Cervical Dystonia

A Treatment Protocol for Physiotherapists

- Muscle Strengthening
- Muscle Stretching
- Sensory Tricks
- Relaxation Techniques
Mon pauvre corps est raccourci
Et j’ai la tête sur l’Oreille
Mais cela sied à merveille
Et parmi les torticollis
Je passe pour des plus jolis

My poor body is shortened
And I have my head on my ear
But it suits me marvelously
And among the stiff-necked
I pass for one of the prettiest

Paul Scarron
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Chapter I Background

I.1 Introduction

This treatment protocol is based on the bachelor thesis “Do patients with focal dystonia benefit from physiotherapy”. In the thesis, a review of evidence was conducted to evaluate if physiotherapy is effective for these patients and to establish which physiotherapeutic interventions are most effective. The protocol is made on request from CatoSenteret (www.catosenteret.no) who wanted the following methods to be included: Muscle strengthening, muscle stretching, sensory tricks and relaxation techniques. Every patient is different and therefore the description of the single exercises is only meant to give guidance to the physiotherapist. The actual execution of the treatment depends on the abilities and preferences of the patient.
I.2 Main Features of Cervical Dystonia

Patients suffering from cervical dystonia often experience pain and disability, and currently the best available treatment is botulinum toxin injections. The signs and symptoms can vary in every patient. Pain is a common feature caused by the severe muscle contractions, with tension headaches also occurring. Cervical dystonia may result in orthopaedic and neurological complications such as degeneration of the cervical spine, spondylosis and disk herniations. Often the dystonia leads to an abnormal position of the head which can be very disabling. Because of this the patient can experience loss of functions and develop problems in certain activities of daily living.
I.3 Anatomy

The muscles most commonly involved in CD are:

- Sternocleidomastoideus (SMC)
- Trapezius pars descendens
- Levator Scapulae (LS)
- Splenius Capitis (SC)
- Scalene
- Semispinalis
Chapter II Muscle Strengthening

Strengthening of the cervical muscles is aimed at muscles that oppose the dystonic pull. This is to help correct the mid-position of the head and indirectly decrease pain. To help identify the dystonic muscles, the P.T. can ask if the patient receives botulinum toxin treatment and if so, ask for a list of the injected muscles. If the patient does not receive botulinum toxin, a thorough assessment to identify the involved muscles is essential.

The exercises described in the following require use of minimal amount of equipment, and can therefore also be used as homework exercises. The dosage of the exercises is only suggestive and should be tailored to the individual patient.

**Precautions**

- The exercises should be performed slowly and painless. If the patient experiences pain, the exercise is stopped and modifications are made.
An overview of the muscles that are recommended to be strengthened if a certain direction of the dystonic pull is present is given in table 1.

**Table 1: Recommended muscles to be strengthened**

<table>
<thead>
<tr>
<th>Main Direction of dystonic pull</th>
<th>SCM</th>
<th>Trapezius</th>
<th>LS</th>
<th>SC</th>
<th>Scalene</th>
<th>Sempispinalis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior (anterocollis)</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Posterior (retrocollis)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Lateral (laterocollis)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Rotation</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Exercise II.1 For Rotation as Main Dystonic Movement

**Starting position:** Supine with a roll under the knees

**Description of movement:** The chin is moved towards the sternum and the head is turned towards the opposite side of the dystonic pull

**Duration:** The position is held for approximately 10 seconds

**Repetitions:** 8

**Sets:** 3

**Note:** This exercise is recommended for patients who are unable to perform it in the sitting position. When the exercise is mastered, the level of difficulty can be increased by moving on to exercise number two.
Exercise II.2 For Rotation as Main Dystonic Movement

Starting position: The feet are placed firmly on the floor. The patient sits upright with the right shoulder lightly placed against a wall and with a (foam) pillow on the right shoulder.

Description of movement: The head is rotated to the right against the resistance of the pillow.

Duration: The position is held for approximately 10 seconds.

Repetitions: 8

Sets: 3

Note: This example describes strengthening the left SCM. To strengthen the right SCM, the exercise is reversed. The foam pillow should be strong enough to give some resistance to the movement.
Exercise II.3 For Lateralflexion & Rotation (left) as Main Dystonic Movements

Starting position: Supine with a roll under the knees, and the head rotated about 45° to the right and tilted backwards

Description of movement: The patient pushes against the pillow with the part of the head that is right behind, and above the right ear

Duration: The position is held for approximately 10 seconds

Repetitions: 8

Sets: 3

Note: This exercise is aimed at strengthening the right splenius capitis to oppose a dystonic pull into left rotation.
Exercise II.4 For Extension as Main Dystonic Movement

Starting position: Supine with a roll under the knees

Description of movement: The chin is moved towards the sternum with the neck bent. Rotational movements of the neck should be avoided

Duration: The position is held for approximately 10 seconds

Repetitions: 8

Sets: 3

Note: It is recommended to also train the deep cervical flexors. The patient is then instructed to not lift up the head from the pillow but make a nodding movement instead.
Exercise II.5 For Flexion as Main Dystonic Movement

**Starting position:** In sitting or standing with a foam pillow between the back of the head and a wall

**Description of movement:** The neck is bent backwards and the top of the head is pressed into the pillow as hard as possible

**Duration:** The position is held for approximately 10 seconds

**Repetitions:** 8

**Sets:** 3

**Note:** Avoid pressing with the whole trunk, use only the head and neck. The same exercise can be performed in supine position, if the patient is unable to perform it in sitting or standing. Do not increase the lordosis of the lumbar spine.
Chapter III Muscle Stretching

Muscle stretching in the treatment of CD is often used in combination with other therapies, such as muscle strengthening exercises or exercises that improves balance and coordination. The purpose of stretching is to increase range of motion, prevent contractures, decrease pain and promote relaxation. It should be taken into consideration that the more advanced the disease is, the more faulty postures can develop. This may make it necessary to also stretch surrounding muscles that are not dystonic. As mentioned in chapter 1, for localizing the dystonic muscles the P.T. can ask if the patient receives botulinum toxin treatment and if so, ask for a list of the injected muscles.

Precautions

- Caution should be used to avoid overstretching structures which may subsequently lead to joint instability and pain. Therefore, slow execution of the stretching techniques is important.
- If the dystonic muscle is unable to relax, it will be difficult to stretch against its pull, and alternative relaxation techniques prior to stretching might be beneficial.
Exercise III.1 Stretching the Contra-lateral Neck Rotator (SCM)

Starting position: Standing or sitting.

Description of movement: To stretch the left SCM, the head is laterally flexed to the right. In this position, the head is rotated to the left and upwards.

Duration: The position is held for approximately 20 seconds

Repetitions: 3

Sets: 1 (the sets can be performed several times per day)

Note: To increase the intensity, the back of the left hand is put on the lumbar spine.
Exercise III.2 Stretching the Ipsilateral Neck Rotators

Starting position: Sitting

Description of movement: The chin is slowly lowered towards the chest until a stretch is felt. In this position the head is carefully rotated to the opposite side being stretched.

Duration: The position is held for approximately 20 seconds

Repetitions: 3

Sets: 1 (the sets can be performed several times per day)

Note: Emphasis should be put on producing a flexion movement in the cervical spine only.
Exercise III.3 Stretching the Lateral Neck Flexors

**Starting position:** In sitting on a chair with the hands grasping the seat to keep the shoulders down

**Description of movement:** The head is tilted directly laterally to stretch the opposite lateral neck flexor. To increase the intensity, the shoulder can be pressed down by the opposite hand.

**Duration:** The position is held for approximately 20 seconds

**Repetitions:** 3

**Sets:** 1 (the sets can be performed several times per day)

**Note:** To emphasize the stretch on the posterior lateral flexors, forward flexion can be added.
Exercise III.4 Stretching the Neck Extensors

Starting position: Sitting with the hands hanging down.

Description of movement: The head is slowly flexed forward, allowing gravity to pull the head down, until a stretch is felt in the neck extensors.

Duration: The position is held for approximately 20 seconds

Repetitions: 3

Sets: 1 (the sets can be performed several times per day)

Note: Flexion of the thoracic spine should be avoided.
Exercise III.5 Stretching the Neck Flexors

Starting position: Supine, with a small roll behind the neck

Description of movement: The neck is slowly moved into extension whilst it is supported by the roll.

Duration: The position is held for approximately 20 seconds

Repetitions: 3

Sets: 1 (the sets can be performed several times per day)

Note: Some patients may find this position uncomfortable if the cervical spine is compressed. This can be avoided by supporting the neck with a roll, which prevents hyperextension of the spine. If the patient reports any dizziness or nausea, the exercise should be ended immediately.
Chapter IV Sensory Tricks (Gestes Antagonistes)

Strictly speaking, a sensory trick is not a treatment modality, but more a strategy used by patients to temporarily decrease symptoms. The sensory trick is a light touch that the patient applies to the head, face or neck. Many patients with cervical dystonia use sensory tricks to relieve their symptoms, and there are even patients who report a relief of their symptoms by only thinking about a sensory trick. The location and characteristic of the touch differ from patient to patient, and therefore the following examples are only meant as general guidelines.
IV.1 Examples of Sensory Tricks

**Example 1:** The patient uses the palm of the hand to touch the postero-lateral side of the neck.

**Example 2:** The patient touches the cheek with the palm of the hand.
IV.2 Examples of Sensory Tricks

Example 3: The patient uses the index and middle finger to touch the lateral side of the neck.

Example 4: The patient touches the forehead with the palm of the hand.
Chapter V Relaxation Techniques

Patients suffering from cervical dystonia often notice an increase of their symptoms when they are stressed. This is why relaxation techniques should be integrated into physiotherapeutic treatments and apart from that the patient may learn how to apply relaxation techniques at home. Moreover, relaxation techniques can be used preparatory to a treatment session, for example before stretching the neck muscles. In this chapter, three types of relaxation techniques are described.

Note

- Some patients find it difficult to relax and therefore the therapist should offer a choice of different techniques, until the patient finds one that suits him/her best.
V.1 Progressive Muscle Relaxation

The concept of progressive muscle relaxation was developed by Edmund Jacobson, an American physician, in the early 1920s. Jacobson argued that since muscular tension accompanies anxiety, one can reduce anxiety by learning how to relax the muscular tension. In 1973, both Bernstein and Borkovec made adjustments to the technique to suit cognitive behavioral stress management. Progressive relaxation helps to identify tensed muscles and learn to distinguish between tension and relaxation.

The exercise described in the following can be performed in sitting or lying position. Each muscle or muscle group is tensed for 5-7 seconds and then relaxed for 20-30 seconds. If the patient notices that it is difficult to relax a certain muscle, relaxing that muscle up to five times in a row can be practiced, otherwise one repetition is advised.
Instructions for the patient

1. Clench your right fist as hard as you can. Feel the tension in the hand and forearm. Relax.

2. Press the right elbow down into the armrest (or ground), and feel the tension in the arm. Relax.

3. Attach the left hand as hard as you can. Feel the tension in the hand and forearm. Relax.

4. Press the left elbow down into the armrest (or ground), and feel the tension in the arm. Relax.

5. Raise your eyebrows as high as possible. Relax.

6. Squint your eyes and wrinkle your nose as much as you can. Relax.

7. Clench your teeth as hard as possible, and pull the corners of your mouth far to the back. Relax.
8. Press your chin towards your chest while whilst using your neck muscles to prevent the chin from touching the chest. Relax.

9. Take a deep breath and hold it, and pull your shoulder blades together and try to make them meet. Relax.
V.2 Deep Relaxation

Another relaxation technique, described by Benson (1975) is the deep relaxation method. It is advised to be practiced once or twice a day, but not before it has been at least two hours after a meal - for digestive processes can easily contribute to disturb the relaxation. This method can also be used if the patient has difficulties falling asleep.

Instructions for the patient

1. Sit or lie down in a comfortable position.

2. Close your eyes.

3. Relax all your muscles and feel each part of the body become relaxed, starting with the legs. Let the relaxation spread to the rest of your body, right up to the face and head. Stay relaxed.
4. Breathe through your nose and focus on your breath. Each time you breathe out, say slowly and calmly the word "one" to yourself. You do it like this: in….out “ONE”, in….out “ONE” and so on. Keep breathing quietly and naturally.

5. Continue like this for 10-20 minutes. When you are finished, you can lie relaxed for a few minutes with your eyes closed.

6. Try not to worry about how the relaxation occurs. Just try to adopt a passive attitude and let the relaxation occur at its own pace.

7. If intrusive thoughts of any kind appear, just try to ignore them without dwelling on them, and continue to repeat the word "ONE". With a little practice, relaxation will occur without any effort on your part.
V.3 Breathing Exercise for Sleep

Many patients with cervical dystonia have difficulties falling asleep, especially if they are too tensed and unable to relax. Breathing exercises can therefore aid in improving the patient’s ability to fall asleep.

**Instructions for the patient**

1. Lie on your back in a relaxed position with your head in the same height as your body, or lower. Close your eyes.

2. Breathe in quietly. Do not breathe in too deeply. Exhale all the air and repeat the sequence three times.

3. When exhaling for the third time, exhale all the air from the lungs and then hold your breath for as long as you can. Breathe in three times calmly, and hold your breath again at the end of the third exhalation.
4. When holding your breath, try to focus on a mental image you find calming.

5. After completing this sequence five to eight times you will feel the need to breathe normally, and you will feel relaxed and sleepy. You can then breathe quietly and normally again.
VI References

Patients suffering from cervical dystonia often experience pain and disability, and currently the best available treatment is botulinum toxin injections. There is evidence that the application of physiotherapy in addition to botulinum toxin can improve the quality of life for these patients, and therefore this protocol was constructed. The protocol is meant to give guidance to physiotherapists who treat patients with cervical dystonia.

Kjersti Larsen from Norway and Elena Reck from Germany study at the European School of Physiotherapy in Amsterdam. They will graduate in July 2010 (Bachelor of Health). During practical experiences they encountered patients with dystonia, and noticed that there is insecurity amongst physiotherapists on how to treat these patients. This led to the idea of writing a treatment protocol that gives clear and evidence-based treatment recommendations. It is based on their bachelor thesis.