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PHYSIOTHERAPY OF ASTHMA RESPIRATORY EXERCISES

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Among the many treatments applied to the respiratory dysfunctions, and especially to asthma, physical measures and particularly respiratory exercises are outstanding today.

Most authors concur in the objective but they differ in the technique. Their object is to diminish the reserve air which the patient does not expel and to transform it into tidal air. This is obtained by means of the diaphragm. In order to get these results we applied the Kendall system to the abdominal muscles.

In order to eliminate any foreign particles (dust, pollens, etc.) we use a *Free Allergen Room* as a gymnasium. It has filtered and sterilized air with controlled humidity and temperature. Thus we avoid the danger of such particles irritating the delicate alveolar wall during deep inspirations, which are practically unavoidable. Some of these particles might act as irritants; others might be true allergens.

It is also necessary to teach the patient the nature of his disease and to explain to him the advantage of notbreathing deeply, but that, on the contrary, he should expel as much air as possible. Having learnt this the patient can usually prevent or at least diminish the intensity of the attack. For this purpose we also teach the Short Diaphragmatic Breathing, with the patient lying on his right side, his thorax high, turned slightly on his face, and with his knees bent comfortably.

Having outlined these preliminary principles, we are going to describe briefly our plan or method of treatment.

A medical examination is first necessary to discard other factors which might contra-indicate the application of the physical treatment. Once we are sure his condition warrants it, the patient is taught the elementary principles of the respiratory exercises, that he must breathe exclusively with his

abdominal muscles so as to use the diaphragm to its fullest capacity, trying at the same time to relax the accessory breathing muscles (pectorals, sternocleidomastois, rhomboideus major, etc.). The inspiration must be short and the expiration long and slow.

The second time he is treated we apply sufficient exercises to create the so-called "first grade of suffocation of Lagrange", which is useful and stimulates the system. Exercises of the trunk and shoulders are also used. Sometimes it is necessary to reeducate the abdominal muscles, for which the Kendall System is the most suitable.

The thorax of this type of patient usually lacks elasticity. It is necessary, therefore, for the doctor to manipulate this region before each session. This lack of elasticity is observed in cases that have had a long development.

The exercises can be done in various positions, those most used being standing, sitting, and lying down. The principal exercises consist of flexions of the trunk accompanied by arm exercises, lateral flexions and rotations. All these must be done together with breathing exercises.

Rosenthal's principles must always be followed; the breathing must be rhythmic, nasal, silent, and with a physiological frequency of 16 to 18 respirations per minute. In the Short Diaphragmatic Breathing the frequency is from 25 to 40 respirations per minute.

If the nose or other passages are obstructed, the condition must be first corrected by a specialist surgeon.

In all cases we teach good posture, among other reasons because the patient usually presents himself tired, with drooping shoulders, downcast in manner and filled with lassitude. We use several methods, including equilibrium exercises which compel the patient to adopt a correct posture, and exercises for hyperextension of the trunk, directed towards the correct functioning of the anti-gravity muscle groups.

We commence with sessions of 10 minutes, slowly increasing them to 45 minutes, with intervals of rest between exercises to avoid fatigue.

Summarizing, we shall present a plan we have used with practical results, giving in detail some exercises of each type.

PLAN OF TREATMENT

Medical examination.

Somatic and kinetic function examination.

Physiotherapy treatment given simultaneously with the medical treatment).

In the first session the following things are taught:

A. Methods of avoiding onset of asthmatic attack:

1. Do not fight actively against the disease.
2. Do not breathe anxiously, since the problem does not consist in lack of air.
3. Learn methods of muscular relaxation.
4. Learn the Short Diaphragmatic Respiration when calm and not suffering an attack of asthma.

B. Abdominal respiration.

In the following sessions exercises are taught:

I. Tiring muscular exercises

- A. Shoulder girdle
- B. Trunk
- C. Abdominal (Kendall's technique).

II. Posture exercises

- A. Equilibrium
- B. Trunk hyperextension.

III. Passive movements of the thorax

IV. Respiratory exercises.

The length of the class was gradually increased from 10 to 45 minutes, and the number of the exercises from the minimum number given below to the maximum.

DESCRIPTION OF THE FUNDAMENTAL EXERCISES

I. *Tiring muscle exercises*

A. Shoulder-girdle

1. Elbow circling

Starting position—Seated, leaning forward with the back flat, fingers to shoulders, which should be kept well down, elbows in a straight line with shoulders. The back is held in the same forward leaning position throughout, to ensure that the movement takes place in the shoulder-girdle joints and not in the back.

Bring the elbows forward, down, back and up to shoulder position, making as complete a circle as possible.

Make 10 circles forward, then reverse direction and make 10 circles starting backwards.

2. Raising the shoulders

Starting position—standing or seated, arms hanging at the sides, feet together.

Raise and lower the shoulders, 8 to 15 times.

3. Raising the arms

Starting position—standing, arms hanging along the sides, feet separated.

Raise the arms forward to a vertical position and lower again to sides. 8 to 15 times.

B. Trunk

1. Flexion of the trunk

Starting position—standing, hands on hips, feet separated.

Bend forward slowly to a 90° angle, raise the chin as far as possible. Lower chin and return to upright position. 8 to 10 times.

2. Side-bending of the trunk

Starting position—standing, hands on hips, feet separated.

Bend the trunk from the waist sideways, without moving the head or bending the knees, alternating to right and left. 5 to 10 times to each side.

3. Trunk rotation

Starting position—standing, hands on hips, feet separated.

Rotate the trunk sideways to a 90° angle, moving the hips the least possible, alternating right and left. 5 to 10 times to each side.

C. Abdominal (Kendall's technique)

II. *Posturals*

A. Equilibrium

1. Knee bending

Starting position—standing, hands on hips, feet separated.

- a. Rise on tiptoes.
 - b. Lower body, bending the knees to about a 90° angle.
 - c. Raise the body upright.
 - d. Lower heels to starting position.
- 5 to 10 times.

2. Walking on tiptoe

Starting position—standing, hands on hips, feet together, a book balanced on the head.

- a. Rise on tiptoes.
 - b. Take ten steps forward on tiptoe.
 - c. Take ten short steps backwards on tiptoe.
 - d. Lower heels to starting position.
- 2 to 4 times.

3. Leg raising

Starting position—standing, hands on hips, feet together.

- a. Raise right leg to a horizontal position, lower to starting position.
 - b. Repeat same exercise with left leg.
- 10 times with each leg.

B. Trunk hyperextension

1. Simple hyperextension

Starting position—standing, or seated on a chair or bench, hands on hips, legs separated.

Bend trunk backwards as far as possible and return to upright position.

2. Hyperextension lying down

5 to 10 times.

Starting position—ventral decubitus, hands on hips, (after 10 sessions place hands on back of neck). An assistant holds the feet down.

Raise the trunk slowly to a 36° angle from horizontal position, then return to starting position.

3 to 10 times.

III. *Passive Movements of the Thorax*

The patient lies on his back on a cot with his arms along his sides. The physiotherapist stands at one side facing the patient.

The patient must relax all his muscles to the utmost. The physiotherapist places his hands along the lower edges of the thorax with the thumbs at the xiphoids, the thumbs being spread as far as possible from the fingers. He presses towards the patient's head and downwards, then reverses the movement and pulls upwards and towards the patient's feet.

IV. *Respiratory exercises*

1. Simple abdominal respiration

Starting position—dorsal decubitus, or reclining at a 30° angle, with pillows under shoulders and head, hands resting on the abdomen.

- a. Exhale slowly while gently lowering the chest as much as possible, and then the upper abdomen. When exhaling is finished, the abdomen should be well drawn in, the fingers resting either lightly on the upper part, or both hands should rest on the lower front margins of the ribs.
- b. Relax the upper abdomen so that it swells a little and the lower part of the chest is felt to expand slightly, while air is inhaled quickly but silently through the nose. The chest is not raised.

2. Complete abdominal respiration

Starting position—dorsal decubitus, arms crossed on the abdomen, knees raised and bent.

- a. Raise the trunk and head towards the knees, exhaling vigorously at the same time.
- b. Return to starting position, inhaling slowly and silently.
3 to 10 times.

3. Flexion of the trunk

Starting position—seated, arms hanging along the sides, feet separated.

- a. Bend the head and trunk towards the knees, exhaling at the same time.
- b. Return to starting position, inhaling gently.
3 to 10 times.

4. Side-bending with compression of the thorax

Starting position—seated, the right hand placed on the right lower thorax.

- a. Bend to the right, exhaling and pressing on the thorax with the right hand.

- b. Return to starting position, inhaling gently and with the hand relaxed.
5 to 10 times, alternating with the left hand and left side.

5. Trunk rotation

Starting position—standing, arms extended horizontally sideways, feet separated.

- a. Rotate the trunk to a 90° angle, exhaling at the same time.
- b. Return to starting position, inhaling gently.
10 to 20 times, alternating to left and right.

6. "Praying" exercise

Starting position—kneeling, arms raised over the head.

- a. Bend the trunk, bring the hands to the floor, exhaling.
- b. Return to starting position, inhaling gently.
5 to 10 times.

7. Short diaphragmatic breathing

Starting position—Lateral decubitus, either side will do, but generally the right side is preferable. Thorax should be high, supported with pillows; the arm on the under side reflexed; arm on top extended along side with a pillow under the armpit. The leg on the under side flexed; the leg on top extended.

- a. Exhale very sharply, contracting the abdominal muscles.
- b. Inhale rapidly but effortlessly, relaxing the abdomen.
25 to 40 respirations per minute. Increase time with practice from 1 to 5 minutes.

8. Teeter-totter exercise

Starting position—Dorsal decubitus on a "resuscitation table of Eye". Feet and shoulders are strapped to the table.

- a. An assistant lowers the head while the patient exhales and sharply contracts his abdominal muscles.
- b. The assistant raises the head while the patient inhales gently, relaxing the abdominal muscles.

15 to 20 respirations a minute. Increase time with practice from 3 to 5 minutes.

This is a very good exercise to use to avoid an attack of asthma, sometimes being more effective than the Short Diaphragmatic Breathing.

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