

# **Hat eine osteopathische Behandlung Einfluss auf Emotionen?**

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Master of Science in Osteopathie

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an der **Wiener Schule für Osteopathie**

von ***Dr. med. Claudia Dettling***

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# Eidesstattliche Erklärung

Hiermit versichere ich, die vorgelegte Masterthese selbständig verfasst zu haben.

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# Abstract

**Dr. med. Dettling, Claudia: “Does an osteopathic treatment have any influence on emotions?”**

## Objectives

Again and again patients report about a change in their emotions after osteopathic treatments. Well-known osteopaths describe a connection between osteopathy and emotions, Thereby they mainly rely on their own observations made in clinical practice (BARRAL and CROIBIER, 2003; BARRAL, 2004, 2006; BECKER, 2007; CHICKLEY, 2001; FULFORD, 2005; UPLEDGER, 2000) or on observations made by other colleagues (COMEAX, 2002; HINKELTHEIN and ZALPOUR, 2006; LIEM, 2001, 2003; PARSONS, 2006; TEMPELHOF, 2001), on a philosophical approach (MC GOVERN, 2003, 2006), on anatomic facts (FULFORD, 2005; HINKELTHEIN and ZALPOUR, 2006; MC GOVERN, 2003; PARSONS, 2006, TEMPELHOF, 2001) and on publications in osteopathic literature (HINKELTHEIN and ZALPOUR, 2006; LIEM, 2003; PARSONS, 2006; TEMPELHOF, 2001). Furthermore emotions are claimed to be indications for an osteopathic treatment (BECKER, 2007; CROIBIER, 2006; FULFORD, 2005; LIEM, 2003).

So far in osteopathy there is hardly any research concerning the field of osteopathy and emotions that was conducted within the framework of a scientific research.

Only a few studies investigate the effects of osteopathic techniques on emotions within a scientific framework (ENGEL, 2006; LINNENBANK, 1999).

The research of medical, osteopathic and psychological data bases did not lead to any results concerning a study which has examined and measured possible effects of a complete osteopathic treatment on the whole spectrum of all momentary emotional feelings.

The study at hand shall clarify whether an osteopathic treatment has a measurable influence on emotions.

## **Study design**

A quantitative study design is chosen. In an experimental clinical study, including to collectives of test persons (group 1 and group 2) emotional experience is inquired by means of two different inquiring instruments (questionnaires): Emotionskalen EMO-16-aktuell (SCHMIDT-ATZERT und HÜPPE, 1996) [Emotion scales EMO-16-current] and Emotionskalen EMO-16-Woche (SCHMIDT-ATZERT, 1997) [Emotion scales EMO-16-week].

The two collectives of test persons undergo two different applications (1: immediate osteopathic treatment, 2: lying still with prospect of subsequent osteopathic treatment). The two groups shall be examined concerning their current emotional condition before and after the treatment.

The individual intensity of 16 emotional qualities concerning the participants' current emotional state is recorded by means of the questionnaire EMO-16-current that uses a six-step scale.

After this data is recorded, as promised group 2 is osteopathically treated as well. After that the test persons fill in the parallel constructed EMO-16-week questionnaire. Thereby the frequency of the same emotions during the previous seven days is inquired by means of a five-step scale.

## **Participants**

Emotional experience is inquired for a survey sample size of 50 test persons. Test persons were assigned to the two respective groups by means of the match-controlled method.

The following inclusion criteria were defined:

Age between 20 and 60, patients of either sex that are under my current treatment or former patients of either sex, friends of either sex; language skills (sufficient knowledge of German in speech and writing).

Furthermore the following exclusion criteria were chosen:

Diagnosed neuroses or psychoses, acute psychosocial crises, alcoholism, drug addiction (legal or illegal drugs), intake of psychotropic drugs.

### **Main Outcome Measures**

The intensity of 16 individual emotional qualities (disgust, anger, envy, boredom, anxiety, restlessness, sadness, yearning, shame, feeling of guilt, joy, pride, compassion, affection, sexual excitement, surprise) concerning the test persons' current emotional condition is rated according to SCHMIDT-ATZERT and HÜPPE (1996) before and after the application by means of the EMO-16-current questionnaire on a six-step scale.

By means of the analogously constructed questionnaire EMO-16-week according to SCHMIDT-ATZERT (1997) one week after the treatment the frequency of the same emotions over the course of seven days is rated on a five-step scale

By means of totaling the item values for "disgust", "anger", "envy", "anxiety", "restlessness", "sadness", "shame" and "feeling of guilt" can be summarized under a total value for "negative feelings" (SCHMIDT-ATZERT and HÜPPE, 1996; SCHMIDT-ATZERT, 1997).

### **Results**

The values are collected in excel charts and are evaluated after the external transformation into SPSS statistical software.

Thus the results of the enquiry of both groups can be compared on the basis of arithmetic averages and frequencies. Thereby all emotion-items are considered individually, except for the sum of negative feelings.

Taking into consideration the strict conditions of multiple average value comparisons with Bonferroni correction, significant values become apparent for "anxiety" and "restlessness", which show more than random lower ratings after the osteopathic treatment ( $p < 0,00315$ ), no significant but nevertheless tendential values for "anger", "sadness" and "compassion" ( $p < 0,05$ ).

After having applied the Bonferroni correction, the items “restlessness” ( $p < 0,00315$ ) and “sadness” ( $p < 0,00315$ ) show significant values after only “lying”; not significantly but nevertheless tendentially lower values show the items “yearning”, “feeling of guilt” and “compassion” ( $p < 0,05$  each)

After the osteopathic treatment negative feeling is on average highly significantly lower ( $p < 0,01$ ).

After “lying still” the negative feeling is on average highly significantly lower ( $p < 0,01$ ).

When testing differences with regard to possible treatment effects the observation of differences in the three categories “better”, “worse” and “same” reveal not significant values after the Bonferroni correction has been applied. No significant but nevertheless tendential values ( $p < 0,05$ ) are observed for “pride” and “compassion”.

When testing differences with regard to a possible treatment effects a comparison of the average values of the two groups reveals no significant differences after the Bonferroni correction was applied due to multiple testing. No significant but nevertheless tendential differences ( $p < 0,05$ ) become apparent for “anger” and “boredom”.

In case of “envy”, “shame” and “surprise” there were significant differences between the two groups already before the treatment. These emotions are stronger in group 2 before and after lying still.

A comparison of the results of the questionnaire EMO-16-week revealed, after Bonferroni correction, no significant differences between the two groups. There are however tendential ( $p < 0,05$ ) differences concerning the items envy and yearning. On average “envy” is higher in group 2, “yearning” in group 1.

## **Conclusions**

The results of the study at hand show that an osteopathic treatment has no treatment effect on emotions when compared to only “lying still”.

It is, however, interesting that within the groups significant differences concerning the total value for negative feelings (“disgust”, “anger”, “envy”, “anxiety”, “restlessness”, “sadness”, “shame” and “feeling of guilt”) and concerning some emotions, after only “lying still” (“restlessness”, “sadness”) as well as after the osteopathic treatment (“anxiety”, “restlessness”) can be observed.

Results have to be viewed within the framework of the complexity of emotional processes under the consideration of neurophysiological behavior and experience aspects and interpreted as individual-environment-adaption (TRAUE, 1989).

However, the concrete mechanisms of action between osteopathy and emotions are still not clarified precisely and require further examinations.

Thus systematic studies in the field of osteopathy and emotion would be desirable.

## **Key Words**

Osteopathy, emotions, capturing emotional states, questionnaire development, questionnaire self-report

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## 1. Introduction

Many patients report about a change in their emotions after osteopathic treatments. Well-known osteopaths write about a connection between osteopathy and emotions. Thereby they mainly rely on observations made by themselves in practice (BARRAL and CROIBIER, 2003; BARRAL, 2004, 2006; BECKER, 2007; CHICKLEY, 2001; FULFORD, 2005; UPLEDGER, 2000) or on observations made by their colleagues (COMEAX, 2002; HINKELTHEIN and ZALPOUR, 2006; LIEM, 2001, 2003; PARSONS, 2006; TEMPELHOF, 2001), on a philosophical approaches (MC GOVERN, 2003, 2006), on anatomic facts (FULFORD, 2005; HINKELTHEIN and ZALPOUR, 2006; MC GOVERN, 2003; PARSONS, 2006, TEMPELHOF, 2001), and on publications in osteopathic literature (HINKELTHEIN and ZALPOUR, 2006; LIEM, 2003; PARSONS, 2006; TEMPELHOF, 2001). Moreover emotions are listed as indication for an osteopathic treatment (BECKER, 2007; CROIBIER, 2006; FULFORD, 2005; LIEM (2003).

Individual studies examine the effects of osteopathic techniques on emotions within a scientific framework (ENGEL, 2006; LINNENBANK, 1999). Only ENGEL (2006) differentiates emotions in his master thesis about cranial techniques and consciousness and distinguishes between positive (joy, sexual excitement, love) and negative (anger, sadness, fear) affects. Scientists have not agreed whether there are positive and negative emotions. If applied to emotions the terms positive and negative require further explanation. Whether a certain emotion is positive or negative, depends on the intra-individual process between person, environment, ethnological and ecological conditions (IZARD, 1981). Furthermore the use of cranial techniques only has to be regarded critically. According to the results of several studies the hypothesis of the cranial concept cannot be supported (FERRE, CHEVALIER, LUMINEAU und BARBIN, 1990; WIRTH-PATTULLO and HAYES, 1995; ROGERS, WITT, GROSS, HACKE and GENOVA, 1998; GREEN, MARTIN, BASSETT and KAZANJIAN, 1999; MORAN and GIBBONS, 2001; HARTMAN and NORTON, 2002; SOMMERFELD, KAIDER and KLEIN, 2004; HARTMAN, 2006).

The research of medical, osteopathic and psychological data bases did not lead to any results concerning a study which has examined and measured possible effects of a complete osteopathic treatment on the whole spectrum of all momentary emotional feelings.

First of all this paper shall deal with definition and function of emotions, emotion theories and neurobiology as these are the precondition for my hypothesis. Thereby I shall focus in particular on those aspects that are relevant for the consideration of “emotion” in the osteopathic context of this study. After that I shall present physiological concepts and experimental examinations in connection with osteopathy and emotions.

Based on these insights I shall then deduce the complex of hypotheses which postulates that osteopathic treatment does actually affect the area of emotions.

Thus this study shall verify whether an osteopathic treatment has or has not any measurable influence on emotions.

## **2. Fundamentals**

### **2.1. Emotions**

#### **2.1.1. Definition of emotions**

Many areas of science deal with emotions. In this master thesis about osteopathy and emotions I shall rely on the insights of such disciplines as psychology, psychiatrics, neurology, brain research, behaviorism, physiology, biology and sociology. Thereby I follow two aims. On the one hand thereby I give a very broad overview of insights and developments in emotion research, however, without making a claim for completeness. And on the other hand results from these scientific fields can be integrated into the work of osteopathy as shall be depicted in the course of this work, because current emotion research does not remain within the old limits of its discipline but requires transdisciplinary thinking (STEPHAN and WALTER, 2003, 2004).

In order to secure terminological clarity for the following chapters, I shall first of all define the term emotion and then distinguish it from other related constructs, such as feeling or mood.

So far no agreement has been achieved about how “emotion” shall exactly be defined. The different areas of science come to different conclusions and therefore offer a range of approaches.

The neuroscientist LEDOUX (2001), for example, defines emotions as biological functions of the nervous system. With his approach of regarding emotions as brain functions, he examines them by looking at the brain.

The neurologist DAMASIO (2001) defines emotions as bundles of chemic and neuronal reactions which build a certain pattern.

However, these neurophysiological approaches require the use of highly technical, expensive examination techniques to which an osteopath normally does not have any access, if he does

not work as an osteopath in a neuro-scientific research department. Thus the neuro-physiological definitions are not useful for my examinations.

The physiological psychologist BIRBAUMER (1975) defines emotion as reaction pattern on a physiological, motor and verbal-subjective level, which react to certain external or internal stimuli. Thus he calls for the simultaneous description of all three components involved, which are the cognitive, the motor and the physiological component.

IZARD (1981), too, describes emotion as a complex phenomenon with equally occurring neurophysiological, motor-expressive and experience-related components. Thereby the intraindividual process, by means of which these components interact, in order to bring about emotions, is an evolutionary – biogenetic phenomenon.

According to SCHMIDT-ATZERT (1996) this demand for the simultaneous description of the three components according to BIRBAUMER (1975) and IZARD (1981) is scientifically not tenable. These components covary in research mostly only weakly. Thus this definition is not useful for me either.

Taking into consideration neurophysiological research, SCHMIDT-ATZERT (1996) claims that emotions are not a consistent homogeneous phenomenon. But he offers a definition of emotions I could use as working definition in practice. He defines emotions as a qualitatively in detail describable state which corresponds to a change on one or more of the levels experiencing (feelings), physical condition and expression. Thus an emotion is a hypothetical construct. By means of assuming the three components of emotion, measures of something observable can be argued. Research shows, as mentioned above, that these components covary only weakly. Thus the occurrence of an emotion does not mean that changes in all components have to take place. Thus the classical approach of their operationalization consists in grasping one or more components.

Thus emotion is not the same as feeling. The term “emotion” is the umbrella term, more global and includes, besides feeling, also physical condition and expression. Feeling, on the other hand, is only related to experiencing.

Emotion and mood are not always differentiated exactly. If however differentiated, there are three distinguishing features: moods are weaker and variable, last longer and there is no clear relation to the cause which set it off. According to LAMMERS (2007), however, moods can be the trigger of concrete emotions.

In regard of the question of this study I'll follow the working definition of SCHMIDT-ATZERT (1996), to regard emotions as hypothetic construct and I will justify my measures by means of the assumption of one component, namely feeling. This approach enables me to practically conduct studies in the field of osteopathy and emotions in my own osteopathic office.

### **2.1.2. Function of emotions**

The function of emotion for human life is closely connected to human basic needs. Human life depends on certain basic needs such as nutrition, reproduction, health and security. In addition to that every human being has certain social basic needs which focus on the integration into the human community and the social environment. These are the so-called need for attachment, the need for orientation and control, pleasure gain and unlust avoidance and the need for enhancing and protecting one's self-worth (LAMMERS, 2007). Emotions help people to estimate the meaning of external and internal stimuli in connection with the needs mentioned above (DAMASIO, 2001; LAMMERS, 2007; LEDOUX, 2001). Thereby emotions cause important adaptive physiological, cognitive and behavioral reactions much faster than the more complex cognitive processes would do (DAMASIO, 2001; LAMMERS, 2007; LEDDOUX, 2001). Emotions do not only trigger off instinctive cognitions and behaviors essential for survival (DAMASIO, 2001; EKMANN, 1992; GOLEMAN, 2007; LAMMERS, 2007), but are furthermore an important motivation system for human beings (IZARD, 1981; LEDOUX, 2001). In addition to that emotions are important for the development of an appropriate social behavior (DAMASIO, 2006). Expressing emotions is an important means of communication concerning the interaction with one's fellow human beings (LAMMERS, 2007; TRAUE and DEIGHTON, 2003, 2004). Thus emotions are essential for the adaption of individuals to their environment (TRAUE, 1989).

### **2.1.3. Basic emotions and complex emotions**

Emotional processes have a significant meaning for human beings. This becomes obvious from the so-called basic emotions or primary affects, about which there is general agreement. These include emotions that were selected. Thus they are inherent to all human beings in the same biological way (EKMAN, 1992). TRAUE (1989) provides a comparing overview of the basic emotions according to different emotion theorists. However there is no general agreement among researchers about the exact number and quality of basic emotions. IZARD (1981) lists ten fundamental emotions: interest-stimulation, joy, surprise, sorrow-pain, fury, disgust, contempt, fear, shame and feeling of guilt. According to EKMAN (1992) among others, the following emotions belong to these basic emotions: sadness, fury, surprise, fear, disgust, contempt and joy. Basic emotions are structured simply. They can be set off without a complex cognitive learning experience. However, over the years they become more complex and differentiated because of learning experiences and therewith related cognitive processes. If this stage is reached they are called complex emotions (LAMMERS, 2007).

### **2.1.4. Emotion theories**

It is the aim of this chapter to provide an overview of the most important psychological emotion theories as these are the basis for discussion of the results of this research.

In the same way as there is no generally accepted definition of emotion there is no common theory of emotions either (KESSLER and TRAUE, 2003, 2004).

The many existing theories of emotions try to answer the question of how emotions come into being. In a simplified way the existing theories might be classified into two groups. The first group tries to put down emotions to other variables. These theories are the theory of expression, neurobiological emotion theory and psychoanalytic emotion theory.

Expression theory of emotions is based on the emotion theory of DARWIN(1965). According to this theory emotions have a biological fundament and are based on evolutionary assumptions. Thus they are in-born and play an important role as survival-aids. Emotions are changeable by learning processes and their main task is adaption. Perception and the



activation of neuronal and endocrine systems as well as inner and outer stimuli trigger off emotions. By the activation of these systems subjective experience, expressive behavior and peripheral-physiological activity is caused. Thereby certain distinctive physiological, expressive and subjective patterns correspond to specific emotions. A very important factor thereby is the back coupling of expressive behavior into subjective experience. The works of TOMKINS (1962), EIBL-EIBESFELDT (1971), EKMAN (1972, 1982), IZARD (1977), PLUTSCHIK (1980) and SCHERER (1981) go into a similar direction.

In neurobiological emotion theories in the tradition of CANNON (1927) and BARD (1934) emotions are put down to neurophysiological processes. Emotions are regarded as central nervous activity of specific brain structures. Crucial thereby is the limbic system with its connections to the cortex. Furthermore the different meaning of left and right hemisphere for positive emotions (left) and negative (right) emotions, respectively, is very important in this respect. The limbic system coordinates the comparison of sensor information to memorial contents. In accordance with earlier assessments, information is sent to autonomous and motor structures and to the cortex thereby. Thus subjective emotional experiences and behavioral components of emotions can proceed, accompany or follow autonomous the reactions.

In the psychoanalytic emotion theory (FREUD's-tradition) drive plays *the* central role. Emotions are according to this theory something deduced from non-cognitive phenomena. Emotions are the result of conflicting drive energies. Sensory perception of the organism is thereby regarded as something unconscious. These perceptions subsequently trigger off relevant drive energies, which come into conflict with other instances. If no drive satisfaction is possible because of such a conflict, instead of goal-oriented action, emotional expression, emotional experience and neurophysiological changes are the results.

Other groups try to put down one partial component of emotions (see also 2.1.1.), e.g. experience (feeling) to other components, e.g. expression or bodily change. This point of view is characteristic for the activation theory of JAMES (1884) and LANGE (1887). According to this theory feelings are the consequences of bodily changes. They try to connect experience, expression and somatic changes. This theory explains emotions from patterns of the autonomous nervous system and claims that they develop as a consequence from emotional stimuli and lead to a subjective emotional experience after they have been perceived as

emotions by the individual. Thus emotions are the perception of physiological activation and a result from bodily changes. Works by AX (1953), SCHLOSBERG (1954) and DAVIS (1957) correspond to this theory.

Besides there are many mixed explanatory approaches which state that one partial component of emotions, such as e.g. bodily change can lead, in combination with another variable, such as e.g. cognition to the third component, which would be experience (feelings) in this example. This approach can be found in cognition-activation theory and in system theory of emotions. In this theory emotion is not regarded as something inborn, as it is according to the theory of expression, but as a product of cognition whose precondition is a certain cognitive development.

According to cognitive-activation theory emotions develop as an interaction of unspecific autonomous stimulation and cognitive evaluation of this stimulation, taking into consideration external stimuli. This theory came to be known due to the experiments by SCHACHTER and SINGER (1962). They showed that different emotional qualities can be assigned to the same peripheral physiological state, depending on the respective environmental situation. They call this assignment cognition. Thus emotions are the result of situation assessments, not of the situations themselves.

System theory of emotions proceeds from a system of basic emotions and a system of social-cognitive emotions, which is hierarchically superordinated to the system of basic emotions and can influence this by means of inhibition- and intensifying-mechanisms.

A further cognitive approach is the idea of evaluation according to which the subjective evaluation of an event is important for the individual's experience. Thus an emotion is a complex system of reaction which results from evaluation. This is the idea of adaptive stimulus processing theory and the integrative synoptic concept of emotions by TRAUE (1989).

According to adaptive stimulus processing theory emotions can also be regarded as adaptive stimuli in the process of emotional behavior. Due to increasing complexity more and more psychic and physiological components are involved. Thereby the process of evaluation is a very important emotional process.

TRAUE (1989) presents an integrative synoptic concept of emotions, which can be regarded as minimal consensus among psychological emotion theories (STEPHAN and WALTER, 2003, 2004). According to TRAUE (1989) emotions are helpful for the individual-environment-adaption. Emotions have developed in the evolutionary development of the human nervous system and their social form of life. Evolutionarily more recent structures have layered older structures but they do not nullify their function but make it controllable. Also in accordance with their individual development emotions are connected with the social form of life of human beings. Furthermore the whole nervous system as well as the neurotransmitter-system is important for emotional processes. Sensory apparatus, subcortical areas and neocortex contribute to emotions in an integrative way. Emotions are regarded as a process, which can trigger off, regulate but also interrupt other behavior. Emotions of low intensity are connected rather specifically with central and motor activity and unspecifically with autonomous activity. Thereby central regulations are more crucial than peripheral feedback. In case of very intense emotions on the other hand autonomous and vital functions play a more important role and dominate over cognitive processes. After emotional processes were triggered by external and internal stimuli, cortical mechanisms set in via evaluation stimulus control as well as control of expression and behavior. On their part, these control mechanisms can be triggered by primary emotions. The quality of experience of emotions has different causes for every individual. Important are central nervous and autonomous activation and the feedback of afferent information from mimic musculature are important thereby. Long-lasting emotions such as anxieties and depressive alienation are primarily caused by permanent changes of the neurobiochemical setting. But emotions can also be created subjectively only by means of imagination, images and verbal expressions.

### **2.1.5. Neurobiology of emotions**

For technical reasons it was hardly possible to find out something about the various areas of the brain that contribute to emotional information processing until recent years. This has significantly changed. Recent non-invasive imaging techniques such as positron emission tomography and functional magnetic resonance tomography as well as the increasing interest in emotions of the neuroscientific research made important insights into the neurobiological basis of emotional processes possible and contribute to further understanding. The following

neurobiological centers have turned out as being essential for emotional information processing: amygdala, hypothalamus, nucleus accumbens, hippocampus and prefrontal cortex. To describe the entire neuroanatomy and neurophysiology of these structures would definitely go beyond the frame of this paper. In case of further interest please consult the literature listed in my bibliography. I have narrowed down the following section to an overview of essential neurobiological findings and their possible relevance for this study.

The amygdala is located at the tip of the choroid plexus of the lateral ventricles and is part of the limbic system. The limbic system consists of the borderline structures of the telencephalon and the diencephalon, which callosum. Attached to it are connections to the brain stem. The amygdala does not only produce emotions such as, e.g. anxiety or fear, but is also the place of the emotional memory. If someone has experienced a certain emotion at a crucial event, this connection is stored in the amygdala as implicit emotional memory. Thus the amygdala is very important for the precognitive evaluation of a stimulus according to its emotional relevance. It produces emotions before cognitive processes set in (BIRBAUMER and SCHMIDT, 2003; DAMASIO, 2001, 2006; ERK and WALTER, 2003,2004; LAMMERS, 2007; LEDOUX, 2001; SCHIEBLER and SCHMIDT, 2003; SOLMS and TURNBULL, 2004).

The hypothalamus makes up the bottom of the third ventricle at the basis of the diencephalon as well as parts of its lateral and front wall. It controls adaptive bodily changes by means of nervous and hormonal reactions as well as it regulates the vegetative components of emotional processes, by means of activating sympathetic and parasympathetic nervous system in the vegetative nervous system. An activation of the amygdala coupled with an activation of the autonomous nervous system by the hypothalamus. Thus the hypothalamus can influence vegetative reactions that are necessary for an emotional reaction (BIRBAUMER and SCHMIDT, 2003; DAMASIO, 2001, 2006; ERK and WALTER, 2003, 2004; LAMMERS, 2007; LEDOUX, 2001; SCHIEBLER and SCHMIDT, 2003; SOLMS and TURNBULL, 2004).

The nucleus accumbens is a core structure of the basal forebrain. It is important for positive motivation and impulse. All human activities that hold out the prospect of experiencing pleasant emotions are coupled to an increased activity of the nucleus accumbens as well as with an increased release of dopamine. Thus experiencing pleasant emotions depends on the

unimpaired function of the nucleus accumbens and its dopamine productions (BIRBAUMER and SCHMIDT, 2003; ERK and WALTER, 2003, 2004; LAMMERS, 2007; SOLMS and TURNBULL, 2004).

The hippocampus, also part of the limbic system, is mainly located in the temporal lobe. It is the place of the consciously memorizable and available, i.e. the explicit-cognitive memory. Hippocampus and amygdala work together on processing memories (DAMASIO, 2001; GOLEMAN, 2005; LAMMERS, 2007; LEDOUX, 2001; SCHIEBLER and SCHMIDT, 2003).

The prefrontal cortex is a cortical structure in the frontal lobe. It is the most highly developed part of the brain and plays an important role for the representation and regulation of emotions. It can block as well as activate the amygdala. The amygdala, on the other hand, can also activate the prefrontal cortex. Thus there is an interrelation between these two structures (DAMASIO, 2001, 2006; ERK and WALTER, 2003, 2004; LAMMERS, 2007; LEDOUX, 2001; GOLEMAN, 2005; SOLMS and TURNBULL, 2004).

The results from neuroscience show that emotions can be explained neurobiologically via the interaction of different structures, which are connected by means of complex circuits and networks. However, it has to be mentioned critically that the results of LEDOUX (2001) come from the examination of rats and can thus not be implicitly referred to human beings. DAMASIO (2001, 2006) works with patients with brain damage, which means they suffer from functional disorders due to tumor or injury. Thus normal conditions were disturbed. This means that the interpretation of this study is limited by this fact. In the work of ERK and WALTER (2003, 2004) results of different research groups concerning systematic examinations of healthy brains can be found. The other authors mainly rely on DAMASIO (2001, 2006) and LEDOUX (2001) and on known facts from anatomy and neurobiology.

The presentation of the brain centers described above shows that emotional processes can also proceed without precedent conscious or unconscious processes. It is possible that emotional processes of low intensity can activate cognitive processes. Likewise emotional processes of high intensity can block cognitive processes. Furthermore it is possible that cognitive processes can activate emotional processes and inhibit them to a certain degree. These insights have to be taken into consideration concerning the results of the study. In chapter

2.2.4. I will then discuss whether there is a connection between osteopathic treatment and these parts of the brain that are relevant for emotions.

### **2.1.6. Summary emotions**

Chapters 2.1.1. – 2.1.5. clearly show that emotions are no coherent phenomenon. Furthermore the complexity of emotions demands a collaboration of different scientific disciplines. I follow the working definition of SCHMIDT-ATZERT (1996), which suggests regarding emotions as a hypothetical construct which consists of the dimensions experience (feelings), physical state and expression. This definition provides for me the possibility to examine emotions within the framework of osteopathic treatment. According to this definition it does not mean that a simultaneous change of all components has to happen if emotions occur. Thus I will inquire exclusively one component, namely emotional experience (feeling), in this study.

## **2.2. Osteopathy and emotions**

### **2.2.1. Osteopathic principles and emotions**

Osteopathy was developed by Dr. A.T. Still (1828-1917). Osteopathy regards human beings as threefoldly differentiated units, consisting of body, mind and spirit. Health means a harmonic interaction of all these factors (STILL, 2005). In osteopathy the wholeness of a human being is viewed concerning his somato-visceral-psychic unity and mode of action. All parts of the physical body as well as mind and spirit with their emotions are connected with each other and interrelate (LIEM, 2001). As mentioned in chapter 2.1.2., emotions do have an essential meaning for human beings. Thus emotions should be taken into consideration within the holistic way of thinking of osteopathy, too.

### **2.2.2. Literature osteopathy and emotions**

Many patients report about a change in their emotions after osteopathic treatments. Well-known osteopaths describe a connection between osteopathy and emotions. Thereby they mainly rely on their own observations made in clinical practice (BARRAL and CROIBIER, 2003; BARRAL, 2004, 2006; BECKER, 2007; CHICKLEY, 2001; FULFORD, 2005; UPLEDGER, 2000) or on the observations made by other colleagues (COMEAX, 2002; HINKELTHEIN and ZALPOUR, 2006; LIEM, 2001, 2003; PARSONS, 2006; TEMPELHOF, 2001), on philosophical approaches (MC GOVERN, 2003, 2006), on anatomic facts (FULFORD, 2005; HINKELTHEIN and ZALPOUR, 2006; MC GOVERN, 2003; PARSONS, 2006, TEMPELHOF, 2001) and on publications in osteopathic literature (HINKELTHEIN and ZALPOUR, 2006; LIEM, 2003; PARSONS, 2006; TEMPELHOF, 2001). Furthermore emotions are presented as indication for an osteopathic treatment (BECKER, 2007; CROIBIER, 2006; LIEM, 2001; 2003).

Clinical observations and experiences about a connection between osteopathy and emotions made by themselves in practice are described by BARRAL and CROIBIER (2003), BARRAL

(2004, 2006); BECKER (2007), CHICKLEY (2001), FULFORD (2005) and UPLEDGER (2000).

In one of their books BARRAL and CROIBIER (2003) discuss emotional reactions after a trauma. They proceed from the assumption that the storage of traumatic experiences does not only happen in certain centers of the brain but also in tissues affected by the trauma. In this connection they talk of emotional shocks, which are stored in the body and thus saved as a memory. Mere touch of such a zone can trigger strong emotional reactions. BARRAL (2004) writes in another book, that characteristic heat flows can spring from tissues in whose disorders emotional components are involved. He describes how it is possible to feel such flows of heat with the aid of his manual thermo-diagnosis. Thereby such emissions of heat that are related to emotions may be wide-spread and have an indeterminable, changeable and elusive boundary. According to BARRAL (2006) there is a further, mutually influencing relation between inner organs and emotions. Based on his longtime professional experience he writes a guidebook for patients in which he provides an overview of organ correlations on a psychic, emotional level of behavior.

BARRAL bases his statements about the connection between osteopathy and emotions on clinical observations and experiences. He publishes them in two osteopathic books (2003 together with CROIBIER; 2004) and in a guidebook for patients (2006). In all three books there is, however, a lack of scientific evidence and respective studies. Furthermore he uses the term emotion quite broadly, without going into any detail about the nature and the structure of emotions. Thus the significance of these publications has to be viewed with a critical eye.

For BECKER (2007) the psycho-mental-emotional mind of a patient is as important as body physiology for his or her entire health. According to BECKER (2007) life is expressed by the body's movements as well as by the dimensions ego, mind and emotions. According to him all forms of movement, whether they are physiological processes or emotional experiences, are impacts that can be perceived and treated by osteopaths. Thereby the patient can let off his or her emotional burden (BECKER (2007)).

BECKER'S statements are based on his own practical experience only. There is no scientific proof. And there is always a certain danger that by the distribution of scientifically not verified statements, therapeutic possibilities are presented which have no sufficient scientific



basis so far. Furthermore he does not differentiate emotions either. The term emotion is used very broadly as well, which narrows significance.

CHIKLEY (2001) writes about a connection between osteopathy and emotions, too. In a book about theory and practice of osteopathic lymphatic drainage he reports that a release of emotions, such as e.g. crying or sighing is a possible reaction to his special form of treatment which is osteopathic lymphatic drainage.

CHIKLEY'S rely on his own practical experiences as well and there is no scientific inquiry that could proof them either. Emotional reactions of patients were merely described and collected without any further structuring.

FULFORD (2005) states that patients do not only feel physically but also psychically better after a successful osteopathic treatment. Especially after a treatment of the sternum his patients feel an emotional as well as physical relief.

FULFORD (2005) is not alone with his observations. As mentioned in chapter 2.2. many more osteopaths have made this observation and clinical experience of the influence of an osteopathic treatment on emotions. But again FULFORD'S statements (2005) are not based on any scientific proof but on his practical experience only.

UPLEDGER (2000) proceeds from a relationship between body and mind. He uses conscience and deliberate touch to detect it. In addition to that UPLEDGER (2000) developed the method of somato-emotional release. By means of these methods those emotions should surface that were held back, suppressed or isolated by the body. The process of somato-emotional release is triggered when the therapist lays his hands on the patient. By means of this touch relaxation shall be caused which in turn releases and tension is drained away, which happens either in the moment of relaxation or 24 to 48 hours later. According to UPLEDGER (2000) it is furthermore possible to feel by means of touch those emotions that are stored within a patient. As storage organs for emotions he lists: liver, heart, pericardium, lung, kidneys and spleen.

As UPLEDGER (2000) writes in his book, his statements are based on his manifold experiences and observations. Again scientific examination is missing. Furthermore he states

that the also method of somato-emotional release has to be regarded as a concept that was not developed intellectually but is based on personal experience. In contrast to the other authors mentioned above UPLEDGER (2000) differentiates emotions in more detail. He creates a connection between certain emotions and the individual organs. He associates, for example, liver with anger and depression, the heart with fear, the pericardium with a protection mechanism for the heart, the lung with grief, the kidneys with fear of (one's own) death and the spleen with disappointment. But even these differentiated statements about emotions and organs rest upon UPLEDGER'S (2000) observations and are not scientifically proved.

The following authors report about a connection of osteopathy and emotions relying on the observations of other colleagues: COMEAUX (2002); HINKELTHEIN and ZALPOUR (2006); LIEM (2001, 2003), PARSONS (2006) and TEMPELHOF (2001).

COMEAUX (2002) was a close companion of the osteopath Robert Fulford. After Fulford's death COMEAUX (2002) writes his biography in which he provides an introduction to Fulford's diagnosis and treatment methods. According to this biography Fulford uses his hands in order to treat patients on a physical, emotional and mental level. Thus for him the process of treatment is a constant mutual exchange on the three levels of physique, emotion and energy.

Although COMEAUX (2002) lists his sources by chapter there are no sources given in connection with emotional statements. In this respect COMEAUX (2002) only repeats Fulford's thoughts and observations. Again there is a lack of scientific proof. The term emotion is used again in an undifferentiated way.

HINKELTHEIN and ZALPOUR (2006) stress in their osteopathic text book that according to osteopathy the fascias are the system which takes in and stores emotional strain.

The only source they mention is UPLEDGER who calls the release of such fascial dysfunctions the somato-emotional release. However, as mentioned above, UPLEDGER has to be viewed critically as his statements do not rest upon any scientific basis.

HINKELTHEIN and ZALPOUR (2006) continue that by means of such fascial techniques emotional blockings can be released but that they can also cause psychic strains on the part of

the patient. They stress that the therapist should have either professional training him- or herself or should be accompanied by a professional in order to be able to cope with such a release of psychic strain.

Their statements concerning emotions have to be viewed critically. On the one hand the term emotion is used quite broadly. Thus neither the emotional blockings mentioned are further differentiated, nor are the psychic strains. Furthermore they do not tell how such a professional training of the therapist in the field of emotions should be.

In one of his practical text books LIEM (2001) describes the unwinding-technique for the treatment of the diaphragms. He lists memories that are coming back and sudden surges of emotions as possible reactions on the part of the patients. According to his assumption emotions seem to be somehow connected with or stored within the body's tissues. These seem to be memories that were more or less inaccessible for the patients' consciousness.

LIEM (2001) gives no scientific verification for these statements, nor are the possible sudden surges of emotions explained or differentiated in any further detail. He backs his theories with the osteopath Becker who works in a similar way. But, as mentioned above, Becker cannot prove his theses either. LIEM (2001) only refers to general further reading.

In another text book LIEM (2003) describes the Fulford-technique, which shall, among other things, release traumata. Thereby he describes a technique of Fulford on the solar plexus.

But he neither explains how this technique shall lead neurophysiologically to the release of traumata nor does he refer to any scientific proofs for this technique. Furthermore he does not mention which emotional traumata he is talking about and which emotional factors are possibly changed.

Although the text books of LIEM (2001, 2003) are of great importance for every student of osteopathy because of their exact description of many craniosacral techniques, they have to be viewed critically concerning osteopathy and emotions as scientific examinations as well as a critical statement of the author concerning this weakness are missing. Furthermore there is always a certain danger that by the distribution of unverified statements therapeutic options are depicted that have no scientific fundament so far.

PARSONS (2006) integrates osteopathic somatic dysfunction and insights from psychoneuroimmunology and develops a model (see Fig. 1). Thereby he deals with the research results of KORR (1948) and VAN BUSKIRK (1990), who concentrated on the osteopathic dysfunction and insights from psychoneuroimmunology. In this model he establishes a connection between osteopathy and emotions. PARSONS (2006) thereby proceeds from an influence of an osteopathic treatment on somatic dysfunctions. According to this model this could eventually have some impact on emotion-relevant areas of the brain such as e.g. the hypothalamus or the limbic system (see also 2.2.4.).

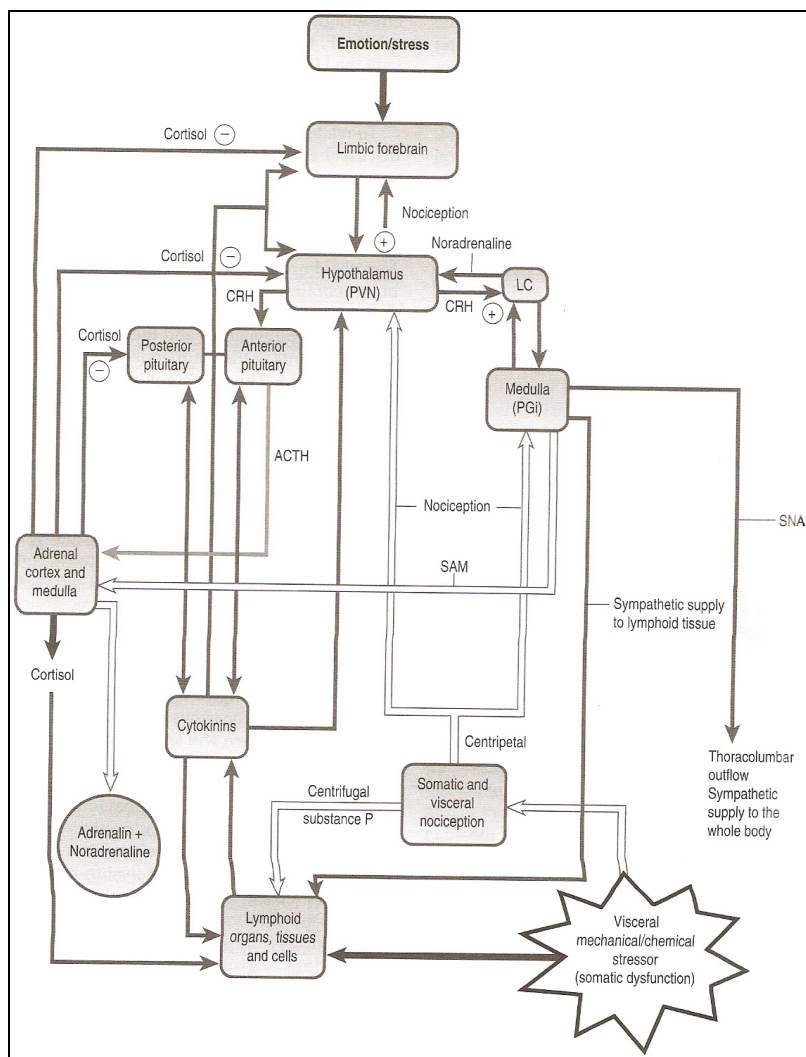


Fig. 1: A schematic depiction of the psychoneuroimmunological process (from PARSONS, J. und MARCER, N. (2006, S. 152))  
SNA=Sympathetic neural axis; SAM=Sympathetic adrenal medulla axis

PARSONS (2006) develops his integrative model on the basis of known research results. It is however only a model, an attempt, of integrating known findings into an overall picture. Whether this model works in reality or not has to be proved or disproved by means of further

research in the future. LEDERMANN (2000, 2008), however, questions the model of the somatic dysfunction. According to him normalization of a disorder cannot be achieved by a stimulation of the reflex system because superordinated central motor centers are not sufficiently stimulated thereby.

Furthermore PARSONS (2006) states that there are certain areas where a possible release of emotions can be triggered after osteopathic treatment according to clinical osteopathic experience. These are the solar plexus, the cardiac plexus, the diaphragm, the trapezius muscle and the masseter muscle, the musculature of the pelvic floor, the inner organs liver, gall bladder, lung and uterus, the area around the navel, the sternum and the fourth thoracic spine.

For PARSONS (2006) thereby the scientific examinations that back this compilation are less important than observations and clinical experience of osteopaths. Although such observations are made by osteopaths again and again, scientific verification is missing. Furthermore PARSONS (2006) does not differentiate the way in which such emotions are released.

TEMPELHOF (2001) writes a German guidebook for patients and thus tries to contribute to osteopathic educational work in Germany. From this guidebook the reader learns that osteopaths do not only look at the psychic-emotional aspects of the patient but can also make use of emotions stored within the tissue. TEMPELHOF (2001) states that by means of the interrelatedness of body, mind and spirit also the psyche may be positively influenced by means of osteopathic tissue corrections. Thus patients may feel lighter or more release after an osteopathic treatment.

The book of TEMPELHOF (2001) is a patients' guidebook. Thus it is clear that it does not contain scientific proof for all statements and theories it explains. In the end of the book, however, he refers to a few osteopathic text books. But what is missing, is literature that can scientifically back the connection between osteopathy and emotions. TEMPELHOF (2001) himself writes briefly that an osteopathic treatment can only be proved incompletely using current measurement methods. Thus the statements concerning a connection of osteopathy and emotions in his patients' guidebook have to be viewed critically as well. There is a certain danger that the possibilities of osteopathic treatments could be overestimated by patients and therapists particularly in the field of emotions. One has to grant TEMPELHOF (2001),

however, that he clearly calls for assigning psychic and psychiatric cases to physicians before the osteopathic treatment is carried out.

MC GOVERN (2003, 2006) writes about a connection between osteopathy and emotions from a philosophical point of view.

MC GOVERN (2003, 2006) works on the further development of the concept of osteopathic medicine. Thereby philosophy plays an essential role. According to him the three principles of structure and function, self-healing forces and interactive unit of body, mind and spirit are equally valid and correspond to the Aristotelian principles of the perception of reality. Corresponding to his fourth principle, MC GOVERN suggests meaning-expectancy responses. Thereby he tries to connect traditional osteopathic insights with more recent immunological, psychosomatic and neurobiological ones and thus to unify body, psyche and mind. According to MC GOVERN (2003, 2006) it is important to realize that body, mental processes and mind are no disconnected systems but that there is an interaction between these systems.

MC GOVERN (2003, 2006) applies a differentiated cause-model in order to integrate the human being as a whole into discussion. Therefore he extends the osteopathic principles and brings in concept structure and future expectation of human existence as a fourth principle. Thereby he achieves to further develop the osteopathic concept. However, one has to take into consideration that this is only a model. A further problem is as MC GOVERN writes himself, the narrow investigation of the osteopathic principles and practices. Furthermore there is a lack of description of the process of this interaction between of mental processes, body and mind in his work.

FULFORD (2005); HINKELTHEIN and ZALPOUR (2006); MC GOVERN (2003); PARSONS (2006), and TEMPELHOF (2001) describe a connection of osteopathy and emotions on the basis of anatomic facts.

FULFORD (2005) regards the solar plexus not only as a conglomeration of nerve cells from which nerve fibres radiate into all abdominal organs. To him the solar plexus is a so-called abdominal brain, in which feelings center and from where they can develop and spread. According to his assumptions the solar plexus is furthermore important for the maintenance

and balance of the abdominal organs. He assumes that the solar plexus has to correct every organic dysfunction that is caused by emotions and is thus responsible for the harmonization of the organs. FULFORD (2005) develops a special technique for the treatment of the solar plexus. This, so-called, FULFORD technique is also described by COMEAUX (2002) and LIEM (2003).

Neurogastroenterology has dealt intensively with the bowel in recent years. Research shows that there is a second brain, an abdominal brain, bowel brain or, as it is scientifically called, enteric nervous system in the bowel which is an independent nervous system. It is embedded in the bowel wall and works independently from the central nervous system. Research reveals that psychic processes and digestive system are coupled (GEO, 2000; GERSHON, 2000, 2004; HOLZER, SCHICHO, HOLZER and LIPPE, 2001; SCHEMANN, 2005). A long time ago FULFORD (2005) had already realized the meaning of the intestinal area for psychic processes. However, it is not explained how this neurophysiological connection between harmonization of the solar plexus and emotion takes place. Furthermore it is questionable whether the solar plexus can be locally influenced by means of applying a manual technique at all. Hardly any research that could back such a claim has been conducted in the field of visceral manual therapy (LEDERMANN, 2008).

According to HINKELTHEIN and ZALPOUR (2006) osteopathy regards fascias as an anatomic structure that takes in and stores emotional strain. Thereby they refer to the osteopath UPLEDGER.

Apart from that the authors do not mention any scientific verification of this claim. Furthermore they use terminology concerning emotions in a rather unspecific way. Moreover there is a lack of explanation concerning a differentiated anatomic connection between fascial system and emotions. The only reference they mention is UPLEDGER whose theories, in turn, are not sufficiently proved either.

MC GOVERN (2003) works on the further development of the concept of the osteopathic medicine. He develops a number of principles (see also p. 27) as part of a unified theory. Therefore MC GOVERN (2003) uses scientific, neuroanatomic knowledge, above all from the field of psychoneuroimmunology in order to show that body, mind and spirit interact.

It is important to bear in mind that MC GOVERN's theory is only a model. Although he bases it on insights from the field of psychoneuroimmunology, the exact neurophysiological circuits are not described. A further problem is, as MC GOVERN (2003) critically states himself, that the osteopathic principles and practices have not been sufficiently investigated so far.

PARSONS (2006) integrates osteopathic somatic dysfunctions into anatomic physiological insights from psychoneuroimmunology and develops a model (see also p. 24). Anatomically known and scientifically proved neurophysiological facts are thereby connected with the osteopathically recognized principle of the somatic dysfunction. According to this theory the osteopathic treatment of the somatic dysfunction would have affect brain areas relevant for emotions.

However, this model has to be viewed with a critical eye, because already the concept of the somatic dysfunction is regarded as a controversial one today (LEDERMANN, 2000; 2008). Furthermore it is discussed whether it is possible to peripherally influence the nervous system by means of manual techniques (LEDERMANN, 2000; 2008; PICKAR, 2002).

TEMPELHOF (2001) presents osteopathy in a guidebook for patients. According to him psychic factors can be positively influenced by means of osteopathic tissue corrections, which is due to the interaction of body, mind and spirit.

TEMPELHOF (2001) certainly contributes with his guidebook to the distribution and educational work concerning osteopathy in Germany. Nevertheless it sometimes lacks critical comments from the author. For instance, he does not explain how the influencing of the psyche by means of osteopathy shall work. This could probably result in an over-estimation of the effectiveness of osteopathy. What is, however, certainly positive for the patients' security is his recommendation of consulting physicians in case of psychic or psychiatric disorders before an osteopathic treatment, in order to probably include a specialist's diagnosis in the treatment.

Based on the research of osteopathic publications HINKELTHEIN and ZALPOUR (2006), LIEM (2003) and PARSONS (2006) see a connection between osteopathy and emotions as well.



HINKELTHEIN and ZALPOUR (2006) refer in this connection of osteopathy and emotions to the osteopath UPLEDGER and his publications concerning the technique of somato-emotional release (see also p. 22). By means of this technique emotional blockings shall be released. As has been mentioned several times already, UPLEDGER has to be viewed critically. His theories are based on clinical observations and there is no scientific proof.

In his osteopathic text book in the chapter on special techniques, LIEM (2003) describes the FULFORD technique, which shall release emotional tensions.

Thereby LIEM (2003) relies on one concrete technique of the osteopath FULFORD and FULFORD's theories, in turn rely, on his clinical experience only and have no scientific base. LIEM (2003) does not explain how these processes neurophysiologically proceed either.

In his integrative model PARSONS (2006) associates osteopathic dysfunction (see also p. 24, 25, 36) with insights from psychoneuroimmunology. According to him the treatment of a somatic dysfunction could affect superordinated areas of the brain that are relevant for emotions. In order to explain the concept of somatic dysfunction, he presents the model of KORR (1948) and VAN BUSKIRK (1990).

However, in his overview LEDERMANN (2000, 2008) generally questions the model of somatic dysfunction (see also p. 38). He states that a normalization of the disorders of a somatic dysfunction cannot be caused by a manual treatment of reflex systems as superordinated centers are not stimulated sufficiently and refers to scientific studies. This point of view is not considered by PARSONS (2006), but seems quite justified because of its scientific arguments.

BECKER (2007), CROIBIER (2006), FULFORD (2005) and LIEM (2003) refer to emotions as indication for an osteopathic treatment.

According to BECKER (2007) all forms of movement, whether they are physiological processes or emotional experiences, are consequences that can be perceived and treated by osteopaths. Thereby a patient can relieve his or her emotional strain. Therefore BECKER (2007) regards osteopathic treatment as a possible therapy of neurosis or psychosomatic diseases.

The idea of treating mentally ill patients by means of osteopathy is not new. Already from 1914-1968 an osteopathic hospital had existed, the Still-Hildreth Sanatorium, in which mentally ill patients were treated osteopathically. The head of the hospital's osteopathic department who was Dr. Hildreth then proceeded from the assumption that mental diseases are caused by physical reasons (HILDRETH, 1942; PATTERSON, 2000).

MAGOUN (2001), too, reports of the osteopathic treatment of mentally ill patients. With the introduction and development of psychotropic drugs, however, the osteopathic treatment of mentally ill patients decreased.

BECKER'S statements rely exclusively on his own practical experience. Scientific proofs are missing. Emotions are not differentiated in detail. The term emotion is used unspecifically. Furthermore the distribution of such osteopathic literature has to be viewed critically, because neuroses and psychosomatic diseases should be treated predominantly by psychiatrists, psychosomatists and psychotherapists. Therapists have to be able to realize whether a patient is mentally stable or not for not leading him or her into a crisis. Not all therapists possess the ability of adequate self-assessment.

CROIBIER (2006) lists emotions among the most frequent indications for applying osteopathic treatment, however stresses, that every osteopath has to know his metes and bounds.

Although CROIBIER (2006) mentions emotions as indication for osteopathic treatment, he uses the term emotions too unspecifically. Furthermore he does not explain how an osteopathic treatment should neurophysiologically affect emotions. However, his last comment about the therapists' limits (a therapist has to know his metes and bounds) is important for the security of patients, because if therapists' know their limits they will send their patients to other specialists if necessary. But here the question arises whether every therapist is aware of his own limits or not.

FULFORD (2005; described also in COMEAUX, 2002) mentions emotional traumata as indication for a special treatment technique on the solar plexus.

LIEM (2003) takes up this technique and describes it as FULFORD- technique in his text books.

However, there are no scientific statements that justify the use of this technique on the solar plexus or in case of emotional traumata. Moreover there are no explanations of these emotional traumata or how they change after this therapy. Furthermore it is questionable whether the solar plexus can be locally influenced by means of a manual technique at all (LEDERMANN, 2008).

The previous chapter provided an overview of literature that deals with the topics osteopathy and emotions. It revealed that the osteopaths discussed clearly observe a connection between emotions and osteopathy. But their statements and theories mostly rely on observations made in clinical practice, on observations made by other colleagues, on a philosophical background, on anatomic facts, on publications in osteopathic literature and not on scientific proofs. Furthermore the term emotion is used too unspecifically without going into detail about the nature and structure of the individual emotions. The manifoldness of emotions is not taken into consideration.

### **2.2.3. Scientific studies concerning osteopathy and emotions**

As mentioned in the literature survey in chapter 2.2.2. there are only a few osteopathic investigations concerning the topic osteopathy and emotions which are conducted within a scientific framework. Research of medical, osteopathic and psychological databases offered two published studies.

LINNENBANK (1999) investigates in a qualitative study, which he conducted with the aid of interviews, how experienced osteopaths deal with emotional reactions of their patients during treatment. As a result LINNENBANK (1999) reports about two main types of emotional reactions that can be distinguished according to the presence and absence of tears. Emotional reactions that bring about tears are reported more frequently than tear-less reactions such as anger. Concerning tearful emotions there are again two sub-kinds of emotions: on the one hand there are sorrow and sadness and on the other hand there is fear. Some of the crying patients additionally have feelings such as sorrow, frustration, bitterness, grief and guilt.

Although this study is conducted within a scientific framework, it is somehow narrowed in its expressiveness due to the small number of participants. These participants are only eight osteopaths, who take part in this study and are interviewed. But as this is only the pilot study of a more extensive investigation, the investigator seems to accept this weakness. Furthermore this study investigates emotional reactions and their management only from the point of view of therapists and not from the patients' perspective, which would be important for an overall picture concerning the connection of osteopathy and emotions.

ENGEL (2006) shows in a study that includes 46 healthy test persons that the use of a cranial technique leads to an altered state of consciousness, which is associated with a positive effect, which is mainly joy. He applies an experimental design with three groups. Experimental group 1 is treated by himself by means of a cranial technique, group 2 is treated by a non-osteopath by means of a mock-technique, which, however, the test persons do not know – and group 3 has to lie quietly with their eyes closed.

In his study ENGEL (2006) differentiates emotions and distinguishes between a positive affect (joy, sexual excitement, love) and a negative affect (anger, sadness, fear). Nevertheless the use of the terms positive and negative have to be viewed critically when related to emotions. According to IZARD (1981) scientists agree about the fact that there *are* positive and negative emotions but also agree that these terms have to be specified in more detail when applied to emotions, because it depends on the intraindividual process between human being, environment, ethnological and ecological conditions whether an emotion is positive or negative. The study design evokes a positive effect, connected with joy. Probably this affect is achieved by the influence of the investigator on the test persons; which something the investigator critically states as well. Because ENGEL, who had personally invited by means a letter and at the same time treated the test persons of group 1, is known to all test persons. A reaction out of favor can thus not be excluded. Test persons are informed exactly about the experimental process. Probably the joy-effect can be traced back to the test persons' happiness of being part of a treatment group and thus receive treatment instead of having to lie still.

In this study healthy persons were treated. Thus the question arises whether these results can be directly transferred to sick persons or if it is a biological that healthy people react with a positive affect, associated with joy, to a cranial technique.

Furthermore the use of one cranial technique only has to be subject to discussion, as according to the results of many investigations the hypothesis of the cranial concept cannot be supported (FERRE, CHEVALIER, LUMINEAU and BARBIN, 1990; WIRTH-PATTULLO and HAYES, 1995; ROGERS, WITT, GROSS, HACKE and GENOVA, 1998; GREEN, MARTIN, BASSETT and KAZANJIAN, 1999; MORAN and GIBBONS, 2001; HARTMAN and NORTON, 2002; SOMMERFELD, KAIDER and KLEIN, 2004; HARTMAN, 2006).

In addition to that I found one more, so far unpublished, study in the course of my research. In a patients' guidebook BARRAL (2006) reports about an experiment with a photoscanner, including ten patients with complex physical and psychoemotional pathologies. He and his colleagues WETZLER and CROIBIER injected a radioactive substance in the vein and then observed the cerebral circulation. The brain reacted to visceral manipulations, palpations and bodily treatment. The effects on the limbic system are recorded by means of a scanner. According to the authors the results of the experiments prove that a bodily treatment affects the psycho-emotional functions.

My investigation shows that the study has been published so far due to temporal reason (letter by BARRAL, 29.3.2008). Thus it cannot be included into scientific discussions, because for a scientific discussion it is crucial to have a publicly accessible, replicable, scientific proof for every statement. Furthermore the study is certainly limited due to its small number of test persons.

In the chapter above I provided an overview of those studies on osteopathy and emotions that were conducted within a scientific framework. On the whole there is only little research on this topic. Due to their complexity it is important to describe emotions as exact and differentiated as possible in scientific studies as well. It has been shown that there is no scientific study that has examined and measured the effects of a complete osteopathic treatment on the whole spectrum of emotional feelings.

#### **2.2.4. Neurobiology of osteopathy and emotions**

It contributes to the further understanding of this study's question to additionally deal with the topic of osteopathy and emotions from a neurobiological perspective. In the following chapter I shall critically discuss the question whether there is a neurobiological connection between an osteopathic treatment and those areas of the brain that are relevant for emotions, namely amygdala, hypothalamus, nucleus accumbens, hippocampus and prefrontal cortex (see also ch. 2.1.5.).

In literature there are two approaches concerning this topic: a peripheral and a central approach. The followers of the peripheral approach proceed from the assumption that individuals and their nervous systems can be influenced by periphery. The central approach, on the other hand, proceeds from the assumption that changes of the nervous system can only happen if the patient participates actively and cognitively in the process of treatment. Action is regarded as a natural centrifugal process, which starts centrally and reaches periphery as motor behavior.

The peripheral approach proceeds from dysfunctions in the periphery. By means of respective osteopathic therapy of these dysfunctions eventually autonomous centers should be controlled via neurophysiological succession processes.

In general somatic dysfunctions are significant findings in the osteopathic examination (KORR, 1948; LIEM, 2002; SEARLE-BARNES, 2000). A somatic dysfunction is defined as a „eine verminderte oder veränderte Funktion von zusammengehörenden Teilen des Körpersystems, also skeletalen, artikulären und myofascialen Strukturen und damit verbundenen Teilen des lymphatischen, vaskulären und Nervensystems“ (LIEM, 2002, 46) [a reduced or altered function of body systems that are belonging together, i.e. skeletal, articular and myofascial structures and connected parts of the lymphatic, vascular and nervous system]. Visceral structures can also develop a reduced or altered function. These are connected to their own anatomic tissues and to lymphatic, vascular and nervous structures (LIEM, 2002; SAMMUT and SEARLE-BARNES, 2000). It is the goal of osteopathic diagnostics to see the dysfunctions found in diagnosis in connection with the entire human being. The osteopath aims at identifying and finding place and cause of the dysfunctions. Thereby he takes into

consideration etiological, predisposing and sustaining factors. The task of an osteopathic treatment is to support the effectiveness of the self-healing forces by means of osteopathic techniques and thus to support the recreation of the normal function (KORR, 1948; LIEM, 2002; SAMMUT and SEARLE-BARNES, 2000).

According to LIEM (2002) the effectiveness of the osteopathic treatment by means of normalizing faulty tissues and movement restrictions in the tissue is reasoned by an improvement of tissue drainage and tissue supply, harmonization of the neurovegetative nervous system and activation of endogenous pain inhibiting mechanisms.

LIEM (2002) cites general osteopathic literature as sources. Scientific studies that concretely back his theories are missing.

As mentioned in chapter 2.2.2., PARSONS (2006) integrates somatic dysfunction into the psychoimmunological process in a model. According to his assumptions the somatic dysfunction can influence this system. Thus, the elimination of the somatic dysfunction by means of an osteopathic treatment could possibly lead to a change in this system and eventually have effects on the hypothalamus and the limbic system as those areas that are relevant for emotions.

Concerning this model PARSONS (2006) relies on the observations made by other colleagues, on anatomic facts and on publications in the osteopathic literature. However, whether this model works in the real world has to be proved or disproved in the future by means of further research.

According to BARRAL and CROIBIER (2003) osteopathic treatment works directly and indirectly. According to their statements a direct effect is achieved via mechanoreceptors which can be found in all tissues including the short spinal muscles, the articular capsules and synovial membrane, the cranial membrane, the visceral ligaments and other fixing structures, the cartilages and bones. An indirect effect, on the other hand, shall be achieved via the central nervous system, which is stimulated by peripheral tissue receptors. According to BARRAL and CROIBIER (2003) thereby reactions shall be triggered in systems such as the arterial system, liquor spinalis, the venous and lymph system, muscles and joints and the psychoemotional system via the central nervous system.

However, so far there are no published neurobiological studies which could back the theories of BARRAL and CROIBIER (2003). The only research that brings results in this respect is the study of BARRAL and his colleagues WETZLER and CROIBIER (2006). According to the authors the results of their study prove that the treatment of the body has effects on the psychoemotional functions. The expressiveness of their study is, however, diminished by the fact that it has only been described in a guidebook so far and has not been published yet, as mentioned in chapter 2.2.2. Thus it cannot be used for a scientific discussion. A further weakness is the small number of participants.

The central approach proceeds from the assumption that changes of the central nervous system can only happen if the patient actively and cognitively contributes to the treatment. An action is regarded as a natural process that starts centrally and reaches periphery as motor behavior. One important representative of this approach is LEDERMANN (2008).

LEDERMANN (2008) deals with the physiology, neurology and psychology of manual therapy. According to him manual therapy is applied in all disciplines that primarily therapeutically use hands for the aim of healing. Thus he also mentions osteopathy and therefore his ideas can be included in the discussion about osteopathy and emotions. According to LEDERMANN (1997, 2000, 2007, 2008) research results have revealed that the nervous system cannot be regulated by peripheral events. According to his assumptions the patient has to contribute actively and cognitively to the treatment process in order to provoke therapeutic changes. Thus he challenges the concept of the somatic dysfunction. Furthermore LEDERMANN (2008) develops a clinical dimensional model in which he describes manual therapy techniques and their modes of effects in three dimensions within the individual: the dimension of tissue, the neurological dimension and the psychological dimension. According to his assumptions the manual therapy has direct influence on the limbic system in the psychological dimension via a psychodynamic effect. Subsequently the limbic system transfers a psychophysiological reaction to the body via three ways: via the motor system (musculature), the autonomous system (sympathetic and parasympathetic nervous system) and via the neuroendocrine system (hypothalamic-hypophysary-adrenergic system). Thereby he calls all psychological reactions that can be caused by manual therapy the psychodynamics of manual therapy. The limbic system is described by LEDERMANN (2008) anatomically in a rather unspecific way as a system that is located at the intersection of cortex and spinal and



supraspinal centers. According to SCHIEBLER and SCHMIDT (2003) and BIRBAUMER and SCHMIDT (2003), who describe the limbic system more precisely, the limbic system consists of borderline structures from telencephalon and diencephalon that frame the corpus callosum. Connections to the brain stem are attached.

The author bases his statements on a number of studies. He clearly distinguishes between modeling and well documented observations and thus makes differentiation possible for the user. Future research will show whether his model will be proved or not. Furthermore it has to be investigated if and how osteopathy differs from other manual therapies in this model.

Belonging to the central approach are furthermore those osteopaths who teach and describe techniques that should be anatomically related to those areas of the brain that are involved in emotional information processing. This shall be depicted in more detail in the following (see also ch. 2.1.5.).

The amygdala, a core area of the brain, is located in the medial part of the temporal lobe at the tip of the choroid plexus of the lateral ventricles (BIRBAUMER and SCHMIDT, 2003; DAMASIO, 2001, 2006; ERK and WALTER, 2003,2004; LAMMERS, 2007; LEDOUX, 2001; SCHIEBLER and SCHMIDT, 2003; SOLMS and TURNBULL, 2004). At the base of the diencephalon the hypothalamus forms the floor of the third ventricle and a part of its lateral and front wall (BIRBAUMER and SCHMIDT, 2003; DAMASIO, 2001, 2006; ERK und WALTER, 2003, 2004; LAMMERS, 2007; LEDOUX, 2001; SCHIEBLER and SCHMIDT, 2003; SOLMS and TURNBULL, 2004). The nucleus accumbens is a core structure of the basal forebrain (BIRBAUMER and SCHMIDT, 2003; ERK and WALTER, 2003, 2004; LAMMERS, 2007; SOLMS and TURNBULL, 2004).The hippocampus is located to a great part in the temporal lobe (DAMASIO, 2001; GOLEMAN, 2005; LAMMERS, 2007; LEDOUX, 2001; SCHIEBLER and SCHMIDT, 2003). The prefrontal cortex is located in the frontal lobe (DAMASIO, 2001, 2006; ERK and WALTER, 2003, 2004; LAMMERS, 2007; LEDOUX, 2001; GOLEMAN, 2005; SOLMS and TURNBULL, 2004). This means that the anatomic areas of those regions of the brain are temporal lobe, the frontal lobe, the forebrain, the basal ganglia and the ventricle system.

CHIKLEY (2006) demonstrates in seminars the osteopathic treatment of brain structures such as hypothalamus and basal ganglia. According to him it should be possible that with the aid of

excellent anatomic knowledge to manually reach and influence the respective structures of the brain way through the different layers of the skull by means of visualization.

CHIKLEY (2006) thereby relies on his own clinical experiences only. Thus there is a lack of scientific proof. It seems questionable if such brain structures can be reached manually at all.

LIEM (2002; 2003) describes in his two text book osteopathic, craniosacral techniques that have an influence on the ventricle system, such as compressions of the 4<sup>th</sup> ventricle, compression of the 3<sup>rd</sup> ventricle and compression of the lateral ventricles. Furthermore he cites treatments for functional disorders of the skull base. According to him an osteopathic dysfunction of the sphenobasilar synchondroses can lead, e.g. to a disorder of supply or drainage in the basal ganglia. These are drained by the sinus cavernosus and the sinus rectus. These are structures that are directly attached to the sphenoid bone, the occiput and the tentorium; all structures that can be treated repeatedly by means of osteopathy. A lateral-inclination-rotation dysfunction of the sphenobasilar synchondroses can impact the hypothalamus. The anatomic neighborhood of the hypothalamus and sphenobasilar synchondroses is well-known. Furthermore LIEM describes techniques for the treatment of the intercranial dura. Summarizingly, one could state that these are all techniques that relate to those areas of the brain that are relevant for emotions that are mentioned above.

PARSONS (2006), too, proceeds from an influence of the CV 4 technique to the ventricle system. And he recalls the spatial nearness of hypothalamus and sphenobasilar synchondroses, which is susceptible for somatic dysfunctions and can be treated osteopathically.

LIEM (2001, 2003) and PARSONS (2006) describe osteopathic techniques that should influence those cerebral structures that are relevant for emotions. Thereby they rely on the observations made by other colleagues, on neuroanatomic insights and on osteopathic literature. However, scientific studies that could prove a direct connection of an osteopathic treatment and emotionally relevant cerebral structures are missing. Furthermore the use of cranial techniques only has to be viewed critically, because according to the results of several examinations the hypothesis of the cranial concept cannot be supported (FERRE, CHEVALIER, LUMINEAU and BARBIN, 1990; WIRTH-PATTULLO and HAYES, 1995; ROGERS, WITT, GROSS, HACKE and GENOVA, 1998; GREEN, MARTIN, BASSETT

and KAZANJIAN, 1999; MORAN and GIBBONS, 2001; HARTMAN and NORTON, 2002; SOMMERFELD, KAIDER and KLEIN, 2004; HARTMAN, 2006).

The overview of neurobiology and emotions shows that there are only hints for assuming that an osteopathic treatment has a direct or indirect neurobiological influence on emotionally relevant areas of the brain. Nevertheless neurobiological studies that could prove these assumptions are missing. Furthermore it becomes clear that there is an urgent need for further research in osteopathy, in particular in the field of neurobiology, in order to be able to better understand the mode of effects of osteopathy.

### **2.2.5. Summary osteopathy and emotions**

Many osteopaths describe a connection between osteopathy and emotions. Thereby they refer to observations made by themselves in clinical practice, to observations of colleagues, to anatomic facts and to publications in osteopathic literature. There is, however, a lack of scientific proof. Thus there is an urgent need for further research in osteopathy concerning osteopathy and emotions. So far there are no results from any study that has investigated and measured the effects of a complete osteopathic treatment to the whole spectrum of emotional feelings. This is what I would like to do with the study at hand.

### **3. Deduction of hypotheses**

Well-known osteopaths describe a connection between osteopathy and emotions. Thereby they mainly rely on their own observations made in clinical practice (BARRAL and CROIBIER, 2003; BARRAL, 2004, 2006; BECKER, 2007; CHICKLEY, 2001; FULFORD, 2005; UPLEDGER, 2000) or on the observations of other colleagues (COMEAX, 2002; HINKELTHEIN and ZALPOUR, 2006; LIEM, 2001, 2003; PARSONS, 2006; TEMPELHOF, 2001), on a philosophical approach (MC GOVERN, 2003, 2006), on anatomic facts (FULFORD, 2005; HINKELTHEIN and ZALPOUR, 2006; MC GOVERN, 2003; PARSONS, 2006, TEMPELHOF, 2001) and on publications in osteopathic literature (HINKELTHEIN and ZALPOUR, 2006; LIEM, 2003; PARSONS, 2006; TEMPELHOF, 2001).

Clinically working researchers have also observed that an osteopathic treatment can have effects on emotions (ENGEL, 2006; LINNENBANK 1999).

I would like to take up these observations and investigate, in analogy with other studies, the influence of osteopathic treatment on emotions. However, in contrast to other studies, I would like to investigate the effects of a complete osteopathic treatment to the whole spectrum of emotional feelings.

I would like to compare the emotional experience of test persons that are treated osteopathically (group 1) to the emotional experience of test persons who are not treated but only lie still (group 2).

If there is a respective pathomechanism of an osteopathic treatment that has an influence on emotions, it should occur in those persons that are osteopathically treated.

Encouraged by previous clinical observations and research results that report about a reflection of osteopathic treatment in the field of emotions, I would like to investigate whether test persons that are osteopathically treated (group 1) differ from those participates that are not treated but only lie still (group 2) or not and if possible changes can be traced back to the osteopathic treatment.

I shall thereby refrain from formulating a respective statistical null hypothesis. It is assumed as being known that usual statistical verification procedures do not have the significance level as assumption for the research hypothesis, but prove the rejection of the null hypothesis. Thus a significant result justifies the rejection of the null hypothesis and at the same time the assumption of the research hypothesis.

Thus the complex of hypotheses reads as follows:

HA: In group 1 the application of “osteopathy” leads to a change in intensity concerning all the emotions inquired.

HB: In group 2 the application of “lying still” leads to a change in intensity concerning all emotions inquired.

HC: In group 1 the application of “osteopathy” leads to changes in intensity concerning the negative emotions.

HD: In group 2 the application of “lying still” leads to changes in intensity concerning negative emotions.

HE: The application of “osteopathy” leads to a higher improvement of emotional intensity (increase of positive, decrease of negative emotions) than the application of “lying still”.

Operationalization:

One group of test persons is osteopathically treated (group 1); a second group to whom an osteopathic treatment is promised for a later point of time, first of all lies with their eyes closed on an examination couch for 15 minutes in order to get a relatively normal process of emotions (group 2). The parameter for the current emotional condition is the Emotionskalen EMO-16-aktuell Fragebogen, short EMO-16-aktuell [emotion scales EMO-16 current questionnaire, short EMO-16-current, translation A.W.]

In addition to that subsequently both collectives are examined regarding differences in the emotional experience one week after the osteopathic treatment. Therefore results a further hypothesis:

HF: Group 1 and group 2 differ after the osteopathic treatment has taken place concerning frequency of emotions after one week.

Operationalization:

As promised after lying still the test persons of group 2 are osteopathically treated as well. The parameter for the frequency of emotions after one week is for both groups the Emotionskalen EMO-16-Woche Fragebogen, short EMO-16-Woche [emotion scales EMO-16-week questionnaire, short EMO-16-week].

## 4. Methods

### 4.1. Experimental design

Capturing emotions can happen on various different levels: experience (feeling), expression and bodily condition. However, if an emotion occurs that does not many that changes in all components involved have to happen simultaneously. The approach for their operationalization consists in capturing one or more components (cf. SCHMIDT-ATZERT (1996; see also ch. 2.1.1.)). I base my measurements on the assumption of one component, namely experience (feeling).

Information about one's own emotional conditions can be only provided by oneself (IZARD 1981; SCHMIDT-ATZERT 2007). Thereby self-observation is the only means of investigation of the subjective experience of emotions (IZARD 1981). Necessary preconditions are the interest and co-operation on part of the participants (IZARD, 1981). A number of techniques have been established for the investigation of emotional experience. People can talk about it spontaneously, by means of interrogation in an interview or by means of answering a questionnaire (SCHMIDT-ATZERT, 2007). In this study I use the EMO-16-current questionnaire developed by SCHMIDT-ATZERT and HÜPPE (1996) and the EMO-16-week questionnaire developed by SCHMIDT-ATZERT (1997) for the self-description of emotional conditions. These are standardized tools for self-observation. By means of this method an individual description of the entire area of emotional experience in validly distinguishable emotional categories is realizable in an osteopathic office in an economic way.

In order to verify my hypothesis I decided to choose the following quantitative experimental design. In an experimental study with two collectives of test persons (group 1 and 2) and a survey sample size of 50 test persons the emotional experience is tested by means of two instruments of inquiry (questionnaires): EMO-16-current and EMO-16-week questionnaire.

The two collectives of test persons undergo two different applications (1: immediate osteopathic treatment, 2: lying still with prospect of subsequent osteopathic treatment). The two groups shall be examined concerning their current emotional condition before and after the treatment.

The individual intensity of 16 emotional qualities concerning the participants' current emotional state is recorded by means of the questionnaire EMO-16-current that uses a six-step scale.

After this data is recorded, as promised group 2 is osteopathically treated as well. After that the test persons fill in the parallel constructed EMO-16-week questionnaire. Thereby the frequency of the same emotions during the previous seven days is inquired by means of a five-step scale.

The quantitative questionnaire design of both inquiry instruments combined with the bound answers due to the rating scale, makes it possible to inquire emotional experience in a standardized form in the framework of an osteopathic treatment in an osteopathic office. Thus objectivity is given concerning conduction and evaluation.

#### **4.2. Choice of test persons**

The study at hand systematically inquires emotional experience concerning the whole range of human emotional experience within the framework of an osteopathic study for the first time. As I have mainly focused on emotions first of all I have refrained from a classification according to mere physical aspects. All patterns of physical complaints are admitted. It is far more important that none of the test persons is in an emotional exceptional situation in order to exclude a priori additional interactions or an additional influence on the process of emotions. Thus the following exclusion criteria are chosen:

Exclusion criteria:

Diagnosed neuroses or psychoses, acute psychosocial crises, alcoholism, drug addiction (legal or illegal drugs), intake of psychotropic drugs.

This study shall capture the broadest possible social stratum of people in working or family life. In order to fill in the questionnaires a good knowledge of German and a certain ability of abstraction are necessary. Thus the following inclusion criteria are chosen:



Inclusion criteria:

Age between 20 and 60, patients of either sex that are under my current treatment or former patients of either sex, friends of either sex; language skills (sufficient knowledge of German in speech and writing).

This examination was conducted within the framework of a masters study at the Universität Krems (University of Krems) in collaboration with the Wiener Schule für Osteopathie (Vienna School of Osteopathy). Test persons were invited according to the inclusion and exclusion criteria mentioned above by means of a letter of invitation, a phone call or in a personal conversation. All forms of invitation had the same wording (see appendix 13.1). Due to the limited time in the masters program the number of participants of either sex was narrowed down a priori to 50. Trying to find further suitable test person would have gone beyond the given time frame. Thus I refrained from doing so for this study. Those patients that were invited by phone or in a personal conversation also got the written invitation on the day of the treatment, in order that all participants were equally informed about the course and the aim of the study (see appendix 13.1.). All test persons participated voluntarily in this study. They were not paid for their participation. Furthermore all test persons gave their written consent to the anonymous use of their data. Test persons were into two groups of 25 persons each using the matched-controlled method. Only on the day of the examinations test group they were assigned to.

### **4.3. Measurement methods**

Information about one's own emotional experience can be provided by oneself only. One can do so spontaneously, in an interview or by means of answering a questionnaire (SCHMIDT-ATZERT, 2007). In this study emotional experience is measured with the aid of questionnaires. By means of ticking preformulated answering options the test person answers to standardized questions about his or her own emotional condition. One can describe feelings according to their intensity, duration and frequency within a given period of time. In this study intensity is inquired by means of the question "How do you feel right now?" in the EMO-16-current questionnaire. Frequency of feelings is inquired retrospectively by means of the question "How did you feel during the last 7 days?" in the EMO-16-week questionnaire.

The questionnaires EMO-16-current and EMO-16-week are economic means for a multidimensional enquiry of emotional experience. Within a short editing time of, usually, two to three minutes a broad range of feelings is captured. These questionnaires make it possible to quickly acquire data about emotional experience from the perspective of patients in a standardized way within the framework of an osteopathic treatment in the osteopathic office.

#### **4.3.1. Comments on the questionnaire EMO-16-current**

Emotions are a hypothetical construct that consist of the three dimensions experience (feelings), expression and bodily change (SCHMIDT-ATZERT, 1996). The method at hand records only one component, namely the emotional experience, in a multidimensional way.

The emotional scales EM-16 current are a multidimensional questionnaire (see appendix), which captures emotional conditions in 16 scales. It includes all important emotional qualities. The 16 scales are based on similarity analyses of emotional words. Each Item (emotionally determined substantive) describes one of these scales. The instruction to this questionnaire stresses that every word stands for one certain area or feelings that includes similar feelings that could also be termed with this same word. The current intensity of the feeling has to be rated by participants on a six-step scale (non existent, very weak, rather weak, medium, rather strong, very strong; see also appendix 13.2). The individual scales are: disgust, anger, envy, boredom, anxiety, restlessness, sadness, yearning, shame, feelings of guilt, joy, pride, compassion, affection, sexual excitement and surprise. Furthermore there is one more category given, which is “other feelings”, which can be used if during examination the feelings experienced are not contained within the guidelines. Multiple nominations shall be mentioned in the results of the examination. A further advantage of the category other feelings is that test persons who think that the 16 scales given are not sufficient for them have no reason for being dissatisfied with the questionnaire. Thereby a reactivity of measurements shall be prevented. According to SCHMIDT-ATZERT and HÜPPE (1996) the chronological order of the Items in the questionnaire was chosen in such a way that similar emotions appear one after the other. Thereby test persons shall be enabled to better demarcate the individual emotions from each other, although that means that it was approved that test persons could probably make logical errors of judgment. When describing his or her own emotional

condition it is essential that the test person is able to differentiate between the different emotion-related terms. Thus participants were asked whether they had comprehensive problems before they filled in the questionnaire.

Reliability and validity of the questionnaire was tested by SCHMIDT-ATZERT and HÜPPE (1996) in 12 examinations including 905 test persons altogether. Therefore I refer to the publication entitled the same title in *Diagnostica* 1996, 42, vol. 3, 242-267. Retest-reliability that was ascertained by means of repeated tests in comparable situations is between .37 and .92 with a median of .70 (N=105). Correlations with scales of the same measurement demand was .75 for joy, .80 for anxiety, .79 for sadness and .83 for anger (N=208). Factor analyses of the 16 scales showed that some were repeatedly loading the same factor (e.g. disgust and anger). That these scales nevertheless differ in their validity is verified by differentially high correlations with external emotion scales and their different sensitivity towards emotion inducing conditions.

The evaluation of the EMO-16-current questionnaire happens according to the original instruction on Item (scales-) level. There are no specific tools for the evaluation. The emotional scales of the EMO-16-current constitute a multidimensional questionnaire. It comprises emotional conditions in 16 scales. Each Item (emotionally determined substantive) describes one scale. The test person has to rate the intensity of the current condition on a six-step scale (non-existent, very weak, rather weak, medium, rather strong, very strong). Values from 0-5 are associated to these scales. Thus the minimum value of one of these 16 conditions is 0; the maximum value is 5. As the scale is limited to values between 0 and 5 no noteworthy distortions due to extreme single values can emerge.

To sum it up: the measurement instrument EMO-16-current questionnaire is a suitable economic method for a fast and profound self-description of current feelings.

#### **4.3.2. Comments on the questionnaire EMP-16-week**

The test variant at hand, called EMO-16-week, developed by SCHMIDT-ATZERT (1997) is a method to capture fundamental aspects of the emotional condition of the previous week by means of only one measuring process. Emotions are a hypothetical construct that consist of

the three dimensions experience (feelings), expression and bodily change (SCHMIDT-ATZERT, 1996; see also ch. 2.1.1.). The method at hand captures exclusively one component of emotion, namely emotional experience, in a multidimensional way (see appendix). With the aid of the EMO-16-week questionnaire by SCHMIDT-ATZERT (1997) the frequency of emotional feelings during the previous seven days is captured retrospectively on a five-step scale. The previous week can be regarded as a time sample from the test person's daily life. A further advantage of the time span of one week is that one week seems to be a manageable time span in order that scaling does not depend too much on the test persons' memory. Furthermore the ratings shall be independent from the cyclic process of emotional condition throughout the week. The 16 emotional qualities are the same as those in the test concerning current emotions mentioned above (see ch. 4.3.1.). All important emotional qualities are comprised. In EMO-16-week the same feelings are measured as in EMO-16-current. A difference is, however, that in case of EMO-16-week frequency of the feelings experienced throughout the week shall be rated on a five-step scale. Thus the difference lies within instruction and the scale of answers (see appendix 13.3.). When describing their own feelings it is important that test persons are able to differentiate between the single emotion-related terms. Thus the instruction of the questionnaire stresses that every word stands for a range of feelings that comprises all feelings that could be termed with the same word.

Concerning validity and reliability of the questionnaire I refer to the article „Entwicklung und Evaluierung von Skalen zur Erfassung des emotionalen Befindens in den letzten 7 Tagen (EMO-16-Woche)“ in der Zeitschrift für Differentielle und Diagnostische Psychologie [journal of differential and diagnostic psychology] 1997, 18, vol. 3, 182-198. In 12 investigations that included 1186 test persons altogether reliability was checked and indications concerning construct validity are collected. When measurements were repeated after one hour restreliabilty of the scales was around .81, after 24 hours it was around .67 on average.

The evaluation of the EMO-16-week questionnaire happens according the original instruction on item (scales-) level. There are no specific tools for the evaluation. The emotional scales of the EMO-16-week constitute a multidimensional questionnaire. It comprises emotional conditions in 16 scales. Each item (emotionally determined substantive) describes one scale. Test persons have to rate the frequency of the individual feelings on a five-step scale (never, rarely, sometimes, often, very often). Values from 0-4 are assigned to these scales. Thus the

minimum value of each of these 16 is 0, the maximum value is 4. As the scale is limited to values between 0 and 4 no noteworthy distortions due to extreme single values can emerge.

To sum it up: the measurement instrument emotion scales EMO-16-week is a questionnaire that is suitable in order to inquire the whole range of emotional conditions that occur within a certain period of time within the framework of an osteopathic treatment.

#### **4.4. Osteopathic techniques**

Test persons were treated individually according to previous findings according to the Black-Box-Method parietally, viscerally, and craniosacrally. The parietal, visceral and craniosacral techniques correspond to the teaching criteria at the Osteopathieschule Deutschland [German School of Osteopathy]. Techniques are recorded in a written form in a proband's file and can be enquired from the author in case of interest.

## **5. Experimental procedure**

An experimental clinical study with two groups was conducted. Participants of both groups came to the office with the prospect of an osteopathic treatment. The test persons of the first group were examined after the anamnesis talk and subsequently treated according to their own needs by means of the black-box-method parietally, viscerally and craniosacrally. Before anamnesis and after the treatment the test persons of group 1 had to fill in the EMO-16-current. Group 2 serves as control group. The test persons of group 2 had to lie still with their eyes closed on an examination couch for 15 minutes before the anamnesis talk. Before and after lying still the test persons of group 2 had to fill in the EMO-16-current questionnaire. After that and after the anamnesis talk, the test persons of group 2 were examined, too, and subsequently they were osteopathically treated according to their needs as well. The test persons of both groups were provided with a stamped envelope in which there was the EMO-16-week questionnaire. They were asked to fill in the questionnaire eight days after the osteopathic treatment and to send it back to the investigator afterwards. In addition to that the investigator reminded the test persons of filling in and sending back by telephone.

### **5.1. Framework conditions**

The investigations were conducted in the period from the 21<sup>st</sup> January 2008 to the 20<sup>th</sup> May 2008. Anamnesis, examinations and osteopathic treatment took place in my office in Marbach am Neckar (Germany). For the execution of the measurement of emotional experience the two questionnaires EMO-16-current and EMO-16-week und a pen were needed. The measurements of the current emotional experiences of the test persons by means of the EMO-16-current were conducted in my office. The measurements of the test persons' emotional experiences over the course of seven days after the osteopathic treatment had taken place, by means of the EMO-16-week was conducted at the test persons' houses. In order to standardize the investigation, the introduction for the test persons (see appendix 13.4.) as well as the instructions at the beginning of the examination (see appendix 13.5., 13.6.) in the office had the same wording for every test person.

## 5.2. Test procedure

For the sake of standardization, test procedure was the same for every test person. The investigator greeted the arriving test person and thanked him for coming. Test persons were explained that the aim of this examination was to investigate the influence of an osteopathic treatment on emotions. The examination was introduced to the test persons (see appendix 13.4.) although they had already read about the test procedure in the written invitation and confirmed it by means of their signature. As a next step the test person was informed about the group he belonged to and was instructed accordingly (cf. instruction group appendix 13.5. and instruction group 2 appendix 13.6.).

The test person of group 1 filled in the EMO-16-current questionnaire. He did so in the osteopath's consulting room. The investigator gave him the questionnaire and asked whether there were any problems concerning comprehension, which he clarified if necessary. After that he left the consulting room for two to three minutes. During that time the test person filled in the questionnaire. After returning the investigator accepted the questionnaire. Subsequently the anamnesis talk, examination and treatment took place. After the treatment the test person filled in another EMO-16-current questionnaire, while the investigator left the room again. At his return the investigator accepted the second questionnaire and handed the test person a stamped envelope, containing the EMO-16-week questionnaire. The investigator said good-bye to the test person and asked him not to inform the other test persons about the procedure. The total time needed for one test person of group 1 was about one hour. Filling in one questionnaire lasted about two to three minutes.

The test person of group 2 filled in the EMO-16-current questionnaire. He did so in the consultation room. The investigator handed him the questionnaire and asked whether there were any comprehension problems, which he clarified if necessary. The he left the room for two to three minutes while the test person filled in the questionnaire. At his return the investigator accepted the questionnaire. After that the patient had to lie still with his eyes closed on an examination couch for 15 minutes. Thereby he was covered with a blanket. The investigator left the room and went into a neighboring room. The door between the two rooms was left ajar in order that the patient could consult the investigator any time if necessary. After the 15 minutes had passed the investigator returned into the consulting room and the test person had to fill in another EMO-16-current questionnaire. Again, the investigator left the room for two to three minutes. At his return he accepted the questionnaire that was filled in by

the test person. Then anamnesis talk, examination and osteopathic treatment took place. After that the investigator handed a stamped envelope, containing the EMO-16-week, to the test person, said good-bye and asked the test person and asked him not to inform the other test persons about the experimental procedure. The total time needed for one test person of group 2 was about 75 minutes. Filling in the questionnaires lasted about two to three minutes each.



## 6. Evaluation and results

Two groups of test persons (group 1 and group 2) undergo two different applications (1: osteopathic treatment, 2: lying still). The two groups are examined concerning their emotional condition before and after the treatment.

After they were lying still for 15 minutes, group 2 is additionally treated osteopathically. In addition to that both groups are again examined concerning their emotional experience one week after treatment has taken place.

Emotional experience of both groups is examined by means of two different inquiring instruments (questionnaires).

The intensity of 16 individual emotional qualities concerning the test persons' current emotional condition is rated according to SCHMIDT-ATZERT and HÜPPE (1996) before and after the application by means of the EMO-16-current questionnaire on a six-step scale.

By means of the analogously constructed questionnaire EMO-16-week according to SCHMIDT-ATZERT (1997) one week after the treatment the frequency of the same emotions over the course of seven days is rated on a five-step scale.

Values are collected in an excel chart and are then sent to Dipl. Med. Inf. (FH) Dr. med. Carsten Urbanek for an external processing and evaluation. After data were transformed to SPSS statistical software, he conducted, by means of these SPSS-data files, the statistical evaluation and, in addition to that, made the charts presented in this paper.

The Item-values of "disgust", "anger", "envy", "anxiety", "restlessness", "sadness", "shame" and "feelings of guilt" can additionally be compromised by means of totaling to an aggregate value of negative condition (SCHMIDT-ATZERT and HÜPPE, 1996; SCHMIDT-ATZERT 1997).

The scale on both questionnaires is limited to values between 0 and 5 and 0 and 4, respectively. Thus no noteworthy distortions due to extreme single values can arise.

Thus the results of the enquiry of both groups can be compared on the basis of arithmetic averages and frequencies. Thereby all emotion-items are considered individually, except for the sum of negative feelings.

## 6.1. Data basis

### 6.1.1. Description of the sample (age and sex)

Gruppe	Geschlecht	N	Minimum	Maximum	Std. Deviation	Mean
1	männlich	8	28	57	9,303	42,38
	weiblich	17	25	54	8,778	43,06
	Total	25	25	57	8,759	42,84
2	männlich	7	45	57	4,685	50,43
	weiblich	18	30	52	6,858	42,28
	Total	25	30	57	7,263	44,56
Total	männlich	15	28	57	8,365	46,13
	weiblich	35	25	54	7,742	42,66
	Total	50	25	57	8,011	43,70

Table 1: Age (estimated by date of birth)

[horizontal: Gruppe= group, Geschlecht= sex  
vertical: männlich= male, weiblich= female]

Sex distribution is equal in both groups. On average the men in group 2 are older than those in group 1. The completed year of ages deviates less in group 2.

## 6.1.2. Distribution of emotion-estimations in the questionnaire EMO-16-current

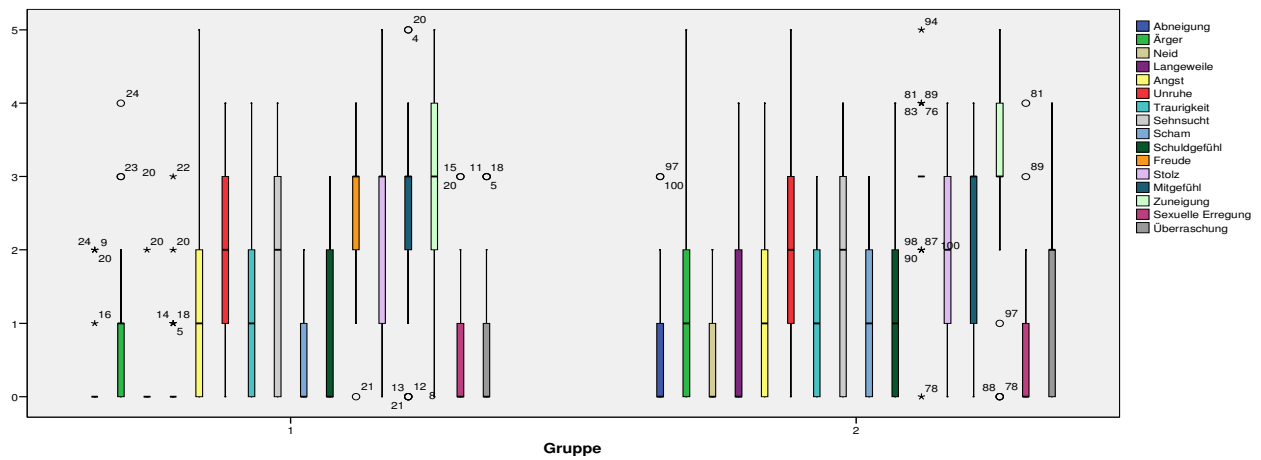


Fig 2: EMO-16-current before

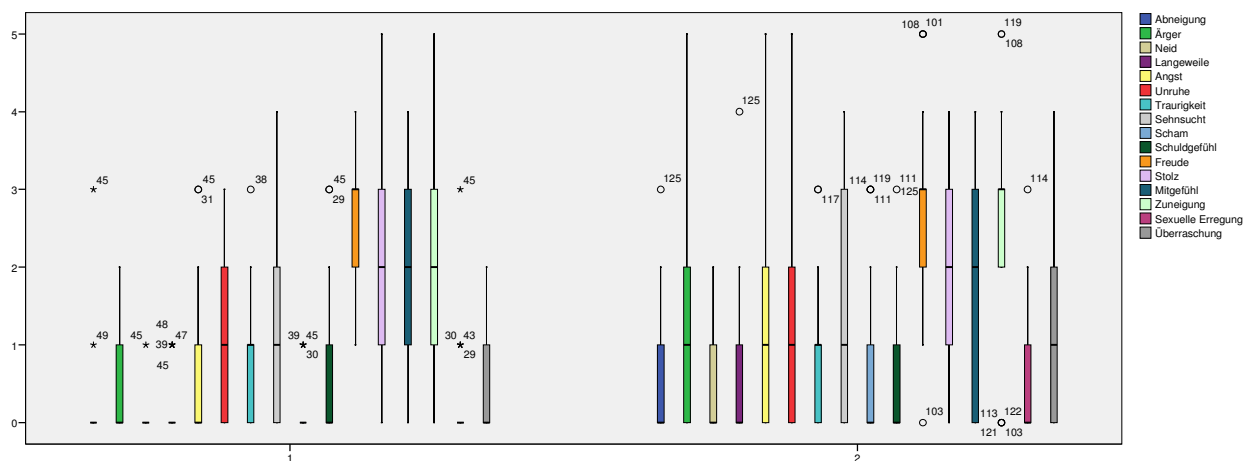


Fig. 3: EMO-16-current after

The distribution of the questionnaire-answers concerning the 16 items considered is depicted in the chart above as Box-Plots. The boxes show the interquartil-distance (mid 50%) of the observations. Comparison is possible only in a limited way as we deal with a discrete feature here.

In group 1 quite a big number of items is rated with 0. This is the case for “disgust”, “envy”, “boredom”, “shame” and “excitement”. Except for “joy” the items are rated in a more differentiated way by group 2.

Concerning emotional intensity some differences can be observed already before the treatment. Thus a simple comparison of the two groups is not justified in every case.

## 6.2. Hypotheses-guided evaluation

HA: In group 1 the application “osteopathy” leads to changes in intensity concerning all emotions inquired.

In group 1 the according average values between first and second EMO-current are tested for all items. Thereby t-tests for dependant samples are conducted. This is a 16-fold test. Thus the desired alpha-value of the test should be adjusted by 1/16 (Bonferroni correction). Thus the alpha-value is reduced to  $0,05/16 = 0,00315$ .

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Abneigung.1: Abneigung	0,28	25	0,678	0,136
	Abneigung.2: Abneigung	0,16	25	0,624	0,125
Pair 2	Ärger.1: Ärger	0,88	25	1,130	0,226
	Ärger.2: Ärger	0,36	25	0,638	0,128
Pair 3	Neid.1: Neid	0,08	25	0,400	0,080
	Neid.2: Neid	0,04	25	0,200	0,040
Pair 4	Langeweile.1: Langeweile	0,32	25	0,748	0,150
	Langeweile.2: Langeweile	0,16	25	0,374	0,075
Pair 5	Angst.1: Angst	1,20	25	1,443	0,289
	Angst.2: Angst	0,68	25	1,030	0,206
Pair 6	Unruhe.1: Unruhe	2,00	25	1,354	0,271
	Unruhe.2: Unruhe	1,04	25	1,098	0,220
Pair 7	Traurigkeit.1: Traurigkeit	1,20	25	1,190	0,238
	Traurigkeit.2: Traurigkeit	0,76	25	0,879	0,176
Pair 8	Sehnsucht.1: Sehnsucht	1,56	25	1,294	0,259
	Sehnsucht.2: Sehnsucht	1,20	25	1,258	0,252
Pair 9	Scham.1: Scham	0,32	25	0,557	0,111
	Scham.2: Scham	0,12	25	0,332	0,066
Pair 10	Schuldgefühl.1: Schuldgefühl	1,00	25	1,258	0,252
	Schuldgefühl.2: Schuldgefühl	0,60	25	0,957	0,191
Pair 11	Freude.1: Freude	2,68	25	0,945	0,189
	Freude.2: Freude	2,72	25	1,021	0,204
Pair 12	Stolz.1: Stolz	2,32	25	1,492	0,298
	Stolz.2: Stolz	2,04	25	1,513	0,303
Pair 13	Mitgefühl.1: Mitgefühl	2,52	25	1,503	0,301
	Mitgefühl.2: Mitgefühl	1,96	25	1,485	0,297
Pair 14	Zuneigung.1: Zuneigung	2,64	25	1,440	0,288
	Zuneigung.2: Zuneigung	2,08	25	1,579	0,316
Pair 15	Erregung.1: Sexuelle Erregung	0,48	25	0,918	0,184
	Erregung.2: Sexuelle Erregung	0,24	25	0,663	0,133
Pair 16	Überraschung.1: Überraschung	0,72	25	1,061	0,212
	Überraschung.2: Überraschung	0,48	25	0,653	0,131

Table2: HA: Average values group 1

[Abneigung = disgust, Ärger = anger, Neid = envy, Langeweile = boredom, Angst = anxiety, Unruhe = restlessness, Traurigkeit = sadness, Sehnsucht = yearning, Scham = shame, Schuldgefühl = feeling of guilt, Freude = joy, Stolz = pride, Mitgefühl = compassion, Zuneigung = affection, sexuelle Erregung = sexual excitement, Überraschung = surprise]

Gruppe 1

		Paired Samples Test					t	df	Sig. (2-tailed)
		Paired Differences			95% Confidence Interval of the				
		Mean	Std. Deviation	Std. Error Mean	Upper	Lower			
Pair 1	Abneigung.1: Abneigung Abneigung.2: Abneigung	0,120	0,526	0,106	-0,097	0,337	1,141	24	0,266
Pair 2	Ärger.1: Ärger - Ärger.2: Ärger	0,520	0,823	0,166	0,180	0,860	3,161	24	0,004
Pair 3	Neid.1: Neid - Neid.2: Neid	0,040	0,200	0,040	-0,043	0,123	1,000	24	0,327
Pair 4	Langeweile.1: Langeweile - Langeweile.2: Langeweile	0,160	0,554	0,111	-0,069	0,389	1,446	24	0,161
Pair 5	Angst.1: Angst - Angst.2: Angst	0,520	0,586	0,117	0,278	0,762	4,437	24	0,000
Pair 6	Unruhe.1: Unruhe - Unruhe.2: Unruhe	0,960	1,060	0,212	0,523	1,397	4,529	24	0,000
Pair 7	Traurigkeit.1: Traurigkeit Traurigkeit.2: Traurigkeit	0,440	1,003	0,201	0,026	0,854	2,193	24	0,038
Pair 8	Sehnsucht.1: Sehnsucht Sehnsucht.2: Sehnsucht	0,360	1,114	0,223	-0,100	0,820	1,616	24	0,119
Pair 9	Scham.1: Scham - Scham.2: Scham	0,200	0,500	0,100	-0,006	0,406	2,000	24	0,057
Pair 10	Schuldgefühl.1: Schuldgefühl - Schuldgefühl.2: Schuldgefühl	0,400	1,000	0,200	-0,013	0,813	2,000	24	0,057
Pair 11	Freude.1: Freude - Freude.2: Freude	-0,040	0,978	0,198	-0,444	0,364	-0,204	24	0,840
Pair 12	Stolz.1: Stolz - Stolz.2: Stolz	0,280	1,308	0,262	-0,280	0,820	1,071	24	0,296
Pair 13	Mitgefühl.1: Mitgefühl - Mitgefühl.2: Mitgefühl	0,560	1,325	0,265	0,013	1,107	2,113	24	0,045
Pair 14	Zuneigung.1: Zuneigung Zuneigung.2: Zuneigung	0,560	1,417	0,283	-0,025	1,146	1,977	24	0,060
Pair 15	Erregung.1: Sexuelle Erregung - Erregung.2: Sexuelle Erregung	0,240	0,723	0,146	-0,059	0,539	1,659	24	0,110
Pair 16	Überraschung.1: Überraschung - Überraschung.2: Überraschung	0,240	1,052	0,210	-0,194	0,674	1,141	24	0,266

Table 3: HA: t-test group 1

**After the Bonferroni correction the result shows significant differences for “anxiety” and “restlessness” that show more than random lower evaluation after the osteopathic treatment ( $p < 0,00315$ ).**

The items “anger”, “sadness” and “compassion” show after Bonferroni-correction no significant, nevertheless tendential values ( $p < 0,05$ ). They were all rated lower after the osteopathic treatment.

Thus hypothesis HA is not verified. In group 1 the application “osteopathy” does not lead to changes concerning the intensity of **all** emotions inquired. Nevertheless, significant differences can be observed concerning **certain** emotions, such as anxiety or restlessness.

HB: In group 2 the application of “lying” still leads to changes in the intensity concerning some emotions inquired.

The evaluation of group 2 is conducted analogously to HA. Concerning group 2 the average values between the first and the second EMO-current are tested for all Items. Thereby t-tests

for dependant samples are conducted. Again the Bonferroni correction mentioned above is applied.

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Abneigung.1: Abneigung	0,52	25	0,918	0,184
	Abneigung.2: Abneigung	0,56	25	0,870	0,174
Pair 2	Ärger.1: Ärger	1,28	25	1,514	0,303
	Ärger.2: Ärger	1,04	25	1,241	0,248
Pair 3	Neid.1: Neid	0,40	25	0,645	0,129
	Neid.2: Neid	0,44	25	0,712	0,142
Pair 4	Langeweile.1: Langeweile	0,72	25	1,100	0,220
	Langeweile.2: Langeweile	0,72	25	0,980	0,196
Pair 5	Angst.1: Angst	1,36	25	1,319	0,264
	Angst.2: Angst	1,04	25	1,274	0,255
Pair 6	Unruhe.1: Unruhe	2,20	25	1,384	0,277
	Unruhe.2: Unruhe	1,36	25	1,381	0,276
Pair 7	Traurigkeit.1: Traurigkeit	1,28	25	1,137	0,227
	Traurigkeit.2: Traurigkeit	0,84	25	0,943	0,189
Pair 8	Sehnsucht.1: Sehnsucht	1,72	25	1,487	0,297
	Sehnsucht.2: Sehnsucht	1,28	25	1,339	0,268
Pair 9	Scham.1: Scham	1,12	25	1,236	0,247
	Scham.2: Scham	0,76	25	1,091	0,218
Pair 10	Schuldgefühl.1: Schuldgefühl	1,04	25	1,136	0,227
	Schuldgefühl.2: Schuldgefühl	0,64	25	0,810	0,162
Pair 11	Freude.1: Freude	2,96	25	0,935	0,187
	Freude.2: Freude	2,80	25	1,190	0,238
Pair 12	Stolz.1: Stolz	2,00	25	1,225	0,245
	Stolz.2: Stolz	1,76	25	1,332	0,266
Pair 13	Mitgefühl.1: Mitgefühl	2,28	25	1,458	0,292
	Mitgefühl.2: Mitgefühl	1,68	25	1,492	0,298
Pair 14	Zuneigung.1: Zuneigung	2,92	25	1,441	0,288
	Zuneigung.2: Zuneigung	2,60	25	1,443	0,289
Pair 15	Erregung.1: Sexuelle Erregung	0,72	25	1,137	0,227
	Erregung.2: Sexuelle Erregung	0,60	25	0,913	0,183
Pair 16	Überraschung.1: Überraschung	1,48	25	1,262	0,252
	Überraschung.2: Überraschung	1,36	25	1,319	0,264

Table 4: HB: Average values group 2

Gruppe 2		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Upper	Lower			
Pair 1	Abneigung.1: Abneigung Abneigung.2: Abneigung	-0,040	0,351	0,070	-0,185	0,105	-0,669	24	0,574
Pair 2	Ärger.1: Ärger - Ärger.2: Ärger	0,240	1,052	0,210	-0,194	0,674	1,141	24	0,266
Pair 3	Neid.1: Neid - Neid.2: Neid	-0,040	0,676	0,135	-0,319	0,239	-0,296	24	0,770
Pair 4	Langeweile.1: Langeweile - Langeweile.2: Langeweile	0,000	0,707	0,141	-0,292	0,292	0,000	24	1,000
Pair 5	Angst.1: Angst - Angst.2: Angst	0,320	0,945	0,189	-0,070	0,710	1,693	24	0,103
Pair 6	Unruhe.1: Unruhe - Unruhe.2: Unruhe	0,840	1,214	0,243	0,339	1,341	3,460	24	0,002
Pair 7	Traurigkeit.1: Traurigkeit Traurigkeit.2: Traurigkeit	0,440	0,651	0,130	0,171	0,709	3,381	24	0,002
Pair 8	Sehnsucht.1: Sehnsucht Sehnsucht.2: Sehnsucht	0,440	1,044	0,209	0,009	0,871	2,107	24	0,046
Pair 9	Scham.1: Scham - Scham.2: Scham	0,360	0,907	0,181	-0,015	0,735	1,994	24	0,059
Pair 10	Schuldgefühl.1: Schuldgefühl.2: Schuldgefühl	0,400	0,816	0,163	0,063	0,737	2,449	24	0,022
Pair 11	Freude.1: Freude - Freude.2: Freude	0,160	0,688	0,138	-0,124	0,444	1,163	24	0,256
Pair 12	Stolz.1: Stolz - Stolz.2: Stolz	0,240	0,723	0,145	-0,059	0,539	1,659	24	0,110
Pair 13	Mitgefühl.1: Mitgefühl - Mitgefühl.2: Mitgefühl	0,600	0,957	0,191	0,205	0,995	3,133	24	0,006
Pair 14	Zuneigung.1: Zuneigung Zuneigung.2: Zuneigung	0,320	0,802	0,160	-0,011	0,651	1,995	24	0,058
Pair 15	Erregung.1: Sexuelle Erregung - Erregung.2: Sexuelle Erregung	0,120	0,528	0,105	-0,097	0,337	1,141	24	0,266
Pair 16	Überraschung.1: Überraschung - Überraschung.2: Überraschung	0,120	0,927	0,185	-0,263	0,503	0,847	24	0,524

Tabelle 5: HB: T-Test Gruppe 2

**After Bonferroni correction results show significant differences concerning restlessness and sadness that show more than random lower values after only “lying still” ( $p < 0,00315$ ).**

Concerning group 2 there are no significant, but tendential ( $p < 0,05$ ) differences concerning “yearning”, “feeling of guilt” and “compassion” after Bonferroni correction. Evaluation is lower after lying.

Thus hypothesis HB is not verified. In group 2 there are no changes in the intensity concerning **all** emotions inquired. There are, however, significant changes concerning **certain** emotions such as restlessness and sadness.

HC: In group 1 the application osteopathy leads to changes in intensity concerning the negative emotions.

In analogy to HA for group 1 the analysis of the variables “negative feelings“ is tested before and after the osteopathic treatment.

Gruppe 1					
Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Summe_neg.1	6,6800	25	4,99767	0,99953
	Summe_neg.2	3,6000	25	3,65148	0,73030

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Summe_neg.1 & Summe_neg.2	25	0,794	0,000

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Upper	Lower			
Pair 1	Summe_neg.1 - Summe_neg.2	3,08000	3,05396	0,61079	1,81939	4,34061	5,043	24	0,000

Table 6: HC: t-test group 1

**The negative feelings are on average significantly lower after the osteopathic treatment. Thus hypothesis HC can be verified. The osteopathic treatment leads to a change in intensity concerning negative feelings.**

HD: In group 2 the application “lying still” leads to changes in intensity concerning the negative emotions.

In analogy to HB the analysis of the variables negative feelings is tested before and after the application for group 2.

Gruppe 2					
Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Summe_neg.1	6,6800	25	5,31288	1,06268
	Summe_neg.2	6,1200	25	5,66657	1,13331

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Summe_neg.1 & Summe_neg.2	25	0,728	0,000

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Upper	Lower			
Pair 1	Summe_neg.1 - Summe_neg.2	2,56000	4,06284	0,81257	0,88294	4,23706	3,151	24	0,004

Table 7: HC: t-test group 2

**Negative feelings are on average significantly lower after the application lying still. Thus the hypothesis HD can be verified. The application of lying still leads to changes in intensity concerning negative emotions.**

However, in group 2 the p-value is a little bit higher and the difference slightly less significant compared to the corresponding values of group 1 (cf. HC). Bearing in mind, however, the small number of test persons this aspect should not be over-estimated. Moreover in group 2 negative feelings was on average stronger before the treatment than in group 1.



HE: The application “osteopathy” causes a higher improvement of the emotional intensity (increase of positive and decrease of negative emotions) than the application “lying still”.

Although it is not guaranteed that group 1 and group 2 are comparable, difference concerning a possible effect of treatment. First of all relative changes are regarded in the form of “decrease“, “no change“ and “increase”. This variable calculated for each Item is compared between group 1 and group 2. Comparison is made by means of contingency tables and corresponding independence tests. Again there are multiple tests for what reason the alpha-value should be adjusted, too.

			Change pride			Total
			Decrease	same	Increase	
Group	Osteopathy	Count	9	11	5	25
		Expected Count	7,0	15,0	3,0	25,0
	Lying still	Count	5	19	1	25
		Expected Count	7,0	15,0	3,0	25,0
Total		Count	14	30	6	50
		Expected Count	14,0	30,0	6,0	50,0

Table 8: HE: Contingency table change pride

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5,943(a)	2	,051
Likelihood Ratio	6,229	2	,044
Linear-by-Linear Association	,000	1	1,000
N of Valid Cases	50		

a 2 cells (33,3%) have expected count less than 5. The minimum expected count is 3,00.

Table 9: HE: Chi-SquareTests pride

		Value	Approx. Sig.
Nominal by Nominal	Phi	,345	,051
	Cramer's V	,345	,051
N of Valid Cases		50	

a Not assuming the null hypothesis.

b Using the asymptotic standard error assuming the null hypothesis.

Table 10: HE Symmetric Measures pride

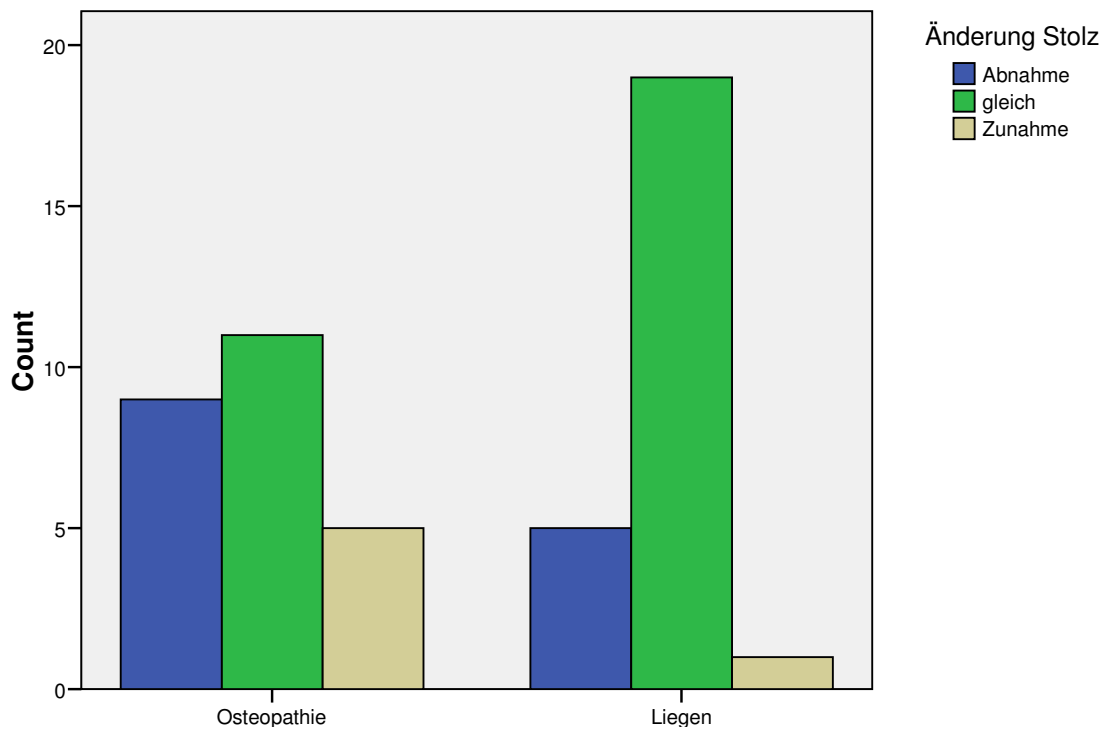


Fig. 4: HE: Bar diagram pride

[Änderung Stolz = change pride, Abnahme = decrease, gleich = same, Zunahme = increase]

			Change compassion			Total
			Decrease	same	Increase	
Group	Osteopathy	Count	15	6	4	25
		Expected Count	12,5	10,0	2,5	25,0
	Lying still	Count	10	14	1	25
		Expected Count	12,5	10,0	2,5	25,0
Total		Count	25	20	5	50
		Expected Count	25,0	20,0	5,0	50,0

Table 11: HE Contingency table change compassion

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6,000(a)	2	,050
Likelihood Ratio	6,226	2	,044
Linear-by-Linear Association	,178	1	,673
N of Valid Cases	50		

a 2 cells (33,3%) have expected count less than 5. The minimum expected count is 2,50.

Table 12: HE Chi-Square Tests compassion

		Value	Approx. Sig.
Nominal by Nominal	Phi	,346	,050
	Cramer's V	,346	,050
N of Valid Cases		50	

a Not assuming the null hypothesis.

b Using the asymptotic standard error assuming the null hypothesis.

Table 13: HE: Symmetric measures compassion

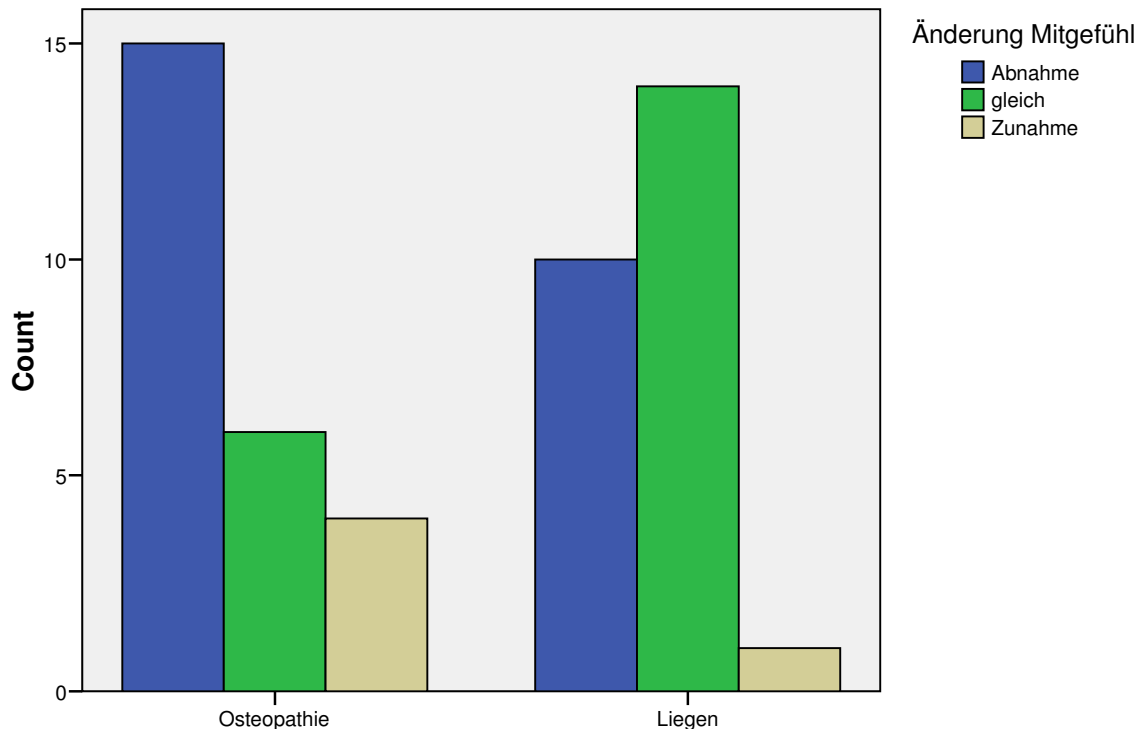


Fig. 5: HE: Bar diagram compassion

Using the Bonferroni-correction, for none of the items significant differences concerning the distribution of “decrease”, “no change” and ”increase” can be observed in either group. There are no significant, nevertheless tendential differences (p-value of the independence test 5% each) concerning the items “pride” and “compassion”. Not significantly, but at least tendentially group 1 shows more changes than group 2 concerning “pride” and “compassion”.

Thus hypothesis HE cannot be verified. The application “osteopathy” causes no higher improvement of the emotional intensity (increase of positive and decrease of negative items) than the application “lying still”.

The method of evaluation by means of contingency tables mentioned above looks at differences of the distribution to the three categories “better”, “worse” and “same”. In a second variant an average value comparison can be drawn. Therefore all values observed are used.

As far as the EMO-16-current questionnaire is concerned, two enquiries are conducted: one before and one after the respective application (osteopathy/lying still). After that the average values of the two groups are compared. However, differences observed after the treatment have to be interpreted in consideration of the differences observed before.

**Vorher**

		Group Statistics			
	Gruppe	N	Mean	Std. Deviation	Std. Error Mean
Abneigung	1	25	0,28	0,678	0,136
	2	25	0,52	0,918	0,184
Ärger	1	25	0,88	1,130	0,226
	2	25	1,28	1,514	0,303
Neid	1	25	0,08	0,400	0,080
	2	25	0,40	0,645	0,123
Langeweile	1	25	0,32	0,748	0,150
	2	25	0,72	1,100	0,220
Angst	1	25	1,20	1,443	0,288
	2	25	1,36	1,319	0,264
Unruhe	1	25	2,00	1,354	0,271
	2	25	2,20	1,384	0,277
Traurigkeit	1	25	1,20	1,190	0,238
	2	25	1,28	1,137	0,227
Sehnsucht	1	25	1,96	1,294	0,253
	2	25	1,72	1,487	0,297
Scham	1	25	0,32	0,557	0,111
	2	25	1,12	1,236	0,247
Schuldgefühl	1	25	1,00	1,258	0,252
	2	25	1,04	1,136	0,227
Freude	1	25	2,68	0,945	0,189
	2	25	2,96	0,935	0,187
Stolz	1	25	2,32	1,482	0,298
	2	25	2,00	1,225	0,245
Mitgefühl	1	25	2,52	1,503	0,301
	2	25	2,28	1,458	0,292
Zuneigung	1	25	2,64	1,440	0,288
	2	25	2,92	1,441	0,288
Sexuelle Erregung	1	25	0,48	0,918	0,184
	2	25	0,72	1,137	0,227
Überraschung	1	25	0,72	1,061	0,212
	2	25	1,48	1,262	0,252

Table14: HE: Average values before

**Nachher**

		Group Statistics			
	Gruppe	N	Mean	Std. Deviation	Std. Error Mean
Abneigung	1	25	0,16	0,624	0,125
	2	25	0,56	0,870	0,174
Ärger	1	25	0,36	0,638	0,128
	2	25	1,04	1,241	0,248
Neid	1	25	0,04	0,200	0,040
	2	25	0,44	0,712	0,142
Langeweile	1	25	0,16	0,374	0,075
	2	25	0,72	0,980	0,196
Angst	1	25	0,68	1,030	0,206
	2	25	1,04	1,274	0,255
Unruhe	1	25	1,04	1,098	0,220
	2	25	1,36	1,381	0,276
Traurigkeit	1	25	0,76	0,879	0,176
	2	25	0,84	0,943	0,189
Sehnsucht	1	25	1,20	1,298	0,252
	2	25	1,28	1,339	0,268
Scham	1	25	0,12	0,332	0,066
	2	25	0,76	1,091	0,218
Schuldgefühl	1	25	0,60	0,957	0,191
	2	25	0,64	0,810	0,162
Freude	1	25	2,72	1,021	0,204
	2	25	2,80	1,190	0,238
Stolz	1	25	2,04	1,513	0,303
	2	25	1,76	1,332	0,266
Mitgefühl	1	25	1,96	1,485	0,297
	2	25	1,68	1,482	0,298
Zuneigung	1	25	2,08	1,579	0,316
	2	25	2,60	1,443	0,289
Sexuelle Erregung	1	25	0,24	0,663	0,133
	2	25	0,60	0,913	0,183
Überraschung	1	25	0,48	0,653	0,131
	2	25	1,36	1,319	0,264

Table 15: HE: Average values after

Vorher		Variances		F test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Abneigung	Equal variances assumed	2,540	0,118	-1,051	48	0,298	-0,240
	Equal variances not assumed			-1,051	44,078	0,299	-0,240
Anger	Equal variances assumed	3,151	0,082	-1,089	48	0,295	-0,400
	Equal variances not assumed			-1,089	44,399	0,296	-0,400
Weid	Equal variances assumed	15,627	0,000	-2,107	48	0,040	-0,300
	Equal variances not assumed			-2,107	40,053	0,041	-0,300
Langeweile	Equal variances assumed	6,851	0,012	-1,503	48	0,139	-0,400
	Equal variances not assumed			-1,503	42,296	0,140	-0,400
Angst	Equal variances assumed	0,056	0,815	-0,409	48	0,684	-0,160
	Equal variances not assumed			-0,409	47,616	0,684	-0,160
Unruhe	Equal variances assumed	0,005	0,941	-0,516	48	0,608	-0,200
	Equal variances not assumed			-0,516	47,976	0,608	-0,200
Traurigkeit	Equal variances assumed	0,070	0,792	-0,243	48	0,809	-0,080
	Equal variances not assumed			-0,243	47,901	0,809	-0,080
Selbstscham	Equal variances assumed	1,910	0,173	-0,406	48	0,687	-0,160
	Equal variances not assumed			-0,406	47,100	0,687	-0,160
Scham	Equal variances assumed	29,902	0,000	-2,952	48	0,005	-0,800
	Equal variances not assumed			-2,952	33,351	0,006	-0,800
Schuldgefühle	Equal variances assumed	0,848	0,362	-0,118	48	0,907	-0,040
	Equal variances not assumed			-0,118	47,805	0,907	-0,040
Freude	Equal variances assumed	0,953	0,384	-1,053	48	0,297	-0,280
	Equal variances not assumed			-1,053	47,984	0,297	-0,280
Stolz	Equal variances assumed	1,708	0,198	0,829	48	0,411	0,300
	Equal variances not assumed			0,829	45,242	0,411	0,300
Mitleidigkeit	Equal variances assumed	0,003	0,959	0,573	48	0,569	0,240
	Equal variances not assumed			0,573	47,966	0,569	0,240
Zuneigung	Equal variances assumed	0,468	0,489	-0,687	48	0,495	-0,280
	Equal variances not assumed			-0,687	48,000	0,495	-0,280
Sexuelle Erregung	Equal variances assumed	1,759	0,191	-0,821	48	0,416	-0,240
	Equal variances not assumed			-0,821	45,951	0,416	-0,240
Überraschung	Equal variances assumed	2,051	0,168	-2,304	48	0,029	-0,760
	Equal variances not assumed			-2,304	46,627	0,030	-0,760

Table 16: HE: t-test before

Independent Samples Test									
Nachher	For Equality of Var.			F-Test for Equality of Means					
	Sig.	F	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Difference		
							Upper	Lower	
Abregung	0,005	-1,868	48	0,068	-0,400	0,214	-0,831	0,031	
		-1,868	43547	0,069	-0,400	0,214	-0,832	0,032	
Änger	0,021	-2,437	48	0,019	-0,680	0,279	-1,241	-0,119	
		-2,437	35849	0,020	-0,680	0,279	-1,245	-0,114	
Mied	0,000	-2,705	48	0,009	-0,400	0,148	-0,697	-0,103	
		-2,705	27766	0,012	-0,400	0,148	-0,703	-0,097	
Largeweile	0,001	-2,670	48	0,010	-0,560	0,210	-0,982	-0,138	
		-2,670	30854	0,012	-0,560	0,210	-0,988	-0,132	
Angst	0,443	-1,099	48	0,277	-0,360	0,328	-1,019	0,299	
		-1,099	45974	0,278	-0,360	0,328	-1,019	0,299	
Unruhe	0,558	-0,907	48	0,369	-0,320	0,353	-1,030	0,390	
		-0,907	45690	0,369	-0,320	0,353	-1,030	0,390	
Traurigkeit	0,948	-0,310	48	0,758	-0,080	0,298	-0,599	0,439	
		-0,310	47765	0,758	-0,080	0,298	-0,599	0,439	
Schmutz	0,748	-0,218	48	0,829	-0,080	0,368	-0,819	0,659	
		-0,218	47815	0,829	-0,080	0,368	-0,819	0,659	
Scham	0,000	-2,807	48	0,007	-0,640	0,238	-1,098	-0,182	
		-2,807	28399	0,009	-0,640	0,238	-1,107	-0,173	
Schuldgefühl	0,471	-0,159	48	0,874	-0,040	0,251	-0,544	0,464	
		-0,159	46724	0,874	-0,040	0,251	-0,545	0,465	
Freude	0,829	-0,255	48	0,800	-0,080	0,314	-0,711	0,551	
		-0,255	46919	0,800	-0,080	0,314	-0,711	0,551	
Stolz	0,886	0,885	48	0,491	0,280	0,403	-0,531	1,091	
		0,885	47236	0,491	0,280	0,403	-0,531	1,091	
Mitleid	0,501	0,855	48	0,509	0,280	0,421	-0,567	1,127	
		0,855	47999	0,509	0,280	0,421	-0,567	1,127	
Zurechnung	0,298	-1,215	48	0,230	-0,520	0,438	-1,380	0,340	
		-1,215	47618	0,230	-0,520	0,438	-1,380	0,340	
Sexuelle Bregung	0,012	-1,595	48	0,117	-0,360	0,235	-0,814	0,094	
		-1,595	43819	0,118	-0,360	0,235	-0,815	0,095	
Überraschung	0,000	-2,989	48	0,004	-0,880	0,294	-1,472	-0,288	
		-2,989	35103	0,005	-0,880	0,294	-1,478	-0,282	

Table17: HE: t-test after

Taking into consideration the Bonferroni correction, neither “before” nor “after” significant differences become apparent. For the Items anger and boredom no significant, nevertheless tendential differences become apparent after the respective treatment. The average value for “anger” decreases in both groups, however slightly more in group 1. For the Item “boredom” the value decreases only for group 1.

Concerning the items “envy”, “shame” and “surprise” there were significant differences already before the treatment. Values are significantly higher in group 2 before as well as after the treatment.

Thus HE cannot be verified in this variant form either. The application “osteopathy” does not cause a higher improvement of the emotional intensity (increase of positive and decrease of negative Items) than the application “lying still”.

HF: Group 1 and group 2 differ after the osteopathic treatment has taken place concerning the frequency of emotions after one week.

Group 1 and group 2 are compared concerning their results of the EMO-16-week questionnaire. Moreover a t-test for independent samples is conducted. In addition to that the Bonferroni correction mentioned above is applied.

Group Statistics					
	Gruppe	N	Mean	Std. Deviation	Std. Error Mean
Abneigung	1	25	0,72	0,737	0,147
	2	25	1,20	0,957	0,191
Ärger	1	25	1,56	0,917	0,183
	2	25	2,08	0,954	0,191
Neid	1	25	0,24	0,436	0,087
	2	25	0,68	0,802	0,160
Langeweile	1	25	0,40	0,577	0,115
	2	25	0,28	0,542	0,108
Angst	1	25	1,24	1,128	0,226
	2	25	0,88	0,781	0,156
Unruhe	1	25	1,72	1,021	0,204
	2	25	1,76	0,779	0,156
Traurigkeit	1	25	1,36	1,114	0,223
	2	25	1,32	0,748	0,150
Sehnsucht	1	25	1,84	0,987	0,197
	2	25	1,28	0,980	0,196
Scham	1	25	0,40	0,645	0,129
	2	25	0,52	0,653	0,131
Schuldgefühl	1	25	1,16	0,987	0,197
	2	25	0,92	0,862	0,172
Freude	1	25	2,56	0,651	0,130
	2	25	2,68	0,690	0,138
Stolz	1	25	2,00	0,866	0,173
	2	25	2,04	0,790	0,158
Mitgefühl	1	25	2,44	0,870	0,174
	2	25	2,08	0,954	0,191
Zuneigung	1	25	2,80	0,707	0,141
	2	25	2,80	0,913	0,183
Sexuelle Erregung	1	25	1,28	1,021	0,204
	2	25	1,36	0,860	0,172
Überraschung	1	25	1,28	0,843	0,169
	2	25	1,44	0,768	0,154

Table 18: HF: Average values EMO-16-week group 1 and 2

[top – down: disgust, anger, envy, boredom, anxiety, restlessness, sadness, yearning, shame, feeling of guilt, joy, pride, compassion, affection, sexual excitement, surprise]



		Independent Samples Test					t-test for Equality of Means			
		Levene's Test for Equality of Variances								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Upper	Lower
Abneigung	Equal variances assumed	1,845	0,181	-1,986	48	0,053	-0,480	0,242	-0,966	0,006
	Equal variances not assumed			-1,986	45,054	0,053	-0,480	0,242	-0,967	0,007
Arger	Equal variances assumed	0,191	0,664	-1,965	48	0,055	-0,520	0,265	-1,052	0,012
	Equal variances not assumed			-1,965	47,923	0,055	-0,520	0,265	-1,052	0,012
Neid	Equal variances assumed	16,870	0,000	-2,410	48	0,020	-0,440	0,183	-0,807	-0,073
	Equal variances not assumed			-2,410	37,039	0,021	-0,440	0,183	-0,810	-0,070
Langeweile	Equal variances assumed	1,132	0,293	0,758	48	0,452	0,120	0,158	-0,198	0,438
	Equal variances not assumed			0,758	47,805	0,452	0,120	0,158	-0,198	0,438
Angst	Equal variances assumed	3,814	0,057	1,312	48	0,198	0,360	0,274	-0,192	0,912
	Equal variances not assumed			1,312	42,703	0,197	0,360	0,274	-0,194	0,914
Unruhe	Equal variances assumed	1,104	0,299	-0,156	48	0,877	-0,040	0,257	-0,557	0,477
	Equal variances not assumed			-0,156	44,858	0,877	-0,040	0,257	-0,557	0,477
Traurigkeit	Equal variances assumed	3,327	0,053	0,149	48	0,882	0,040	0,268	-0,500	0,580
	Equal variances not assumed			0,149	42,005	0,882	0,040	0,268	-0,502	0,582
Sehnsucht	Equal variances assumed	0,247	0,622	2,014	48	0,050	0,560	0,278	0,001	1,119
	Equal variances not assumed			2,014	47,998	0,050	0,560	0,278	0,001	1,119
Scham	Equal variances assumed	0,203	0,654	-0,653	48	0,517	-0,120	0,184	-0,489	0,249
	Equal variances not assumed			-0,653	47,993	0,517	-0,120	0,184	-0,489	0,249
Schuldgefühl	Equal variances assumed	0,403	0,529	0,916	48	0,364	0,240	0,262	-0,287	0,767
	Equal variances not assumed			0,916	47,154	0,364	0,240	0,262	-0,287	0,767
Freude	Equal variances assumed	0,001	0,973	-0,632	48	0,530	-0,120	0,190	-0,501	0,261
	Equal variances not assumed			-0,632	47,832	0,530	-0,120	0,190	-0,502	0,262
Stolz	Equal variances assumed	0,017	0,897	-0,171	48	0,865	-0,040	0,234	-0,511	0,431
	Equal variances not assumed			-0,171	47,595	0,865	-0,040	0,234	-0,511	0,431
Mitgefühl	Equal variances assumed	0,216	0,644	1,394	48	0,170	0,360	0,258	-0,159	0,879
	Equal variances not assumed			1,394	47,597	0,170	0,360	0,258	-0,159	0,879
Zuneigung	Equal variances assumed	0,362	0,550	0,000	48	1,000	0,000	0,231	-0,464	0,464
	Equal variances not assumed			0,000	45,176	1,000	0,000	0,231	-0,465	0,465
Sexuelle Erregung	Equal variances assumed	1,001	0,322	-0,300	48	0,766	-0,080	0,267	-0,617	0,457
	Equal variances not assumed			-0,300	46,650	0,766	-0,080	0,267	-0,617	0,457
Überraschung	Equal variances assumed	0,284	0,597	-0,702	48	0,488	-0,160	0,228	-0,618	0,298
	Equal variances not assumed			-0,702	47,594	0,488	-0,160	0,228	-0,619	0,299

Table 19: HF: t-test

There are no significant differences between the two groups. Concerning the items envy and yearning there are no significant, nevertheless tendential ( $p < 0,05$ ) differences. On average “envy” is higher in group 2 than in group 1.

Thus hypothesis HF cannot be verified. Group 1 and group 2 do not differ after the osteopathic treatment concerning the frequency of emotions after one week.

## **7. Discussion**

The title of this study asks: “Does an osteopathic treatment have influence on emotions?” In order to answer this question I have developed and tested relevant hypotheses.

The results of the study at hand show that the osteopathic treatment has no bigger effect on emotions than only “lying still“.

It is, however, interesting that within the groups significant differences concerning the total value for negative feelings (“disgust”, “anger”, “envy”, “anxiety”, “restlessness”, “sadness”, “shame” and “feeling of guilt”) and concerning some emotions, after only “lying still” (“restlessness”, “sadness”) as well as after the osteopathic treatment (“anxiety”, “restlessness”) can be observed.

It is still to be discussed whether the results influenced by the respective applications (osteopathic treatment/lying still) can be interpreted in a meaningful way from a technical-contentual point of view.

### **7.1. Discussion of the individual results**

#### **7.1.1. About data basis: description of the sample**

Sex distribution is similar in both groups. However, the men in group 2 are on average older (50,43) than those in group 1 (42,38). Furthermore the completed year of ages deviates less in group 2. It cannot be excluded that in group 2 there are certain influences due to gender-specific, age-specific answering behavior. However, under controlled circumstances there were hardly any examinations conducted so far that could give information whether older persons emotionally react in a different way than younger ones (SCHMIDT-ATZERT, 1996). Due to the small number of cases stratification according to age and sex was impossible for this study. This shall be subject to other further investigations.

### **7.1.2. About data basis: emotion-estimation in EMO-16-current**

It is striking that the evaluation shows that in group 1 relatively many items are rated with 0 (cf. Fig. 2 and 3). This is the case for “disgust”, “envy”, “boredom”, “shame” and “excitement”. In group 2 the individual items were rated in a more differentiated way, except for “joy” before treatment.

The scale of the questionnaire is limited to values between 0 and 5. Thus no noteworthy distortions due to extreme single values can arise. The use of arithmetic average values for the evaluation of the EMO-16-current is admissible. A comparison of the distributions depicted in the Box-Plots is only possible in a restricted way, as emotion-estimation according to EMO-current is a discrete feature. Thus the distributions compared are clearly graded. Generally this form of chart is very useful to show those many distributions of the 16 emotions, smaller differences are, however, not that obvious. It would have been better if according to original instruction there had not been the values 0,1,2,3,... only but also values in between. In such a case it would have been possible to calculate the percentile of the Box-Plots more exactly.

To sum it up: concerning emotional intensity it has been shown that differences existed already before the treatment. Thus for all further observations a simple comparison of the two groups is not justified in any case.

### **7.1.3. About hypothesis HA**

Hypothesis HA was: “In group 1 the application osteopathy leads to changes in intensity concerning all emotions inquired”.

For all Items the average values of first and second EMO-current are tested. Thereby t-tests for dependent samples are conducted.

Resulting p-values are for the items “anxiety“ and “restlessness“ 0,000 each, for the item “anger“ 0,004, for “sadness“ 0,038 and for “compassion“ 0,045. This means that the osteopathically treated test persons in the study at hand, had, according to common

conventions, highly significantly lower values concerning the items “anxiety” and “restlessness” ( $p < 1\%$ ) and significantly lower values concerning the items “anger”, “sadness” and “compassion” ( $p < 5\%$ ).

As for this examination a multiple 16-fold test is conducted, it is possible to deviate from common conventions. By means of Bonferroni correction it is determined which level has to be assumed for the individual tests in order to be able to maintain a predefined level. If in total 5% should be maintained, every single t-test should maintain  $5/16\% = 0,00315$  (WEISS, 2008). This is a very strict correction. Thereby the level is significantly minimized and results are thus limited again. But by means of this correction I get even stronger hints to significant differences.

**After the Bonferroni correction results show even more significant results for “anxiety” and “restlessness” that reveal more than random lower ratings after the osteopathic treatment.**

The Items “anger”, “sadness” and “compassion” show, after the Bonferroni correction, no significant, nevertheless tendential values ( $p < 0,05$ ). They were all rated lower after the osteopathic treatment and thus indicate possible effects that could be meaningful.

The Items “anxiety”, “restlessness”, “anger” and “sadness” mentioned above a rather negative emotions. The only exception is “compassion”.

These results somehow contradict the examination of ENGEL (2006). In a study including 46 healthy patients he shows that cranial techniques lead to a change in the state of consciousness that is associated with a positive effect, mainly joy. He applies an experimental design with three groups. Experimental group 1 is treated by himself by means of a cranial technique. Group 2 is treated by a non-osteopath by means of a mock-technique; a fact which is not known to the test persons. Group 3 has to lie still with their eyes closed. It is, however, possible that the affect found in this study can be traced back to the investigator himself. Because ENGEL (2006) who treated experimental group 1, is known by all test persons. Thus a reaction out of favor cannot be excluded. Moreover a situative influence is possible. All test persons of the study are well-informed about the experimental procedure. Probably the joy-

effect can be traced back to the test persons' joy about being in the treatment group, i.e. about being treated instead of having to lie still.

In contrast to the investigation by ENGEL (2006) the test persons of the study at hand know that they will be treated in any case, even if only after the "lying still". Thus the aspect discussed above cannot apply. But probably the social context of a medical osteopathic examination and treatment influenced results in such a way that test persons rather focus negative aspects, such as their complaints in such a frame.

Strong hints for significant difference become apparent especially in the Items "anxiety" and "restlessness". It's still to be clarified why test persons react significantly in exactly these emotions.

According to IZARD (1981) in case of anxiety the core feeling fear correlates with sorrow, anger, shame, feeling of guilt or interest. These six emotions are regarded as variable components of a complex pattern. The relative meaning of these emotions within the anxiety-pattern changes with the individual and with his life situation. Probably the experimental design has evoked in connection with the individual test person and his corresponding life situation a corresponding pattern.

According to LAMMERS (2007) anxiety is the most frequent emotion that is central to psychic disorders of patients that are under psychotherapeutic treatment. In this study special emphasize was put on the fact that test persons are not in any emotional exceptional situation, in order to exclude a priori additional interactions or an additional influence on the progress of emotions. Thus the following exclusion criteria were chosen: diagnoses neuroses and psychoses, acute psychosocial crises, alcoholism, drug addiction (legal and illegal drugs), intake of psychotropic drugs. Thus it is so much more interesting that test persons reacted with significantly lower values particularly concerning the Item "anxiety". Probably the phenomenon anxiety is more wide spread than is generally assumed and is rather accounted within the frame of an osteopathic examination. However, this aspect requires further exclusion criteria.

Concerning restlessness there is no emotion-specific literature.

Different mechanisms that could have possibly influenced the results were discussed. Furthermore it is important to take into consideration the placebo effect that could possibly occur within the frame of an osteopathic treatment (RESCH, 2005) as test persons are osteopathically treated for this study as well.

The placebo effect was discussed in connection with many different therapeutic measures (BENSON and STARK, 1997; MOSELEY, O`MALLEY, PETERSEN, MENKE, BRODY, KUYKENDALL HOLLINGSWORTH, ASHTON and WRAY, 2002; WAGER, RILLING, SMITH, SOKOLIK, CASEY, DAVIDSON, KOSSLYN, ROSE and COHEN, 2004)), although it is not always possible to prove it ((HROBJARTSSON and GOTZSCHE, 2001, 2004). According to recent studies the placebo effect can be achieved either by means of expectation or by means of conditioning, the learning effect (KLINGER, SOOST, FLOR and WORM, 2007). In addition to that the placebo has furthermore a gender-specific component. Women react to their environment by using their wealth of experience while men are rather influenced by suggestive information (ENCK, BENEDETTI, SCHEDLOWSKI 2008).

Concerning osteopathy only UPLEDGER (2000) and BARRAL (2004) specifically comment on the Item “anxiety”; nobody comments on “restlessness”.

Within the framework of his concept of somato-emotional release Upledger (2000) describes a specific, therapy relevant, connection between fear and the organ heart. However this only relies on the observation of patients and is not scientifically proved.

According to BARRAL (2004, 2006) there is a connection between cardiac plexus, gall bladder, right and left kidney and the feeling of anxiety (fear). But he, too, bases his statements only on clinical observations and experiences. Scientific proof in terms of corresponding studies is missing.

On the whole in the study at hand there are indications for significant differences in the emotions anxiety and restlessness. This observation demands further exclusion criteria.

#### 7.1.4. About hypothesis HB

Hypothesis HB said: “In group 2 the application lying still leads to changes concerning all emotions inquired”.

For all items the corresponding average values of the first and second EMO-current are tested. Therefore t-tests for dependent samples are conducted.

The resulting p-values are 0,002 for the items “restlessness” and “sadness”, 0,046 for the item “yearning”, 0,022 for the item “feeling of guilt” and 0,005 for the item “compassion”. This means that the test persons of this study who were lying still had, according to common conventions, highly significant values concerning the items “restlessness”, “sadness” and “compassion” ( $p < 1\%$ ) and significant values concerning the items “yearning” and “feeling of guilt” ( $p < 5\%$ ).

As for this study a multiple 16-fold test was conducted, it is possible to deviate from common conventions. By means of the Bonferroni correction it is determined which level has to be assumed for the individual tests in order to be able to maintain a predefined level. If in total 5% should be maintained, every single t-test should maintain  $5/16\% = 0,00315$  (WEISS, 2008). This is a very strict correction. Thereby the level is significantly minimized and results are thus limited again. But by means of this correction I get even stronger hints to significant differences.

**After the Bonferroni correction was applied results show significant differences concerning the items “restlessness” and “sadness”, no significant but nevertheless tendentially lower values concerning the items “yearning”, “feeling of guilt” and “compassion”.**

Similar to the results of hypothesis HA, here again rather negative emotions are observed, except for “compassion”.

The test persons of group 2 have to lie still for 15 minutes at first. They know, however, that they will be osteopathically treated afterwards. Thus the “joy-effect” observed in the study of ENGEL (2006, cf. 7.1.3.) does not play any role in the study at hand.

Again, probably the frame of the medical osteopathic examination influenced test persons in such a way that they rather focused on the negative aspects (cf. 7.1.3.).

Also after only lying, the value of the item “restlessness” decreases in a similar way as it was the case after the osteopathic treatment. This could mean that the influence of the osteopathic treatment on the emotion “restlessness” could be traced back to a certain lying- or relaxing effect (cf. 7.1.3.). Concerning the expense factor, mere lying is certainly the cheaper form of treatment in order to work with this particular emotion.

It is still to be considered why the emotion of “sadness” decreases in the group of those lying still.

According to IZARD (1981) sadness, which he regards as being synonymous to sorrow, is an extremely important fundamental emotion. According to him one cause is real or imagined failure concerning meeting one’s own or others’ requirements.

LAMMERS (2007) regards sadness as one of the human basic emotions that signals a loss which has already been experienced or which is to come up. The visible signs of sadness are signals to the environment that shall lead to stronger affection or support for the sad person.

Taking these aspects into consideration it is imaginable that the test persons of group 2 were in some degree sadder before the investigation because they were not immediately treated. After they were lying this emotion was possibly relativized because the treatment took place immediately afterwards.

To sum it up: the results of the hypothesis HB could be explained from the context.

It is interesting that the item “compassion” tendentially decreases in those test persons treated as well as in those that were lying. As it was the case in the study of ENGEL (2006) most test



persons knew the investigator beforehand. Thus a reaction out of favor, connected with strong compassion at the beginning of the investigation cannot be excluded.

#### **7.1.5. About hypothesis HC**

As mentioned in chapter 6, the item values for “disgust”, “anger”, “envy”, “anxiety”, “restlessness”, “sadness”, “shame” and “feeling of guilt” can be comprised to a total value for “negative condition” by means of totaling (SCHMIDT-ATZERT and HÜPPE, 1996; SCHMIDT-ATZERT 1997).

Hypothesis HC said: In group 1 the application of osteopathy leads to changes in intensity concerning negative emotions.

**With a significant p-value of 0,000 this hypothesis can be verified.**

The osteopathic treatment caused a change in intensity concerning negative emotions in the test persons of the study at hand.

However, this result has to be viewed in connection with the results of the hypothesis HD and thereby is clearly attenuated. Because also in the case of those patients that were lying the negative feelings is significantly lower on average (cf. 6.2.). However, in group 2 the p-value (0,004) is slightly higher and thus the difference is slightly less clear in comparison to the corresponding values of group 1. However, taking into consideration the small number of test persons, this aspect should not be over-estimated. Furthermore on average the negative feeling of group 2 was already stronger before the treatment than of group 1.

As a conclusion one can say that according to these results there is a clear association between an osteopathic treatment and negative factors. However, this requires further exclusion criteria.

### **7.1.6. About hypothesis HD**

Hypothesis HD says: “In group 2 the application “lying still” causes changes in intensity concerning negative emotions”.

**This hypothesis can be verified with a significant p-value of 0,004.**

The application “lying still” causes in the study at hand changes concerning the intensity of negative emotions in the test persons.

However, in group 2 the p-value is slightly higher and the difference is slightly less clear in comparison to those test persons that were treated osteopathically (cf. 6.2.). Taking into consideration the small number of test persons in this study this aspect shall not be over-estimated. Furthermore on average the negative feeling in group 2 was already stronger before the treatment than in group 1.

### **7.1.7. About hypothesis HE**

Hypothesis HE said: “The application “osteopathy” leads to a higher improvement of the emotional intensity (increase of positive and decrease of negative emotions) than the application “lying still”. Although it is not guaranteed that group 1 and group 2 are comparable, a difference concerning a possible treatment effect is tested. First of all only the relative changes are observed in the form of “decrease”, “no change” and “increase”. This variable calculated for each Item is compared between group 1 and group 2. Comparison is drawn by means of contingency tables and corresponding independent tests. Thereby a p-value of 0,051 for “pride” and a p-value of 0,05 for “compassion”, which are according to common conventions significant values, become apparent. But here again we deal with multiple testing. If one considered an approximating correction according to Bonferroni, no significant differences concerning “decrease”, “no change” and “increase” would become apparent. No significant but nevertheless tendential differences for the Items “pride” and “compassion” arise. Thereby group 1 shows tendentially more changes than group 2.

The method of evaluation by means of contingency tables mentioned above looks at differences of the distribution to the three categories “better”, “worse” and “same”. In a second variant an average value comparison can be drawn. Therefore all values observed are used.

As far as the EMO-16-current questionnaire is concerned, two enquiries are conducted: one before and one after the respective application (osteopathy/lying still). After that the average values of the two groups are compared. However, differences observed after the treatment have to be interpreted in consideration of the differences observed before.

Average value comparisons result in a p-value of 0,019 for the item anger and a p-value of 0,010 for the item boredom. According to common conventions these are significant values. According to the Bonferroni correction applied because of multiple testing the items “anger” and “boredom” show, after the respective application (osteopathy/lying still) no significant but still tendential differences. Thereby “anger” decreases in both groups, however, in group 1 slightly more. In the case of “boredom” only the value of group 1 decreases.

In case of envy, shame and surprise there were significant differences already before the treatment. Thus the differences observed “after” cannot be traced back to the different applications (osteopathy/lying still). Concerning anger and boredom the difference is only significant after the treatment and after the Bonferroni correction not significant, but tendential, respectively.

In general for emotion research the initial state is important. If two collectives differ already from the beginning, as it is partly the case in this study, changes compared to the initial state are hard to interpret, too (SCHMIDT-ATZERT, 1996).

Because they are not significant but only tendential after the Bonferroni correction, the results concerning “pride”, “compassion”, “anger” and “boredom” can only be interpreted carefully to the effect that there are indications for possible effects of an osteopathic treatment on these particular emotions.

### **7.1.8. About hypothesis HF**

Hypothesis HF said: “Group 1 and group 2 differ concerning the frequency of the emotions after one week”. This hypothesis cannot be verified. After the Bonferroni correction was applied, group 1 and group 2 do not differ concerning the frequency of the emotions after one week after the osteopathic treatment.

Concerning the evaluation one has to remark positively that there are not fundamental differences between the two groups. However, one has to take into consideration that certain differences concerning emotional intensity became apparent already before the treatment.

Further interpretations are not useful as it was not inquired which experiences that could probably influence results the individual test persons had.

## **7.2. General discussion of results**

Taking into consideration the strict conditions of the multiple average comparisons, this study reveals comparatively few significant results concerning the hypotheses presented in chapter 7.1. It is useful from a technical point of view to include, besides statistic considerations, results from emotion research in the discussion of these observations.

The missing associations between osteopathy and emotions can be probably traced back to the small case number of 50 test persons. It is for this same reason, too, that no further stratification according to age and sex was possible in this study.

However, this study was conducted within the framework of a masters program. Due to the limited time frame from a pragmatic perspective a survey sample size of 50 seemed useful in order to be able to conduct an experimental clinical study within the given frame of time. This had nothing to do with scientific evidence.

In the neurobiological approach of osteopathy and emotions there are two approaches: a peripheral and a central approach. Representatives following the peripheral approach proceed

from the assumption that individuals and their nervous system can be influenced from periphery. The central treatment approach proceeds from the assumption that changes of the nervous system can only happen if patients actively and cognitively contribute to the treatment. An action is regarded as a natural centrifugal process, which starts centrally and reaches periphery as motor behavior (cf. 2.2.4).

The peripheral approach proceeds from dysfunctions in the periphery. By means of corresponding osteopathic treatment of these, eventually autonomous centers shall be controlled via neurophysiological succession processes (KORR, 1948; SAMMUT and SEARLE-BARNES, 2000; LIEM, 2002; BARRAL, 2003; BARRAL and CROIBIER (2003); BARRAL, WETZLER and CROIBIER, 2006; PARSONS, 2006). However this view is disputed (LEDERMANN, 2008; cf. also 2.2.4.) and there are no scientific neurobiological proofs.

The results of this study cannot support the view of the peripheral osteopathic approach. Although in group 1 all dysfunctions found in diagnosis were treated correspondingly from periphery, the few significant results do not necessarily speak for a treatment effect by means of osteopathy.

A further questionable aspect is if and how the verbal accounts differ from what the test person knows about his feelings. Feelings, such as positive feelings as joy are often not revealed. Obviously that depends on whether the feeling is appropriate in the respective situation. Furthermore it is decisive to whom these feelings refer to. Further influencing factors are the person of the interlocutor and possible consequences such an account of his feelings may have from the perspective of the test person (SCHMIDT-ATZERT, 1993).

Probably the results of this study base on an only indirect enquiry of feelings because the verbal expression of feelings was controlled too much by various factors in the situation given (consulting room). TRAUE and DEIGHTON (2003, 2004) have dealt intensively with emotional inhibition as a complex event. According to them the control of emotions shall not be reduced to psychological and biological aspects, but has to be viewed within a social context that consist of historical, political and social circumstances.

The central treatment approach proceeds from the assumption that changes of the nervous system can only happen if the patient actively and cognitively contributes to the treatment. An action is regarded as a natural process that starts centrally and reaches periphery as motor behavior. One important follower of this approach is LEDERMANN (2008; cf. also 2.2.4.).

Research results have shown, according to LEDERMANN (2000, 2008), that the nervous system cannot be regulated by peripheral events. According to his assumptions the patient has to be included actively and cognitively into the treatment process, in order that therapeutic changes can arise. Thus he challenges the concept of the somatic dysfunction.

RICHTER and DAHME (1981) claim that at the choice of the experimental situation of an investigation the aspect of action shall not be ignored or neglected. During the stress situation the test person shall be active and try to manage demands resulting from the current situation.

Now, what can be concluded from these considerations by LEDERMANN (2008) and RICHTER and DAHME (1981)? Although LEDERMANN (2008) refers in his considerations only to bringing about therapeutic changes, his basic thought, that says that it is only possible to bring about changes in a patient if he actively and cognitively is included into the process, corresponds to the considerations of RICHTER and DAHME (1981). One reason for the relatively few significant results in the study at hand could thus be found in the situative request-character of the investigation. From the test persons only a passive experiencing of feelings and their passive expressions, but no behavioral reaction to the osteopathic treatment was expected. The test persons were not actively and cognitively included into the treatment process.

Concerning the interpretation one certainly also has to bear in mind the Hawthorne-effect, well-known and described in psychology. The Hawthorne-Effect is an unspecific reactivity, which occurs when the behavior of test persons is influenced only by their participation. Researchers assign the Hawthorne-effect to the fact that investigators dedicate more attention to patients that take part in the studies (BENSON, 1996).

According to SCHMIDT-ATZERT (in print) there are five preconditions in order that persons can make valid statements about their emotional state: the ability for perception of the

emotional condition, language skill, retentiveness, readiness for disclosure and reactivity of the measurement.

According to him first of all the inquired person has to be able to perceive his emotional condition.

Concerning the evaluation it is striking that in group 1 relatively many items are exclusively rated with 0 (cf. Fig. 2 and 3). This is the case of “disgust”, “envy”, “boredom”, “shame” and “excitement”. In group 2 the individual items are evaluated in a more differentiated way, except for joy.

The concept of alexithymy claims that some people are not able to perceive and verbalize their own feelings. This concept comes from psychoanalytically oriented research.

GERHARDS (1988) critically deals with the alexithymy concept.

Probably these facts play a role concerning the behavior of the test persons of group 1.

Added to that, a comparison of the distribution in the graphic depiction is possible only in a limited way, as the emotion-estimation in EMO-16-current is a discrete feature. Thus the distributions compared are clearly graded. Generally this form of chart is very useful to show those many distributions of the 16 emotions, smaller differences are, however, not that obvious. It would have been better if according to original instruction there had not been the values 0,1,2,3,... only but also values in between. In such a case it would have been possible to calculate the percentile of the Box-Plots more exactly.

The gender distribution is similar in both groups. This supports the statements of SCHMIDT-ATZERT (1996). According to him one always has to expect gender-specific differences in emotion-psychological investigations, which are, however, usually not that big. However, the gender-specific age distribution differs. The men in group 2 are on average older than those in group 1. Furthermore the completed year of ages deviates less in group 2. It cannot be excluded that in group 2 there are certain influences due to gender-specific, age-specific answering behavior. However, under controlled circumstances there were hardly any examinations conducted so far that could give information whether older persons emotionally react in a different way than younger ones (SCHMIDT-ATZERT, 1996). Due to the small

number of cases stratification according to age and sex was impossible for this study. This shall be subject to other further investigations.

Emotions cannot only be traced back to external events, but also depend on the current condition and temporally outlasting characteristics of the individual persons (SCHMIDT-ATZERT, 1996). But neither the experiences that the individual test persons of the single groups had before nor their personality traits were controlled. Probably these factors influenced the decisions of the individual test persons, too.

Furthermore emotions can be regarded as a process that can initiate, regulate or even interrupt certain behavior of individuals (TRAUE and KESSLER, 2004, 2004). It is imaginable that such interactions have taken place and have influenced the individual test persons.

Added to that two phenomena known from psychology have to be considered in emotional research, which are floor and ceiling effect. Ceiling effect means that the test person is already in an extreme emotional state and can hardly be influenced by further stimuli anymore. Floor effect means that measurements for changing, e.g. negative emotions, if a test person is in an emotion-neutral state.

However, for research the initial state is important. If two collectives differ already from the start, which is the case in this study, changes compared to the initial states are hard to interpret.

To sum it up: bearing in mind the considerations presented above it has to be proceeded from the assumption that probably test persons of this study were not always able to perceive their emotional state.

The second precondition SCHMIDT-ATZERT (in print) mentions as being crucial for stating one's emotional condition is language skill. When describing their emotional state, test persons have to be able to distinguish between numerous emotional terms. The investigator asked for comprehension before every enquiry. On the whole the experimental process seemed clear and the questionnaires were filled in rapidly.

Thus one can assume that the precondition of language skill was fulfilled in this study.



The third precondition for a valid statement concerning emotional condition is retentiveness. The current emotional condition was measured immediately before and after the application (osteopathy/lying still). Thus at least concerning the EMO-16-current no information could get lost due to reasons of retentiveness. However, the situation is quite different if it comes to the EMO-16-week questionnaire. Due to the daily routine it is quite imaginable that one or the other test persons forgets some information about his emotions over the course of one week.

This means that the third condition, retentiveness, is probably fulfilled only partly.

The fourth precondition is readiness for disclosure. Although many people have a clear idea of their emotional condition, some of them may have a reason not to talk about them. Reasons therefore maybe found in the person's traits or in the situation itself (1993, in print). Thus it is very important whether a certain feeling seems appropriate in the situation given or not (JOHNSON, 1987, SCHMIDT-ATZERT, 1993). It is striking in this investigation that significant and tendential results are mainly of negative nature. One reason may be the frame of the medical osteopathic examination and treatment, in which test persons rather focus on their negative complaints.

This means that the fourth precondition is probably fulfilled only partly: it is possible that the readiness for disclosure was not fully given.

The fifth precondition is the reactivity of measurement. The emotional condition can be influenced by means of the measurement process. Thus it could be influenced negatively because of the multiple editing of the questionnaire. Also an intensification or selective focus of self-observation is possible. For this reason the questionnaire was specifically used only before and after the application (osteopathy/lying still) as well as after one week.

Thus the fifth condition for a valid statement concerning emotional condition could be fulfilled.

Now, what can be concluded from these considerations of valid precondition for valid statements concerning emotional condition? Although the investigator had emphasized on

fulfilling all conditions in the experimental design, in practice it become apparent that this was not always possible as was mentioned in the discussion above.

For the conceptual classification of the results at hand several different emotion theories have to be consulted as well (cf. also 2.1.4.).

The different emotion theories try to clarify the question how emotions arise. In a simplified way the different emotion theories may be divided in two groups.

The first group tries to trace back emotions to other variables. This group includes the theory of expression, the neurobiological emotion theory and the psychoanalytical emotion theory (cf. also 2.1.4.).

The other group tries to trace back one partial component of emotions (see also 2.1.1.), e.g. experience (feelings) to other components such as, e.g. expression or bodily changes. This is the view of activation theory (cf. 2.1.4.).

Besides there are also mixed explanatory approaches, which say that one partial component of emotion, e.g. bodily changes in combination with another variable, such as e.g. cognition can lead to another partial component, e.g. the component of experience (feeling). This approach is found in the cognition-activations theory as well as in the system theory of emotions (cf. 2.1.4.)

In alignment with this theory is also the integrative synoptic concept of emotions of TRAUE (1989). According to TRAUE (1989) emotions are helpful for the individual-environment-adaption. Emotions have developed in the evolutionary development of the human nervous system and their social form of life. Evolutionarily more recent structures have layered older structures but they do not nullify their function but make it controllable. Also in accordance with their individual development emotions are connected with the social form of life of human beings. Furthermore the whole nervous system as well as the neurotransmitter-system is important for emotional processes. Sensory apparatus, subcortical areas and neocortex contribute to emotions in an integrative way. Emotions are regarded as a process, which can trigger off, regulate but also interrupt other behavior. Emotions of low intensity are connected rather specifically with central and motor activity and unspecifically with autonomous

activity. Thereby central regulations are more crucial than peripheral feedback. In case of very intense emotions on the other hand autonomous and vital functions play a more important role and dominate over cognitive processes. After emotional processes were triggered by external and internal stimuli, cortical mechanisms set in via evaluation stimulus control as well as control of expression and behavior. On their part, these control mechanisms can be triggered by primary emotions. The quality of experience of emotions has different causes for every individual. Important are central nervous and autonomous activation and the feedback of afferent information from mimic musculature are important thereby.

In the study at hand on the whole only a few significant results become apparent. Some striking items can be explained application-specifically (osteopathy/lying still); others context-specifically.

In addition to that I interpret the results of this study in alignment with the integrative concept of TRAUE (1989), which means in alignment with an individual-environment-adaption. Applied to this study this means that here as well the function of emotion consists in a continuous situation-adaption. Thereby intrapsychic coping mechanisms play an important role. Furthermore I take into consideration the ideas of SCHMIDT-ATZERT (1996). According to him emotions cannot only be traced back to external events but also depend on the current state and time-independent traits of a person.

These considerations support the viewpoint of the central treatment approach of the manual therapy according to LEDERMANN (2008, cf. also 2.2.4.). According to him an action is always a centrifugal process that primarily starts centrally and only later reaches periphery as a consequence.

### **7.3. Concluding evaluation of the results**

The results of the study at hand do not deliver any assured facts concerning the influence of an osteopathic treatment on emotions.

Results show that there is not treatment effect of an osteopathic treatment on emotions in comparison to only “lying”.

However, it is interesting that within the groups significant differences concerning a total value for negative feelings (“disgust”, “anger”, “envy”, “anxiety”, “restlessness”, “sadness”, “shame” and “feeling of guilt”) and concerning certain emotions after “lying still” (restlessness, sadness) as well as after the osteopathic treatment (anxiety, restlessness) can be observed.

Several different explanatory approaches were made in order to understand the results found in this investigation.

Finally it has to be stated that the fact that there are only few significant results emerging from this study does not mean that there is no influence of an osteopathic treatment on emotions. Results have to be viewed rather in the context of the complexity of osteopathic and emotional processes combined with neurobiological aspects of behavior and experience. However, the detailed mechanisms of action between osteopathy and emotions have not been clarified so far and require further examinations.

## **8. Clinical relevance**

### **8.1. (Public) Clinical relevance for the patients**

Emotion research is clinically relevant for patients insofar as it contributes to the fact that they can be informed much better by therapists about possible reactions to the osteopathic treatment. This creates stronger mutual trust between patient and therapist.

It is well-known that emotional feelings play an important role concerning the susceptibility for illness as well as recovery. According to GOLEMANN (2005) negative feelings of a certain intensity and duration can increase the bodily susceptibility for illness, enhance already existing symptoms and prevent healing. Positive feelings have a health-promoting effect.

The osteopath shall try to understand the patients' stories without becoming involved too much with the emotions of the patient. This would be the task of psychologists, psychiatrists and psychotherapists. Thereby the osteopath is able to respond optimally to patients and their specific needs by means of the osteopathic treatment.

Proceeding from the results of this study at hand concerning "anxiety" and "restlessness" and the "total value for negative feelings" of the asymptomatic test persons of this study, it seems justified pondering whether there could be an influence of an osteopathic treatment on patients with symptomatic, which means psychic and emotional, disorders, too. However, this aspect requires further examinations.

### **8.2. Clinical relevance for osteopathy**

This study is a contribution to the discussion about osteopathy and emotions. The theories and statements of well-known osteopaths and previous research results in the field of osteopathy and emotions were discussed critically as a basis for further examinations.

According to SCHMIDT-ATZERT (1996) the implementation perspectives of emotion research can be found in the diagnostic and prognostic relevance of emotions as well as in the relevance of emotions for intervention measures.

These implementations can also be transferred to emotion research in osteopathy.

Osteopathy regards human beings as threefoldly differentiated units, consisting of body, mind and spirit. Health means a harmonic interaction of all these factors (STILL, 2005). In osteopathy the wholeness of a human being is viewed concerning his somato-visceral-psychic unity and mode of action. All parts of the physical body as well as mind and spirit with their emotions are connected with each other and interrelate (LIEM, 2001).

Knowledge of emotional experience and behavior of the patients can thus contribute in osteopathy to more precise diagnosing in some respects and thus to working more effectively than working without such a knowledge. Therefore adequate further training measurements seem to be useful.

Furthermore emotions are useful for prognosis in osteopathy, if they precede other behavior patterns or somatic diseases. By means of research such connections can be described precisely and explanatory models can be developed and tested.

Moreover emotions can be relevant in osteopathy for certain intervention measures. Probably via the modification of emotions it could become possible to make certain recommendations concerning health-conscious behavior or to improve the acceptance of therapeutic measures.

My criticism of already existing findings regarding emotional discourse within osteopathy does not refer to its quality but to its interpretation. It is necessary to develop a better neurophysiological understanding of emotions within osteopathy and, moreover, to integrate psychological approaches into osteopathy.

Emotion research in osteopathy shall not be conducted only for the sake of research. Due to its clinical relevance such research is certainly justified.

## **9. Comment on certain problems of this study**

This study includes only a small number of test persons. This is why stratification according to age and sex was not possible.

This study was conducted within a masters program. It was placed emphasis on including an extensive social stratum of middle age; people who are in family- and professional life and are under no exceptional emotional strain. Due to the limited time frame a survey sample size of 50 test persons seemed useful from a pragmatic perspective, in order to be able to conduct an experimental clinical investigation within the given frame of time. This had nothing to do with scientific evidence.

To conduct a study with the same experimental design but a bigger case number would be useful in order to back the results of the study at hand.

A further problem of this study is a probably metrologically determined spreading effect of the bodily symptoms of the test persons. The study at hand systematically inquires emotional experience concerning the whole range of human emotional experience within the framework of an osteopathic study for the first time. As I have mainly focused on emotions first of all I have refrained from a classification according to mere physical aspects. All patterns of physical complaints are admitted. It was far more important that none of the test persons is in an emotional exceptional situation in order to exclude a priori additional interactions or an additional influence on the process of emotions. However, for the cause mentioned above after all it would have been probably useful to make a further grouping according to bodily aspects.

Furthermore the motivation for participation has to be discussed. All test persons were treated osteopathically after their participation. Thus the question about their real reason for participation – materialistic reason or interest in the experiment – cannot definitely be answered. Furthermore a lack of concentration or a possible change of attitude during the experiment could also have influenced the results.

A further problem of this study is that the scale of the EMO-16-current questionnaire is limited to values from 0 to 5. A comparison of the distributions depicted in the Box-Plots is only possible in a restricted way, as emotion-estimation according to EMO-current is a discrete feature. Thus the distributions compared are clearly graded. Generally this form of chart is very useful to show those many distributions of the 16 emotions, smaller differences are, however, not that obvious. It would have been better if according to original instruction there had not been the values 0,1,2,3,... only but also values in between. In such a case it would have been possible to calculate the percentile of the Box-Plots more exactly.

The emotional reactions of the test persons were probably influenced by the fact that the investigating osteopath and the person who invited the test persons was one and the same person and was known to all test persons. Thus a reaction out of favor cannot be excluded. The results concerning the emotion “compassion” in hypothesis HA, HB and HE support these considerations. In his study ENGEL (2006) discussed this aspect as well.

In order to reach profound insights, the results of studies have to be comparable. This is a general problem of studies that investigate emotional processes. Emotions are not easily measurable and they cannot be evoked in a reliable and reproducible way. Added to that, there are the aspects of subjective experience and a cognitively evaluating component. These aspects are responsible for the fact that emotions are phenomena that are hard to be compared inter-individually.

However, due to the problems discussed above, it would be interesting to let my hypotheses be tested under the consideration of the bodily complaints by osteopaths that are not identical with the inviting person within the framework of a long-term study.



## **10. Research outlook**

Osteopaths describe a connection between osteopathy and emotions. Thereby they refer to their observations made in clinical practice, to observations made by other colleagues, to philosophical approaches, to anatomic facts and to publications in osteopathic technical literature. However, there are only few studies that were conducted within a scientific framework. This is why there is an urgent need for further research concerning the field of osteopathy and emotions in osteopathy.

Thus systematic studies in the field of osteopathy and emotions would be useful and make sense. However, the time and costs needed for such studies cannot be carried by one single person, but only by university work groups.

Insights concerning emotional psychosocial components of an osteopathic treatment could be useful to better plan and interpret further studies.

The collaboration between osteopaths, psychologists, psychiatrists and psychosomatists should be expanded, especially with regard to the field of emotion research. The development of an interdisciplinary research group at a university level would be desirable. It can be expected that such collaboration would be of mutual interest for theory as well as for practice.

## 11. Summary

The study at hand shall prove whether an osteopathic treatment has a measurable influence on emotions.

After a short overview of the current standard of knowledge concerning definition and the function of emotions, under particular consideration of the view of emotion in an osteopathic framework, certain important physiological concepts concerning the topic of emotions and osteopathy are discussed.

The theoretical starting point of this paper are the statements of well-known osteopaths about a connection between osteopathy and emotion. Therefore these osteopaths mainly rely on their own clinical observations (BARRAL and CROIBIER, 2003; BARRAL, 2004, 2006; BECKER, 2007; CHICKLEY, 2001; FULFORD, 2005; UPLEDGER, 2000), on the observations of other colleagues (COMEAX, 2002; HINKELTHEIN and ZALPOUR, 2006; LIEM, 2001, 2003; PARSONS, 2006; TEMPELHOF, 2001), on a philosophical approach (MC GOVERN, 2003, 2006), on anatomic facts (FULFORD, 2005; HINKELTHEIN and ZALPOUR, 2006; MC GOVERN, 2003; PARSONS, 2006, TEMPELHOF, 2001), on publications in osteopathic literature (HINKELTHEIN and ZALPOUR, 2006; LIEM, 2003; PARSONS, 2006; TEMPELHOF, 2001) and on clinical research (ENGEL, 2006; LINNENBANK 1999).

Based on these insights, first of all the hypotheses are deduced which state that test persons that are osteopathically treated differ concerning emotions from other test persons that were not treated but only have to lie still and that possible changes can be traced back to the osteopathic treatment.

Furthermore it is assumed that an emotion is a qualitatively describable state that is accompanied by changes on one or more of the levels experience (feelings), bodily change and expression and thus is a hypothetic construct. By means of the assumption of the three emotional components, measurements can be reasoned that refer to something observable. Supported by research results which state that the components covary only weakly, in the case

of the occurrence of emotions not all components have to change. Consequently the classical approach for their operationalization consists in capturing one or more components (SCHMIDT-ATZERT, 1996). In this study exclusively one component of emotion, namely the component of emotional experience (feelings) is inquired.

As far as methodology is concerned, the investigation is based on the questionnaire emotional scales EMO-16-current developed by SCHMIDT-ATZERT and HÜPPE (1996). This questionnaire inquires exclusively the component of current emotional experience, divided into 16 emotional qualities.

One group is immediately treated osteopathically; a second group of test persons, to which a later osteopathic treatment is promised as well, first of all lies still with their eyes closed on an examination couch for 15 minutes. The EMO-16-current questionnaire serves as parameter for the current emotional state before and after the treatment and before and after lying still, respectively.

Concerning this osteopathic investigation, the EMO-16-current is an adequate economic method for a fast and profound self-description of current feelings.

Results of this investigation show that there is not treatment effect of an osteopathic treatment on emotions in comparison to only “lying still”.

However, it is interesting that within the groups significant differences concerning a total value for negative feelings (“disgust”, “anger”, “envy”, “anxiety”, “restlessness”, “sadness”, “shame” and “feeling of guilt”) and concerning certain emotions after “lying still” (restlessness, sadness) as well as after the osteopathic treatment (anxiety, restlessness) can be observed.

Results are discussed within the framework of the complexity of emotional processes under the consideration of neurophysiological behavior and experience aspects and interpreted as individual-environment-adaption (TRAUE, 1989).

The results of this study show that within the frame of an osteopathic investigation concerning the field of emotions also the situative aspect has to be considered, too, because emotional

reactions of the osteopathically treated test persons also depend on the naturalness of the environment as well as on the test persons' attitude towards the conditions of such stressful situations.

## 12. Bibliography

- AX, A.F. (1964): Goals and methods of psychophysiology. *Psychophysiol.*, 1, 8 – 25.
- BARDESSON, P. (1934): On emotional expression after decortication with some remarks on certain theoretical views. *Psychological Review*, 41, 424 – 449-
- BARRAL, J.P. und CROIBIER, A. (2003): *Trauma – Ein Osteopathischer Ansatz -*. Kötzing: Verlag für Ganzheitliche Medizin.
- BARRAL, J.P. (2004): *Manuelle Thermodiagnose*, 1. Auflage, München: Urban & Fischer.
- BARRAL, J.P. (2006): *Die Botschaften unseres Körpers*. München: Südwest Verlag.
- BECKER, R. (2007): *Leben in Bewegung & Stille des Lebens*. Pähl: Jolandos.
- BENSON, H. und STARK, M. (1996): *Timeless healing: the power and biology of belief*, New York, Scribner.
- BIRBAUMER, N. (1973): *Neurophysiologie der Angst*. München: Urban & Schwarzenberg.
- BIRBAUMER, N. (1975): *Physiologische Psychologie*. Berlin – Heidelberg: Springer Verlag.
- BIRBAUMER, N. und SCHMIDT, R.F. (2003): *Biologische Psychologie*, 5. Auflage, Berlin: Springer-Verlag.
- CANNON, W.B. (1927): The James – Lange Theory of emotions: a critical examination and an alternative theory. *American Journal of Psychology*, 39, 106 – 127.
- CHIKLY, B. (2001): *Silent waves*, 2nd ed., Scottsdale: International Health & Healing Inc. Publishing.
- CHIKLEY, B. (2006): *Brain Tissue, Nuclei, Fluid & Autonomic Nervous System*. Seminar an der Osteopathie Schule Deutschland.
- COMEALUX, Z. (2002): *Robert Fulford, D. O. and the Philosopher Physician*. Seattle: Eastland Press.
- CROIBIER, A. (2006): *Diagnostik in der Osteopathie*, 1. Aufl., München: Elsevier Verlag.
- DAMASIO, A. (2001): *Ich fühle, also bin ich*, 3. Auflage, München: Econ Ullstein List Verlag.
- DAMASIO, A. (2006): *Descartes Irrtum*, 4. Aufl., Berlin: Ullstein Buchverlage.
- DARWIN, R.C. (1965): *The expression of emotion in man and animals*. Chicago: University of Chicago Press (Original 1872 publiziert).
- DAVIS, R.C. (1957): *Response Patterns*. *Transactions of the New York Academy of Sciences*, 19, 731 – 739.

- EIBL – EIBESFELD, I. (1971): Love and Hate: The Natural History of Behaviour Patterns. New York: Holt, Rinehart & Winston
- EKMAN, P.; FRIESEN, W.V. und ELLSWORTH, P.C. (1972): Emotion in the human face: Guidelines for research and an integration of findings. New York: Pergamon Press.
- EKMAN, P. (1992): An Argument for Basic Emotions. *Cognition and Emotion*, 6, 169-200.
- ENCK, P.; BENEDETTI, F. und SCHEDLOWSKI, M. (2008): New insights into the placebo and nocebo responses. *Neuron*, 59 (2), 195-2006.
- ENGEL, R. (2006): Does Cranial Osteopathy influence the patient`s state of consciousness. Wien: Masterthese. WSO.
- ERK S. und WALTER H. (2003, 2004): Funktionelle Bildgebung der Emotionen. In: STEPHAN A. und WALTER H. (Hrsg.): *Natur und Theorie der Emotion*. Paderborn: mentis Verlag, 51–74.
- FERRE, J. C.; CHEVALIER, C.; LUMINEAU, J.P. und BARBIN, J.Y. ( 1990): Cranial osteopathy, delusion or reality? *Actual Odontostomatol (Paris)*, 44 (171), 481-494:
- FREUD, S. (1915, 1946): *Das Unbewusste*. Gesammelte Werke, Band X, London: Imago Publishing.
- FULFORD, R. (2005): *Touch of Life. Puls des Lebens*. Pähl: Jolandos.
- GEO Magazin (2000): *Neurologie: Wie der Bauch den Kopf bestimmt*. Nr. 11, 136-162.
- GERHARDS, F. (1988): *Emotionsausdruck und emotionales Erleben bei psychosomatisch Kranken*. Opladen: Westdeutscher Verlag.
- GERSHON, M.D. (2000): 5-HT (serotonin) physiology. *Current Opinion in Gastroenterology*, 16 (2), 113-120.
- GERSHON, M.D. (2004): Review article: serotonin receptors and transporters- roles in normal and abnormal gastrointestinal motility. *Alimentary, Pharmacology & Therapeutics*, Nov., 20 Suppl. 7, 3-14.
- GOLEMAN, D. (2005): *Die heilende Kraft der Gefühle*, 4.Aufl., München: Deutscher Taschenbuchverlag.
- GOLEMAN, D. (2007): *Emotionale Intelligenz*, 19. Aufl., München: Deutscher Taschenbuch Verlag.
- GREEN, C.; MARTIN, C.W.; BASSETT, K. und KAZANJIAN, A. (1999): A systematic review of craniosacral therapy: biological plausibility, assessment reliability and clinical effectiveness. *Complement Therapies in Medicine*, 7 (4), 201-207.
- HARTMANN, S.E. und NORTON, J.M. (2002): Interexaminer reliability and cranial osteopathy. *The Scientific Review of Alternative Medicine*, 6 (1), 23-34.

HARTMANN, S.E. (2006): Cranial osteopathy: its fate seems clear. *Chiropractic & Osteopathy*, 14: 10; published online 2006 June 8. doi:10.1186/1746-1340-14-10.

HILDRETH, A.G. (1942): *The lengthening shadow of A.T. Still*, second edition. Kirksville, Missouri: Simpson Printing Company.

HINKELTHEIN, E. und ZALPOUR, C. (2006): *Diagnose- und Therapiekonzepte in der Osteopathie*. Heidelberg: Springer Medizin Verlag.

HOLZER, P.; SCHICHO, R.; HOLZER-PETSCHKE, U. und LIPPE I.T. (2001): The gut as a neurological organ. *Wiener Klinische Wochenschrift*, Sep. 17, 113 (17-18), 647-660.

HROBJARTSSON, A. und GOTZSCHE, P.C. (2001): Is he placebo powerless? An analysis of clinical trials comparing placebo with no treatment. *The NEW ENGLAND JOURNAL of MEDICINE*, 344 (21), 1594-1602.

HROBJARTSSON, A. und GOTZSCHE, P.C. (2004): Is he placebo powerless? Update of a systematic review with 52 new randomized trials comparing placebo with no treatment. *Journal of internal medicine*, 256 (2), 91-100.

IZARD, C.E. (1977): *Human emotions*. New York und London: Plenum Press.

IZARD, C.E. (1981): *Die Emotionen des Menschen*. Weinheim und Basel: Beltz Verlag.

JAMES, W. (1884): What is an emotion? *Mind* 19, 188 – 205.

JOHNSON, J.T. (1987): The heart on the sleeve and the secret self: Estimations of hidden emotion in self and acquaintances. *Journal of Personality*, 55, 563-582.

KESSLER, H. und TRAUE, C. (2003, 2004): Psychologische Emotionskonzepte. In: STEPHAN, A. und WALTER, H. (Hrsg): *Natur und Theorie der Emotion*. Paderborn: mentis Verlag. 20 – 33.

KLINGER, R.; SOOST, S.; FLOOR H. und WORM, M (2007): Classical conditioning and expectancy in placebo hypoalgesia: a randomized controlled study in patients with atopic dermatitis and persons with healthy skin. *Pain*, 128 (1-2): 31-39.

KORR, I.M. (1948): The Emerging Concept of the Osteopathic Lesion. *The Journal of the American Osteopathic Association* Vol. 48, No.3, 127-138.

LAMMERS, C. 2007): *Emotionsbezogene Psychotherapie*. Stuttgart: Schattauer Verlag.

LANGE, C.G. (1887): *Über Gemütsbewegungen*. Leipzig: Theodor Thomas.

LEDERMANN, E. (1997): *Fundamental of Manual Therapy*. London: Churchill Livingstone.

LEDERMANN, E. (2000): Facilitated Segments: a critical review. *British Osteopathic Journal* 22, 7-10.

LEDERMANN, E. (2007): *Harmonische Techniken*, 1. Auflage, München: Urban und Fischer Verlag.

- LEDERMANN, E. (2008): Die Praxis der manuellen Therapie, 1. Auflage, München: Urban & Fischer Verlag.
- LEDOUX, J. (2001): Das Netz der Gefühle. München: Deutscher Taschenbuch Verlag.
- LIEM, T. (2001): Osteopathie – Die sanfte Lösung von Blockaden - , 4. Auflage, Kreuzlingen: Hugendubel Verlag.
- LIEM, T. (2001): Kraniosakrale Osteopathie, 3. Auflage, Stuttgart: Hippokrates Verlag.
- LIEM, T. und DOBLER, T.K. (2002): Leitfaden Osteopathie, 1. Auflage, München; Urban & Fischer Verlag.
- LIEM, T. (2003): Praxis der Kraniosakralen Therapie, 2. Auflage, Stuttgart: Hippokrates Verlag.
- LINNENBANK, S. (1999): A preliminary study into emotional outbursts and their management within the osteopathic consultation. London: Undergraduate Project. British School of Osteopathy.
- MACLEAN, P.D. (1969): A triune concept of brain and behaviour. Toronto: University of Toronto Press.
- MAGOUN H.I. (2001): Die Osteopathie in der Schädelkapsel. Erste deutsche Übersetzung. Montreal (Quebec): Editions Spirales.
- MCGOVERN, J. und MCGOVERN, R. (2003): Dein innerer Heiler. Pöhl: Jolandos.
- MCGOVERN, J. (2006): Die osteopathische Versorgung älterer Menschen. Deutsche Zeitschrift für Osteopathie, 1, 22-24.
- MORAN, R.W. and GIBBONS, P. (2001): Intraexaminer and interexaminer reliability for palpation of the cranial rhythmic impulse at the head and sacrum. Journal of Manipulative and Physiological Therapeutics, 24 (3), 183-190.
- MOSELEY, J.B.; O'MALLEY, K; PETERSEN, N.J.; MENKE, T.J.; BRODY, B.A.; KUYKENDALL, D.H.; HOLLINGSWORTH, J.C.; ASHTON, C.M.; und WRAY, N.P; (2002): A Controlled Trial of Arthroscopic Surgery for Osteoarthritis of the Knee. The NEW ENGLAND JOURNAL of MEDICINE, Volume 347, 81-88.
- PARSONS, J. und MARCER, N. (2006): Osteopathy – Models for Diagnosis, Treatment and Practice. Edinburgh: Elsevier: .
- PATTERSON, M. (2000): Psychosis and osteopathy. JAOA, Vol.100, No.8, 498.
- PLUTSCHIK, R. (1980): Emotion. A psycho-evolutionary synthesis. New York: Harper & Row.
- RESCH, K.L. (2005): Placebo: Heiltechnik und Heilkunst. Deutsche Zeitschrift für Osteopathie. 3,1.




- RICHTER R. und DAHME, B. (1981): Probleme psychophysiologischer Feldforschung. In: MICHAELIS, W. (Hrsg.): Bericht über den 32. Kongress der DGB in Zürich 1980, Bd.1, 168-173. Göttingen: Hogrefe.
- ROGERS, J.S., WITT, P.L., GROSS, M.T., HACKE, J.D. und GENOVA, P.A. (1998): Simultaneous palpation of the craniosacral rate at the head and feet: intrarater and interrater reliability and rate comparisons. *Physical Therapy*, 78 (11), 1175-1185.
- SAMMUT, E. und SEARLE-BARNES P. (2000): Osteopathische Diagnose, deutsche Ausgabe, München: Pflaum Verlag.
- SCHACHTER, S. und SINGER, J.E. (1962): Cognitive, social and psychological determinants of emotional state. *Psychological Review*, 69, 69, 377 – 399.
- SCHEMANN M. (2005): Control of gastrointestinal motility by the „gut brain“-the enteric nervous system. *Journal of Pediatric Gastroenterology and Nutrition*, Sep. 41 Suppl. 1, 4-6.
- SCHERER, K.R. (1981). Wider der Vernachlässigung der Emotion in der Psychologie. In: MICHAELIS, W. (Hrsg.): Bericht über den 32. Kongress der DGfP's in Zürich (1980), Band 1, Hogreve.
- SCHIEBLER und SCHMIDT (2003): Anatomie, 8.Auflage, Berlin: Springer-Verlag.
- SCHLOSBERG, H. (1954): Three dimension of emotion. *Psychol. Rev.*, 61, 81 – 88.
- SCHMIDT – ATZERT, L. (1993): Die Entstehung von Gefühlen. Vom Auslöser zur Mitteilung. Berlin: Springer Verlag.
- SCHMIDT – ATZERT, L. (1996): Lehrbuch der Emotionspsychologie. Stuttgart: Verlag W. Kohlhammer.
- SCHMIDT-ATZERT, L. und HÜPPE (1996): Emotionsskalen EMO 16. Ein Fragebogen zur Selbstbeschreibung des aktuellen emotionalen Gefühlszustandes. *Diagnostica* 42, Heft 3, 242-267.
- SCHMIDT - ATZERT, L. (1997):Entwicklung und Evaluierung von Skalen zur Erfassung des emotionalen Befindens in den letzten 7 Tagen (EMO-16-Woche). *Zeitschrift für Differentielle und Diagnostische Psychologie*, 18, Heft 3, 182 - 198.
- SCHMIDT - ATZERT (in Druck): Verbale Daten: Fragebogenverfahren. Erscheint in J. H. OTTO & V. BRANDSTÄTTER-MORAWIETZ (Hrsg.), *Handbuch der Emotions-und Motivationspsychologie*. Göttingen: Hogrefe Verlag.
- SOLMS, M. und TURNBULL, O. (2004): Das Gehirn und die innere Welt. Düsseldorf: Patmos Verlag.

- SOMMERFELD, P; KAIDER, A. und KLEIN, P (2004): Inter- and intraexaminer reliability in palpation of the "primary respiratory mechanism" within the "cranial concept". *Manual Therapy* 9, 22-29.
- STILL A. T.: (2005): *Das große Still Kompendium*, 2. Auflage. Pähl: Jolandos.
- TEMPELHOF, S. (2001): *Osteopathie – Schmerzfrei durch sanfte Berührungen*. München: Gräfe und Unzer Verlag.
- TOMKINS, S.S. (1962): *Affect imagery consciousness. The positive affects*, Vol. 1, New York: Springer Verlag.
- TRAUE, H.C. (1989): *Gefühlsausdruck, Hemmung und Muskelspannung unter sozialem Stress. Verhaltensmedizin myogener Kopfschmerzen*. Habilitationsschrift. Universität Ulm: Göttingen: Verlag für Psychologie: Hogrefe.
- TRAUE H. C. und DEIGHTON R.M. (2003, 2004): Emotionale Hemmung als Risikofaktor für die Gesundheit. In: STEPHAN A. und WALTER H. (Hrsg.): *Natur und Theorie der Emotion*. Paderborn: mentis Verlag, 184-216.
- UPLEDGER, J. (2000): *Somatoemotionale Praxis der Craniosakralen Therapie*, 2.Auflage, Heidelberg: Haug Verlag.
- VAN BUSKIRK, R.L. (1990): Nociceptive reflexes and the somatic dysfunction: a model. *The Journal of the American Osteopathic Association*, Vol. 90, Issue 9, 792-809.
- WAGER, T.D.; RILLING, J.K.; SMITH, E.E.; SOKOLIK, A.; CASEY, K.L.; DAVIDSON, R.J.; KOSSLYN, S.M.; ROSE R.M. und COHEN, J.D. (2004): Placebo-induced changes in fMRI in the anticipation and experience of pain. *Science*, 303 (5661), 1162-1167.
- WEISS, C. (2008): *Basiswissen Medizinische Statistik*, 4. Auflage. Heidelberg: Springer Medizin Verlag.
- WIRT-PATTULLO, V. und HAYES, K.W. (1994): Interrater reliability of craniosacral rate measurements and their relationship with subjects` and examiners` heart and respiratory rate measurements. *Physical Therapy*, 67 (10), 1526-1532.

## 13. Appendix

### 13.1. Invitation

<p>Dr. med. Claudia Detling Ärztin - Osteopathie</p>	<p>Linsenbergweg 4/1 71672 Marbach Telefon: 07144 / 809585 Fax: 07144 / 809584 email: claudia.detling@freenet.de</p>	
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Marbach, im Januar 2008

Für meine Masterarbeit **Osteopathie an der Universität Krems** führe ich eine Studie durch, die den Einfluss einer osteopathischen Behandlung auf den emotionalen Gefühlszustand untersucht. Ich möchte Sie einladen, sich als Versuchsperson daran zu beteiligen. Sämtliche Daten werden anonym verwendet. Die Zuordnung zur jeweiligen Gruppe erfolgt per Zufall.

**Der Ablauf wird so zu sehen:**

**Gruppe 1** wird untersucht und entsprechend den Untersuchungsergebnissen osteopathisch behandelt. Vor der Untersuchung und nach der Behandlung füllen Sie Fragebogen Nr. 1 aus.

**Gruppe 2** wird 15 Minuten mit geschlossenen Augen auf einer Untersuchungsfläche liegen, ohne behandelt zu werden. Vor und nach dem Liegen füllen Sie den Fragebogen Nr. 1 aus. Danach wird auch Gruppe 2 untersucht und entsprechend den Untersuchungsergebnissen osteopathisch behandelt.

Im Fragebogen Nr. 1 geht es darum, seinen gerade erlebten Gefühlszustand mit Hilfe von vorgegebenen Wörtern zu beschreiben.

Nach der osteopathischen Behandlung bekommen die Teilnehmer beider Gruppen einen mit Rückporto versehenen Briefumschlag mit, in dem sich der Fragebogen Nr. 2 befindet. Sie füllen diesen zweiten Fragebogen 8 Tage nach der osteopathischen Behandlung aus und schicken ihn mir zurück. Ich werde Sie zusätzlich nochmals telefonisch an diesen Termin erinnern. Im Fragebogen Nr. 2 geht es darum, die Gefühle, die Sie in den letzten 7 Tagen erlebt haben, zu beschreiben.

**Ort:** Praxis für Osteopathie, Linsenbergweg 4/1, 71672 Marbach  
**Gesamtdauer:** 60 – 75 Minuten

Die Untersuchungen finden von Januar bis Ende Mai 2008 statt. Bitte kreuzen Sie auf dem untenstehenden Abschnitt an, ob Sie interessiert sind und welche Termine für Sie möglich wären. (Jeder kommt natürlich nur ein Mal dran!)  
Ich würde mich sehr über Ihre Mitarbeit freuen. Sie unterstützen mich damit persönlich bei der Forschung im Gebiet Osteopathie und Emotionen und die Osteopathie insgesamt, die weitere wissenschaftliche Dokumentationen benötigt.

Mit freundlichen Grüßen

Dr. Claudia Detling

Dr. med. Claudia Detling  
Ärztin - Osteopathie

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### Antwortabschnitt

- Ich nehme an der Studie teil.

Mögliche Termine von für mich von Januar bis Ende Mai 2008 mich sind:

	vorm.	nachm.		vorm.	nachm.
Mo	<input type="checkbox"/>	<input type="checkbox"/>	Do	<input type="checkbox"/>	<input type="checkbox"/>
Di	<input type="checkbox"/>	<input type="checkbox"/>	Fr	<input type="checkbox"/>	<input type="checkbox"/>
Mi	<input type="checkbox"/>	<input type="checkbox"/>	Sa	<input type="checkbox"/>	<input type="checkbox"/>

- Ich würde gerne teilnehmen, habe aber zu diesen Terminen keine Zeit. Bitte kontaktieren Sie mich zur Terminvereinbarung.

Name:

Adresse:

Telefon/Fax:

Email:

Ich bitte Sie um Antwort per Email ([claudia.detling@freenet.de](mailto:claudia.detling@freenet.de)), Fax (07144/809584), Telefon (07144/809584) oder Brief (Dr. Claudia Detling, Linsenbergweg 4/1 71672 Marbach).

### 13.2. Questionnaire EMO-16-current

Emotionsskalen EMO 16

**EMO 16 akt**

**Wie fühlen Sie sich jetzt?**

Beschreiben Sie bitte Ihren Gefühlszustand mit Hilfe der vorgegebenen Wörter. Jedes Wort steht für einen Bereich von Gefühlen. Es schließt also ähnliche Gefühle ein, für die man auch ein anderes Wort verwenden könnte.

Kreuzen Sie nun an (–  –), wie intensiv Sie gerade jedes Gefühl erleben! Je stärker das Gefühl ist, desto weiter rechts machen Sie das Kreuz.

	nicht vorhanden	sehr schwach	eher schwach	mittel	eher stark	sehr stark	
	↓	↓	↓	↓	↓	↓	
Abneigung	0	-----	0	-----	0	-----	0
Ärger	0	-----	0	-----	0	-----	0
Neid	0	-----	0	-----	0	-----	0
Langeweile	0	-----	0	-----	0	-----	0
Angst	0	-----	0	-----	0	-----	0
Unruhe	0	-----	0	-----	0	-----	0
Traurigkeit	0	-----	0	-----	0	-----	0
Sehnsucht	0	-----	0	-----	0	-----	0
Scham	0	-----	0	-----	0	-----	0
Schuldgefühl	0	-----	0	-----	0	-----	0
Freude	0	-----	0	-----	0	-----	0
Stolz	0	-----	0	-----	0	-----	0
Mitgefühl	0	-----	0	-----	0	-----	0
Zuneigung	0	-----	0	-----	0	-----	0
Sexuelle Erregung	0	-----	0	-----	0	-----	0
Überraschung	0	-----	0	-----	0	-----	0
<i>Sonstige Gefühle:</i>							
.....	0	-----	0	-----	0	-----	0

Benutzung zu wissenschaftlichen Zwecken gestattet.

[How do you feel right now?

Please describe your emotional state by means of the words given. Every word stands for an area of feelings. This means it includes other similar feelings that could be termed with another word as well. Please mark with a cross the intensity you feel right now.

nicht vorhanden = not existent, sehr schwach = very weak, eher schwach = rather weak,

mittel= medium, eher stark = rather strong, sehr stark = very strong

Abneigung = disgust, Ärger = anger, Neid = envy, Langeweile = boredom, Angst = anxiety,

Unruhe = restlessness, Traurigkeit = sadness, Sehnsucht = yearning, Scham = shame,

Schuldgefühl = feeling of guilt, Freude = joy, Stolz = pride, Mitgefühl = compassion,

Zuneigung = affection, Sexuelle Erregung = sexual excitement, Überraschung = surprise,

Sonstige Gefühle = other feelings]

### 13.3. Questionnaire EMO-16-week

**Wie haben Sie sich in den letzten 7 Tagen gefühlt?**

Beschreiben Sie bitte Ihren Gefühlszustand mit Hilfe der vorgegebenen Wörter. Jedes Wort steht für einen Bereich von Gefühlen. Es schließt also ähnliche Gefühle ein, für die man auch ein anderes Wort verwenden könnte. Kreuzen Sie nun an ( ---X--- ), wie häufig Sie jedes Gefühl in den letzten 7 Tagen erlebt haben!

Je häufiger das Gefühl vorkam, desto weiter rechts machen Sie das Kreuz.

	überhaupt nicht	selten	manchmal	häufig	sehr häufig
	↓	↓	↓	↓	↓
Abneigung	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Ärger	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Neid	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Langeweile	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Angst	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Unruhe	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Traurigkeit	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Sehnsucht	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Scham	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Schuldgefühl	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Freude	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Stolz	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Mitgefühl	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Zuneigung	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Sexuelle Erregung	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Überraschung	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0
Sonstige Gefühle:					
.....	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0	0 ----- 0

[How did you feel during the last 7 days? Please describe your emotional state by means of the words given. Every word stands for an area of feelings. This means it includes other similar feelings that could be termed with another word as well. Please check how often you have felt the individual feelings during the last seven days. überhaupt nicht = never, selten = rarely, manchmal = sometimes, häufig = often, sehr häufig = very often]

### **13.4. Introduction**

Für meine Masterarbeit Osteopathie an der Universität Krems führe ich eine Studie durch, die den Einfluss einer osteopathischen Behandlung auf den emotionalen Gefühlszustand untersucht. Sie haben sich bereit erklärt an der Studie teilzunehmen. Sämtliche Daten werden anonym verwendet. Alle Fragebögen sind mit Nummern versehen. Ihr Name erscheint lediglich in der Einverständniserklärung. Es gibt zwei Gruppen: Gruppe 1 und Gruppe 2. Beide Gruppen werden osteopathisch behandelt. Gruppe 2 muss jedoch vor der Behandlung erst 15 Minuten mit geschlossenen Augen auf einer Untersuchungsliege liegen. Die Zuordnung zur jeweiligen Gruppe erfolgt per Zufall. Der Ablauf wird so aussehen. Gruppe 1 wird zur Krankengeschichte befragt, untersucht und entsprechend den Untersuchungsergebnissen osteopathisch behandelt werden. Vor der Befragung zur Krankengeschichte und nach der Behandlung füllen die Teilnehmer dieser Gruppe jeweils Fragebogen Nr. 1 aus. Gruppe 2 wird zunächst 15 Minuten mit geschlossenen Augen auf einer Untersuchungsliege liegen. Vor und nach dem Liegen füllen die Teilnehmer dieser Gruppe jeweils den Fragebogen Nr. 1 aus. Danach werden auch die Teilnehmer dieser Gruppe zur Krankengeschichte befragt, untersucht und entsprechend den Untersuchungsergebnissen osteopathisch behandelt werden. Im Fragebogen Nr. 1 geht es darum, seinen gerade erlebten Gefühlszustand mit Hilfe von vorgegebenen Wörtern zu beschreiben. Nach der osteopathischen Behandlung bekommen die Teilnehmer beider Gruppen einen mit Rückporto versehenen Briefumschlag mit, in dem sich der Fragebogen Nr. 2 befindet. Im Fragebogen Nr. 2 geht es darum, die Gefühle, die Sie in den 7 Tagen nach der osteopathischen Behandlung erlebt haben, zu beschreiben. Sie füllen diesen zweiten Fragebogen 8 Tage nach der osteopathischen Behandlung zuhause in Ruhe aus und schicken ihn mir in dem frankierten Briefumschlag zurück. Ich habe Ihnen den Termin mit Bleistift auf den Briefumschlag geschrieben und werde Sie zusätzlich noch telefonisch an diesen Termin erinnern.



### **13.5. Instruction Group 1**

Sie gehören der Gruppe 1 an. Dies bedeutet für Sie, dass Sie jetzt gleich den Fragebogen Nr. 1 ausfüllen dürfen. Danach werde ich Sie zu ihren Beschwerden befragen, untersuchen und entsprechend Ihrem Befund osteopathisch behandeln. Im Anschluss daran füllen Sie nochmals den Fragebogen Nr. 1 aus. Nach der Behandlung bekommen Sie einen mit Rückporto versehenen Umschlag mit. In diesem befindet sich der Fragebogen Nr. 2. Diesen füllen Sie acht Tage nach der osteopathischen Behandlung zuhause aus. Ich habe Ihnen den Termin mit Bleistift auf den Briefumschlag geschrieben. Ich werde Sie zusätzlich nochmals telefonisch an diesen Termin erinnern. Im Fragebogen Nr. 1 geht es darum zu beschreiben, wie Sie sich jetzt fühlen. Sie sollen ihren Gefühlszustand mit Hilfe der vorgegebenen Wörter auf einer sechsstufigen Skala beschreiben. Jedes Wort steht für einen Bereich von Gefühlen. Es schließt also ähnliche Gefühle ein, für die man auch ein anderes Wort verwenden könnte. Kreuzen Sie dann an, wie intensiv Sie gerade jedes Gefühl erleben. Je stärker das Gefühl ist, desto weiter rechts machen Sie das Kreuz. Im Fragebogen Nr. 2 geht es darum die Gefühle, die Sie in den sieben Tagen nach der Behandlung erlebt haben, zu beschreiben. Jedes Wort steht wiederum für einen Bereich von Gefühlen, für die man auch ein anderes Wort verwenden könnte. Kreuzen Sie dann zuhause in Ruhe an, wie häufig Sie jedes Gefühl in den letzten 7 Tagen erlebt haben. Je häufiger das Gefühl vorkam, desto weiter rechts machen Sie das Kreuz. Im Fragebogen Nr. 2 werden die gleichen Gefühle gemessen werden wie im Fragebogen Nr. 1, nur wird dieses Mal die Häufigkeit der erlebten Gefühle auf einer fünfstufigen Skala abgefragt. Wenn Sie Fragen haben, können Sie diese jetzt gerne stellen. Ansonsten werden Sie nun mit dem Ausfüllen des Fragebogens EMO-16-aktuell beginnen.

## 13.6. Instruction Group 2

Sie gehören der Gruppe 2 an. Das bedeutet für Sie, dass Sie jetzt gleich den Fragebogen Nr. 1 ausfüllen dürfen. Danach werden Sie 15 Minuten mit geschlossenen Augen auf der Untersuchungsliege liegen. Im Anschluss daran füllen Sie nochmals den Fragebogen Nr. 1 aus. Danach werde ich Sie zu ihren Beschwerden befragen, untersuchen und entsprechend Ihrem Befund osteopathisch behandeln. Im Fragebogen Nr. 1 geht es darum zu beschreiben, wie Sie sich jetzt fühlen. Sie sollen ihren Gefühlszustand mit Hilfe der vorgegebenen Wörter auf einer sechsstufigen Skala beschreiben. Jedes Wort steht für einen Bereich von Gefühlen. Es schließt also ähnliche Gefühle ein, für die man auch ein anderes Wort verwenden könnte. Kreuzen Sie dann an, wie intensiv Sie gerade jedes Gefühl erleben. Je stärker das Gefühl ist, desto weiter rechts machen Sie das Kreuz. Im Fragebogen Nr. 2 geht es darum die Gefühle, die Sie in den 7 Tagen nach der Behandlung erlebt haben, zu beschreiben. Jedes Wort steht wiederum für einen Bereich von Gefühlen, für die man auch ein anderes Wort verwenden könnte. Kreuzen Sie dann zuhause in Ruhe an, wie häufig Sie jedes Gefühl in den letzten 7 Tagen erlebt haben. Je häufiger das Gefühl vorkam, desto weiter rechts machen Sie das Kreuz. Im Fragebogen Nr. 2 werden die gleichen Gefühle gemessen werden wie im Fragebogen Nr. 1, nur wird dieses Mal die Häufigkeit der erlebten Gefühle auf einer fünfstufigen Skala abgefragt. Wenn Sie Fragen haben, können Sie diese jetzt gerne stellen. Ansonsten werden Sie nun mit dem Ausfüllen des Fragebogens EMO-16-aktuell beginnen.

## **14. List of abbreviations**

HA = Hypothese A

HB = Hypothese B

HC = Hypothese C

HD = Hypothese D

HE = Hypothese E

HF = Hypothese F

EMO-16-aktuell = Emotionsskalen EMO-16-aktuell Fragebogen

EMO-16-Woche = Emotionsskalen EMO-16-Woche Fragebogen

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