing tasks (7).

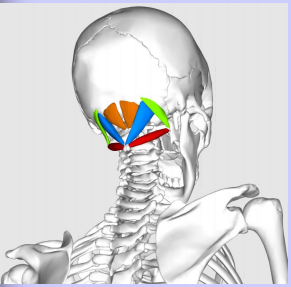
Moreover, it has been confirmed that exercises involving repeated specific contraction of craniocervical musculature, precise movement relocation practice and eye-head coordination can improve the quality of cervical afferent input into the CNS and alleviate neck pain in chronic neck pain patients (4).

It is well established that the head repositioning (neutral position) is the only way to control this excessive and prolonged muscle activity of the head's deep flexors or correct those inappropriate postural behaviors cited before.

An exercise protocol like the one presented in this guide is meant to address all previously mentioned problems altogether.



Awkward and sustained postures adopted by office employees



Tight neck muscles and stiff joints are symptoms of prolonged sitting position

Goals of the exercise protocol:

- A. Strengthening
- B. Stretching
- C. Functional exercise

Frequency:
every 2-3 hours
in the
workplace



Advantages of the exercise protocol

The advantages of the suggested protocol are the following:

- Office workers can make use of this protocol while sitting or standing without drawing attention to their workout!
- Office clothes are perfectly suitable for this protocol. (e.g. a tie, a skirt or a suit should not dissuade anyone from adhering to the program).
- The protocol does not require any special equipment, so anyone can use it while seated even in the car waiting at traffic lights.
- The exercises are easy to execute, following a brief instruction period with a specialist.
- After only a little practice, office workers are able to check themselves for proper execution and appropriate posture while working (without the help of the check list proposed in the present article).

Main points to remember:

1. Head-repositioning of the office worker is critical to prevent or cope with the symptoms of chronic neck pain.
2. The exercise program suggested can be used by office workers easily and effectively every two or three hours while in the workplace.
3. An important factor as to the effectiveness of the exercise is to maintain proper upper body standing position while exercising: come to a posterior pelvis tilt, bring your shoulders in contact with the wall, tuck your chin and lift your head, breathe normally.
4. The frequent use of this exercise program prepares the office worker to adopt the appropriate sitting position while working.
5. Improving proprioception ability while working is important in order for the effects of this exercise protocol to start becoming more and more positive.

References

1. Bernard BP, ed. *Musculoskeletal Disorders and Workplace Factors: A Critical Review of Epidemiologic Evidence for Work-Related Musculoskeletal Disorders of the Neck, Upper Extremity, and Low Back*. Atlanta, GA: US Dept of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health; 1997.
2. Hanney WJ, Zbaraschuk KS, Yi CJ, Klausner SH, Wawrzyniak L. Neck Pain: Exercise and Training Considerations. *Strength and Conditioning Journal*. 2011; 33(3): 104-110.
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6. Treleaven J, Jull G, Sterling M. Dizziness and unsteadiness following whiplash injury: characteristic features and relationship with cervical joint position error. *J Rehabil Med*. 2003; 35:36-43.
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Exercises types in THEWS protocol— Progressive application

First, use some relaxation techniques (<http://thews-platform.eu>). Next perform exercises with the following order:

1. positioning exercises (page 5)
2. stretching exercises (pages 5-10)
3. Simple strengthening exercises (page 11)
4. Combination of stretching and strengthening exercises (pages 11 and 12)
5. Functional exercise at workplace (pages 12-14)

Steps to maintain proper upper body posture while sitting (152911)

- While in sitting position slowly roll the pelvis forward to create a normal lumbar lordosis.
- Then lift the sternum, so the shoulders fall back into a neutral position.
- Tuck the chin as if making a double chin and lift the head while maintain the chin tuck.
- Hold for 10 sec and relax.
- Repeat.



Proper upper body sitting position 152911

Steps to maintain proper upper body posture while standing (155715)

- Stand against the wall, with your legs apart perform posterior pelvis tilt position in order to eliminate the lumbar extension. Hold for 10 seconds.

Check point: The lumbar spine should be flat and touching the wall.

- While maintaining posterior pelvis tilt (isometrically) bring the shoulders in contact with the wall and hold this position for 10 seconds.

Check point: Shoulders should touch the wall and remain there.

- Tuck the chin and finally lift the head while maintaining the chin tuck, posterior pelvis tilt and shoulder positions described.

Check point: Lift your head as if someone was tearing your hair out.

N.B. Always remember to move air in and out of your lungs (7) and maintain proper posture while executing the exercise protocol.




Proper upper body standing position 155715

NB: The figures in parentheses correspond to the numbers of the exercises presented in THEWS multimedia application (<http://thews-platform.eu>)

Lateral neck flexors muscles' stretching from sitting position

1st step (134815)


- Sit properly.
- Hold your upper back on the chair (your scapulas touch the chair).
- As you hold this position, laterally bend your head. / tilt your head to one side.
- Feel a mild stretch on the other side of the neck. Hold for 10 seconds.
- Return to the initial position, and repeat for your other side.



Lateral neck flexors muscles' stretching 1st step 134815

2nd step (134953)


- Sit properly.
- Hold your upper back on the chair (your scapulas touch the chair).
- Raise one arm over your head, flex the elbow and touch the opposite ear with your hand.
- As you hold this position, laterally bend your head while gently pulling on the side of the head to increase the stretch.
- Feel a stretch on the other side of the neck. Hold for 10 seconds.
- Return to the initial position, and repeat for your other side.



Lateral neck flexors muscles' stretching 2nd step 134953

3rd step (135134)


- Sit properly.
- Hold your upper back on the chair (your scapulas touch the chair).
- Raise your left arm over your head and touch the other side ear with your left hand.
- Place your right hand over your right arm/ shoulder and hold it.
- As you hold this position, laterally bend your head while gently pulling on the side of the head to increase the stretch. At the same time your right hand holds your right arm to stay still.
- Feel a stretch on the right side of the neck. Hold for 10 seconds.
- Return to the initial position, and repeat for your other side.



Lateral neck flexors muscles' stretching 3rd step 135134

Rotator neck muscles stretching from sitting position (135731)

- Sit properly.
- Hold your upper back on the chair (your scapulas touch the chair).
- As you hold this position, rotate your head towards your right shoulder.
- Feel a mild stretch on the back side of the neck. Hold for 10 seconds.
- Return to the initial position, relax and repeat for your other side.



Rotator neck muscles stretching 135731

Rotator neck muscles stretching with isometric activation from sitting position (140017)

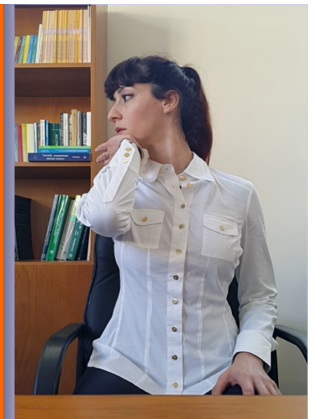
- Sit properly.
- Hold your upper back on the chair (your scapulas touch the chair).
- As you hold this position, rotate your head towards your right shoulder.
- Feel a mild stretch on the back side of the neck.
- Place your hand against your chin (right rotation – right hand).
- Try to return to the initial position while your hand gently prevents you from doing so.
- Hold for 6 seconds. Relax.
- Then try to rotate farther in the stretching position.
- Hold for 10 seconds.
- Return to the initial position, relax and repeat for the other side.

Neck extensors muscles' stretching from sitting position (172920)

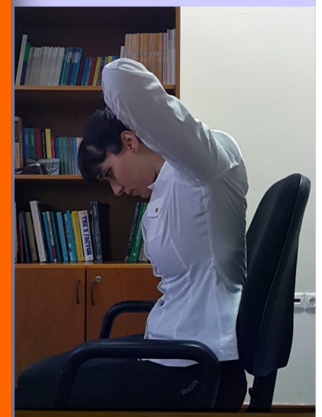
- Sit properly.
- Hold your upper back on the chair (your scapulas touch the chair).
- Place your hands behind your head (thumbs down).
- Flex your head gently while feeling a mild stretch on the back side of the neck. Try to lengthen your neck without pressing your head.
- Hold for 10 seconds.
- Return to the initial position, relax and repeat.

Neck extensors and upper back muscles' stretching from sitting position (144339)

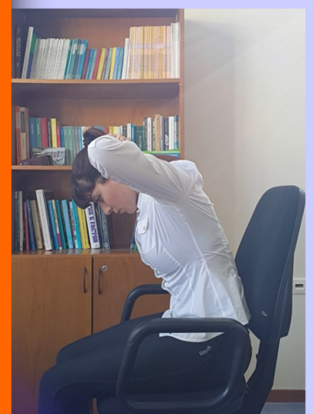
- Sit properly.
- Hold your upper back on the chair (your scapulas touch the chair).
- Place your hands behind your head (thumbs down).
- Flex your head gently while feeling a mild stretch on the back side of the neck.
- Then slowly lean your torso forward (draw your belly, torso flexion, no more than 30cm away from the chair) while feeling the stretching is moving lower.
- Hold for 10 seconds.
- Return to the initial position, relax and repeat.



Rotator neck muscles stretching with isometric activation 140017



Neck extensors muscles' stretching 172920



Neck extensors and upper back muscles' stretching 144339



Neck extensors muscles' stretching with isometric 145019

Neck extensors muscles' stretching with isometric from sitting position(145019)

- Sit properly.
- Hold your upper back on the chair (your scapulas touch the chair).
- Place your hands on the back of your head and interlace your fingers (thumbs down).
- Flex your head gently while feeling a mild stretch on the back side of the neck.
- Try to extend your head while placing a mild and controlled resistance with your hands without moving. Try to lengthen your neck without pressing your head.
- Hold for 6 seconds.
- Relax and try to stretch more to initial direction.
- Hold for 10 seconds. Return to the initial position, relax and repeat.



Lateral flexors and rotator muscles of the neck stretching 45038

Lateral flexors and rotator muscles of the neck stretching from sitting position I (145308)

- Sit properly.
- Hold your upper back on the chair (your scapulas touch the chair).
- As you hold this position, bend your head laterally .
- Feel a mild stretch on the opposite side of the neck.
- Then rotate your head to the same direction as if you try to look at the floor.
- Feel a mild stretch and hold for 10 seconds.
- Return to the initial position, and repeat for the other side.



Lateral flexors and rotator muscles of the neck stretching 145456

Lateral flexors and rotator muscles of the neck stretching from sitting position II (145456)

- Sit properly.
- Hold your upper back on the chair (your scapulas touch the chair).
- As you hold this position, bend your head laterally .
- Feel a mild stretch on the opposite side of the neck.
- Then rotate your head to the other direction as if you try to look at the ceiling.
- Feel a mild stretch and hold for 10 seconds.
- Return to the initial position, and repeat for the other side.

Triceps stretching from sitting position (145800)

- Sit properly.
- Place your arm above and back of your head bending the elbow.
- Place the opposite hand above the elbow while you move it towards the center line of the body.
- Feel the stretch in the back area of the arm and hold for 10 seconds.
- Return to the initial position, and repeat on the other side.

Forearm muscle' stretching from sitting position I (145945)

- Sit properly.
- Extend your right arm out in front of your chest.
- Palm faces forward and fingers pointed to the ceiling.
- Use your left hand to stretch your right hand's fingers and palm back towards you as far as they comfortably go.
- Feel the stretch in the inner area of the forearm and hold for 10 seconds.
- Return to the initial position, and repeat on the other hand.

Forearm muscle' stretching from sitting position II (150117)

- Sit properly.
- Extend your right arm in front of your chest.
- Flex your right palm.
- Try to flex it more with the help of the opposite hand.
- Feel the stretch in the lateral area of the forearm and hold for 10 seconds.
- Return to the initial position, and repeat to the other side.

Thoracic muscle stretching from sitting position I (150618)

- Sit properly.
- Keep your scapulas closed while lifting your chest. Remember to tuck your chin and draw your belly.
- Feel the stretch in the front area of the chest and hold for 10 seconds.
- Return to the initial position, and repeat.



Triceps stretching I 145800



Forearm muscle' stretching 145945



Forearm muscle' stretching 150117



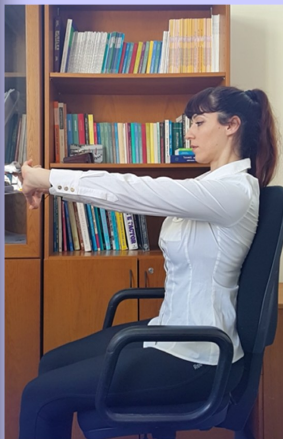
Thoracic muscle stretching 150618



**Thoracic muscle stretching I
150907**

Thoracic muscle stretching from sitting position II (150907)

- Sit properly.
- Rotate your torso while your low back is still on the chair.
- Keep your upper back in upright position (scapulas closed) while rotating.
- Feel the stretch in the lateral area of the torso and hold for 12 seconds.
- Return to the initial position, and repeat for the other side.



Upper back muscle stretching 151126

Upper back muscle stretching from sitting position I(151126)

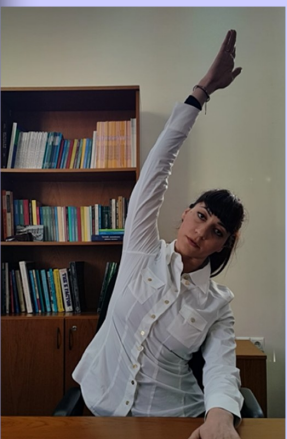
- Sit properly.
- Extend your arms in front of your chest and interlace your fingers.
- Turn your arms inwards and try to push away while keeping your scapulas in touch with the chair.
- Feel the stretch in the back area of the arm and hold for 10 seconds. Breath normally.
- Return to the initial position, and repeat.



**Upper back muscle stretching
151336**

Upper back muscle stretching from sitting position II(151336)

- Sit properly.
- Extend your arms in front of your chest and interlace your fingers.
- Turn your arms inwards and try to push away while keeping your scapulas in touch with the chair.
- Elevate your hands over your head as far as you can and hold for 12 seconds.
- Feel the stretch in the back area of the torso and arms.
- Return to the initial position, and repeat.



Upper back muscle stretching 152212

Upper back muscle stretching from sitting position III(152212)

- Sit properly.
- Place one forearm firmly on your desk and keep it still.
- Bend your torso laterally with the opposite arm/hand extended over your head.
- Feel the stretch in the lateral area of the torso.
- Hold for 12seconds.
- Return to the initial position, and repeat on the other side.

Scapulas adduction muscle isometric activation I (152911)

- Roll the pelvis forward to create a normal lumbar lordosis.
- Lift the sternum, shoulders falling back into neutral position, slightly in front of the chair.
- Tuck the chin as if making a double chin and lift the head while maintaining the chin tuck.
- Close your scapulas (shoulders back) as much as you can.
- Hold for 10 seconds.
- Relax and repeat.

Scapulas adduction muscle isometric activation II (153055)

- Roll the pelvis forward to create a normal lumbar lordosis.
- Lift the sternum, shoulders falling back into neutral position in contact with the chair.
- Bend your elbows in 90-degree flexion.
- Tuck the chin as if making a double chin and lift the head while maintaining the chin tuck.
- Push your shoulders and arms against the back of the chair.
- Hold for 10 seconds.
- Relax and repeat.

Thoracic muscle strengthening and stretching exercises combination (154055)

- Use an elastic band to make a loop and place it around your chest and your chair's back.
- Push the band forward with your shoulders while you bend your extended torso (hip flexion).
- Hold for 10 seconds.
- Relax gradually as the band pulls your shoulders backwards. Feel the stretching of your thoracic muscles.
- Hold for 10 seconds.



Scapulas adduction muscle isometric activation 152911

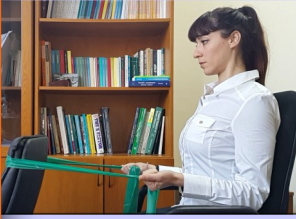


Scapulas adduction muscle isometric activation II 153055



Thoracic muscle strengthening and stretching exercises combination 154055

Muscle back strengthening and stretching exercises combination (154855)



Muscle back strengthening and stretching exercises combination 154855

- Place another chair in front of your chair.
- Then place a band around the other chair's back.
- Adopt proper sitting position.
- Roll the pelvis forward to create a normal lumbar lordosis
- Lift the sternum, so the shoulders fall back into neutral position, slightly in front of the chair.
- Tuck the chin as if making a double chin and lift your head while maintaining the chin tuck.
- Pull the band with bended elbows and adduct your scapula as much as you can while you rotate your forearms outwards.
- Hold for 10 seconds.
- Relax gradually as the band pulls you forwards while you rotate your forearms inwards.
- Feel the stretch in your upper back and shoulders.

Functional strengthening-stretching exercise from standing position I (161719)



Functional strengthening-stretching exercise- standing position 161719

- Perform a standing position, place the band under your feet and hold it with your hands in neutral position.
- Adjust the length of the rubber band by tightening your grip until it becomes very tight.
- Bend your knees slightly .
- Adopt a posterior pelvis tilt position in order to eliminate the lumbar extension and hold it.
- While maintaining this position bring the scapulas together (in adduction).
- Tuck the chin and finally lift the head while maintain the chin tuck, posterior pelvis tilt and shoulder position mentioned .
- Relax your shoulders while the rubber band stretches your upper back.
- Keep doing so for 10seconds.
- Relax your grips.
- Repeat.

Functional strengthening-stretching exercise II (162007)

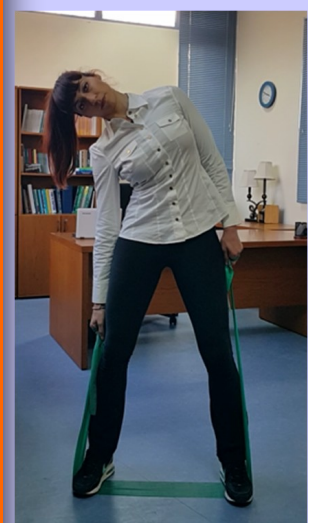
- Perform a standing position and place the band under your feet and hold it with your hands in neutral position.
- Adjust the length of the band by tightening your grips until it is very tight.
- Bend your knees slightly .
- Adopt a posterior pelvis tilt position in order to eliminate the lumbar extension and hold it.
- While maintaining this position close your scapulas (in adduction).
- Tuck the chin and finally lift the head while maintaining the chin tuck, posterior pelvis tilt and shoulders back.
- Relax your shoulders while the rubber band stretches your upper back.
- Bend your head laterally to increase the stretch.
- Hold for 10 seconds.
- Repeat with the other side of the head bending.
- Hold for 10 seconds.
- Relax your grips.
- Repeat.

Functional strengthening-stretching exercise III (162228)

- Perform a standing position and place the band under your feet and hold it with your hands in neutral position.
- Adjust the length of the rubber band by tightening your grips until it is very tight.
- Adopt a posterior pelvis tilt position in order to eliminate the lumbar extension and hold it.
- Bend your knees slightly .
- While maintaining this position close your scapulas (in adduction).
- Tuck the chin and finally lift the head while maintaining the chin tuck, posterior pelvis tilt and shoulders back.
- Bend your torso laterally as far as you can.
- Hold for 10 seconds.
- Feel the stretch on the opposite side.
- Slowly return to initial position.
- Repeat for the other side.



Functional strengthening-stretching exercise 162007



Functional strengthening-stretching exercise 162228

Functional strengthening-stretching exercise IV (162713)

- Perform a standing position , place the band under your feet and hold it with your hands in neutral position.
- Adjust the length of the rubber band as previously.
- Bend your knees slightly .
- Adopt a posterior pelvis tilt position in order to eliminate the lumbar extension and hold it.
- While maintaining this position close your scapulas (in adduction).
- Tuck the chin and finally lift the head while maintaining the chin tuck, posterior pelvis tilt and shoulders back.
- Slowly rotate your shoulders backwards , trying to do a circle path.
- Stop when your shoulders are in front of your body line.
- Keep this position for 10 seconds and feel the stretch.
- Slowly rotate backwards and stop when your shoulders are behind your body line.
- Keep this position for 10 seconds and feel the stretch.
- Slowly return to initial position.
- Repeat.



Functional strengthening-stretching exercise 162713

Functional strengthening-stretching exercise for triceps and back (163024)

- Perform a standing position and make a step backwards.
- Place the rubber band under your back foot and hold it with your hands (after you place your arms over your shoulders and bend them on the back) and hold it.
- Adjust the length of the rubber band as previously.
- Bend your knees slightly .
- Perform posterior pelvis tilt position in order to eliminate the lumbar extension and hold it.
- While maintaining this position close your scapulas (in adduction).
- Tuck the chin and finally lift the head while maintaining the chin tuck and posterior pelvis tilt with the head in slightly flexed position.
- Feel the stretch in your chest, back and shoulders.
- Hold this position for 10seconds.
- Relax and slowly return to initial position.
- Repeat.



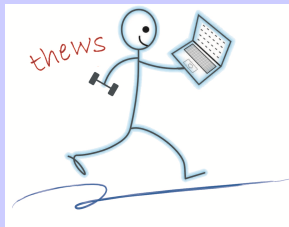
Functional strengthening-stretching exercise for triceps and back 163024

Therapeutic Exercise at Workspace

Handbook with guidelines adapted for exercise and rehabilitation specialists

Output Leader: Democritus University of Thrace

Co-funded by ERASMUS+ IKY



Partners of the Project

- Democritus University of Thrace, Greece (Coordinator)
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- Center for Orthopaedics and Traumatology, St Anna Hospital, St. Elizabeth-Gruppe Ruhr, Herne, Germany
- Instituto Pedro Nunes, Portugal
- ALBA Graduate Business School at The American College of Greece

<http://thews-platform.eu>

Exercise Program Structure according to the body area of pain as its is described in THEWS application

GROUP A

135134, 162228

GROUP B

154055, 161719

GROUP C

151336, 153055, 162713

GROUP D

145800, 145945, 150117, 151126, 154855, 163024,

COMMON PROGRAM I

152911, 134815, 135731, 172920

144339, 150618, 150907, 152911,

COMMON PROGRAM II

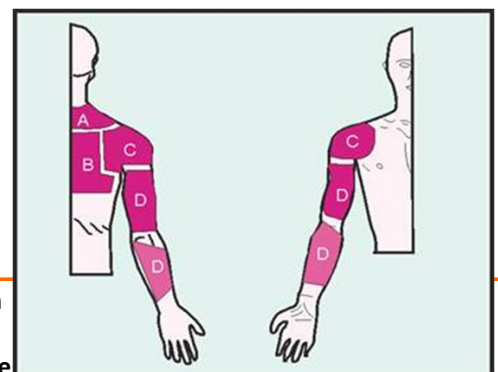
155715, 134953, 144339, 145019,

145308, 145456, 150618, 150907

152212, 152911, 154855, 162007



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Glossary

Adduction of the scapula: Bring the scapulas together

Afferent input into the CNS: The sensory-motor signals to the brain through afferent neurons

Chronic or recurrent neck pain: It's a pain in neck area that exists more than 3 months with recurrent form many times.

Craniocervical musculature: The deep cervical flexor *muscles* (longus colli, longus capitis etc)

Functional exercises: Combined exercises that improve the motor system function

Isometric exercise: or "isometrics" are a type of strength training in which the joint angle and muscle length do not change during contraction.

Joint range of motion: Range of motion is a measurement of movement around a joint. Each specific joint has a normal range of motion that is expressed in degrees.

Lateral neck flexors muscles: The muscles which laterally flex the cervical spine.

Lumbar spine: The lower area of the back.

Neck extensors muscles: The muscles which extended the cervical spine.

Neck range of motion: The range of motion of the cervical spine complex through passive or active movements.

Position sense abnormalities: Restrictive kinesthetic information through kinetic tasks.

Proprioception disturbances It is sensory processing deficits

Proprioception exercises: Functional exercises through balance task that improve the sensory-motor input signals to the brain

Relaxation techniques: Copying stress management techniques.

Rotator neck muscles: The muscles which rotate the cervical spine.

Scapular postural correction exercise Exercises that aim to correct the false alignment and posture of the scapula.

Sensory control: is the neurological process that organizes sensation from one's own body.

Strengthening exercises: are the exercises that improve muscle's power, endurance and speed of contraction. They can be performed with weights, elastic bands etc.

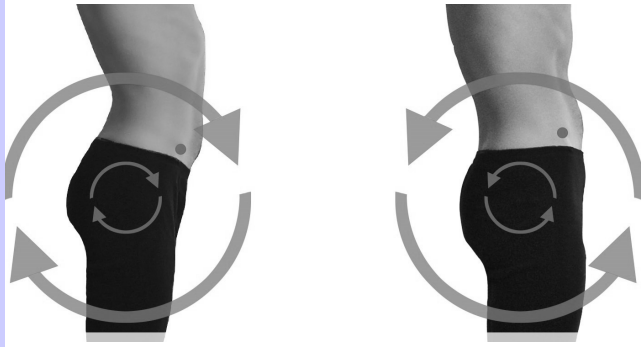
Stretching exercises: are the exercises that improve muscle's elasticity and length.

Thoracic muscles: The superficial muscles that lay on the upper area of the thorax (Thoracic major and minor).

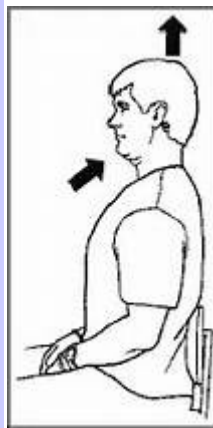
Tight muscles: Muscles with restricted elasticity and length.

**Explanation of
basic movements**

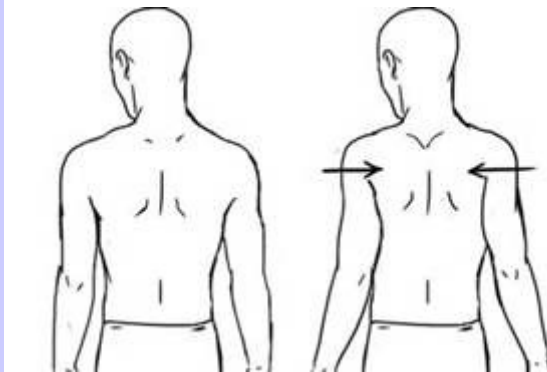
Anterior pelvis tilt (left) and posterior pelvis tilt (right)



Tuck the chin and lift the head



Shoulders closed or shoulders falling back



Shoulders down

