Bachelor's Thesis (TUAS)

Degree Program in Performing Arts

Puppet Theatre

2011

Katri Pekri

OCCUPATIONAL DISEASE

– The Skeleton in Puppeteer's Closet

TURUN AMMATTIKORKEAKOULU
TURKU UNIVERSITY OF APPLIED SCIENCES

BACHELOR´S THESIS | ABSTRACT

UNIVERSITY OF APPLIED SCIENCES

Degree Program in Performing Arts | Puppet Theatre

21.05.2011 | 67

Ari Ahlholm

Katri Pekri

OCCUPATIONAL DISEASE – The Skeleton in Puppeteer's Closet

The topic of my thesis is *occupational disease*, a matter that goes hand by, as the name reveals, with every occupation. The subject reference is carried out from the point of view of a becoming puppeteer. The theme is introduced through the mixed elements: personal observations (collected during puppet theatre studies), as well the subjective interpretations of the results from the online survey "Puppeteer's Body Health" and the studies carried out by qualified researches from different fields, over the matters of *occupational disease,* human body and the movement, as well the work ergonomics.

The occupational *disease* is like a cuckoo, which lays its eggs in somebody else's nest, in this case into humans' body. In order to talk about issues related to human body, there is a need do define, what human body is about. So my thesis starts from climbing up the human spine, slightly touches the bones and the muscles on its way, until it meets the laws of motion and ends up creating movement.

After that, there is an opening of the *occupational disease*, its characteristics, and descriptions as well some examples of the treatment and ease. The matters' concerning *occupational disease* is followed by the analysation of the online survey "Puppeteer's Body Health", where main focus is on the puppeteer's body. And finally there will be a short overview of the work ergonomics.

KEYWORDS:

Occupational disease, puppet theatre, puppeteer, ergonomics

OPINNÄYTETYÖ (AMK) | TIIVISTELMÄ

TURUN AMMATTIKORKEAKOULU

Esittävä taide | Nukketeatterin suuntautumisvaihtoehto

21.05.2011 | 67

Ari Ahlholm

Katri Pekri

AMMATITAUTI – luuranko nukketeatteritaiteilijan kaapissa

Opinnäytetyöni aiheena on *ammattitauti.* Kuten nimestä voi päätellä, ammattitauti on yleinen kaikissa ammateissa. Lähestyn aihetta pian valmistuvan nukketeatterin ammattilaisen näkökulmasta. Käsittelen aihetta henkilökohtaisten havaintojeni (kerätty nukketeatterikoulutuksen aikana), internetissä tekemäni ”Nukketeatteritaiteilijan kehonhuolto” -kyselyn subjektiivisten tulkintojeni sekä eri alojen tutkimusten (liittyen ammatitautiin, ihmisen kehoon, sekä liikkeeseen ja työn ergonomiaan) avulla.

Ammattitauti on kuin käki, joka munii munansa jonkun toisen pesään. Tässä tapauksessa pesänä on ihmisen ruumis. Voidakseni käsitellä ihmiskehoon liittyviä ilmiöitä, tulee aluksi määritellä mistä kehosta puhuttaessa on kyse. Kehoa käsittelevässä osiossa lähden liikkeelle pitkin ihmisen selkärankaa, käsittelen hieman luita ja lihaksia, pohdin liikkeen lakeja ja päädyn lopulta tutkimaan miten liike syntyy.

Seuraavassa osiossa tutustun *ammattitaudin* käsitteeseen, sen ominaisuuksiin, kuvauksiin ja keinoihin saada helpotusta ja hoitoa ammattitaudin aiheuttamiin vaivoihin. Tämän jälkeen huomio siirtyy nukketeatteritaiteilijan kehoon internet-kysely ”Nukketeatteritaiteilijan kehonhuolto” analysoinnin myötä. Viimeiseksi käsittelen lyhyesti työergonomiaa.

ASIASANAT:

Ammatitauti, nukketeatteri, nukketeatterin taiteilija, ergonomia

CONTENTS

1 Introduction

> "All the responsibility of man can be contained in one sentence: Make yourself a perfect body." Ralph Waldo Emerson (Lecoq 2006, 58)

We are born into our bodies. It is a commitment (union) that is made for the lifetime. The contract is signed by the laws of nature, it consists multiple paragraphs, some of them are encrypted, others in languages that we do not understand, but despite of that we are obliged to follow this pact as precisely as possible. We belong to our bodies and our bodies belong to us. In order that this life long relationship could last, it should be rather based on symbiosis, than any other long-term interactions.

Wherever our life might lead us and whatever occupation we end up choosing, we get the whole package. The occupation "case" is filled with all sorts of things; some of them are more pleasant than others. But each "case" will definitely have some dangers and risks, which are related to this particular occupation. Even more, "extra" hazards appear along the way, risks we not aware of while making the actual choice. In order to prevent permanent injuries, it is essential to become aware of these hazards, because only after that, we are able to look for the solutions or even preventing measures. So the risks could be kept as minimal as possible.

What concerns us, puppeteers, and our body is one of our main tools, it is as important as the figures (characters) that come alive on the stage, through whom we spread our message. Unfortunately we seem to underestimate its importance and values, as puppeteers' body is quite often hidden, behind a screen, out from the light (being dressed in black) or just serving the role of a neutral figure. We tend to fall into a trap "If we cannot see, it is not there", even though in the reality puppeteers body, is the groundsel of the whole structure.

Our bodies are very smart figures, capable of learning all our habits in a very small amount of time and adapting them to itself. So, this is the first alert of the danger, if we ignore the "red light" once or twice or even more, it might end up

being a “green light” for the body and it stops warning us. Everything seems to be functioning as normal, even though in the meantime we actually keep developing the damage even further. Up to the day, it reaches to the edge of the abyss.

Human body is probably one of the innocent victims of life that is being abused over and over again. Whether it is done for the sake of an art, beauty or for some other reasons, the result in the end is the same for all of us: one day human body will ware out. But as we go along on the path of life, we are the ones who can affect for how long our body will be “in season”, despite of the years passing by. Our body is always negotiating with us, before it makes a decision; we just need to listen to it very carefully. With listening comes the awareness and with awareness comes the opportunity to make difference or even prevent things from happening.

So the main issues of the thesis are: human body in general, as well from the point of view of a *puppeteers* body, human occupation and its hazards, including the occupational diseases as well the suggestions for adaptations from other occupations into puppeteers profession. The initiation for this thesis was caused by the inner necessity to know more about the unknown puppetry world, which is waiting behind the safe walls of the school. The inner impulse was evoked by the approaching graduation and the need to fly out from the secure nest, as well of the personal curiosity towards the human body. As it is not common for my nature to wait until the expected one arrives, I decided to do some research of my own and find out which kind of the skeletons might be trying to sneak into my closet, while I am walking on the path of my chosen occupation.

As there is not much literature about puppeteer’s profession, this thesis is mainly based on the researches made among other professions, about occupational diseases and adapted for the puppeteer’s occupation. Adaptations are based on my personal experiences and explorations made during the four years studies in Turku Arts Academy in the Puppet Theatre department as well founded on the information gathered from the online survey “Puppeteer’s Body

Health", which was conducted among the Finnish and Estonia puppeteers (the ones who had signed themselves up on the national UNIMA pages), during the autumn 2010. That is why, all the generalizations of the work are primitive and do not reflect the common situation taking place in the puppetry world. So it is rather a suggestion out from all the possibilities, than a confirmed model, that has reached out from the hypothetical status. And as one of the most important things for me for writing this thesis, was to have a firm footing. I decided to head more towards the direction of finding out how the skeleton could look like (discovering the diseases and disorders), rather than how, could I throw it out when it has all ready moved into my closet or even stop it from going there. These last two matters will be dealt with, but it is important to acknowledge, that the scale pan will not be equally shared.

2 Human body and motion

> It is our body that climbs the mountain, whispers in another's ear, trembles with excitement, notices the light change, grips the bag, tenses with fear, laughs with delight. It is our body that actually lives the life. Our mind may plan, and process, and recall, but it is the body that directly experiences the reality of the world. (Marshall 2008, vii)

2.1 Human body

Human body consists: head, neck, trunk (torso), and upper and lower limbs. Trunk includes chest (thorax), abdomen (belly) and the posterior called back. Shoulder, arm, elbow, forearm, wrist and hand form upper limb and pelvic girdle, buttocks, hip, thigh, shin and the leg form the lower limb. Bones form the structure of the body and muscles, tendons and ligaments hold it together. (Roosalu 2006, 22)

The power center of the human body is the spine, which connects the head, limbs, chest and pelvis by giving them a moving column of support, as well serving a protective corridor for spinal cord. That is why; the alignment of the spine affects the entire functioning of the body.

Normally human spine is made up of thirty-three or thirty-four vertebrae (Figure 1, page 57); the topmost cervical vertebra (C1) is called *atlas,* and along with the next one, called *axis* (C2), it forms the joint connecting the spine and the skull. According to which areas vertebrae are occupying, five different regions can be distinguished. First seven vertebrae (C1-C7) make up the neck area and are gathered under the name *cervical,* next twelve vertebrae (T1-T12) from a *thoracic*, the area from where the ribs extend, *lumbar* is made out from five next vertebrae (L1-L5) and is followed by *sacral* which consists five fused vertebrae (S1-S5) and finally four-five coccygeal bones as the remnant of the tail (also know as tailbone).

The vertebrae vary in shape, but their basic form is the same: a cylindrical weight-bearing „body“ in front, with a vertical arch extending out from it. (Tufnell & Crickmay 2006, 9) Vertebrae form joints, by coming into contact with each other at the back, which in turn makes it possible to move the spine. (Dimon 2001, 75) Between each vertebra lies a spongy and fluid filled disc, which acts as self-adjusting cushion in order to protect the spinal nerves that emerge from the cord. The discs make up a quarter of the total length of the spine, being proportionally larger in the more flexible areas of the backbone. They form: 40% on the cervical, 33% of the lumbar, 20% of the thoracic areas, as there is no discs on the sacrum, it has no movement.

The accumulated weight of the head, thorax and limbs is transferred down the vertebral column to the pelvis, which acts as a bridge spreading the weight down through the legs and into the ground. (Tufnell & Crickmay 2006, 9)

So, it is essential to remember that the spine forms the central support structure for the body, and it is supported or acted upon by the large and complex network of muscles. Moreover, in order for a movement to take place, and in order that the body would be supported against gravity, muscles that are related to movement need to have a solid structure to act upon. So these muscles cannot exist without the skeleton and the spine is the central core of the skeleton structure. (Dimon 2001, 73)

Puppeteer's body, what does it mean?

As it appeared from above, human body is finely combined system, where each "detail" have meaningful role to play for best functioning of the whole system. Even though it is evident, that all the body elements are and must be equally important, there are always ones that we would like to lift to the foreground. It is like in theatre, where we have protagonist and side characters, both are vital for the play, but in the bigger scale, we follow the protagonist's story as the main one.

The body model for this particular work is not accidentally chosen, but a peculiar one called *puppeteer's body*, so lets look bit more closely, in order to find out, what it is about? What are its characteristics and what could be the main body areas, that actually carries the weight of the puppeteer's profession on the top of their "shoulders"?

Puppeteer's body is a body type, which cannot be described using the adjectives, in order to generalise the whole race. A person cannot be born into this peculiar body built, because it is being modeled by the demands of the occupation during the working years and it is getting adjusted (finds its shape) along the way. So in my opinion the best way to find the characteristics of *puppeteer's body* is to shift the focus through the requests of the profession.

Puppeteer's occupation in my opinion is not the easiest one, to give a short informative description about (See as well: Being a puppeteer as profession? page 21), because its characteristics can vary in a large scale, whether it is caused by the chosen puppet theatre style or in nowadays, because of the fact that puppetry gets often mixed with other art forms, it does not matter, the result is still the same. It is almost impossible to put all the possible possibilities describing puppeteer's profession into one sentence. So I will try to point out some of the important matters that from my point of view are relevant and go hand by hand with the occupation under the discussion.

So, according to my opinion being a puppeteer involves working with movement and stillness, in different scales (varying from massive, to everyday as well to

the microscopic measures), as well in strange and challenging body positions. It means giving weight, sharing it as well baring it (whether it is a puppet, object or a part of scenery), working on stable and unstable surfaces, above and under things and the list could be continued endlessly.

Puppet theatre is an art form that is crossing over the borders of mans imagination and cannot be stopped by the limitations of human body, so that is why, this profession demands a lot from *puppeteer's body*. Even though it is difficult to find general characteristics that would appear in the occupation under the discussion, there is at least one element, that is common for all puppeteers, despite of the chosen style. It is the necessity of the alerted body. Because the preciseness and the quality as well the range of the movement, does not only depend of one particular body-part. It is rather relied on the use of the whole body as a complex. So, being alerted and ready, gives the opportunity to receive, act and react. I would say that puppeteers' profession is quite a lot, a body based work and p*uppeteer's body* is one of the main tools being used in order to accomplish the actions.

As in this writing p*uppeteer's body* is like an onion that is pealed along the journey, not all of the matters were revealed in this very chapter. But before we prolong to the next one, "Proper body alignment", there is a small hint I would like share. It concerns the battle for the role of the main character: Which body areas are baring the weight of the profession on top of their "shoulders"? The fight for the podium places was held between the following body areas: the knees, the upper body (including neck and shoulders) and the lower back. In order to still keep up the curiosity, the final arrangement will be revealed along the way. (See more from the Chapter 4, page 34; Appendices, page 59)

2.2 Proper body alignment

> The first step is to engage the whole body. Not just hands, arms and face. Not just the features you see every morning in the bathroom mirror. You want every limb, muscle and bone in your body to be vibrantly present, and able to communicate equally well. (Lorna 2008, 12)

Proper body alignment is a balanced body position in which the body's load-bearing joints are aligned, while body is being held upright against the gravity (standing, sitting or lying down). It occurs when all the muscles are in balance - front to back, side-to-side, top to bottom. When the body is in this state, the musculoskeletal system functions optimally, the body bears the force of gravity with minimal effort, as well it is in the most "ready" state to react properly to any kind of movement.

Proper body alignment:

- Head is centered and stacks on the top of the shoulders, shoulders stack on top of the hips, which in turn stack on top of the knees and ankles
- Shoulders and hips are at the same level
- Pelvis is aligned neutrally, not tipped forward or tipped backwards (tail-bone downward)
- Knees are pointing straight ahead (kneecap is in the center and pointing straight forward) and are at the same level, as are ankles and feet
- Feet are attached to the ankles at the base and are pointing straight ahead, so there goes a straight line out from the middle of the ankles and it intersects between the second and the third toe (Moving Synergy, referred 12.10.2010)

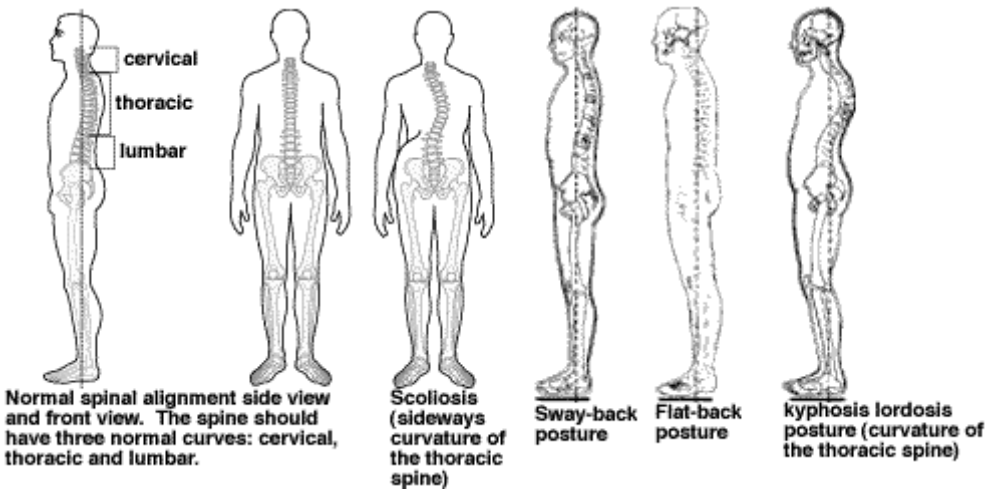


Figure 2. Proper body posture (The Cleveland Online Foundation 2008, referred 12.10.2010)

Efficiency factors of proper body posture:

- Decreases the abnormal wearing of joint surfaces that could result in arthritis
- Decreases the stress on the ligaments holding the joints of the spine together
- Prevents the spine from becoming fixed in abnormal positions
- Prevents fatigue, because muscles are being used more efficiently, allowing the body to use less energy
- Prevents strain or overuse problems
- Prevents backache and muscular pain (The Cleveland Clinic Foundation 2008, referred 12.10.2010)

The key figure to maintain the correct posture is hidden into our muscles. If all the muscles are getting the proper amount of stimulus, our bodies naturally conform to this proper body alignment. They will move with ease and without pain. But, if some of our muscles do not get enough stimulus, they will become weak and as the brain is as clever as it is, it will do anything to keep a person upright and moving the best it can. So, the brain picks another muscle to compensate the weakened one. As a result, the body begins to move out of balance and deviate from proper body alignment, because some of the muscles

are forced to work “overtime” in order to compensate the weakened muscles, but as well to combat the forces of gravity.

So in order to keep proper body alignment, we must provide extra stimulus to the body, that it is missing form our everyday lives. Because when the muscles are performing their functions properly, our joints will also realign. (Moving Synergy, referred 12.10.2010)

2.3 Human motion

> Movement defines us from the moment we are born to the day we die. From the first kick in our mother’s womb, until our dying breath, we participate the dance of life and experience the power of movement. (Kleinman 1994, 70)

Motion is defined as the process of continual change in the physical position of an object. In other words: as a movement or an action in the position of the body or a part of the body. It can be voluntary or involuntary and it is opposed to resting. (Free Online Dictionary, referred 25.02.2011)

The foundation for the study of motion lies in the musculoskeletal and nervous systems. While muscle actions are the basis of movement of the skeleton at joints, the nervous system is an essential component of all movement. Their combined activity maintains the muscle tone, which holds the static positions of the body in preparation of movement. (Tyldesley & Grieve 2009, 3)

In human occupation, the body moves through sequences of movements. Each stage in the sequence involves simultaneous movements at several joints and the goal for the task may be reached in variety of ways. (Tyldesley & Grieve 2009, 223) The weight of the body follows the laws of gravitation and in order to interact effectively with the environment, the body utilizes a number of basic, or core positions (lying, sitting, squatting and standing). The choice of the position to be adopted for the performance depends on the attributes of the task and the environment.

The functional objectives guiding the selection of these positions are:

- Positioning of the head, for optimal visual and auditory monitoring events
- Bringing the trunk and upper limbs into the most effective and efficient position in order to perform the tasks
- Ensuring the optimal stability and equilibrium
- Minimising the amount of the physical effort that is required in order to execute the tasks and achieve the goals (Tyldesley & Grieve 2009, 208)

2.3.1 Laws of motion

Everything in the universe moves: even if we appear standing still, the Earth keeps on moving around the Sun, and the Sun in turn, keeps on moving around the galaxy.

In organising and producing movement, the brain regulates posture to ensure that the body can maintain and restore the balance and be safe from the threat of harm. For example, when we are reaching for an object, if the line of gravity begins to move beyond the base of support, compensatory adjustments are made to maintain the balance. If these adjustments are not made, the intended goal is abandoned as righting and saving reactions are initiated. Another priority is the adoption of body positions that allow any given task to be carried out in the most efficient way. (Tyldesley & Grieve 2009, 207-208)

I believe that the laws of motion are important in a relation how movement happens in our bodies, and how it is related to the surroundings, to the space around us. Especially, when we puppeteers are not just responsible of moving our own bodies in space, but others as well. Movement does not happen without a reason and it always has its own nature and the certain laws it follows.

The reason why I decided to introduce the laws of motion, formulated by well-known physical theatre researcher and teacher Jacques Lecoq, was driven by the fact that he had defined the scientific terms into the language of theatre. Even though these laws do not present the complete universal “laws of motion”,

but in terms of language, they are more close to language of art, which in turn makes them more adjustable for puppetry world.

According to Lecoq, the movement can be characterised by displacement in relation to stillness and there cannot be movement without a fixed point. Everything that moves is recognised according to a chosen element referring to the immobile. (Lecoq 2006, 80)

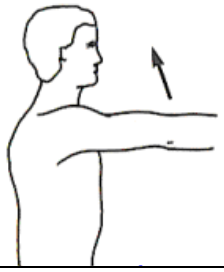
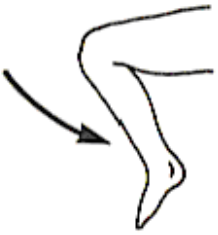
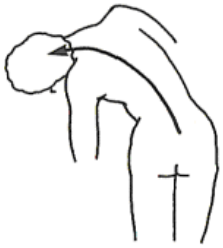
Laws of motion, defined by Lecoq:

- There is no action without reaction
- Motion is continuous, it never stops
- Motion always originates in a state of disequilibrium tending towards equilibrium (balance)
- Equilibrium is itself in motion
- There is no motion without a fixed point
- Motion highlights the fixed point
- The fixed point, too, is in motion (Lecoq, Carasso & Lallias 2009, 94)

2.3.2 Types of movement

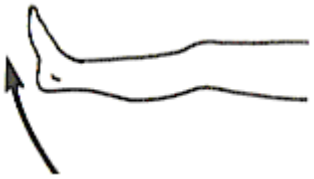
The skeletal muscles, which are attached to the bones of the skeleton, are producing the movement at joints, which in turn allow the movement of the segments of the body relative to each other. The joints are classified by the particular connective tissue involved: fibrous, cartilaginous and synovial. Most movements of the body occur at the synovial joints, which are the most mobile ones by offering a variety range of movements. The synovial joints can be classified by the shape of their articulating surfaces, which determines the number of axes of movement (hinge, pivot, ellipsoid, ball and socket, plane and saddle joint). (Tyldesley & Grieve 2009, 8-9, 27)

Table 1. Normal ranges of movement: joint actions

<table>
<tr><td colspan="3">Flexion is to bent from the joint, so the angle at the joint decreases</td></tr>
<tr><td>Spinal column</td><td>Shoulder joint</td><td>Elbow joint</td></tr>
<tr><td>  </td><td>  </td><td>  </td></tr>
<tr><td>Wrist joint</td><td>Hip joint</td><td>Knee joint</td></tr>
<tr><td>  </td><td>  </td><td>  </td></tr>
<tr><td>Dorsiflexion is to bend the ankle by bringing the toes towards the knee (bending the foot upward, as if digging in the heel)</td><td>Plantar flexion is to bend at the ankle by bringing the toes away from the knee (bending the foot downward, as if standing on the tiptoes)</td><td>Lateral flexion is to bend the trunk laterally (width) or sideways</td></tr>
<tr><td colspan="2">Ankle joint</td><td>Spinal column</td></tr>
<tr><td>  </td><td>  </td><td>  </td></tr>
</table>

(Dimon 2001, 9-12; McKenzie 2011, referred 16.01.2011)

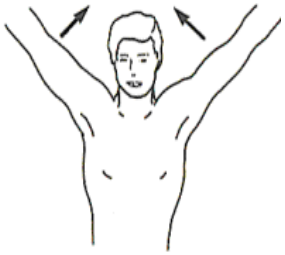
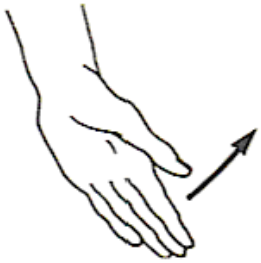
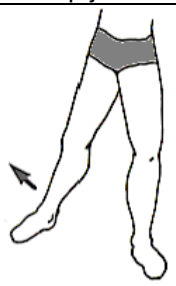
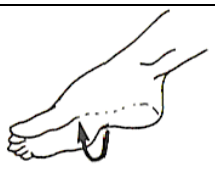
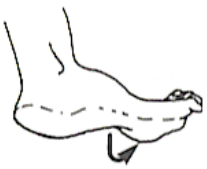
Table 2. Normal ranges of movement: joint actions

Extension is to stretch out, or straighten at the joint, the angle at the joint increases		
Spinal column	Shoulder joint	Elbow joint
		
Wrist joint	Hip joint	Knee joint
		
Hyperextension is to straighten at a joint beyond 180 degrees (past the anatomical position), to overextend		

Rotation is to rotate the body or a limb around its long vertical axis				
Spinal column	Outward medial rotation (shoulder joint)	Inward medial rotation (shoulder joint)	Lateral rotation (hip joint)	Medial rotation (hip joint)
				

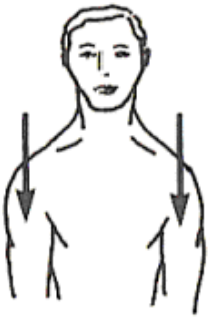
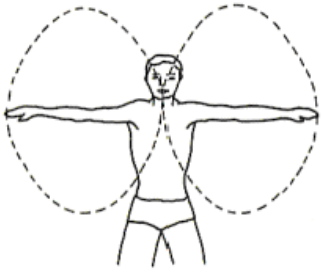
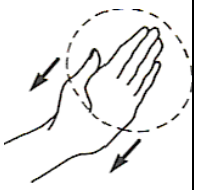
(Dimon 2001, 9-12; McKenzie 2011, referred 16.01.2011)

Table 3. Normal ranges of movement: joint actions

Abduction is to move a part away from the centre of the body			
Shoulder girdle	Shoulder joint	Wrist joint	Hip joint
			
Adduction is to move a part towards the centre of the body			
Shoulder girdle	Shoulder joint	Wrist joint	Hip joint
			
Pronation is the rotation of the forearm so that the palm turns downward. (palm-facing-back)	**Suspination** is the rotation of forearm so that the palm turns upward (palm-facing-front)	**Inversion** is the turning of the foot to face inward	**Eversion** is turning of the foot to face outward
Elbow joint		Ankle joint	
			
Ulnar deviation is the sideways movement of the hand at the wrist (*ulna* is one of the long bones of the forearm)	**Radial deviation** is the return movement from ulnar deviation (movement of the wrist, where the hand including the fingers move towards the *ulna*)	**Cortical opposition** is the movement of the thumb that opposes the fingers	

(Dimon 2001, 9-12; McKenzie 2011, referred 16.01.2011)

Table 4. Normal ranges of movement: joint actions

<table>
<tr><td>Elevation is raising a part of the body</td><td>Depression is lowering the part of the body</td><td colspan="2">Circumduction is a circular movement of the trunk or limb that combines flexion, abduction, extension, and adduction</td></tr>
<tr><td colspan="2">Shoulder girdle</td><td>Shoulder joint</td><td>Wrist joint</td></tr>
<tr><td>  </td><td>  </td><td>  </td><td>  </td></tr>
<tr><td>Protraction is moving a part forward along the surface</td><td>Retraction is moving a part backward along the surface</td><td></td><td></td></tr>
</table>

(Dimon 2001, 9-12; McKenzie 2011, referred 16.01.2011; Wisc-Online 1999-2011, referred 7.02.2011)

3 Occupational disease

Occupational diseases are disorders of health resulting from conditions related to the workplace and are registered into the list of occupational diseases. In general, occupational diseases are related to exposures to physical, chemical or, controversially, psychological hazards; they usually develop over a period of time (over many months or years, depending of the intensity and the circumstances of the exposure) and often resemble or duplicate diseases occurring in other settings.

Occupational diseases often look like as any other medical conditions and for these reasons, most of them, are frequently overlooked or misdiagnosed. Even though, occupational disorders are actually more common than it is generally realized.

Certain occupational diseases occur exclusively in certain industries or occupations; these are often given fanciful names such as welder's flash (an inflammation of the eye caused by ultraviolet light from welding) or farmer's lung (an inflammatory lung disease caused by inhalation of mold spores). Others occur in almost every industry, such as low back pain (more properly considered as injury) or a noise-induced hearing loss and so on. (Guidotti, referred 7.10.2010)

Being a puppeteer, as profession?

Every occupation has its characteristics, as well stereotypical features that are commonly used in order to describe the nature of the profession. What could be the conventional properties for puppeteering? According to my experience, people tend to raise their hands above their heads, mimicking glove puppets or wiggling their fingers in order to do an impression of manipulating a string marionette, after hearing about my chosen profession. These two matters could be (and are) part of puppeteers' profession, but are not capable of revealing all the possible sides of the issued occupations polyhedron. Unfortunately there is very limited amount of material available for larger readership, in order to understand the profession better. Huge quantity of knowledge is stored inside the puppeteers and passed on orally or practically in certain districts. That is why; the "new arrivals" quite often end up reinventing the "bicycle" all over again, because there is just not enough researches been made in order to have a firm footing right away.

For example, if we compare dancer's profession to puppeteers, we can find similar lines. Both occupations might occur in several different forms: as a hobby, as an amateur work or as professional work. As well include the active use of ones own body, the working spaces are not so regular as well the working characteristics. Both can vary depending of the particular work. But in my opinion dancers are operating in more firm ground compared to puppeteers, and that is because of the amount of researches been done among their field. There is a lot of material that could be beneficial for them, in the sake of the work safety.

The researches made on the field of art mainly cover some explorations about drama actors and singers, where the most frequent references are linked to the possible damages of the vocal chords, caused by the stage dust or the overuse of the vocal strings.

The lack of knowledge about the occupational diseases linked with puppeteer's profession was the impetus to investigate the current issue more closely and find the connections and similarities, that occur in other professions and have exploratory background and could be adapted into puppeteer's occupation. So the following chapters are mainly researches that have been made amongst other professions and are adapted into puppetry world based on my own explorations of the *needs of a puppeteer*, during the four-year studies In Turku Arts Academy in the Puppet Theatre department.

3.1 Classification by the hazards

Occupational hazards are classified by their form as well of their route of exposure and can be evaluated with estimates or measurements of the risk. Generally five different types of occupational hazards are distinguished: physical, physiological (ergonomic), chemical, biological and psychological (psychosocial).

- Physical hazards: noise and vibration, extremes of heat and cold, radiation, barometric pressure and others
- Physiological (ergonomic) hazards: repetitive motion, excessive force, awkward postures and other aggravating positions
- Chemical hazards: inhalation (particulate matters, gazes and vapours), skin absorption, ingestion, other routes
- Biological hazards: infectious microorganisms, chemical hazards of biological origin, animals and plants
- Psychological (psychosocial) hazards: work load (speed and hours of work), social isolation, work organization, abusive social environment (Levy, Wagner & Rest 2005, referred 12.10.2010)

As the matter of occupational diseases include a wide area, I decided to narrow it down into one specific hazard type and concentrate on the disorders that are caused by the physiological hazards, which occur in the working place and are posing a risk of injury to the musculoskeletal system of the worker. Choice was made in accordance with the predetermined amount of time and the volume of the work, as well based on the need of a becoming puppeteer. Because as it has appeared above, being a puppeteer quite often demands working in extreme body positions, on unstable surfaces, as well with heavy puppets. Puppeteer's body is one of the main tools of the profession. So based on that, it is essential to start from the human body and look at the disorders that might appear, if the body is not being used wisely.

3.2 Occupational diseases caused by physical overload

Physical load is defined as the requirements that are given to the organism. These requirements do not depend of the individuals, but do devolve on the external conditions. If human acts onto the load, it means he or she is working and in the meantime individual reactions show the strain of the organism while working. (Loogna & Loogna 1999, 5)

Physical overload could be defined by giving your body more to do than it is accustomed to do. (WikiAnswers, referred 16.01.2011)

In many cases we are dealing with load that is not acknowledged as overload and repeated actions under these circumstances will cause changes in tissues, which will appear after some while. (Loogna 2007, 19) So, the physical overload disorders may be caused by irrational organisation of the working, long term forced positions, frequent same kind of fast movements, sudden changes in the working rhythm, incorrect working methods, mistakes while handling the loads, smaller damages (micro-traumas) as well excessive tiredness. Even more, the hazard to get ill is not only increased by the bad working conditions and lack of knowledge, it also depends of the employees personal (age, sex, hereditary predisposition and so on) as well physical features (untrained muscles, spinal

anomaly), of the amount of stress and workers unhealthy habits (abusive use of alcohol, smoking, over weight and so on).

There are distinguished almost thirty different disorders caused by physical overload. The most common affected area is support and moving organs. Overload diseases are conditionally divided into four categories: neurological, muscular, joint and aseptic disorders (Figure 3, page 58). The distribution is made, depending of which body area organs and tissues are mainly baring the overload. Some of the tough elastic tissue (gristle) and bone tissue disorders are looked at separately from the four categories, for example scoliosis and varicose veins. (Loogna & Loogna 1999, 29)

Even though the medical descriptions of the disorders might feel difficult to approach to in the first reading, I personally think that they are important for the sake of understanding. With what, we are actually dealing with, what are its characteristics, how does it affect our bodies and how serious this theme actually is and why it needs our attention. Because human nature seems to live by the law “It does not happen to me” and have tendency to react only after, when the “earthquake” has taken place. The preventing measures are taken into use after the first “crisis” even thought it could have been stopped all ready in the “mother’s womb”.

3.2.1 Neurological disorders

Neurological disorders appear mainly in such physical working conditions where employees certain body parts (for example back and limbs) are submitted under a frequent contact with cold or vibration. First signs: noticing the pain in the back, as well in shoulders, in a forearm or fingers. As a result of a physical overload light functional health disorders appear, which might develop into occupational disease, if the issues are not solved in the first phases.

Neurological disorders are:

- Radiculitis as well know, as lumbosacral radiculopathy (lumbalgia) appears as the pain in the lower back. It is caused by changes in the discs and in the anatomical structures (joints, ligaments and muscles) that are functionally related to these discs. Degenerations of the discs are encouraged by micro traumas, which in turn are caused by the use of wrong working methods (for example while lifting weights). The most common degenerative changes appear between fourth and fifth lumbar vertebrae and between the last lumbar vertebrae and the sacrum discs. This is probably due to the fact that in this region, the spine has the greatest mobility and there is the biggest tilt between vertebras. Degenerative changes of the spine are called spondolysis (Loogna & Loogna 1999, 38-47)
- Neuritis is an inflammation of a nerve or nerve group
- Polyneuritis or multiple neuritis is a widespread inflammation of nerves
- Neck-brachial plexus (network of nerves that originate near the neck and shoulder) inflammations are caused by the overload to the shoulder girdle and upper limb muscles, especially when working hand is frequently lifted higher from the shoulder level or shoulders are kept up. Microtraumas are also conducing brachial plexus inflammations. Disease is quite often appearing at the same time with the inflammation around the shoulder joint. The main symptoms of the disorder are pain in shoulders and hands, as the disease evolves the pain in the arms changes and muscles become weaker and skin becomes paler (Loogna & Loogna 1999, 59-61)

According to the general opinion the pain is mainly considered to be neuralgia, caused by the nerve origin, but actually in reality neuralgia appears more rarely, than muscle pain. (Loogna & Loogna 1999, 63)

3.2.2 Muscular disorders

Human body contains over 300 muscles that provide movement for the whole body. It is a big area of responsibility to cover, but besides being responsible for making a body part to move, muscles also respond for holding the body in a position, if needed, as well controlling the effect of external forces acting on the body part. Muscle actions may involve shortening of the muscle (concentric work), or the muscle staying at the same length (static work) or a controlled lengthening of the muscle (eccentric work). (Tyldesley & Grieve 2009, 30-31)

The functional activity of the muscles of the body depends on nervous stimulation and the conduction impulses to and from the muscles. A muscle cannot function without its nerve supply. That explains the muscle tone (muscles are not limp, but “lively”), which we can notice while our bodies are actually resting, it is caused by the low level of nervous activity, which is always present in the muscles. (Tyldesley & Grieve 2009, 22-24)

Muscular disorders can be classified as musculoskeletal and neuromuscular. Musculoskeletal disorders can affect the body’s ligaments, tendons, joints, muscles and nerves and neuromuscular disorders are affecting the muscles and/or their nervous controls.

- Myalgia (muscle pain): Light overloading disorder, mainly appearing as pain in the back and the limbs, especially in the hands. Pain can be caused by overloaded muscles or be a result of working in a forced position. Muscle pain usually eases after few days and does not need special treatment. But it should be taken as a sign to decrease the load, limit the movements that are causing the pain. If the pain is ignored, it will last longer and eventually can develop into chronic pain. Once injured muscle is more sensitive to the overload and even a slightest over stretch can bring pain alert.
- Myositis: (muscle fibre inflammation) is caused by regular overload to certain muscle groups. Frequent overload to the muscles interferes their blood circulation as well affects the metabolism, which in turn decreases

their efficiency. Damaged muscle becomes tense, henceforward muscle elasticity decreases and muscle becomes loose.

- Myofacitis is an inflammation of muscle and its fascia. Myofacitis causes intensive pain in arms and legs, as well in cubit and hand-wrist joints. In many cases it also captures the tendons, through what muscles attach to the bones. Tendon pain is most frequently noticed in shoulder girdle and at the elbow joint area. If the disease develops chronically, the symptoms get deeper. Muscle tissue gets partially replaced by the connective tissue, which in turn causes the muscles to emaciate and their efficiency decreases.
- Myofibrosis is a chronic myositis, where muscle tissue becomes replaced by fibrous tissue.
- Neuromyositis is one type of polymyositis or proximal muscle weakness; it is an inflammatory disease that leads to significant muscle weakness. (Loogna & Loogna 1999, 63-64)
- Neuromyopathy is a combination of muscle and nerve disorder. (Loogna 2007, 43)

3.2.3 Joint disorders

Joints are the areas where bones are linked together, like the knee, hip, elbow and others. Some joints are very inflexible and capable of little or no movement (sacroiliac joints); others are more freely movable (synovial joints). (Dimon 2001, 15) Joint damages can be caused by joint inflammation arthritis, which can affect more than just one joint. Arthritis is causing pain, stiffness, swelling and limitation in movement. Besides that, the joint diseases can be caused by other injuries or the joints will be simply “worn out” by the years of use. (MedilinePlus, referred 23.02.2011)

Ostearthrosis is one form of arthritis. It is a painful degenerative disease that is affecting joints and can lead into disability. It is caused by the overload to the joints. It starts from the joint cartilage damage. Firstly the pain as well the cracking sound is noticed while overloading the joint, both disappear in relaxed

position, but without a treatment disorder will develop further and will bring along the changes into bones near the joint. So, eventually the joint mobility gets reduced and its shape will be distorted.

According to the joint area being affected, different forms of ostearthrosis can be distinguished:

- Lumbar arthrosis affects the lower back and the pelvic girdle causing pain, inflammation and loss of motion in these areas
- Ankle or Achilles arthrosis, signs of wear appear in the ankle (Loogna & Loogna 1999, 64-67)
- Coxarthrosis is a noninflammatory degenerative disease of the hip joint. The disease is characterized by certain stiffness that will progressively increase in the affected hip joint. At first cracking sound appear is the joints and the pain can be deeply located in the middle of the groin while the joint is moved. Afterwards it can be noticed also during the rest. Without the treatment the damage of the cartilage and the deformation of the joint surfaces will lead into the shortening of the leg at the affected side (Muresan, referred 25.02.2011)
- Gonarthrosis is the degenerative disorder of the knee joints, caused by the damage to the overlying cartilage or gristle. First symptoms are crackles in the knee joints, then the pain appears in the knee joint, as well it can irradiate at the distance (up and down the knee joint). Without a treatment the disease advances and as the articular cartilage is lost, the ligaments around become looser, weaker and the joint becomes more unstable, knee “slips” appear. Joint becomes more painful and rigid and might cause even joint blocks (Muresan, referred 26.02.2011)

3.2.4 Aseptic inflammations

Aseptic means free from pathogenic microorganisms, so aseptic inflammations are caused by the growth microorganisms, which bring along a deviation from organism being sterile. (Free Online Dictionary, referred 25.02.2011)

- Epicondylitis is an inflammation of an epicondyle; lateral epicondylitis, also known as tennis elbow and medial epicondylitis, also known as golfer's (thrower's) elbow). Caused by repetitive and same kind of movements as well micro traumas to the upper arm. Disease is quite often related with the "working hand". Symptoms: pain in the upper arm and weakened grip. (Loogna & Loogna 1999, 67-68)
- Bursitis is an inflammation of a joint capsule, caused by frequent micro traumas, repetitive movement and excessive pressure. Elbows and knees are most commonly affected. The symptoms vary from local joint pain and stiffness, to burning pain that surrounds the joint around the inflamed small sacks. (Loogna & Loogna 1999, 68-70)
- Tendovaginitis (tenosynovitis) is the inflammation of the fibrous wall of the sheath that covers a tendon. Caused by long lasting and frequent or strained movements. (Loogna & Loogna 1999, 76-78)
- Stenosing ligamentitis is caused by the continuing pressure to the palm in the area of hand phalanx joints. Disorder is affecting the movements of the fingers. In the progression of the disease three stages are distinguished. At first, one or more fingers might get locked "snapping fingers" and will not be able to fully extend. In the second face more intense pain appears and it can radiate even to the upper arm, shoulders and neck, fingers get locked more often. In the third stadium locked fingers become permanent symptom and the passive stretching of the finger takes place slowly. (Loogna & Loogna 1999, 81-82)
- Shoulder tendonitis is a shoulder tendon area inflammation (swelling or irritation), most commonly appearing in the working hand. Caused by fast, repetitive movements under strain. Pain is noticed gradually, first notice might be days after the actual event that caused the injury and is located to the front and side of the shoulder and is increased when the shoulder is moved away from the body. If the overloading continues and treatment is not applied, pain becomes more intense and appears as well during the nighttimes and might lead into more serious damages. (Loogna & Loogna 1999, 68)

- Hand-wrist channel disease (carpal tunnel syndrome) is caused by overload of the hand (pressure on the median nerve at the wrist). In the beginning of the disease, pain can be located in upper limbs, especially during the nighttimes (“dying arms”), as the disease develops also daytime pain in the thumb, wrist and forearm can be noticed. Fingers become numb and hand looses its strength. (Loogna & Loogna 1999, 82)
- Tendinitis is a tendon area inflammation, caused by continuing overload and stretching to the muscles, as well it is a result of stationary dull injuries. Its symptoms are pain and local stiffness also crackles in the joints as well slowing down of the movements. Generally tendinitis is referred to the body part of its appearance (for example Achilles tendinitis). (Loogna & Loogna 1999, 79)
- Stenosing tendovaginitis (stenosing tenosynovitis) is a progressive restriction of the sheath surrounding a tendon, which causes the inflammation. It is one of the most common overload diseases, caused by long lasting and frequent or strained movements of the hand. Inflammation decreases the muscle performance and hand becomes weaker. (Loogna & Loogna 1999, 79-80)
- Mucous membrane inflammation. (Loogna & Loogna 1999, 30)
- Chronic inflammation of the throat (laryngitis) is an inflammation of the larynx (“voice box”), which appears suddenly after a long-term hyperextension of the vocal cords. (Loogna & Loogna 1999, 83)

3.2.5 Uncategorized diseases

- Scoliosis (Figure 2, page 13) is an abnormal curvature of the spine to one side (either right or left). The curvature of the backbone can vary from being slight to serve. The bend can occur at any point along the spine, from top to bottom, as well pelvic asymmetry can occur. The causes of scoliosis vary from its nature, it can be also native, but in this case we look at static scoliosis (professional scoliosis), where deformed factors act already on developed skeleton. (Loogna & Loogna 1999, 70-74)

- Bone fractures caused by overloads also known as stress fractures. Fracture is cause by non-traumatic, long-term overload on a bone, generally resulting in pain, swelling and loss of movement
- Wrist tenderness (malacia) is the abnormal “softening of the cartilage”. Caused by frequent micro traumas to the wrist area or constant overload to the radius-carpal joint. Pain appears in the wrist when pressure is applied to one of its structures. At first the pain appears periodically as the clinical course of the disease is very slow, but it gets more intense with time. Disease develops chronically and no complete healing is possible. (Loogna & Loogna 1999, 75)
- Dupuytren’s contracture is an abnormal thickening and shortening of the palm tissue, which gradually causes the fingers to bend towards the palm, without the possibility to fully extend them anymore. Disorder is most commonly appearing in the fourth and fifth finger and quite often goes symmetrically in both hands. The precise cause of Dupuytren’s contracture is unknown. (Loogna & Loogna 1999, 76)
- Ganglion is a sac-like swelling or cyst formed from the tissue (synovium that is filled with a thick jelly-like fluid) that lines a joint or tendon. The exact cause of ganglion is unknown, but it appears most commonly in the wrists and ankles. (Loogna & Loogna 1999, 79)
- Varicose veins can be caused by variety of matters, but it is classified under occupational diseases, with its relations to occupations that require a long-term standing on the feet. This decreases the muscle tone in the legs that in turn decreases the leg muscles impact on the deep veins. Residual blood accumulates into limbs and intra-vein hydrostatic pressure rises, which in long term causes the varicose. (Loogna & Loogna 1999, 86)
- Progressive short-sightedness (myopia) is a refractive defect of an eye, caused by repetitive overload of the eye, while working. (Loogna & Loogna 1999, 83)
- Occupational dyskinesia (coordination neurosis, movement disorder) is functional disease, not a muscle inflammation, which mainly appears

amongst worker, whose profession involves long-term accurate and fast movements. The most common appearance of occupational dyskinesia is “writing cramp”. (Loogna & Loogna 1999, 61-62)

3.3 Prevention and rehabilitation

Since the knowledge of the existence of the occupational disease, is not so widely spread, it is quite common that health disorders caused by occupational hazards are being undiagnosed. This tendency is inflicted by the lack of knowledge as well of the fact that the symptoms of disorders caused by occupational hazards are similar with any other symptoms caused by hazards of everyday life. The difference lies on the fact, that occupational diseases are site-specific: health disorders develop over certain amount of time, and are caused by the hazards of the working place.

In my opinion, the prevention as well the ease of physical overload diseases depends largely on each and every individual. Because despite all of the researches that has been made and the knowledge that could be found from books, no one else could sense our bodies the way we do, notice what it likes or dislikes or even to spoil it for us. So, the remote control, of the well being of our body, lies in our hands. The very first step is to become aware of the hazards that are ambushing us behind the corners of life, in order to adopt the necessary measures for prevention, ease (minimize) or treatment. We are the ones who are responsible of the physical condition of our bodies (training the muscles in order to keep the right amount of stimulus) as well the ones who administrate all the negative habit patterns (abusive use of alcohol, smoking, over weight and so on). Because all these matters along with unhealthy working conditions increase the risk of our body getting affected.

An elementary principle of minimizing the risks of illnesses and injuries from exposure to health hazards is that one cuts down the risk by reducing exposure. The most efficient way to reduce exposure is to eliminate the hazard, by preventing its generation at the source. The next most efficient control is to prevent hazards dispersal into the environment with engineering controls and

then the least efficient control is to protect the individual worker with appropriate personal protective equipment, though it can be effective, but not as one independent solution. (Levy, Wagner & Rest 2005, referred 12.10.2010)

Rehabilitation options for disorders caused by physical overload:

- Physical therapy (short walk, skating, skiing, running, swimming, orthopedic exercises, therapeutic exercises)
- Heat treatment (electricity treatment, sauna, warm bath, baths for limbs, mud treatment, ozokerite treatment, paraffin wraps)
- Mechanical stimulus (therapeutic massage, acupuncture treatment, needle treatment, acupuncture massage, stretching treatment, wearing joint supporters, wearing heel adds, wearing a corset)
- Medicamentosive treatment (analgesics, tranquilizers, unguents, epidural blockade)
- Surgical treatment (Loogna & Loogna 1999, 91)

4 Online survey “Puppeteers Body Health”

The survey “Puppeteers Body Health” was conducted in online, among the Estonian and Finnish puppet artists, who had subscribed themselves in the national UNIMA page, as well among the current and former students from the University of Applied Sciences, Arts Academy of Turku, from the puppet theatre department. The questionnaire was held during 1.10.2010-1.12.2010 and was completely anonyms. All the participants got the link of the survey via e-mail and were completely free making the choice whether to answer and when.

The purpose of this survey was to find out some of the patterns that seem to repeat themselves if we talk about the profession of puppet artists as well to get more general idea of puppeteers physical condition. The questionnaire was deliberately built up in a quite “site-specific” way, the choice was made consciously and based on my own personal knowledge about these two countries (Estonia and Finland) and that is why, it only covers a small area of

the actual puppet theatre field. So the results of the survey are more likely to be viewed as one of the facet of the polyhedron.

Questionnaire was divided into two parts: general information (age, gender, active years in puppetry, current employment, puppet theatre style) and the body knowledge (general necessity, training habits, knowledge and the use of different body techniques, main areas of tension, difficult puppeteering positions). The results from the survey will be found from the following chapters as well from the appendices (pages 57-62).

4.1 Results and analysis

All together there were thirty-nine responses. Ratios between female and male respondents divided 30/9 in women's favor. Despite of that quite considerable difference, it would be still too premature to claim, that there are more women than male in the puppetry fields of Estonia and of Finland. As this matter was not the question with the big question mark, the discussion over this matter will not be prolonged any further.

The respondents were between the age of 20-69 and their active years in puppetry varied from half a year up to 43 years, so the average "Being active in puppet theatre world" is about 11 years.

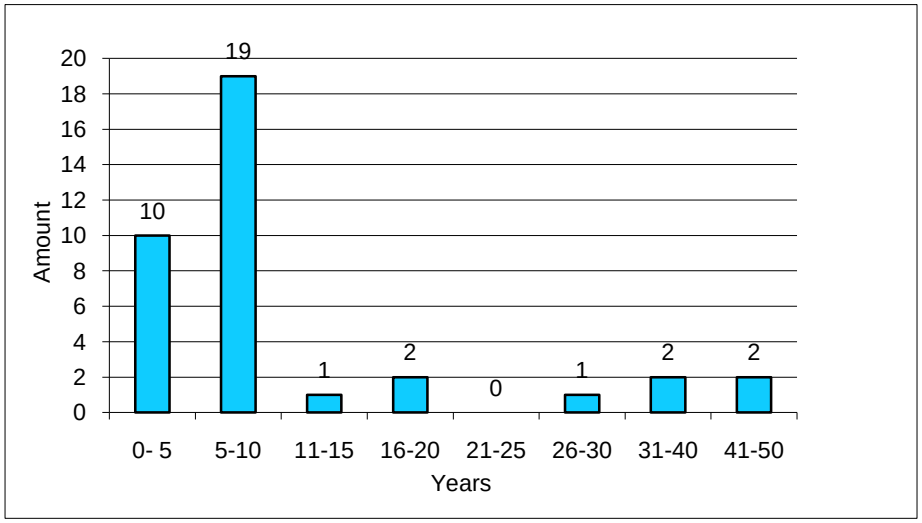


Figure 4. Being active in puppet theatre

Significant amount of the participants of the survey are currently working as part time puppeteers, freelancers or are still in the middle of their studies. Some of the answerers have been puppeteers in their past and have now become teachers or researches; there were as well some amateurs and retired ones, who are continuously active in puppetry field (Table 9, page 59).

Other matters (“Puppet theatre style”) concerning the first part of the survey could be found form the appendices (pages 59-60).

The second part of the survey consisted questions related to puppeteers body knowledge, general habits, repetitive patters of the tension in certain body areas (during or after the work) as well the question about difficult manipulating positions. All of these matters are helping to map the situation on the puppetry field, by giving the knowledge of the puppeteers physical condition as well the hint of the possible body areas, that could be the most vulnerable ones to get infected by the occupational disease.

77% of the respondents considered the knowledge of the body heath as *very important* and 23% as *important* matter of their profession. Answer *irrelevant* did not receive any supportive votes.

According to my point of view this clearly shows that there is an interest and the need of the knowledge “How to stay healthy as a puppeteer?” At the current moment, puppeteers are lacking of a strong supporting system, for example what professional dancers have. They can be ignoring the fact that dancer, as a profession does not belong to the list of the occupations that are studied in order to detect the possible occupational diseases. Because lot of researches has been made among their profession and the knowledge has been gathered, so they are aware of the hazards of their occupation, as well have the suggestions for minimizing the risks and suggestions for treatment. Puppeteers are more on their own. Ought to find the same kind of patterns that appear in other occupations and to pick out the things that could be related to puppeteers profession and adapt the suggestions for prevention as well the ease, according to their needs.

Because, ones physical condition plays an essential role on how easily the hazard appearing on the working place could affect the employee. Keeping the body in shape and providing the muscles to have equal amount of stimuli, is one of the key figures of being vaccinated against the “bacteria” of occupational disease. According to the results of the survey, more than half of the respondents (74,4%) are actively training at least once a week and less than one third (25,6%) of the answerers are training more rarely.

Table 5. General frequency of training activities per week

Frequency per week	Amount	Percent
Less than once a week	10 persons	25,6 %
Once a week	3 persons	7,7 %
Twice a week	10 persons	25,6 %
Three-four times a week	14 persons	36,0 %
More than five times a week	2 persons	5,1 %

As the matter of occupational health, should not be only the responsibility of an employee, I also added a question concerning the support coming from the employers. In order to find out, whether employers promote the physical activities among their employees, by offering them training possibilities inside or outside from the working place or rather consider this as a matter as something that does not belong to their field of activity.

According to the results of the survey, the support coming from employers scored less than half from the maximum. Only thirty-six percent of the respondents could say that, their employers are taking care of them, by providing opportunities for physical training. And even though, that the answer *sometimes* got the highest ratings, instead of the definite *no,* I personally feel that the situation on the working field is quite unfortunate. On the other hand, it once again supports the idea, that matter of occupational health lies on the hands of each individual.

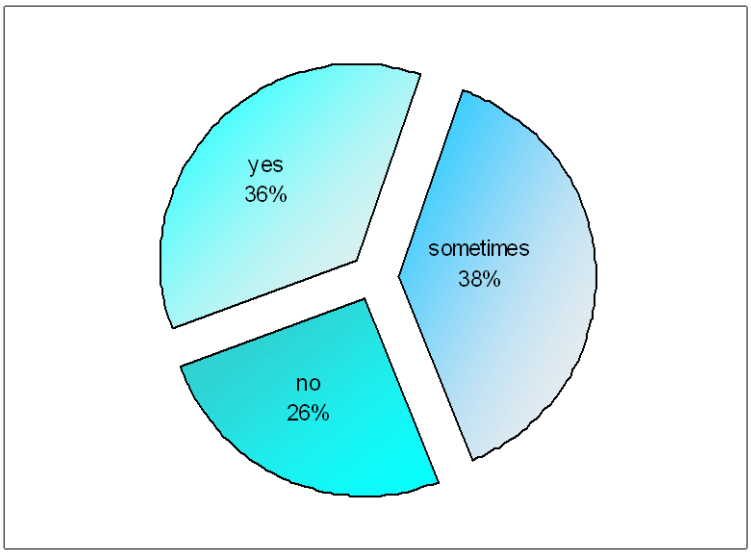


Figure 5. Physical training opportunities provided by working place

Main activities that belong to the monthly routine

As it appeared from results of the previous questions, puppeteers' being physically active outside the working place varies from average to low-level activity. The race for "The most common physical activity belonging to the puppeteers monthly routine" (Table 12, page 61) was won by *walking* and followed by *dancing* and *bicycling/spinning*, the first ones to be left out form the award podium were the different *body techniques* (Yoga, Pilates, Alexander Technique, Qi Gong, Laban and so on). See also the puppeteer's knowledge and use of different body techniques from Table 13, page 62.

In my opinion, there might be a slight danger, that some of the muscle groups are not getting enough stimuli. Even though walking, dancing and bicycling are good activities for the body and do an excellent work of keeping a healthy body state, practising only these activities, will not be able to cover all the needs of *puppeteer's body*. Because the demands for *puppeteer's body* are higher than just a healthy body state, though it is a good starting point. Phenomenon is caused by the variations of the characteristics of the work. *Puppeteer's body* is forced to adjust itself over and over again, as the situations change. That means: yes, the body must have a strong and healthy basis, on top of the adjustments could be built, but as the situations keep on changing, the training

plan cannot be one-sided; otherwise we end up being in a situation, where some of the muscles are doing the overwork.

That is why I personally think that puppeteer's training plan should have variations: exercises that help to built up the basics and keep a healthy physical condition, as well some general *bodywork*, which delicately tunes the *sensitive ear* of a puppeteer, in order to listen to ones body, as well some extra flavours, which should be added separately, according to the need of each project.

Notices of body tensions and repetitive patterns

Thirty-seven respondents have noticed the tension or/and pain in the certain areas of their bodies, after or during the work and only two of answerers replied as negative. Question about noticing the repetitive patterns of the tension or/and the pain in the same kind of body area, got 67% of the *positive* answers (26 persons), 23% (9 persons) replied of noticing *some kind* of overlapping and 10% replied as negative (4 persons).

And finally we have reached to the point, where we can solve the mystery of the "golden trio" or in other words, the final arrangement, of the body areas, that carry the weight of puppeteering on top of their "shoulders". As it was mentioned before, the body areas that were notably featured out "noticing the pain or/and tension" (see below, Table 6) were (this time in arranged order): neck, shoulders, hands (including arms, wrists and fingers), lower back and the knees. So, according to these results, body areas mentioned above, might be under the actual threat of meeting the skeleton hiding in the puppeteer's closet.

Table 6. The most common body areas, where the tension (pain) is noticed

The area of the body, were the tension is noticed	Amount
Neck	29 persons
Shoulders	27 persons
Hands (arms, writs, fingers)	26 persons
Lower back	19 persons
Knees	17 persons
Upper back	12 persons
Throat, vocal chords	10 persons
Feet, ankles, toes	7 persons
Shins	6 persons
Thighs	4 persons
Head	3 person
Pelvis	3 persons
Chest	2 persons
Buttocks	1 person
Stomach	1 person

In order to have better understanding, which body area is most commonly infected by, what type of an occupational disease, see the following table (Table 7) about “Body areas linked with occupational diseases”.

Table 7. Body areas linked with occupational diseases

	Body areas that are most commonly being affected														
Occupational disease	Neck	Shoulders	Hands (arms, writs, fingers)	Lower back	Knees	Upper back	Throat, vocal chords	Feet, ankles, toes	Shins	Thighs	Head	Pelvis	Chest	Buttock	Stomach
Radiculitis				■											
Neck-brachial plexus	■	■	■												
Myalgia	■	■	■	■	■	■		■	■	■			■	■	■
Myofacitis		■	■					■							
Lumbar arthrosis				■								■			
Ankle/achilles arthrosis								■							
Gonarthrosis					■										
Epicondylitis			■												
Bursitis			■		■										
Stenosing ligamentitis			■												
Shoulder tendonitis		■													
Hand-wrist channel dis.			■												

	Body areas that are most commonly being affected															
Occupational disease	Neck	Shoulders	Hands (arms, writs, fingers)	Lower back	Knees	Upper back	Throat, vocal chords	Feet, ankles, toes	Shins	Thighs	Head	Pelvis	Chest	Buttock	Stomach
Stenosing tendovaginitis	■	■	■												
Chronic inflammation of the throat							■								
Wrist tenderness			■												
Dupuytren's contracture			■												
Ganglion			■					■							
Varicose veins								■							
Occupational dyskinesia			■												

Other diseases (the ones, that can affect larger body areas, or groups of muscles or nerves and so on): neuritis, polyneuritis, myositis, myofibrosis, neuromyositis, neuromyopathy, ostearthrosis, coxarthrosis, epicondylitis, bursitis, tendovaginitis, tendinitis, mucous membrane inflammation, scoliosis, bone fractures, ganglion, progressive short-sightedness. (For more precise descriptions of the occupational diseases, see the pages 24-32)

4.2 Examples of difficult manipulation positions and suggestions for ease

Example 1

Situation: Big and heavy puppet is being manipulated behind high screen. Sight is kept on the puppet, both arms are lifted and singing with a loud voice.

According to the described situation, the neck, shoulders and vocal chords are body areas that catch the eye the quickest, as the ones being under the threat of getting overloaded. This is caused by the risk of working behind the high screens, with a lifted arms position. There is always a danger, that the shoulders get lifted too high, which puts a lot of pressure to the shoulder area, as well blocks the nape, which in turn makes it more difficult to produce the voice as well affects the rest of the body aggravatingly.

So in order to be more economic with the use of the body, following suggestions should be taken into consideration. If the screen is too high compared to puppeteer's height and the arms must be in the lifted position, a small platform should be placed under puppeteer's legs, with a purpose to compensate the missing centimeters, instead of overstretching the arms. As the puppet is supposed to be followed by the sight, it is better to do it more with the eyes, than with the whole head, in order that the nape would stay open, as well that the voice could be produced naturally. Because following something with the whole head (especially while looking up) might be causing the neck to crush, this in turn reduces the range of vision. Though, if there is a need to widen the vision area, it can be easily done, by just tilting the head slightly to one of the sides, without forcing the neck too much.

In addition, to the matters mentioned above, there is one extra element that should be taken into consideration; it is the weight of the puppet. This in this particular case carries a label "heavy" as one of its characteristics. So it is even more essential to point out, that the weight of the puppet must be supported by the whole body and should not rely only on the strength of the upper limb muscles. That concerns actually both matters: keeping the puppet up as well while lifting it.

Example 2

Situation: Puppeteering simultaneously two small cardboard boxes (one in both hands). Hand is bent from the wrist, in the way that palm is facing the ”audience” and it is kept inside the box. Thumb and little finger are holding onto a little ring, in order to keep the box up and stable. Ring finger is bent to the palm and the index and middle finger are wearing little legs, which are walking, dancing, jumping and so on.

Based on the depiction above, it shows clearly, that the wrists and the fingers are put under amount of pressure, while manipulating the boxes and the little legs. And as the positioning of the hand is twisted form being *normal* (healthy), there lies a danger of injuring the hand. So the very first suggestion would be: re-considering the hand positioning, in a way, that there would not be so many deviations from the natural state position of the hand and it could move more freely. If it is not possible, then it is absolutely necessary to train the hand muscles (especially the wrist and fingers) for this particular case, so these muscles could give a wider support for this abnormal hand positioning. Also there is definitely a need to have brakes between periods of actions, so that the hand could return into its normal state and have some relief, as well relaxation.

Example 3

Situation: Puppeteer’s legs (up to knee height) are presenting the puppet’s legs. Puppets’ head, which is a ball, is kept on the level of the knees and being manipulated by one hand, other hand is used for manipulating the puppet’s hand. Puppeteers’ own upper-body is ought to be kept as far as possible from the puppet.

This type of a puppet puts a large amount of stress on *puppeteer’s body*. Because, while knees are pulling forward in order to be represented as puppets legs, the back is drawn back, for the sake to have a clear separation between the puppet and its manipulator. At the same time, the arms are reaching forward, with a task to manipulate the head and hand of the puppet, so basically the arms end up being in the middle of two separations (the knees and the

back), which causes the body being out of balance. Moreover, the puppet is mainly moving on the strength of the tight muscles.

So there is a high risk that the arms get overstretched and back crushed, while the thighs are baring the overload. In order to ease the situation, I would suggest firstly one technical solution, concerning the manipulation methods for puppets head and hand. In my opinion, distant manipulation (with stick, string or something else) should be used instead of straight manipulation (with puppeteer's hand) in order to get more space between puppet and the puppeteer, as well to keep the body in healthier position. Secondly, back should be kept as straight as possible (towards the direction of the body is headed to), in order to maintain the proper body alignment (Proper body alignment, page 12) and have a firm footing. Even more, back should also be used as a "tool" to reach further with the arms, with intention to avoid the overstretching. Besides those special exercises, with aim to increase the muscle tone (legs muscles) should be adapted into the daily routine as one supportive element for this particular case. So that the leg muscles would not ran off from stimuli and other muscles would be obliged to do overwork.

Example 4

Situation: Behind the screen (height 50cm) manipulating a fish puppet (moving across the stage on knees), with a moving mouth. Puppeteer's hand goes inside the puppet, from the back of the fish and is kept in a horizontal position (from elbow until the top of the fingers) and puppeteer's own head is kept down the whole time, in order it would not be seen behind the screen.

So once again puppeteer is behind the screen, this time the situation is vice versa, compared with the example 1, because the height of the screen is much lower. Even though the body stays on the low level, it is still very important to keep the back as straight as possible. Moreover, it would be good, if the puppeteer's head, that is supposed to be unseen, would continue heading towards the same direction as the back, instead of being pulled against the chest. While moving on knees across the stage, the contact between knees and

floor should be softened (for example by using kneepads) in order to avoid the knee damages or another option, is to change the whole body positioning. For example, placing one of the legs so, that the whole shin is on the floor, knee is heading towards the moving direction and the foot is placed under the buttocks, while the other leg is kept bent from the knee and the foot firmly on the ground. The leg with the bent knee is used for taking the step as well pulling the body forward. And it would be good to change the positions of the legs every once in a while.

In addition to the placement of the back and the knees, there is also one lifted arm, kept horizontally (so that the elbow stays at the same level with the rest of the hand, until the top of the fingers), that needs our attention, in order to avoid the shoulders being lifted too high up.

Example 5

Situation: Manipulating a puppet in a sitting position (without a chair). Hands are kept as straight as possible on the shoulder level. Meanwhile puppeteers' own head should be kept as far as possible from the hands.

According to the description of the situation, it appears that the thighs are baring a huge amount of weight (the puppeteer’s as well the puppets). This brings the need to add extra stimuli to the thigh muscles, in order to keep the muscles balanced. This in turn guarantees that the joints will be aligned and the proper body posture will be kept.

As the manipulation position demands lifted hands (arms are kept in shoulders height), the shoulder area must be checked, with an eye to confirm, that the shoulders are staying down and relaxed, in order to prevent overloading the shoulder girdle and overstretching the arms.

5 ERGONOMICS

Word ergonomics comes from Greek *ergon* means work and *nomos* means law. Ergonomics is a scientific discipline that explores human (human groups) in a workflow in order to optimize working tools and working conditions. It treats work in a system human-working tool, working tools-working environment, and acts according to the principle to protect humans' health and assure the development in work efficiency. (Loogna & Loogna 1999, 13)

5.1 Important elements of work ergonomics

Working capacity and ergonomics

If we speak of the working under the strain (overload)**,** we mean requirements that are submitted to the organism depending of the external conditions, not inside the present working time.

Strains could physical or psychological. The effort depends of the hazards and work efficiency. Under the work efficiency we mean ability to react on to the strain and work. It is influenced by many factors. (Loogna 2007, 21)

Working efficiency

- Personal qualities: inheritance, physical condition, endurance pf the physical strain, professional competence (knowledge, skills), health condition, way of living (habits, ability to rest and so on), age and sex
- Nature of the work and working conditions: working skills, physical strain (overload), psycho emotional pressure, psycho climate inside the company, hazards of the working place and the external environment factors
- Living conditions (Loogna 2007, 21)

5.1.1 Ergonomic working positions

Head and neck area

Typical mistakes are wrong positioning of the head (bending too much back or leaning too much forward) and too frequent head turns. Incorrect use of the head and neck area, causes overstretching of the neck muscles, an interruption in the bloodstream as well puts an extra load to the neck area and pressure to the nerves. In order to avoid these negative events, head must be kept, as centre, as possible, extreme positions should be avoided and sudden as well frequent head turns should be decreased to minimum quantum. (Loogna & Loogna 1999, 17-20)

One of the puppeteer's tasks is to follow the puppet with the sight. In most of the cases it does not mean following the puppet in the level of puppeteers' eyes, it means rather looking more up, because the manipulation position is lower than the puppet or more down, if the situation is *vice versa*. As the sight of the eyes is shifted from the normal, there is a tendency to bent the head too much back or lean it too much forward, in order to still catch the "object" being followed, which in turn blocks the nape. So as to keep the nape open, it would be better to catch the puppet more with the eyes than with the whole head. Tilting the head a bit, to one of the sides, opens the sight range even more. The idea of "inner nodding" (without actually performing the action), which comes from Alexander Technique, is in my opinion a very good tool for making sure that there is no extra tension in the nape and it is moving freely.

Shoulder area

The most common shoulder area un-ergonomic body positions are: upper arms or shoulders that are lifted too high (over 30 cm), too fast and frequent upper arm movements, strong turning of the forearms (inwards, outwards), arms in a restricted position (wrists over stretched or bent too much forward) or under static pressure, while holding a detail or a working tool(s). Incorrect working

positions are causing the pain in hands during the night times, feeling of “dying arms” and disorders of the tendons and nerves.

Recommended working position includes keeping the shoulders relaxed and forearms as close to your body as possible. Also wrist should be kept in a normal position, so that any over stretching and extension from the carpal joint (this case wrist joint) should be avoided. (Loogna & Loogna 1999, 17-20)

So all these suggestions mentioned above are good for puppeteers as well. It is always wise to check the manipulation position; by making sure that the shoulders are kept relaxed and not lifted up too high. If the manipulating position demands keeping the arms raised, there is a quick way to test, whether the lifting rate is safe or not. Place your index finger on top of the collar-bone, raise your arm and make sure that your finger does not get stuck (squashed) between the shoulders, if it does, you have reached too far with your arms. There should be always place between the shoulder blades. (Hint learnt from yoga classes)

Another good thing to remember while working with lifted arms is that the movement itself is much wider, also safer, if it is supported as well by the rest of the body. For example if the movement for lifting the shoulders does not begin from the shoulders, but all ready from the back. And if there is a need to get closer to something, then it is helpful to gain the whole body, for example by adding the support of the upper-body and legs, rather than overstretching the arms.

Back area

If we talk about inefficient use of the back, it is usually caused by the continues working in a bent forced position, but besides that, the damages can be caused by too frequent upper body turns or even using a wrong method to lift weights. These damages can appear as backaches, but can also develop into radiculopathy or even scoliosis. The most important issue in order to prevent the damages mentioned above, is to keep the back as straight as possible while working (during sitting as well standing) and switch between sitting and

standing, depending of the main working position, as well minimising the time spent in a forced position. (Loogna & Loogna 1999, 17-20)

Keeping the back straight does not necessarily mean it must be kept only upwards. The basic rule to follow is that the back should be straight in a relation with the direction towards the body is headed to. So it can be even in a bent position. Though in that case, it is good to check that the folding of the back starts all ready from the hips not from the upper back. In order to identify from where the folding starts from, place your palm on the top on the hip joint (fingers facing the opposite thigh) and fold. If the fingers get squashed between, the folding was started from the hips, if not and there is a gap between your body and the fingers, the movement came from the upper back. This actually does not help keeping the back straight, but curves it instead.

Feet area

Feet area is mainly concerned with a position: staying on the feet for too long time. Which causes the slowing down of the blood circulation, as well increases the cardiac load and also causes swollen feet and varicose veins. So if the work demands a lot of standing up, there is an essential need to switch between standing and sitting as well the use of comfortable footwear. (Loogna & Loogna 1999, 17-20)

In order to restore the blood circulation I would suggest one simple exercise, from Pilates that could be done after the work or even during the break in between the rehearsals. Lie on your back, arms and legs straightly on the floor. Breathe and relax your body to the ground, then lift your legs as well the arms up, so they will form a 90-degree angle with your body. And then just let the blood to “fall down”. Legs and the arms should be kept relaxed. After some time has passed, start throwing your arms and legs away from your body and let them drop naturally and then thrown again. Repeat it 8-16 times and then relax the arms and the legs to the floor.

What concerns puppeteer’s, feet are one of the essential elements of the work. Feet can be as supportive structure by keeping the grip, baring the weight and

assisting the weight lifts, as well making it possible to move in space. More over feet offer the opportunity to reach further, without actually overstretching the arms neither the upper body.

Puppeteer's feet should be always in *ready for action* position, so the weight is shared equally under the foot. The weight is not placed on the heels, neither the toes it is nicely lying in the middle of the foot. So in order to find the right place, where the weight should be kept, stand up, place your feet in parallel position (knees unlocked) and start leaning your body forward and backward. Firstly keep the movement quite small, just going forward and backward and then after some while make the movement bit-by-bit larger, until it reaches to the edge, where you loose your balance. Then come slowly back by decreasing the movement until your body finds naturally the place, where the weight should be settled. After that, repeat the same thing to the sides, and then go thorough the whole circle and end up minimising the movement, until it stops. Relax in the found position. Now your feet have a right grip and are ready to start the movement, as well to take the weight.

After the feet have been well positioned and are ready for action, extra layers can be added. For example placing the feet in unparallel position widens the movement area, especially, in cases where the feet are supposed to be kept in the same spot and motion mainly happens in upper body and hands. Unparallel feet allow the body to move in a wider scale. As well bending the knees permits to get closer or move away from, without having the need to take a step further or back.

5.1.2 How to lift weights?

In our everyday lives, we are constantly picking things up, or moving them from one place to another, whether it is a pen, to take notes or chair behind the dining table, it does not matter, the general trend is that we do not pay too much attention on how we lift things. Even though it is like any other action we involve our bodies in: there is a healthy way to do it and more destructing one. The

threat to injure oneself, while using the wrong methods, increases when the loads get heavier or the load-lifting frequency rises.

Puppeteers' profession goes quite often hand-by-hand with the necessity to lift things and change their locations over and over again. It might be coming from the need to build up (or take down) the scenery, loading (or unloading) the wagon for touring with a performance, manipulating a heavy puppet (object or some other figure) or some other matters, either way it is a phenomenon that is often present and its presence should be taken into account, in order to avoid permanent damages.

Correct lifting position

Before lifting a weight, make sure that you have firm footing, straight back and knees unlocked. Appropriate lifting height is about 70-80 centimeters; so always make sure that you are not lifting from too low position. In order to pick up an object that is lower from your waist level, keep your back straight and bent from your knees and hips. It is never good to bend forward straightly from the waist especially with your knees straight, so make sure your knees are unlocked. While lifting the load, tighten your stomach muscles and lift the object by using your leg muscles. So the impulse for the lift comes from the ground, from the legs. After that straighten your knees in a steady motion, but keep them still unlocked, and make sure that you are not jerking the object to high. It should stay about the waistline, as close to the body as possible, while keeping your arms bent and stomach muscles tight. Stand completely upright without twisting your body, if there is a need to turn, rather make it from the legs than form the back. Always move your feet forward while lifting an object and if you need to go further with the load then take small steps and go with a slow tempo.

In a case there is a need to lift an object from the table, then it should be slide to the edge of the table, so you could get it as close to your body as possible. After that bent your knees and use your legs to lift the object up as it was described above and come into a standing position.

Avoid:

- Accidental extreme lifts
- Frequent lifts with one hand
- Lifting heavy objects above the waist line
- Lifting weights higher from the shoulder level
- Lifting weights while sitting
- Sudden movements

In order to lower the object, place your feet the same way as with the lifting up, tighten the stomach muscles, bend from your hips and knees and place the object down. (The Cleveland Clinic Foundation 2008, referred 12.10.2010)

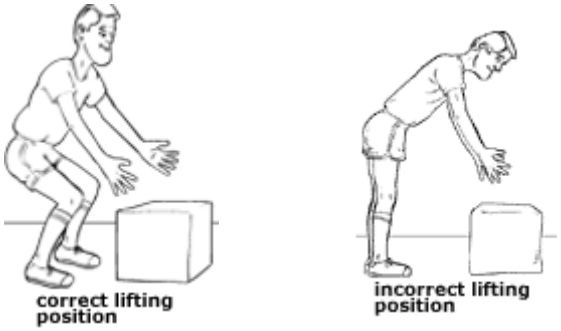


Figure 6. How to lift weights? (The Cleveland Clinic Foundation 2008, referred 12.10.2010)

Table 8. Calculated, suggested weight amounts according to sex and the load-lifting frequency

Hand weights (loads)	Female	Male
Constantly	20 kg	35 kg
Rarely	30 kg	55 kg

(Loogna 2007, 25)

REFERENCES

Bartal, L. & Ne' eman, N. 2002. Movement Awareness and Creativity. New edition. Alton: Dance Books Ltd.

Dimon, T. 2001. Anatomy of the Moving Body. United States of America, California: North Atlantic Books.

Kleinman, S., 1994. Submission for the Record, Statement of The American Dance Therapy Association to the Sub-committee on Ways and Means, House of Representatives Hearing on The Congressional Budget Office's Analysis of the President's Health Care Reform Proposal, Volume X11, President's Health Care Reform Proposals: Impact on Providers and Consumers, Part 3 of 3, February, 1994, Serial 103-91. United States of America, Washington: US Government Printing Office.

Lecoq, J. Edited by. Bradby, D. 2006. Theatre of Movement and Gesture. Le Théâtre du Geste. Translator. Anderson, J. London: Routledge.

Lecoq, J., Carasso, J. G., & Lallias, J. C. 2009. The Moving Body: Teaching Creative Theatre. Le Corps Poétique . Translator. Bradby, D. Revised edition. London: Methuen Drama.

Loogna, N. & Loogna, G. 1999. Füüsiline töö ja ülekoormushaigused. Tallinn: TEN-TEAM OÜ.

Loogna, N. 2007. Kutsehaigused: Riskitegurid ja ennetamine. Tallinn: Teabekirjastuse OÜ.

Loogna, N. 2008. Elukutsed ja terviseriskid. Tallinn: Teabekirjastuse OÜ.

Marshall, L. 2008. The Body Speaks: Performance and Physical Expression. Revised edition. London: Methuen Drama.

Roosalu, M. 2006. Inimese anatoomia. Tallinn: Koolibri.

Tufnell, M. & Crickmay, C. 2006, Body, Space, Image: Notes Towards Improvisation and Performance. Fourth edition. Great Britain: Dance Books Ltd.

Tyldesley, B. & Grieve, I. J. 2002. Muscles, Nerves and Movement: In Human Occupation. Third edition. United Kingdom: Blackwell Science Ltd, Blackwell Publishing.

WEB:

Free Online Dictionary. Definition of the aseptic in the online dictionary. Referred 25.02.2011 http://www.thefreedictionary.com/aseptic

Free Online Dictionary. Definition of the motion in the online dictionary. Referred 25.02.2011 http://www.thefreedictionary.com/motion

Guidotti, T. L. Occupational Diseases. Referred 7.10.2010 http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1ARTA0005870

Levy, B.S, Wagner, G. R, & Rest, K. M. 2005. Preventing Occupational Disease and Injury. Referred 12.10.2010 http://books.google.ee/books?id=pM7DNkbVyQgC&pg=PA12&lpg=PA12&dq=occupational+disease+actors&source=bl&ots=-6pijJsRRu&sig=sX8MCpjj5PtVNEmUZax-auIDhtI&hl=et&ei=X1C0TJ7rD5DqObTHuYMK&sa=X&oi=book_result&ct=result&resnum=10&ved=0CDkQ6AEwCTgU#v=onepage&q&f=false

Mackenzie, B. 13.01.2011 Range of Movement. Referred 16.01.2011 http://www.brianmac.co.uk/musrom.html

MedilinePlus. Joint Disorders. Referred 23.02.2011 http://www.nlm.nih.gov/medlineplus/jointdisorders.html

Moving Synergy. Proper Body Alignment. Referred 12.10.2010 http://www.movingsynergy.com/designposture.html

Muresan, P. Coxarthorsis. Referred 25.02.2011 http://www.medreflexline.ro/detalii_EN.aspx?coxarthrosis

Muresan, P. Gonarthorsis. Referred 26.02.2011 http://www.medreflexline.ro/detalii_EN.aspx?Gonarthrosis

The Cleveland Clinic Foundation. 24.10.2008 Posture for a Healthy Back. Referred 12.10.2010 http://my.clevelandclinic.org/healthy_living/back_health/hic_posture_for_a_healthy_back.aspx

WikiAswers. What is Physical Overload? Referred 16.01.2011 http://wiki.answers.com/Q/What_is_physical_overload#ixzz1EW8j1Uv8

Wisc-Online. 1999-2011 Movement Terminology. Referred 7.02.2011 http://www.wisc-online.com/Objects/ViewObject.aspx?ID=AP12004

6 CONCLUSION

In the beginning of the writing process I had an ambitious idea to dig out all the possible occupational diseases that could be linked to puppeteer's profession, to cut them open (find out the characteristics of each disease as well the options for the ease and/or prevention) and finally, to put together a training plan, which could act as an injection shot against the occupational disorders. Plan seemed to be well structured and waterproof, until to the point where I noticed that my socks had got wet and the water level was rising fast.

Ambitions can be great motivators for pushing a human being forward on the path of personal development, but on the other hand, ambitions, can also turn into the heavy stones, hanging around the neck and actually slow us down. When this happens, it is good to hit the brakes and make a stop, in order to reformulate the priorities, rather than keep running against the same wall, without having the option to succeed in the choice list of options.

After few months of collecting the background information, I pulled the brakes, because I noticed the stone around my neck. The predetermined amount of time and the actual volume of the work represented the stone, I realised that I will not be able to fulfill the ambitious plan. It just would not fit to the frames of the set limits.

So I had to reorganise the first idea and ended up narrowing the circle down quite a lot. As a result, of the choices made during that time, only one hazard type (physiological hazards) out five, causing the occupational disorders, was focused in more detailed manner and the idea of creating a *vaccine* (training plan) for puppeteers against occupational disorders, was put on hold, to the shelves of the future plans.

These choices were made deliberately, based on my own explorations, as well of the results of the online survey "Puppeteer's Body Health", related to the characteristics of puppeteer's work. This gave a reason to believe, that the health disorders caused by physical overload are most likely the ones that can

become a threat towards puppeteers body health. That is why the weight of the scale pan sank into that particular direction.

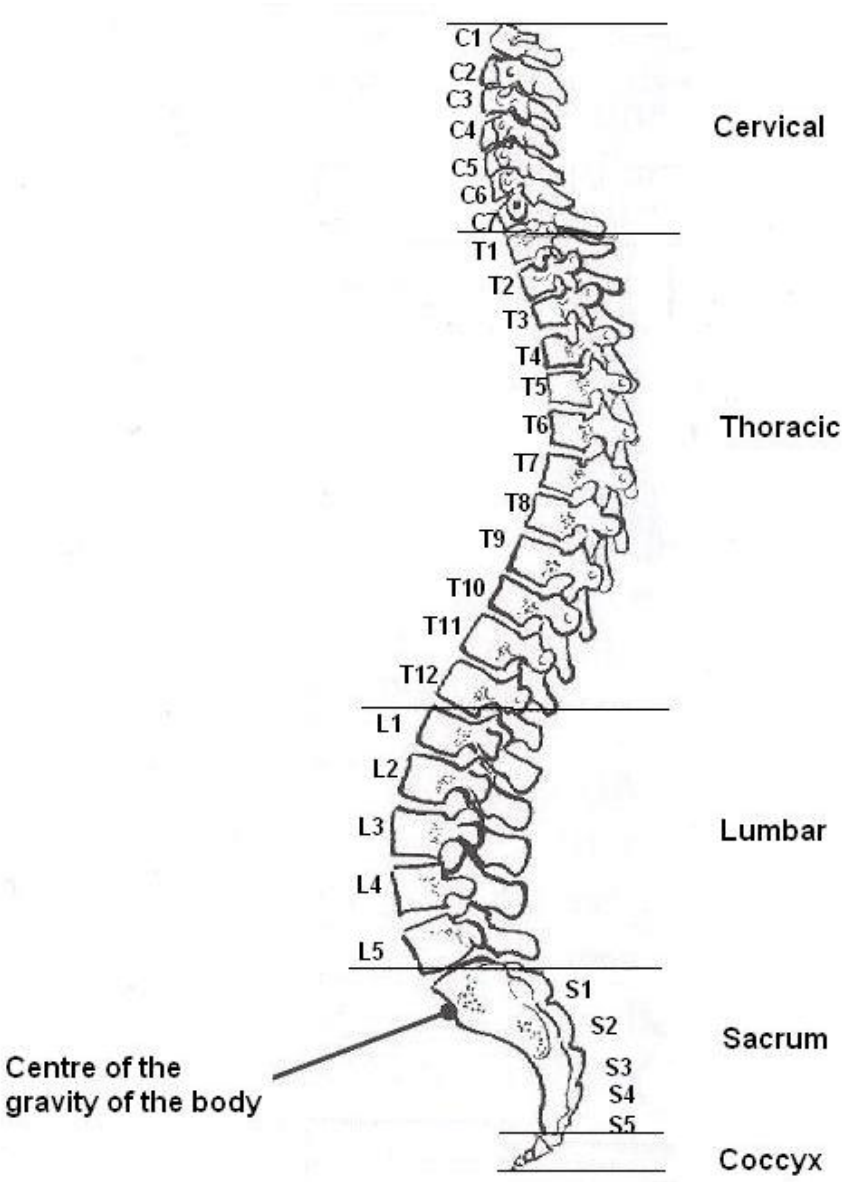
The option not to invent the *vaccine* (a training plan for puppeteers) as a part of this thesis was driven by the fact, that *vaccination* is more a matter of the *ergonomics* than the *occupational disease* itself. Even though the idea of inventing the *vaccine* sounded fascinating and it would have been warmly welcomed by the puppeteers. I felt the need to spend more time in the laboratory, be inside the puppetry world, dig deeper, run more tests, and collect knowledge, experience, before I could suggest a formula that would fit to puppeteers. That is why; only the very fist layers of the soil of *ergonomics* were dug over.

The primary mission to accomplish was to awaken the consciousness of a puppeteer, about the importance of the body knowledge, as well of the *occupational disease*, with intention, to stay healthy in a working place. According to my opinion “Staying healthy in a working place” formula should consist following matters: the general knowledge of the human body (How it is built? How does it work? What is a correct body posture? How can we maintain it? And so on.) Besides that, the awareness of the threats, which are linked to puppeteer’s profession, so that the risks could be minimised or even prevented. And last but not least, the knowledge of the characteristics and the symptoms of different *occupational diseases*, which give the opportunity to recognise, whether the body has been infected or not. So, the necessary measures could be applied in the earliest phase.

APPENDICES

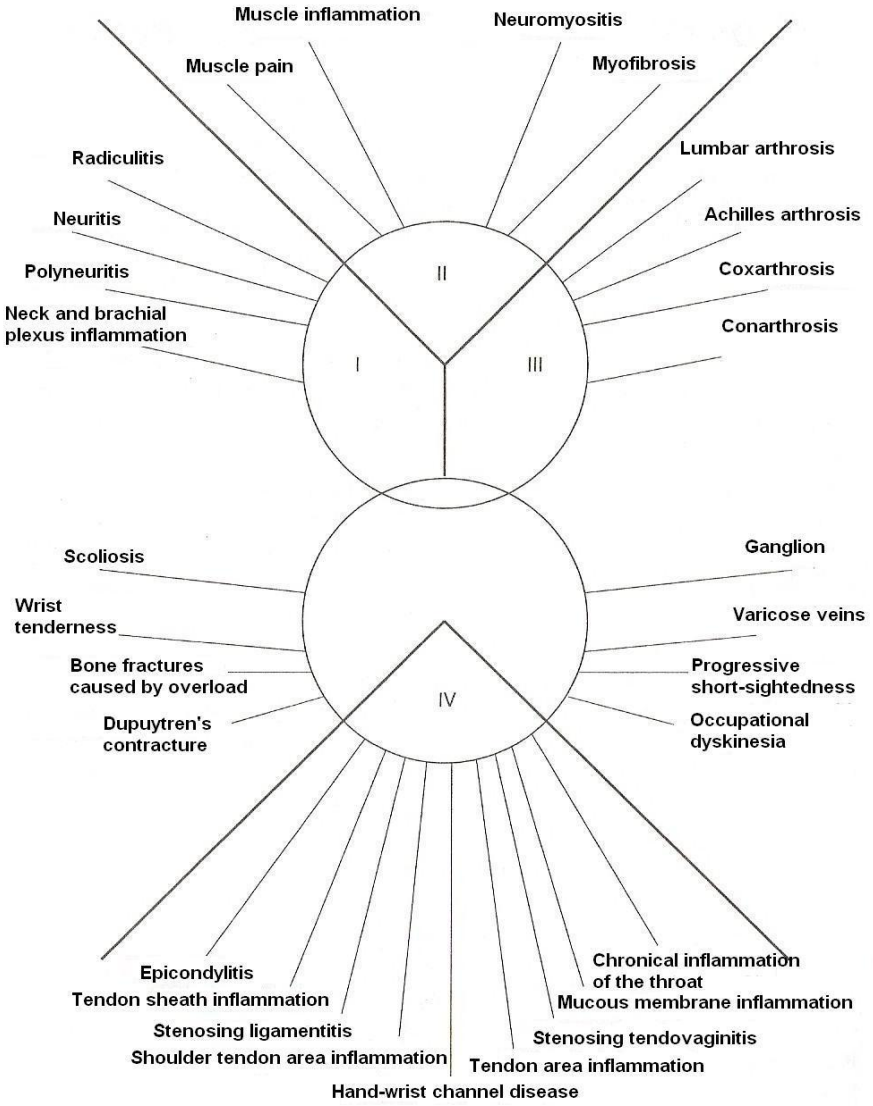
FIGURES

Figure 1. Vertebral column



(Tyldesley & Grieve 2009, 162)

Figure 3. Classification of overload diseases



(Loogna 1999, 30)

TABLES

Table 9. Current employment

Current employment	Amount
Full time puppeteer	7 persons
Part time puppeteer	14 persons
Freelancer	1 person
Retired, but still working	2 persons
Amateur	2 persons
Student	7 persons
Student/ part time puppeteer	1 person
Student/freelancer/teacher	1 person
Teacher/ part time puppeteer	1 person
Researcher	1 person
Unemployed	1 person

Table 10. Current working place

Current working place	Amount
Amateur Theatre	4 persons
Amateur Theatre and freelancing	1 person
Company	4 persons
Company and freelancing	3 persons
Freelancing	11 persons
Student	7 persons
Student and freelancer	1 person
State Puppet Theatre	5 persons
State Puppet Theatre and Company	1 person
University	1 person
Unemployed	1 person

Table 11. Most commonly used puppets or styles of puppetry

Puppets or style of puppetry	Regular users
Table-top puppets	25
Found puppets (object manipulation, object theatre)	18
Shadow puppets	15
Costume puppets, walkabouts, carnival puppets (puppets you can wear)	11
White Light Theatre (puppeteers visible)	10
Rod puppets	10
Muppet-types	10
Marionettes	10
Light Curtain Staging (puppets seen, puppeteers "invisible")	10
Black light puppets (UV, puppeteer invisible)	9
Bunraku puppets	8
Toy Theatre	7
Mouth Puppets	4
Javanese Wayang Golek	3
Glove, hand puppets	3
Finger puppets	3
Sock puppets	2
Paper Theatre	2
Humanettes	2
Human arm-puppet (two-man puppet)	2
Combined puppets	2
Shoulder puppets	1
Parade puppets	1
Akhe	1

Table 12. General activities that occur in puppeteer's monthly routine

Activity	Amount
Walking	24 persons
Dancing	21 persons
Bicycling/spinning	20 persons
Yoga, Pilates, Tai Chi, Alexander Technique, Laban and so on	18 persons
Swimming	13 persons
Gym	10 persons
Jogging	8 persons
Aerobics	7
Camping	5
Skiing	4
Martial Arts	2
Muscle training	2
Riding	2
Ball games (football, basket ball, volley ball and so on)	1
Ballet	1
Roller skating	1
Stretching	1
Acrobatics	1
Extreme sport (canoeing, skateboarding and so on)	-
Ice hokey, skating, floor ball	-
Rock climbing	-

Table 13. Knowledge of different body techniques

Body technique	Have heard (aware of)	Using (or have used)
Alexander Technique	31	13
Body-Mind Centering	7	1
Feldekrais Method	13	3
Laban	37	5
Pilates	37	14
Qi Gong	22	12
Tai Chi	35	15
Yoga	36	23
Others:		
Aikido	1	-
Asahi	1	-
Body Balance	2	2
Karate		1
Method Putkisto	1	-
Morning stretching	2	2
Nia-dance	1	-
Suzuki Method	1	1

THE SURVEY

Puppeteers Body Health/ Nukunäitleja kehahooldus/ Nukketeatteritaiteilijan kehohuolto

Hi, My name is Katri Pekri and I am a fourth year Puppet Theatre student in Turku Arts Academy. This survey I part of my literal work „Puppeteers body“. The purpose of the survey is to find out what kind of patterns seem to be recurring themselves if the concentration is pointed to the profession puppeteers (habits, general body placement, body health etc). In order to figure out what can be the possible dangers for occupational diseases for puppeteers. Survey is anonymous and the results are only used for the purposes of the research of bachelor thesis.

* Required

1. Gender/ sugu/ sukupuoli *

- Male/ mees/ mies
- Female/ naine/ nainen

2. Age category/ vanus/ ikä *

3. Years in 'puppetry-world'/ tegev 'nukumaailmas'/ aktiivinen 'nukketeatterin maailmassa * Everything included (studies, teaching, working as professional, non-professional puppeteer etc)/ Hõlmab kõike (õpinguid, õpetamist, professionaalset kui ka harrastaja tasemel nukunäitleja tööd jne/ Sisältää kaikkea (opintoja, opetuksia, ammatilaista töitä, myös harrastajan tasoa jne)

4. Current employment status/ käesolev töö staatus/ nykyinen työn status *

- Student/ õpilane/ opiskelija
- Teacher/ õpetaja/ opettaja
- Full time puppeteer/ täiskohaga nukunäitleja/ kokopäivätoiminen nukkenäyttelijä
- Part time puppeteer/ osalise tööajaga nukunäitleja/ osa-aika työ nukkenäyttelijana

- Retired/ pensionil/ eläkeillä
- Other:

5. Current working place/ käesolev töökoht/ nykyinen työpaikka *

- State Puppet Theatre (Theatre)/ Riiklik Nukuteater (Teater)/ Valtakunnalline Nukketeatteri (Teatteri)
- Company/ Kompanii/ Yhtiö
- Amateur Theatre /Harrastusteater/ Harrastusteatteri
- Freelancer/ vabakutseline/ freelance nukkenäyttelijä
- Student/ õpilane/ opiskelija
- Other:

6. What sort(s) of puppet(s) or style(s) of puppetry you have been mostly involved with? Milliste nukkude või nukuteatri liigiga olete kõige enam kokku puutunud? Minkäläisiä nukkeja tai minkä tyylisen nukketeatterin teillä on kaikista enemmän ollut yhteyksiä * You can choose multiple answers if you like/ võib valida mitu erinevat varianti/ saa valita monta vaihtoehtoa

- Animatronics (robotic puppets)
- Black light puppets (UV, puppeteers invisible)
- Costume puppets, walkabouts, carnival puppets (puppets you wear)
- Finger puppets
- Found puppets (object manipulation or object theatre)
- Humanettes (A puppet-proportioned body hangs from the puppeteer's neck)
- Human arm-puppet (two-man puppet)
- Javanes Wayang Golek
- Javanese Wayang Kulit
- Light curtain staging (puppets seen, puppeteers "invisible")
- Marionettes
- Marottes
- Mouth puppets
- Muppet-types
- Parade puppets
- Rod puppets
- Senor wences puppets
- Shadow puppets
- Shoulder puppets
- Sock puppets
- Table-top puppets
- Toy theatre
- Ventriloquist puppets
- Vietnamese water puppetry
- White light theatre (puppeteers visible)/
- Bunraku puppets
- Other:

7. Do you consider the 'knowledge of body health' relevant for your profession? / Kas peate 'teadlikkust oma kehast' vajalikuks elemendiks oma töö juures? Onko 'kehon tietoisuus' tärkeä elementi teidän ammatissa? *

- It is very important/ väga oluline/ tosi tärkeä
- It is important/ on oluline/ on tärkeä
- It is not important/ ei ole oluline/ ei ole tärkeä
- It is irrelevant/ ebaoluline/ epäolennainen

8. Does your workplace (school) provide/predispose some kind of physical training opportunities?/ Kas teie töökoht (õppeaasutus) pakub/soodustab füüsilise treeningu võimalusi? Tarjoako/suositteleko teidän työpaikka (koulu) mahdollisuuksia harrasta ruumiinharjoituksia? * Group trainings, personal training opportunities etc/ Rühma treeningud, individuaaltreeningute võimalust jne/ Ryhmä treenejä, private treenejä jne

- Yes/ jah/ kyllä
- No/ ei/ ei
- Sometimes/ mõnikord/ joskus

9. How often do you exercise? Kui tihti osalete treeningul (töötate oma keha heaks)? Kuinka usein treenatte? *

- Less than once a week/ vähem kui kord nädalas/ vähemmän kun kerra viikossa
- Once a week/ kord nädalas/ kerran viikossa
- Twice a week/ 2 korda nädalas/ 2 kertaa viikossa
- 3-4 times a week/ 3-4 korda nädalas/ 3-4 kertaa viikossa
- More than 5 times a week/ rohkem kui 5 korda nädalas/ enemmän kun 5 kerta viikossa

10. What kind of physical activities belong to your monthly routine? Millised järgmistest füüsilistest tegevustest kuuluvad teie iga kuulisse rutiini? Minkäläiset seuraavista fyysisistä toiminnoista kuulu teidän kuukausittaisen rutiinin? *

- Aerobics/ aeroobika/ aerobic
- Ball games (football, basket ball, handball, volley ball etc)/ Pallimängud (jalg-, käsi-, korv-, võrkpall jne)/ Pallopelit (jalkapallo, koripallo, käsipallo, lentopallo jne)
- Ballet/ ballett/ baletti
- Bicycling, spinning/ jalgrattasõit/ pyöräily
- Camping/ matkamine/ retkeily
- Dancing/ tantsimine/ tanssin harrastaminen
- Extreme sport (canoeing, skateboarding etc)/ ekstreemsport (kanuutamine, rulatamine jne)/ extreme urheilu (melonta, rulla lautailu jne)

- Gym/ jõusaal/ kuntosali
- Ice hokey, skating, floorball/ jäähoki, saalihoki, uisutamine/ jääkiekko, luistelu, sähly
- Jogging/ sörkjooks/ kunto juoksu
- Ridining/ ratsutamine/ ratsastus
- Rock glimbing/ mägironimine/ vuori kiipeily
- Rollerskating/ rulluisutamine/ rulla luistelu
- Skiing/ suustamine/ hiihtely
- Swimming/ ujumine/ uinti
- Walking/ jalutamine/ käveily
- Yoga, Pilates, Tai Chi, Alexander Technique, Laban etc
- Other:

11. Have you heard of following "body techniques"? Which kind?/ Kas olete kuulnud järgevatest "keha tehnikatest"? Millistest?/ Oleteko kuulut seuraavista "kehon tekniikoista"? Minkäläisistä? *

- No, I have not/ Ei ole kuulnud/ En ole kuulut
- Yes, I have. Which?/ Jah, olen kuulnud. Millistest?/ Kyllä. Minkäläisistä?
- Alexander Technique
- Body-Mind Centering
- Qi Gong
- Feldekrais Method
- Laban
- Pilates
- Tai Chi
- Yoga
- Other:

12. Have you used some of these techniques? / Kas olete ise mõnda neist "keha tehnikatest" kasutatud? / Oleteko itse käyttänyt jotain niistä tekniikoista? *

- Yes/ jah / kyllä
- No/ ei/ ei ole

12A: What of these "body techniques" and how often? / Millist kehatehnikat ja kui tihti?/ Minkäläistä kehon tekniikka ja kuinka usein? * Alexander Technique, Body-Mind Centering, Qi Gong, Feldekraist Method, Laban, Pilates, Yoga, Tai Chi, etc

13. Have you noticed/experienced a tension (pain) in your body while working (after work)?/ Kas olete kogenud/täheldanud pinget (valu) oma kehas töö tegemise ajal (pärast tööd)?/ Oletko huomanut kehossa jännitystä (kipua) työn tekemisen ajalla (tai sen jälkeen)? *

- Yes/ jah/ kyllä

- No/ ei/ ei ole

14. Have you noticed any recurrent patterns? Kas olete märganud korduvaid mustreid? Oleteko huomannut analoogista toistuvuutta? * Same kind og tension, in the same muscles, same body area etc/ Sarnane pigem juba varem aset leidnud koldes, samas kehaosas/ Analooginen jännitys samoissa lihaksissa tai kehon osassa?

- Yes/ jah/ kyllä
- Sometimes/ mõnikord/ joskus
- No/ ei/ ei ole

15. What are the most common places (areas of our body) that you feel the tension/pressure? / Kus olete kõige sagedamini tähendanud pingekoldeid (valuallikaid) oma kehas?/ Missä kohtin kehoa te olette huomannut kaikista enemmän jännitysta, kipua? *

- Throat, vocal chords/ kõri, häälekurrud/ kurkku, äänen huulet
- Head/ pea/ pää
- Neck/ kael/ niska
- Shoulders/ õlad/ olkapäät
- Hands (arms, wrists, fingers)/ käed (käsivarred, randmed, sõrmed)/ kädet (käsivarsi, ranteet, sormet)
- Upper-back/ ülaselg/ ylä kroppa
- Chest/ rindkere/ rintakeha
- Stomach/ kõht/ vatsa
- Lower back/ alaselg/ ala kroppa
- Pelvis/ vaagen/ lantio
- Buttocks/ istmik/ takapuoli
- Thigh/ reis/ reisi
- Knees/ põlved/ polvet
- Shins/ sääred/ pohjet
- Feet, ankle, toes /jalad, pahkluu, varbad/ jalat, nilkka, varpaat

16. Describe the most difficult/extreme manipulating position you have been in? Kirjelda kõige raskemat/ekstreemsemat nuku manipuleerimis asendit, milles teil on tulnud töötata? Kuvaile kaikista vaikeampa/ äärimäistä nuketusasentoa missä teidän on täytynyt manipuloida nukkea.