

## STUDY ON THE HUMAN BODY'S CENTRAL AXIS. DAY-TO-DAY LIFE VERTICALITY

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**Abstract.** *This paper addresses a case study involving two subjects, a man and a woman, both of them practicing yoga regularly and having experience with such types of exercises. They were tracked for one month and, after each set of stretching exercises, their height was measured in centimetres. We were interested in the way in which the spine responded to elongation exercises, as well as the mind-body interaction during exercise, even if science is far from elucidating a philosophical rather than scientific problem. We emphasised that a minimal set of elongation exercises, together with short relaxation breaks during which the subject focuses on his/her own post-exercise bodily sensations, for no more than 30 minutes a day, can lead to a healthy and relaxed spine, can prevent vertebral compression and, consequently, all negative implications that may result from gravitational compression. The challenge for further research on this theory is the practice of a special elongation program over a period of more than 2 years, using the most appropriate measurements to get the best health effects.*

**Keywords:** *spine, dehydration, compression, elongation, physical exercise.*

### Introduction

The spine is the central axis of the human body, the value scale of the human being. It also represents, beyond the anatomical and physiological aspects, the somatic expression of our mind. Just as the neural tube divides and unifies the left and right asymmetries, being both a command centre for the transmission of information and the representation of mental and spiritual feelings.

Since the central axis is subject to gravity, it has the ingrate but amazing task to ensure the 3D balance between kyphosis, lordosis and scoliosis, but especially in elongation. It is well known that, as the human body grows older, its height decreases through dehydration and oxidative degeneration processes.

But what if, each morning, no longer than 15 minutes, we worked a minimal set of elongation and integration of the spine, on the one hand, and of the entire body, on the other hand, listening to the intelligence of our body? (Lysebeth, 2004, pp. 10-20; Price, 1993). Is this a way to preserve our verticality throughout time, thus avoiding spinal dysfunctions and normal aging degradation?

### Material and Methods

#### *Participants*

The research subjects are a male aged 30 years and a female aged 37 years. Both of them practice yoga regularly and have experience with such types of exercises (future studies that will involve people practicing such exercises for the first time may lead to different results).

#### *Procedure*

This study is the result of a one-month research conducted in 2013. Measurements were used to assess (in centimetres and millimetres) the height dimensions with a height measuring instrument, both before and after the execution of exercises sets (presented below).

Exercises were performed in the morning, considering normal body stiffness at this time of day, compared to body flexibility for the rest of the day. Moreover, the height is higher in the morning than in the evening because of dehydration and the compacting effect of gravity, an issue also taken into account.

The applied method consists in performing daily, for 15-30 minutes, elongation exercises for the spine (Goyal, 1992). Short relaxation intervals, called “self-listening to the body”, were included between exercise series. Both subjects strictly followed the exercise protocol.



Figure 1. Diagonal elongations

The first exercise (Vasilescu, 2000) starts in the lying down position. The right hand is extended, together with the left leg. The palm is flexed backwards at 90 degrees, and the left leg is in maximum dorsal flexion. Elongation is performed diagonally to the body during a few breaths, then the opposite hand and leg (left hand and right leg) will execute the extension.

Details on the exercise method: elongation will be performed gradually, not in a hurry, the mind of the subject being focused on exercise. Elongation performed slowly and carefully is more effective than when performed rapidly (in a military style). For better elongation, subjects must relax the muscles not involved in the exercise, avoiding their unnecessary contraction. For example, while the left hand - right leg pair is involved in the exercise, the other pair, the right hand - left leg, is completely relaxed on the floor.

The facial and tongue muscles are also perfectly relaxed. The lips are open. Elongation is much more effective as the rest of the body, which is not involved in elongation, is more relaxed.

Such an exercise performed in the conditions described above (relaxation, focus etc.) is more efficient if its duration is increased. We aim to conduct further research on the measurable results of this approach.



Figure 2. Different stages of vertebral rolling

The second exercise that involves the spine and detaches the vertebrae is “vertebral rolling” (Vasilescu, 2000) (Figure 2).

The starting point is sitting with the knees extended, the feet in maximum dorsal flexion and the heels firmly fixed on the floor. The upper limbs are initially extended parallel to the body, with the elbows flexed and carried overhead and the face of the palm overhead.

The head is gently pushed by the hands, so it has a small movement of “exiting” from the shoulders (similar to an extraction), the back of the neck is stretched, and the chin moves slowly backwards. From this point, the exercise starts: the upper body is slowly laid down on the floor, rolling one vertebra after another. The intention is to lay down the upper body in a straight line on the floor, to align and roll each vertebra, one after another, from the lumbar to the thoracic and cervical areas of the spine. The heels will remain on the floor for all the duration of the exercise, and the knees are totally stretched. The breath is kept normal, without apnea, throughout the exercise and the rolling speed is kept constant. Ideally, it is maintained the same relaxation of the rest of the body, as described in the previous exercise. Several rolls are followed by short breaks to recover after exercise. The abdominal muscle tone is significant during this exercise, and the exercise efficiency is higher as the exercise speed is slower. Getting back to the original position is done with the upper limbs extended at the elbow, starting over the head until the upper body reaches an angle of 90 degrees from the lower limbs on the floor and from the hands, which reach a position parallel to the ground.



Figure 3. Goyal extension

The third spinal stretching exercise was described for the first time by Suren Goyal (1992) (Figure 3). The starting position is lying on the back. The right knee is bent until the foot reaches the level of the left knee. Then, the right foot (toe area) is “attached” the popliteus space of the left knee (see the above picture). The upper limbs are at 90-degree flexion to the shoulders, perpendicular to the upper body, with the elbows extended, and the hands are joined together with the fingers intertwined. The whole body rolls over on the left side, so that the body sits on the left side, and the right knee is a fixed anchor for an exercise landmark. The upper limbs are at 180° to the body, with the elbows extended. Now, the real exercise begins with 4 fundamental elements:

- The right knee is fixed on the floor (inspiration);
- Hands towards the head (inspiration);
- Heels towards the opposite side of the head (inspiration);
- Shoulder blades towards the floor (expiration).

After a few repetitions, the entire pattern will be equally performed two times on the opposite side, alternately.



Figure 4. Position for self-listening

Lying on the back, in a symmetrical anatomical posture, with the knees extended, the heels together, the toes relaxed. The arms are close to the body touching the ribs, and the forearms are at 30-45° abduction. The palms are up and open. The whole body is symmetrical with the chin, belly button, pubis, heels on the same line. The head, with the cervical area, is stretched.

## Results

The results of measurements after the minimal set of exercises indicate an elongation of about 1 centimeter. Certainly, the elongation of the spine may vary according to the patient’s health status, age and height, as well as the patient’s experience with such exercises. Along with the spinal elongation, an improvement in general mobility is observed, although it has not been measured in the research (but it was mentioned in the reports of the two subjects). The initial height of the two subjects was 180 cm for the male participant (subject no. 1) and 172 cm for the female participant (subject no. 2).

Elongation ( $\Delta y$ ) is defined as the difference module between the length of the spine before exercise and its length after exercise ( $\Delta y = y_2 - y_1$ ). Elongations of the two subjects over a month are presented in Tables 1-4.

Table 1. Elongation in days 1-15 for subject 1

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
$\Delta y$ (cm)	1	0.9	1.1	1	1	0.8	1.2	1	0.9	1	1	1.1	0.9	1	1

Table 2. Elongation in days 16-30 for subject 1

Day	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
$\Delta y$ (cm)	1	1	0.9	0.9	1	1.1	1.1	1	1	1.1	0.9	1	0.9	1	1

Table 3. Elongation in days 1-15 for subject 2

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
$\Delta y$ (cm)	1	0.9	1.1	1	1	0.8	1.1	1	0.9	1	1	1.1	0.9	1	1

Table 4. Elongation in days 16-30 for subject 2

Day	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
$\Delta y$ (cm)	0.8	0.8	0.9	0.9	0.8	0.7	1	1	1	0.9	0.9	1	0.9	0.9	1

## Discussions and conclusions

As our research topic is strictly about the elongation of the spine, we shall not insist on the effects of these exercises on the internal organs, muscles, joints, or on the mental level. We just mention that they exist and will be included as a theme in our further studies.

A special mention related to the second exercise: the balance between the spine and the abdomen. Vertebral rolling works on the antagonist muscles, the abdominal and lumbar ones, and therefore the idea of balance is clear in this type of exercise.

The human being is a whole, and the human body is an organism, not a mechanism, so the synergic concept is needed in our way of understanding. In this argument, the interdisciplinarity tendency applies together theories from physics + economy = econophysics; math + grammar and biology + physics = biophysics, psychology, theology = the synergy concept. The whole is more than the sum of parts, representing not just the sum of parts, but their interaction.

The body-mind issue is complex and far from being resolved. There are different approaches, from neurophilosophy (Churchland, 2007; Dennett, 1986) to the quantum brain theory (Penrose, 2006; Stapp, 1998). Beyond understanding this mechanism, it is important to stress the great potential of the mind-body interaction by observing the placebo effect, for example the Tummo Tibetan practice (Price, Finnis, & Benedetti, 2008; Benson et al., 1982).

We underline the importance of self-listening after each exercise as a rest of the body assisted by the brain, as a spectator to the own exercise echo inside the body.

We listen, capture and receive, for a few seconds to a few minutes, the whole rainbow of sensations inside the sky of the body. In this sense, self-listening is a form of relaxation, rehabilitation, disconnection, disjunction, in which inner attention is an act of progressive increase in efficiency.

A minimal set of elongation exercises, together with short relaxation breaks during which the participant focuses on his/her own post-exercise bodily sensations, for no more than 30 minutes a day, can lead to a healthy and relaxed spine, can prevent vertebral compression and, consequently, all negative implications that may result from gravitational compression.

Future studies will provide possible measurements of the positive effects of elongation methods on the spine, as well as of the self-listening to the body after exercise.

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