The Influence of Osteopathy on ADHD

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Statutory Declaration

I hereby declare to have written this master thesis entirely by myself.

All passages used verbatim or paraphrased from other published or unpublished work have been marked as such. All sources and resources which I have used for this work have been specified. This work and its content have never been presented to an other examination authority.

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1. Introduction

With ever increasing frequency I see children and adolescents in my practice who struggle with problems such as poor concentration, restlessness, and headaches. Their parents often complain about aggressive, disobedient children and find themselves in a situation of helplessness.

After osteopathic treatment of such children I was often told that not only the headache – the main reason for their visit at the osteopath – disappeared but that other symptoms such as hyperactivity have also improved.
This led to my decision to deal more intensively with ADHD and to write this thesis titled: "The influence of osteopathy on ADHD".

(see Brandau, 2004)
As early as in the 19th century doctors dealt with the issue of Attention Deficit Hyperactivity Disorder (ADHD).
The personal physician of emperor Napoleon I described a morally sick child as slave of its fervor, terror of school, torment of the family, and terror of his environment.
Furthermore, in 1844, the Frankfurt-based German physician Heinrich Hoffmann described typical features of hyperkinetic children and used these descriptions in his book "Struwwelpeter" including "The Story of Fidgety Philip" and "Johnny Look-in-the-Air".
In 1899, a scottish physician saw disturbances in higher brain centers, which control and slow down activity, as the cause of symptoms such as overexcitability and mental explosiveness. As a therapy he suggested the administration of bromine, a special diet, lots of fresh air and appropriate activities. This therapy aimed at the reduction of cell metabolism and a slow-down of CNS activity (Clouston 1899).
In 1902 Sir George Frederic Still (1868-1941), Pediatrician and Professor of Pediatrics in London, described in 20 case stories the hallmark signs of ADHD which, in essence, are still valid today.
The cardinal symptoms, described throughout history, are constant movement, extreme restlessness, inattention as well as lack of perseverance and control of will.

These symptoms lead to an immense level of suffering for the affected person. The resulting consequences are perception disorders, partial achievement disorders, impairment of learning, problems with ones social position and, consequently, low self-esteem.
Tredgold (1908), too, saw a connection between hyperactive behavior and brain function disorders. This theory was confirmed when an encephalitis epidemic raged in Europe and the US in 1917/1918. The symptoms which appeared in children after the epidemic were learning problems, hyperactivity, impulsiveness, and attention disorders.

All this shows the severity of this illness is for those affected and how it might influence their development in life. This results in a negative spiral of aggravating basic symptoms from which those affected are unable to get out by themselves.

2. Hypothesis and Aim of the Study

My hypothesis is that a targeted osteopathic treatment of ADHD symptoms positively influence attention disorder and hyperactivity.

The aim of this study is a reduction of ADHD symptoms by a custom-tailored treatment of each patient.

This thesis intends to enhance and improve the multitude of existing treatment methods, which I will later describe in more detail.

3. What is ADHD ?

3.1. Definition of ADHD

(see also Brandau, 2004; Remschmidt 2004)

The term Attention Deficit Hyperactivity Disorder replaced formerly used terms such as Hyperkinetic Disorder (HKD) or Psycho-organic Syndrome (POS), which, however, are still to be found in scientific literature today.

ADHD is a disorder not precisely defined and this is why currently valid definitions slightly differ from each other.

Currently, there are 2 different classification systems for diagnosing the disorder. First, the ICD 10 system (International Classification of Diseases) of WHO (World Health Organization) and, secondly, DSM IV (Diagnostic and Statistic Manual of Mental Disorders), mainly used in the United States.

According to the APA (American Psychiatric Association) ADHD is a developmental disorder characterized by inattention, hyperactivity and impulsiveness which appears more frequently and more intense in affected children than in other children of the same age and development level.

Furthermore, the symptoms must occur before age 7 and last for at least 6 months in at least 2 areas of life – which in most cases are school and home. If the disorder is observable only in one area of life, such as at home, and if the child has no major problems in school, has friends, etc., the diagnosis “ADHD” is inadmissible, according to DSM IV.

The classification systems ICD 10 and DSM IV differ as far as the definitions of disorders is concerned.. DSM IV classifies subtypes focusing on symptoms, whereas in ICD 10 all three major symptoms, i.e. hyperactivity, attention disorder and impulsiveness have to be present.

In ICD 10 the disorders are characterized by:

- early onset, mostly during the first five years of life
- lack of perseverance
- rapid change of activities
- excessive activity
- carelessness and impulsiveness
- lack of distance particularly towards adults

- retardation of motor and language development
- dissocial behavior and low self-esteem

3.2. Symptoms

For following chapters 3.2.1 – 3.2.3 (see Bonath, 2004; Mumbach, 2005; Brandau, 2004)

ADHD is characterized by 3 major symptoms:

- **Attention deficiency**
- **Hyperactivity**
- **Impulsiveness**

3.2.1. Attention Deficiency

The term “attention” has its root in the Latin term “attendere”, literally meaning “to stretch to”.
Attention is the capability of ignoring distracting inputs and focusing on the subject of interest for a longer period of time, if necessary.
Furthermore, it should be possible to share attention in order to do two things at once, e.g.

There are 2 types of attention:

- Sustained attention (vigilance)
- Selective or focused attention

In ADHD mostly both types are disturbed.
Often, affected persons are unable to maintain vigilance for a longer period of time and become tired very quickly. However, we have to differentiate between an interesting computer game or homework.
With regard to selective attention the problem is that outside stimuli cannot be filtered. These people permanently have the feeling of being disturbed.

Characteristics of attention disorders:

- Sustained attention disturbed
- Selective attention disturbed
- Poor concentration
- Reduced or distorted perception
- Decreased ability to filter stimuli

3.2.2. Hyperactivity

"Hyperactivity" is characterized by excessive movements which are unordered and hardly controllable.
Hyperactivity is hardly controllable by will power and hardly influenceable by admonition. This permanent restlessness can be seen in gross motor function such as in "fidgeting Philipp" but also in fine motor behavior.
One study proved that ADHD children showed significantly higher values of movement frequency and intensity than healthy children of the same age (Halperin et al.1992)

Characteristic features of hyperactivity:

- Motor restlessness
- Uncontrolled movements
- Reduced fine motor functions
- Restlessness

3.2.3. Impulsiveness

The term "impulsiveness" means that all activities are carried out with too much intensity and even before thinking about it – true to the motto: "act first, then think".

Characteristic features of impulsiveness:

- Inability to wait
- Overhasty actions
- Uncontrolled actions
- Uncontrolled verbal responses

Each symptom, i.e. attention deficit, hyperactivity, and impulsiveness is a big problem in itself but they almost always occur together and potentiate each other leading to even worse consequences.
Affected children are not accepted in their environment, have problems at school, are teased by their classmates, are disobedient at home. So a downward spiral develops drawing the child even further down.

Consequences of these problems:

- Learning disorders
- Perception disorders
- Partial achievement disorders
- Language and speech disorders
- Disorders in social behavior
- Disturbed self-esteem

3.3. Types of ADHD

(please see Möckel, Noori, 2006)

According to **DSM IV** there are 3 types of ADHD:

- **Inattentive type**: This type shows a pronounced attention deficit, while hyperactivity and impulsiveness are less manifest or absent at all.
- **Hyperactive-impulsive type**: Attention deficit plays a minor role.
- **Combined type**: All three major symptoms are present at the same degree.

According to **ICD 10** (2004), for diagnosing ADHD **all three symptoms** have to be present.

3.4. Epidemiology

(see also Bonath, 2004)

Data on frequency vary considerably in various epidemiologic studies. Depending on study, culture, available statistics and research methods, frequency is between 2% and 9.5% , being highest at 4 – 5%.

These huge differences stem from the difficulty of diagnosing this disorder because different diagnostic instruments were used.

Nevertheless, ADHD is a frequent diagnosis, given by children's psychiatrists in an increasing number of cases. Boys are affected by ADHD 2 – 9 times more often than girls. In girls hyperactivity is less pronounced so they are frequently diagnosed with a „common attention disorder".

4. Etiological Factors of ADHD

Following chapters 4.1 – 4.5 (see also Roth, 2003; Bonath, 2004; Brandau, 2004; Rothenberger, 2004)

So far, no clearly defined cause of ADHD has been found. Disorder- related processes are multifunctional and cross-linked and, in my opinion, it is an interaction of many biological, psychological and social factors which lead to the manifestation of this disorder.

Possible causes and triggers of ADHD are:

- Neurochemical disturbances
- Genetic factors
- Prenatal and perinatal noxae
- Environmental irritations and allergic reactions
- Psychogenic and psychosocial factors
- Neuroanatomical and neurophysiological aspects
- Visual and acoustic problems
- Speech and communication problems

4.1. Neurochemical Disturbances

In recent years there has been increasing evidence that certain genes play a major role in triggering ADHD. Blum and associates (1990) found that particularly dopamine receptor genes are involved which lead to a subfunction of the dopaminergic system.
1 – 2% of the synapses in the human brain use dopamine as a transmitter. The amino acid tyrosine is transformed to L-dopa. Another enzyme converts L-dopa to dopamine. From this adrenaline and noradrenaline are created whose metabolism is also disturbed in ADHD. Dopamine is involved in many behavioral functions such as movement, attention, action planning, learning and the feeling of reward.
Certain stimuli lead to the release of dopamine which further reinforces these stimuli leading to the need to seek these stimuli again and again. This results in a form of addictive behavior.

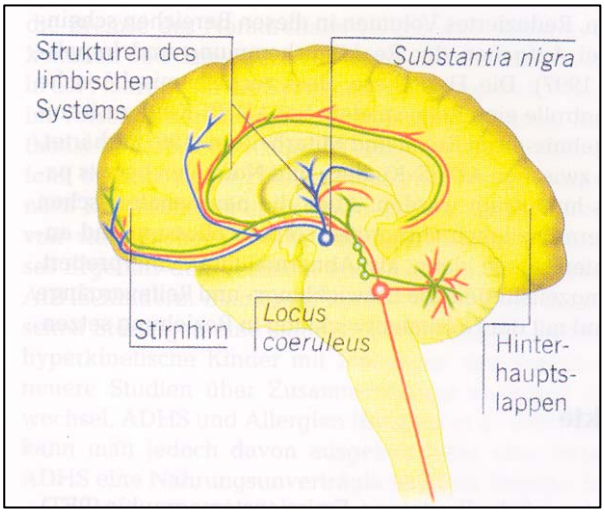


Fig.1 *Courses of the neurotransmitters dopamine, noradrenaline and serotonin* (Brandau, 2004, Das ADHS-puzzle, p. 32)

Various studies, however, say that ADHD cannot be explained by selective disturbances of the transmitter system but has its roots rather in a disbalance in the neurotransmitter system.

4.2. Genetic Factors

Frequently, parents of affected children show ADHD symptoms, in some cases, however, they show other psychological disturbances which favor the emergence of ADHD in their children.
There is no defined chromosomal abnormality such as in Down Syndrome, it is rather assumed that more genes are involved.

4.3. Prenatal and Perinatal Noxae

- Intrauterine infections
- Intrauterine malnutrition
- Pharmaceuticals and drugs during pregnancy
- Birth traumas such as oxygen deficiency, bleeding, vacuum extraction or forceps delivery
- Premature delivery

4.4. Environmental Irritations and Allergic Reactions

This issue is still very controversial. On the basis of clinical experience, however, a connection between certain substances and attention and hyperactivity disorders can be discerned. In the 1950ies Chisholm and Harrison (1956) investigated the effects of lead on behavior. They observed a considerable increase in motor agitation, distractibility, and aggressiveness.
Hafer(1978) held a high phosphate burden responsible for theses symptoms.
In more recent studies such as that of Burgess et al. (2000) a connection between disturbances in fatty acid metabolism, allergies and ADHD has been discussed.
In my opinion, these factors should be taken into account, however, they should not be attributed a major importance in their impact on ADHD symptoms.

4.5. Psychogenic and Psychosocial Factors

Psychosocial factors are strongly influenced by ADHD, however, they, in turn, can trigger or reinforce ADHD.
Frequently, psychosocial factors do not have a crucial influence on the severity of ADHD. However, in case of biologically caused disturbances they can reinforce the symptoms, leading to a decompensation.
Such factors might be:

- Early attachment disturbances (mother-child)
- Socioeconomic status
- Familial factors (psychiatric diseases, alcohol problems, etc.)
- Lack of attention
- School problems

5. Affected Structures in the Brain

Following chapters 5.1 – 5.2 (see also Roth, 2003; Rohkamm, 2003; Andreasen, 2001; Prosiegel, 2002; Kahle 1991; Putz, 1993)

5.1. Neuroanatomy of the Brain

Neuronal networks in the prefrontal cortex of the frontal lobe are responsible for the degree of development of so called executive functions such as action planning, performance of working memory, selective and permanent attention as well as cognitive flexibility.
These networks are called frontal attention system.
Together with the parietal attention system, which is mainly located in the parietal lobe, this network controls our behavior.

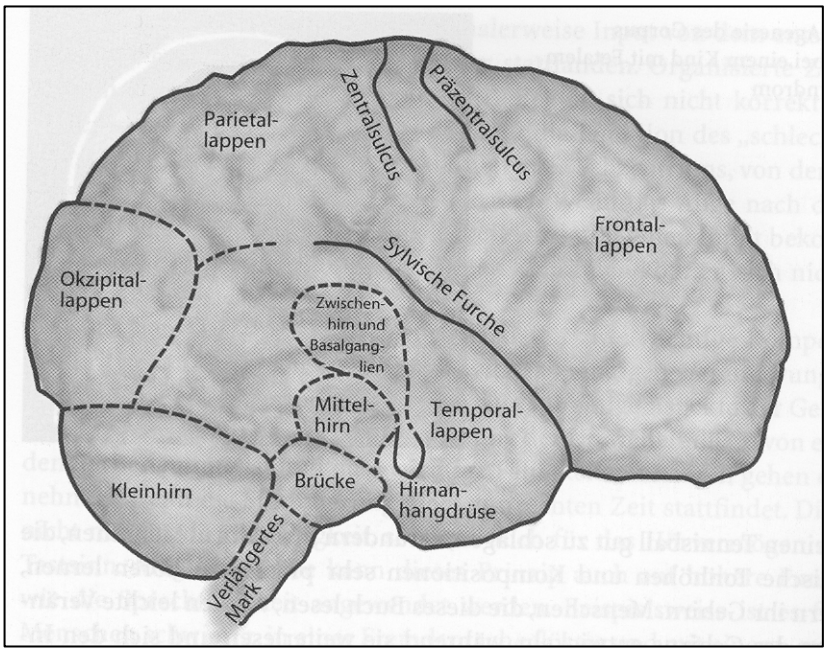


Fig. 2 *Major regions of the human brain* (Andreasen, 2001, Brave new brain, p. 60)

In addition to the cerebellum, which coordinates our movements, motor acitivity is controlled by various systems located in and under the motor cortex. Movement impulses from neurons in basal ganglia, thalamus and cortex follow the pyramidal tracts to the target muscles.

By means of magnetic resonance technology deviations in certain brain areas have been discerned in ADHD patients. Volume measurements were performed and it was found that the following structures were less pronounced:

- Right frontal lobe (Casey et al.1997)
- Basal ganglia (Casey et al.1997)
- Parietal lobe (Filipek 1996)
- Corpus callossum (Hynd et al.1991)

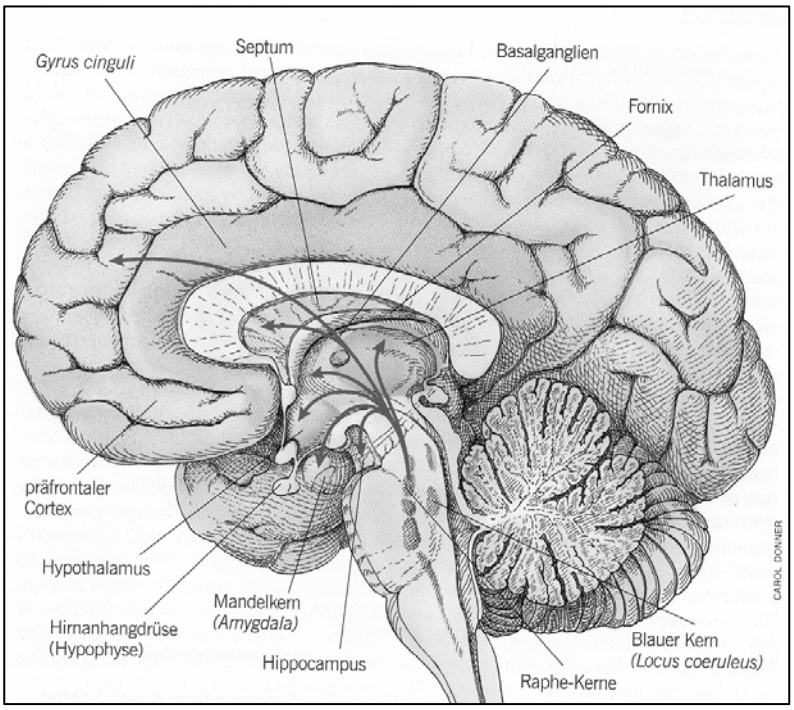


Fig. 3 *Affected regions of the brain*
(Spectrum d. Wissenschaft, 4/2004, p. 85)

The limbic system is also affected. This system encompasses several closely linked nuclei and cortex areas which are as follows:

- Amygdaloid corpus
- Parahippocampal gyrus
- Cingulate gyrus
- Hypothalamus
- Anterior thalamus
- Mamillary bodies
- Fornix

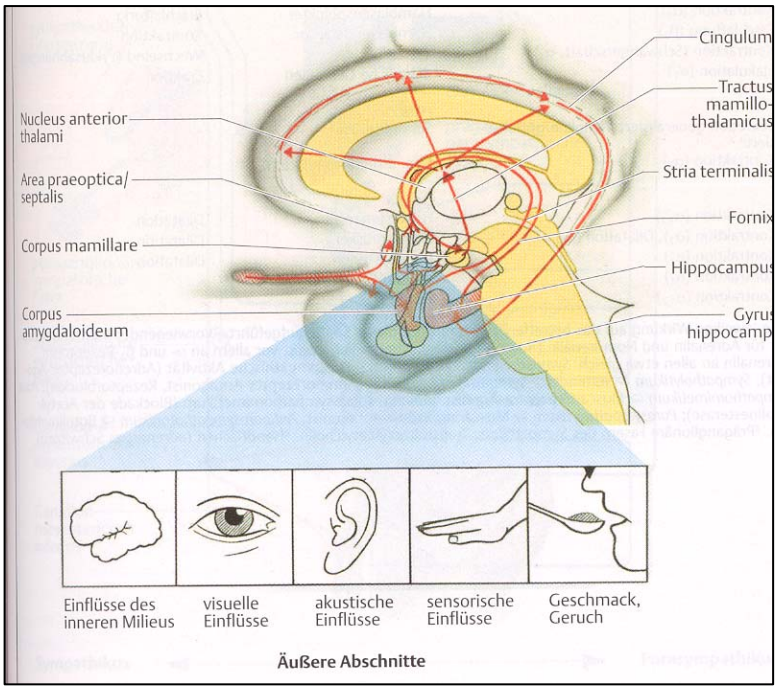


Fig. 4 *Limbic system*
(Rohkamm, 2003, Taschenatlas Neurologie, p. 145)

The limbic system is considered to be the center of emotional processing and is closely connected to the prefrontal cortex.

5.2. Neuroanatomy and its Function

The **prefrontal cortex** is part of the frontal lobe and, as the entire cortex, consists of grey substance.
In recent years many authors such as Förstl (2002) have dealt with the prefrontal cortex and ascribed the following functions to this structure:

- Assessment of the environment
- Adjustment of conflicting actions
- Flexible switching between different tactics and strategies
- Concentration on one thing
- Maintaining attention and control
- Planning and organizing action sequences
- Establishment and carrying out a plan
- Knowledge what to do to realize a plan
- Reflect what has to be done at a certain point in time

Together with all other cortex areas the prefrontal cortex is involved in planning, preparation, carrying out and controlling of voluntary acts.

The **limbic system** is, anatomically and functionally, a very extensive system and is closely connected to the structures mentioned before. Scientific debate on this system is often very bewildering because knowledge about its functions has increased considerably due to new insights in neuroscience and because of the fact that new regions belonging to this systems have been identified.
The most important limbic centers have already been mentioned in chapter 5.1
Its functions are:

- Origins and regulation of emotions
- Reaction to emotional stimuli
- Organization of memory
- Controlling attention and consciousness
- Origin of positive and negative feelings
- Regulation of vegetative functions such as hunger, thirst, sexual impulses

The **basal ganglia** are located in the depths of the cerebrum and consist of the following structures:

- Caudate nucleus
- Putamen
- Globus pallidus
- Substantia nigra
- Subthalamic nucleus

Together with the cerebellum and various nuclei of the thalamus these structures belong to the subcortical centers which are instrumental in voluntary movements.

6. Diagnosing ADHD in Conventional Medicine

In conventional medicine ADHD is diagnosed through a series of examinations necessary to confirm or exclude ADHD.
Anamnesis, observation of behavior, visual acuity and listening tests as well as motor tests are of particular importance for my study as these tests can provide preliminary information needed for osteopathic findings.

6.1. Anamnesis

Anamnesis encompasses a comprehensive questioning of parents, other persons involved in child care/education such as teachers, and the child itself, if possible (from age 10, approximately).
This information is obtained by means of questionnaires and interviews.

6.2. Physical Examination

A general pediatric examination is necessary to exclude possible other organ lesions such as brain tumors which can also cause abnormalities in behavior.

6.3. Behavior Observation

The child's behavior is assessed by both specific questionnaires and by observing the child's behavior in its daily environment. There is a wide variety of questionnaires for parents, teachers and other persons who are in close contact with the child and there are questionnaires für children for self-reflection and reflection of others such as:

- Child-Behavior Checklist (CBCL)
- Teacher Rating Form (TRF)
- Conners Questionnaire

The most frequently used questionnaires to assess behavior are the Conners Rating Scales (CRS) developed by C. Keith Conners, Ph.D.
In 1994 Conners published his first scale for examination and treatment evaluation in children and adolescents suffering from Attention Deficit Hyperactive Disorder.
In 1997 he established a new Rating Scale which met the criteria of DSM IV and which is used worldwide today.

6.4. Visual Acuity and Listening Tests

To test perception and processing of optical and auditive stimuli.

6.5. Psychological Testing

- **Intelligence testing**
- **Neuropsychological tests:** sensory perception, stimulus processing, motor function, language function, problem-solving capabilities
- **Attention strain test**: short visual focussing of attention
- **Concentration performance test**: Visual attention, calculation abilities

These tests are to be carried out by the treating physician because they may provide information on the patient's behavior when working.
Additionally, these tests are very informative for follow-up checks.

6.6. Performance Testing

These tests assess if the children are able to do well at school according to their age and which deficiencies are present.
Children may be offered help and counselling as well as targeted training if need be.

6.7. Motor Function Tests

Examinations of motor skills and abilities

6.8. Differential Diagnostics

Differential diagnostics of ADHD can be divided in psychogenic and physical disturbances:

Psychogenic disturbances:

- Psychological disturbances or abnormalities in behavior such as anxiety disorders, depression, autism, Rett syndrome, tic disorders, etc.
- Social abnormality in behavior such as attachment disturbances
- Reduced intelligence and excessive/too little demands at school
- Developmental disorders such as dyslexia, dyscalculia
- Development-related hyperactivity

Physical disturbances:

- Injuries of the head or the brain
- Chronic sleep deprivation
- Hearing and visual deficiencies
- Seizure diseases such as epilepsy, etc.
- Pharmaceuticals, alcohol, drugs

For differential diagnosis it is important to understand if the diseases causing the symptoms hyperactivity, attention deficit and impulsiveness are concomitant or primary diseases.

6.9. Machine-Aided Diagnosis

Due to the heterogeneity and the various manifestations of the disease it remains doubtful if a standardized parameter for diagnosing ADHD can be found. Current measurements do not indicate ADHD-specific data.

Possible machine-aided diagnostics are:

- Laboratory: blood, urine, cerebrospinal fluid; there are no significant data
- EEG and EP (evoked potentials): EEG findings show that there are brain electric deviations, which, however, may also be present in other disorders.
- Imaging techniques: CT, MRI, PET, SPECT
- Imaging techniques are mainly used in research, for diagnostics they are too complex, too expensive and too stressful for the patient.

7. Conventional Medicine Treatment

As already mentioned in chapter 2, there is a wide variety of therapeutic treatments. The clearer the diagnosis the more targeted the treatment can be.

7.1. Drug Therapy

The most frequently used drugs are psychostimulants such as amphetamines and methylphenidate which, in the German-speaking market, are known under their trade names Ritalin, Equasym and Medikinet. In their chemical structure amphetamines are similar to dopamine and their effect can be described as follows:

- They facilitate the release of neurotransmitters such as dopamine and noradrenaline from the presynaptic vesicles.
- They inhibit mechanisms responsible for back transportation of neurotransmitters from the synaptic gap.

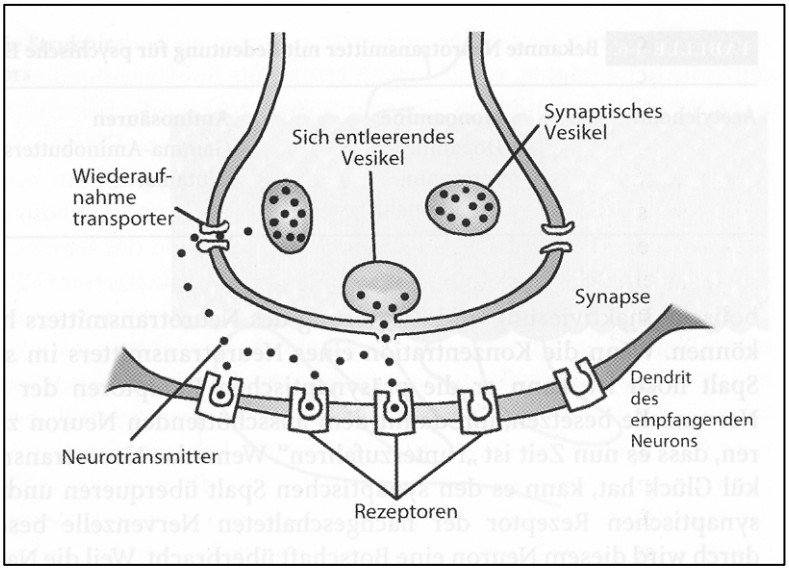


Fig. 5 *How a synapsis works* (Andreasen, 2001, Brave new brain, p. 91)

Both mechanisms increase the concentration of neurotransmitters in the synaptic gap and the excitability of postsynaptic receptors. Furthermore, amphetamines boost the sensitivity of these receptors for dopamine and noradrenaline.

The aim of these processes is to stimulate certain structures in the brain and improve their function.In the frontal brain functions such as self-control, self-criticism, sense of responsibility and interest are to be improved. In the reticular formation concentrated and creative work are to be enhanced.

Since spring 2005 a new drug called Strattera has been available. Its active substance is the hydrochloride salt of atomoxetine which leads to an increase in the effect of noradrenaline in the CNS, particularly focusing on the attention system.

Patients are stabilized on the drug by their physician. Parents and teachers closely observe the child during this period. Children under the age of 6 should not be treated with this drug.

Due to adverse effects the treatment is very controversial. The following adverse effects my occur:

- Sleeplessness
- Loss of appetite
- Fatigue
- Weight loss
- Headaches
- Dizziness
- Anxiety
- Gastrointestinal disturbances

In rare cases:

- Psychotic reactions
- Hypersensitivity disorders
- Muscel twitches
- Loss of hair
- Problems with joints, etc.

Due to these side effects it has to be considered carefully if it makes sense using this drug in an affected child.
According to (Döpfner, Lehmkuhl 1998; Eckpapier 2003) amphetamines enable or increase the effects of other interventions in the first place.

7.2. Psychotherapeutic Measures

Psychotherapeutic measures include:

- Behavior therapy
- Perception training
- Coordination training
- Learning therapy at school
- Psychological counselling
- Parents talks

8. Developmental Disorders

Developmental disorders of the vestibular, auditive and visual systems may intensify ADHD, but they can also act as a co-trigger of the disease.

8.1. Development of the Vestibular System

According to Ayres (1972) the vestibular system is responsible for the development of skills such as to estimate distances and speed.
The vestibular system is responsible for coordination and balance and it is one of the first systems entirely myelinated.
The ampulla, which is a part of the equilibrium organ, continually provides information on gravity. The semicircular ducts provide information on speed and direction of head movements. If this information is missing, control of the head and thus coordination of eyes is disturbed.
If primitve reflexes, which usually disappear during the first year of life, persist, normal development is compromised. If, for example, the tonic labyrinth reflex does not disappear by the end of the sixth month the child cannot develop a sense of gravity (Blythe, 1979).
In case of vestibular system problems information exchange with other systems such as the auditive and visual systems is restricted.
There are children who can come to terms with these problems because they are supported by other, well integrated systems. Other children, however, are in a state of permanent confusion because interaction between vestibular system and eyes does not work and therefore coordination and balance may be disturbed.

The following symptoms may occur:

- Problems with spatial perception
- Problems with activities requiring coordination of both body halfs
- Child is frightened by speedy movements
- Child seeks to activate the system
- Nausea during car rides, when accelerating or braking

8.2. Development of the Auditive System

The development of the hearing ability starts very early. Between 24th and 28th week of pregnancy auditive nerve fibers start to myelinate. This means that from this time on sounds can be perceived. The fetus reacts to sounds coming from the uterus and sometimes to sounds from outside.
Inside the uterus sounds are transmitted by bone conduction, after birth by aerial conduction. The child has to learn to adjust to specific frequencies of language. During this period the child has the ability to learn any language. After the third year of life, learning a new language becomes more difficult because these adjustments have already taken place.
The following abilities have to be present in order to successfully process tones and sounds:

- Differentiation of high and low tones which contributes to a better understanding of language.
- Localization of tones because this influences the speed of reaction
- Ability to focus attention on something and filter out other things.

Symptoms of hearing defects:

- Excessive demands and attention deficits because the child can understand only parts of words and sentences due to slow auditory processing
- Delayed or weak language development
- Strong emotional fluctuations
- Aggression, both psychologically and physically
- Problems at school

A hearing defect can have numerous causes.
These defects may already emerge in the uterus and can be caused by infections of the mother such as rubella, toxoplasmosis or genital herpes.
Additionally, certain drugs, alcohol and nicotine may affect the development of the auditive system and today we know that a permanently high noise exposure during pregnancy can harm the internal ear.
Frequent infections of the otolaryngological area during childhood lead to hearing defects and losses.

In most cases the „hearing problem“ in ADHD children, however, cannot be explained by an organic hearing defect but rather by disturbed processing and interaction of several systems. Tomatis (1991) thinks that there is a marked difference between hearing and listening. Hearing refers to the mechanics and the structure of the ears. Listening is the result of auditive processing, i.e. the ability to ascribe meaning to sounds.
The problem of ADHD children is exactly this processing of information not only in the auditive system but also in the vestibular and visual system and their interaction.

These information and processing disturbances are the reason why I have described the “development of the vestibular, auditive and visual systems” in more detail.

8.3. Development of the Visual System

In the complex process of vision two essential aspects can be differentiated:

- Long-distance vision
- Seeing rapid changes within the visual field

Gallaburda (1991) and Lovegrove (1990) discovered a system of “twin cells“ acting along the visual pathway – the parvocellular and magnocellular system.
The parvocellular system is responsible for distant vision and seeing backgrounds whereas the magnocellular system is responsible for recognizing rapid changes within the visual field. In order to read the eye must be able to converge, i.e. recognize a word or a line and forward this information to the brain.
Accomodation is necessary to keep near and far objects in focus and get a clear picture. Disturbances in processing or processing speed may lead to considerable learning disorders due to a lack of visual acuity. Rapidly the system gets overloaded leading to excessively rapid eye movements instead of fixation.
Consequently, perception problems as well as reading and learning difficulties occur.

Frequently, the causes of developmental disorders are genetic, however, infections, abuse of alcohol, nicotine and drugs during pregnancy may also lead to vision problems. Furthermore, metabolic and other disease can cause impaired vision.

9. Osteopathic Studies

W. G. Sutherland laid the foundation for the work with children.
He said that the spinal cord must exit the foramen magnum unrestrictedly to guarantee proper functioning of the craniosacral system.
He assumed that malpositions of the skull which, for example, may be caused by a birth trauma, disturb the system possibly leading to physical and mental handicaps. Sutherland carried out a study with children who were hyperactive and had emotional and social problems. He found that in children with neurological disorders particularly the occipital bone may show structural changes such as compressions or torsions.

In 1976 **Viola Fryman** published her study "Learning difficulties of children viewed in the light of osteopathic concept".
She studied school children with learning difficulties over a period of ten years. She asked herself 3 questions:

- Do birth and early development have any influence on children with regard to learning problems?
- Do children with learning problems have a specific traumatic pattern in the craniosacral mechanism?
- Were there any significances in the period during which the trauma emerged?

The results of her study were:

- Among children with learning problems she found a higher number of birth complications and accidents as well as SBS dysfunctions.
- Traumatic patterns may occur in both children with and without learning problems.

Furthermore, Viola Fryman stated that osteopathic treatment of the entire body positively influences learning problems.

In a 1999 study titled "**Intracranial membrane tension release of children with hyperactive disorder"** N.Röh and M.Rütz examined the hypothesis of whether the technique

of releasing the tension of intracranial membranes causes sufficient improvement of symptoms or whether a combination with treatment of dysfunctions of the SBS might be more practical.

They treated 30 children diagnosed with hyperactive disorder aged between four and eight years.
The children were divided into three groups of 10 patients each. The following interventions were performed:
Group 1: Treatment of SBS dysfunction and tension release of intracranial membranes.
Gruppe 2: Release of tension of intracranial membranes.
Group 3: None of the treatments mentioned.
Four treatments were given at four-week intervals. The results were as follows:
Group 1 showed statistically significant improvement of the score of the Conners Test and in osteopathic findings. No improvements were registered in group 2 and 3.
N.Röh and M.Rütz concluded that osteopathic therapy is a promising treatment approach, however, only if both dysfunctions of SBS are treated and tension release of intracranial membranes is reached (Rütz,Röh, 1999)

In her study **“Influence of osteopathic treatments on concentration disorders in children“** (2002), A. Lamberts examined if concentration disorders in children of the third and fourth grade could be improved by osteopathic treatment.
Study participants were 18 children who suffered from concentration disorders, a birth trauma or a skull trauma in their first or second year of life.
The children were divided in 2 groups. One group received 3 osteopathic treatments, the other was not treated. Before and after treatment a concentration test was carried out.

The result was that osteopathic treatment of children with concentration disorders and coexistent skull trauma in the first two years of life shows a statistically significant effect.

In a study titled **“The therapeutic efficacy of osteopathy in treating children with auditory processing and perception disorders“** carried out by Guerassimiouk and Markhoff

in 2003, the therapeutic efficacy of osteopathy in treating children with processing and perception disorders was to be examined.

34 children aged between 7 and 13 years were participating in this study. Patients in the main group (two thirds of the children) were treated by two osteopaths (11 – 14 times over 10 – 15 months). Patients in the other group (control group) were treated by practitioners of ergonomic, learning and motion therapy (once or twice a week over 10 – 15 months).
The result of this study showed osteopathic treatment to be an effective, integrated method of treatment for children with processing and perception disorders.

A study by A.Bierent-Vass, J.Lang, N.Neumann titled **"Osteopathic treatment of children with attention deficit disorders, with or without hyperactivity (ADD/ADHD) - is there any effect?**" dealt with the hypothesis that osteopathic treatment has a positive influence on children with ADHD.

77 children aged between 6 and 14 years and diagnosed with ADHD participated in this study. 50 children were treated, 27 were in the control group.
On the one hand children were examined along osteopathic principles, on the other hand the „Conners Scale" served as target parameter.
After a series of 4 treatments the following changes have occured:
In view of both the Conners Scale and the examination results a clear improvement could be seen, which means that the hypothesis was confirmed.

9.1. Discussion of Studies

All studies described in chapter 9 deal with the treatment of children suffering from stimulus perception and/or processing disorders. As a consequence, these children show changes in behavior and symptoms such as learning and concentration disorders, attention deficits and hyperactivity which are described in these studies.

Viola Fryman focuses on the treatment of learning disorders.

The study by D.Guerassimiouk and J.P.Markhoff deals with perception and processing disorders which might be the cause of learning disorders mentioned by V. Fryman but also of concentration disorders as discussed in the study by A. Lamberts. .

The study by Bierent-Vass, J.Lang and N.Neumann additionally deals with the symptom hyperactivity whose causes may be manifold, but in most of the cases lies in perception and processing problems.

M.Rütz and N.Röh also examined hyperactivity. In contrast to the studies mentioned before which are based on a general osteopathic treatment, they examined hyperactivity by means of a special technique.

10. Methodology

10.1. Type of Study

This is a clinical study, i.e. patients have been selected randomly.
Of all patients who had reported to be willing to take part in this study, an independent person allocated 15 patients to the experimental group(EG) and 15 to the control group (CG).

The children came from psychological practitioners, pediatricians, clinics, schools and associations for the support of children and adolescents suffering from processing disorders.

After randomization two groups were established:

- 15 ADHD patients in EG
- 15 ADHD patients in CT

10.2. Criteria to be Met

10.2.1. Inclussion criteria

- Diagnosed with ADHD; symptoms attention deficit and hyperactivity
- Children between 6 and 10 years of age
- Female and male
- All children both in EG and in CG are treated with Ritalin or other ADHD-specific drugs.

10.2.2. Exclusion criteria

- Diagnosed with attention deficit and hyperactivity but not with ADHD
- Children younger than 6 and older than 10 years
- ADHD patients who are not treated with Ritalin or other ADHD-specific drugs
- Children in psychotherapeutic treatment
- Children with other chronic diseases
- Handicapped children (neurological diseases)
- Children with severe birth traumas

10.3. Variables

10.3.1. Dependent Variable (DV)

DV can be measured (measuring instrument = questionnaire)
Following are the symptoms which are listed in ICD 10 and DSM IV for ADHD:

- Attention deficit
- Hyperactivity

10.3.2. Independent Variable (IV)

The IV must not be influenced, changes in DV should be causally dependent on IV. IV is:

- Osteopathic treatment (no specific technique but a general osteopathic treatment)

The reason why I used a general osteopathic treatment is that I wanted to change the current state of each ADHD child in a way that leads to an improvement of the symptoms attention deficit and hyperactivity.

10.3.3. Validity and Reliability

To ensure validity and reliability of DV and IV, this study uses the “Conners Scale”, which is acknowledged in medicine and psychology (see attachment). This questionnaire was developed by C. Keith Conners, Ph.D., in 1997 and adjusted to the criteria of DSM IV in 1997.

The “Conners Scale” used in this study contains 10 items on ADHD symptoms assessing 4 different severity grades. It is short and precise and enables parents to describe their child’s behavior well and easily.

10.4. Study Procedure

After group formation the study schedule is established:

Group A (= EG)

1st visit:

- Completing the ADHD questionnaire (Conners Scale) by parents
- Family anamnesis
- Osteopathic findings

2nd visit:

- 1st treatment

3rd visit:

- 2nd treatment; approximately 4 weeks after first treatment

4th visit:

- 3rd treatment; 4 weeks after second treatment
- Osteopathic findings
- Completing of Conners Scale by parents

Group B (=CG)

1st visit:

- Completing of Conners Scale by parents

2nd visit:

- Completing of Conners Scale by parents

The interval between the first and second visit in group B is approximately as long as the interval between the first and the fourth visit in group A.

11. Study

11.1. Description of Charts and Tables

Chart:

x-axis: Period of time

- 1st part: before first treatment
- 2nd part: after last treatment

y-axis: Shares of symptom severity

For each question the experimental group is compared to the control group. In order to compare these two, scores from result tables are multiplied by the number of patients and then added together.

Example:

Item 1= restless or overactive:

Not at all = 0 patients	0 x 0 = 0
Just a little = 4 patients	1 x 4 = 4
Quite a bit = 9 patients	2 x 9 = 18
Very much = 2 patients	3 x 2 = 6
0 + 4 + 18 + 6 = 28 =	score

On the basis of baseline values, this score is assumed to be 100%. Thus, the differences can be shown as absolute score or in percent and are comparable to each other.

11.2. Tables of Results

EG before treatment	Not at all (0)	Just a little (1)	Quite a bit (2)	Very much(3)
1. Restless or overactive	0	4	9	2
2. Excitable, impulsive	1	3	7	4
3. Disturbs other children	1	6	7	1
4. Fails to finish things – short attention span	0	2	13	0
5. Constantly fidgeting	0	6	6	3
6. Inattentive, easily distracted	0	2	6	7
7. Demands must be met immediately, easily frustrated	0	6	5	4
8. Cries often and easily	0	6	4	5
9. Mood changes quickly and drastically	1	4	9	1
10. Temper outburst, explosive and unpredictable behavior	1	5	7	2
EG after treatment	Not at all (0)	Just a little (1)	Quite a bit (2)	Very much (3)
1. Restless or overactive	0	9	5	1
2. Excitable, impulsive	0	10	5	0
3. Disturbs other children	1	8	6	0
4. Fails to finish things – short attention span	0	11	4	0
5. Constantly fidgeting	0	8	6	1
6. Inattentive, easily distracted	0	6	9	0
7. Demands must be met immediately, easily frustrated	0	7	7	1
8. Cries often and easily	0	10	3	2
9. Mood changes quickly and drastically	0	9	5	1
10. Temper outburst, explosive and unpredictable behavior	1	7	5	2

CG before	Not at all (0)	Just a little (1)	Quite a bit (2)	Very much(3)
1. Restless or overactive	0	8	4	3
2. Excitable, impulsive	0	4	11	0
3. Disturbs other children	1	10	4	0
4. Fails to finish things – short attention span	0	5	7	3
5. Constantly fidgeting	0	4	7	4
6. Inattentive, easily distracted	0	1	13	1
7. Demands must be met immediately, easily frustrated	1	4	7	3
8. Cries often and easily	3	5	3	4
9. Mood changes quickly and drastically	0	9	4	2
10. Temper outburst, explosive and unpredictable behavior	1	4	9	1
CG after	Not at all (0)	Just a little (1)	Quite a bit (2)	Very much(3)
1. Restless or overactive	0	7	8	0
2. Excitable, impulsive	1	5	8	1
3. Disturbs other children	1	7	7	0
4. Fails to finish things – short attention span	0	4	10	1
5. Constantly fidgeting	0	3	9	3
6. Inattentive, easily distracted	0	4	10	1
7. Demands must be met immediately, easily frustrated	1	2	9	3
8. Cries often and easily	1	8	4	2
9. Mood changes quickly and drastically	0	6	7	2
10. Temper outburst, explosive and unpredictable behavior	0	6	7	2

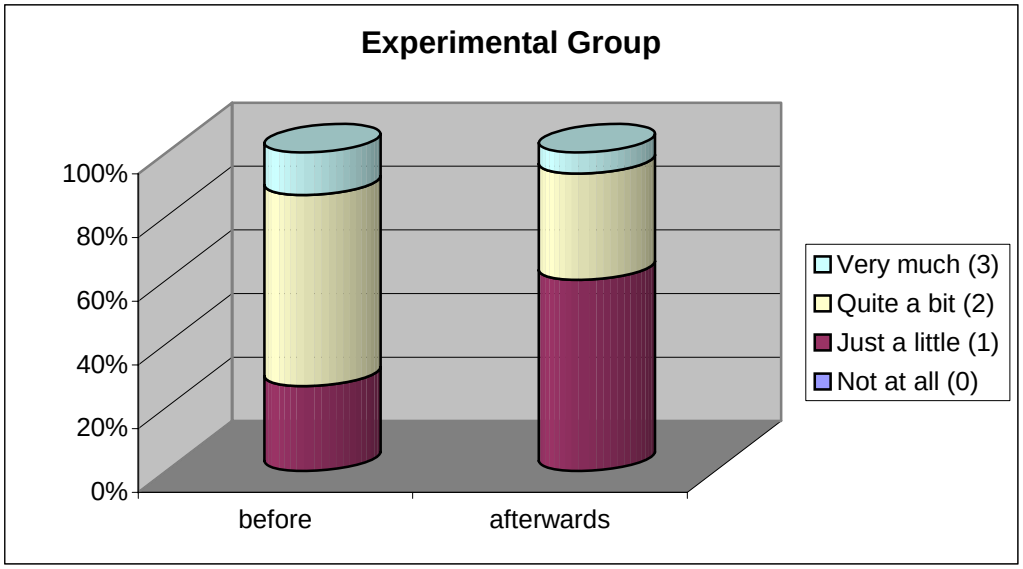
11.3. Changes of Values

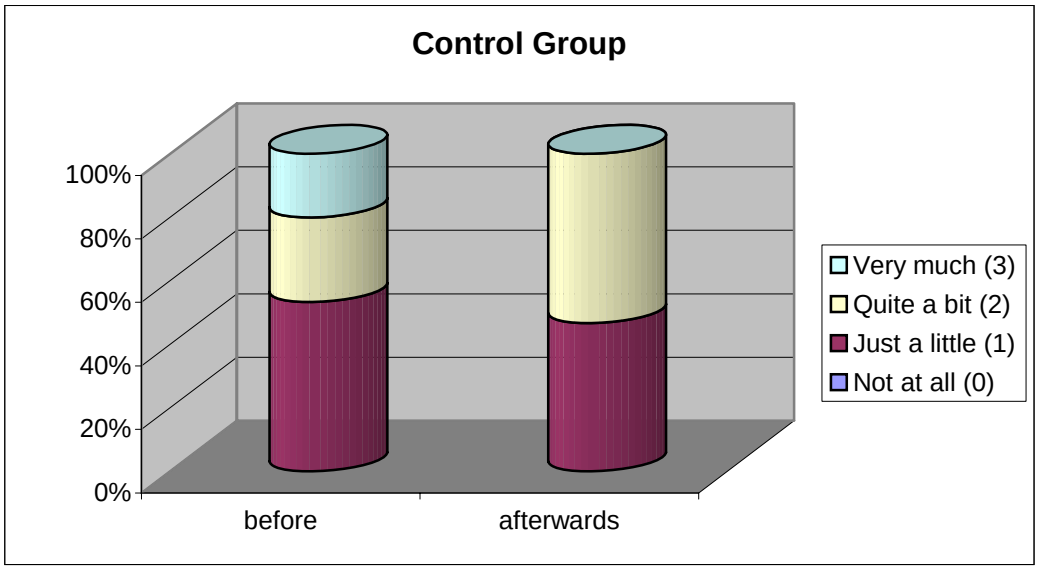
Experimental Group	absolute (score)	relative (%)
1. Restless or overactive	-6	-21.43 %
2. Excitable, impulsive	-9	-31.03 %
3. Disturbs other children	-3	-13.04 %
4. Fails to finish things – short attention span	-9	-32.14 %
5. Constantly fidgeting	-4	-14.81 %
6. Inattentive, easily distracted	-11	-31.43 %
7. Demands must be met immediately, easily frustrated	-4	-14.29 %
8. Cries often and easily	-7	-24.14 %
9. Mood changes quickly and drastically	-3	-12.00 %
10. Temper outburst, explosive and unpredictable behavior	-2	-8.00 %

Control Group	absolute (score)	relative (%)
1. Restless or overactive	-2	-8.00 %
2. Excitable, impulsive	-2	-7.69 %
3. Disturbs other children	3	16.67 %
4. Fails to finish things – short attention span	-1	-3.57 %
5. Constantly fidgeting	0	0.00 %
6. Inattentive, easily distracted	-3	-10.00 %
7. Demands must be met immediately, easily frustrated	2	7.41 %
8. Cries often and easily	-1	-4.35 %
9. Mood changes quickly and drastically	3	13.04 %
10. Temper outburst, explosive and unpredictable behavior	1	4.00 %

11.4. Charts and results

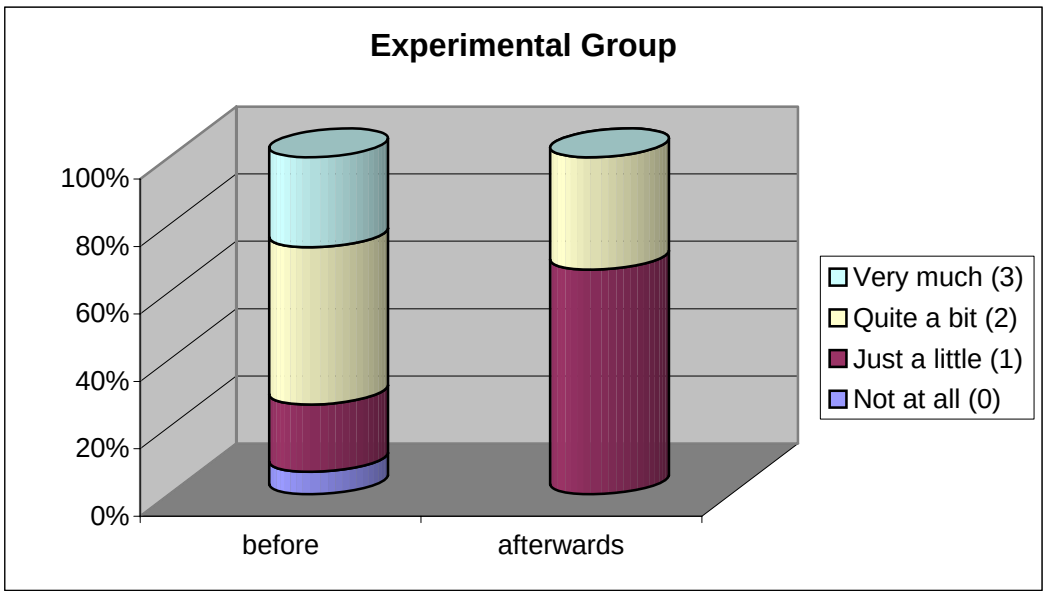
11.4.1. Item 1: Restless or overactive?

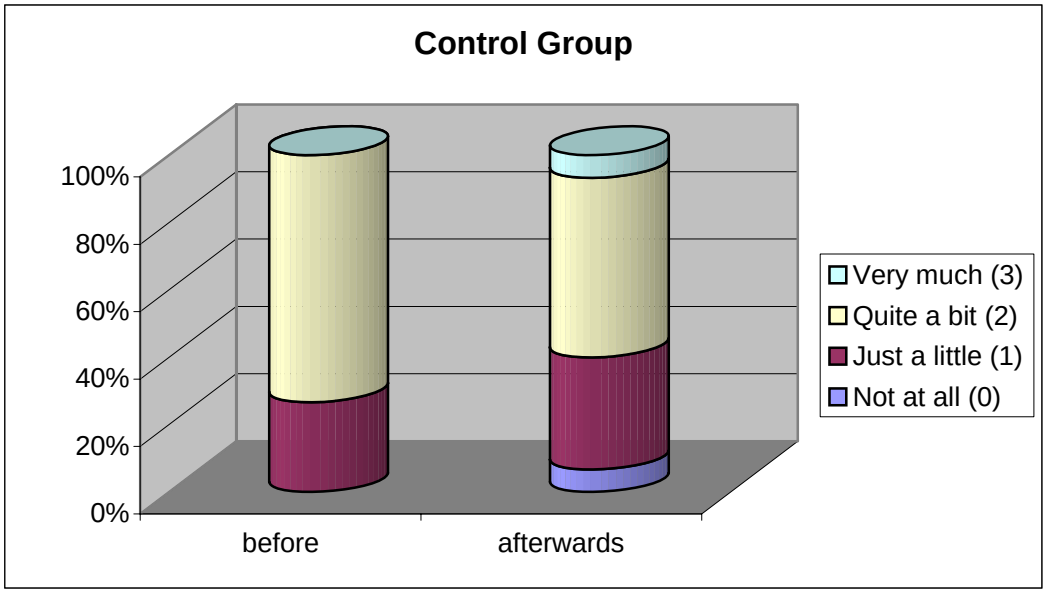




In EG the score for this item improved from 28 to 22 (-6 = -21.43 %) compared to CG which showed an improvement from 25 to 22 (-2 = -8.00 %).

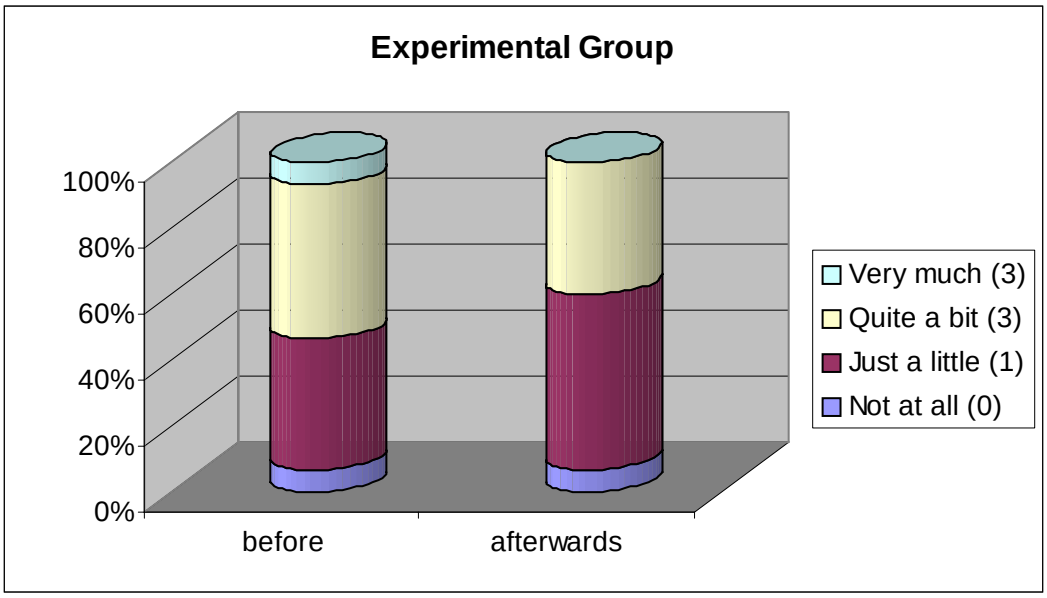
11.4.2. Item 2: Excitable, impulsive?

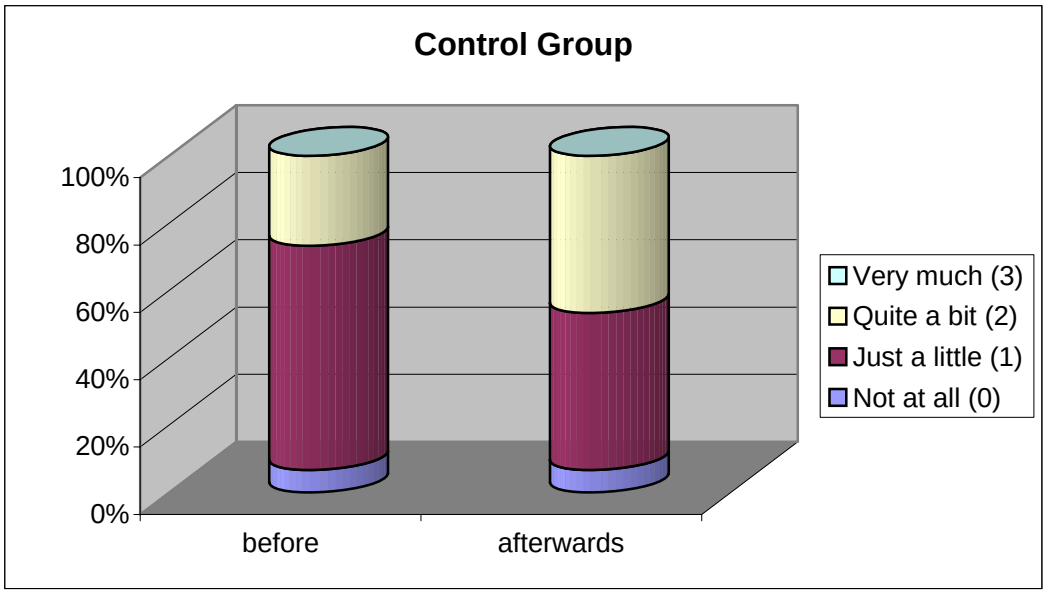




In this item the difference between EG and CG was even higher. EG improved from 29 to 20 (-9 = -31.03 %), CG improved from 26 to 24 (-2 P. = -7.69 %).

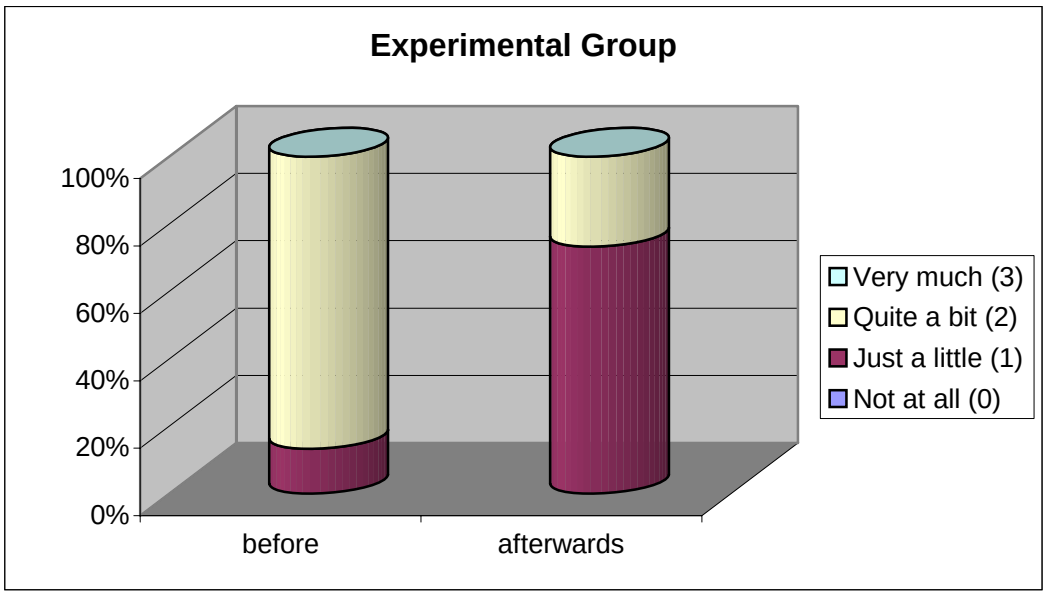
11.4.3. Item 3: Disturbs other children?

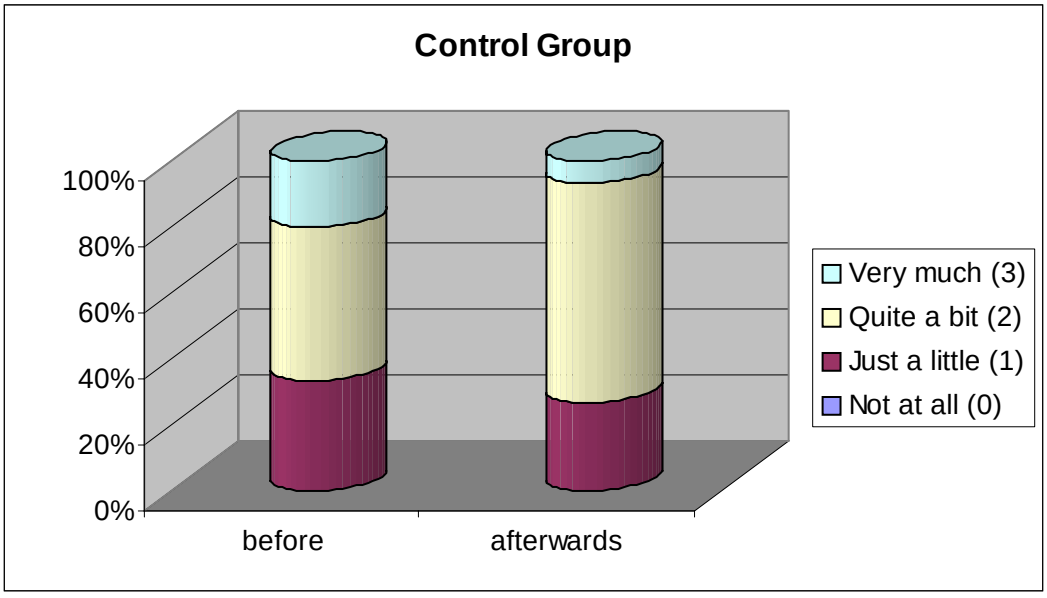




With regard to disturbing other children EG showed a slight improvement from 23 to 20 (-3 = -13.04 %), whereas CG showed a deterioration from 18 to 21(+3 = +16.67 %).

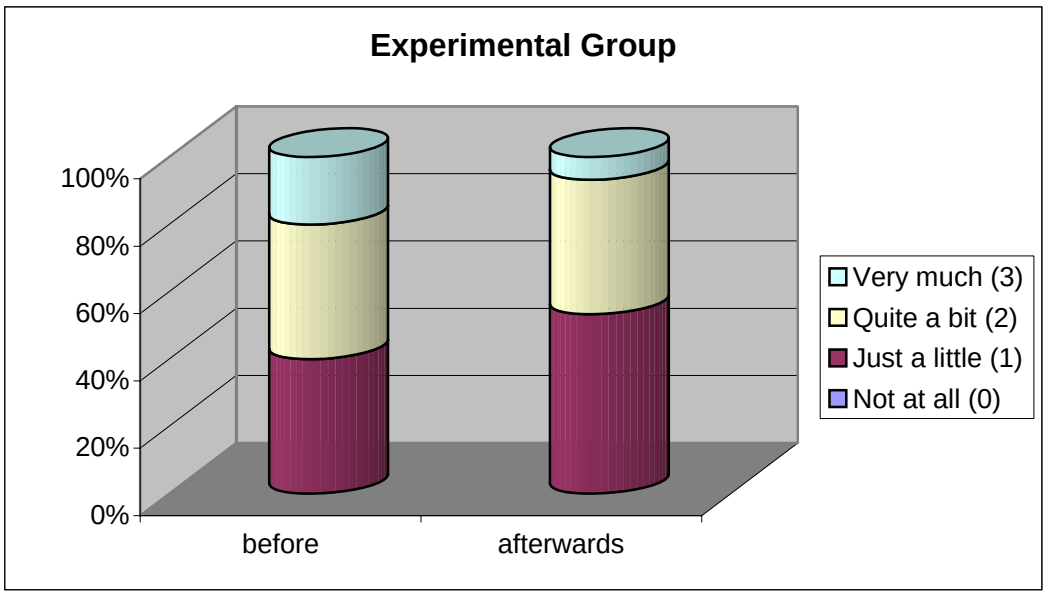
11.4.4. Item 4: Fails to finish things – short attention span?

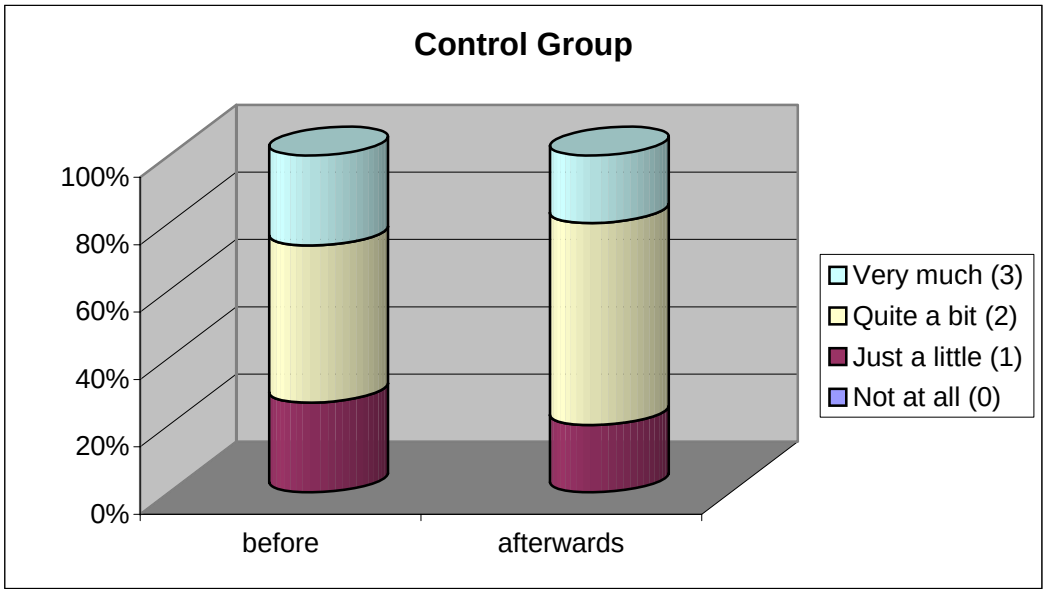




In this item EG showed particularly good results, improving from 28 to 19 (-9 = -32.14 %), while CG showed an improvement of merely 1 (= -3.57 %), from 28 to 27 .

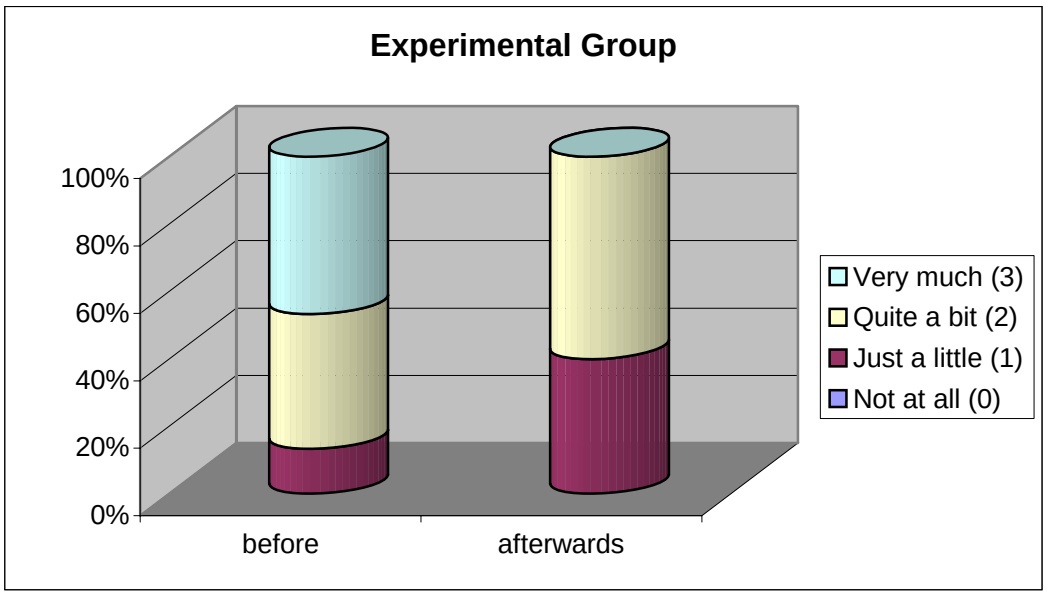
11.4.5. Item 5: Constantly fidgeting?

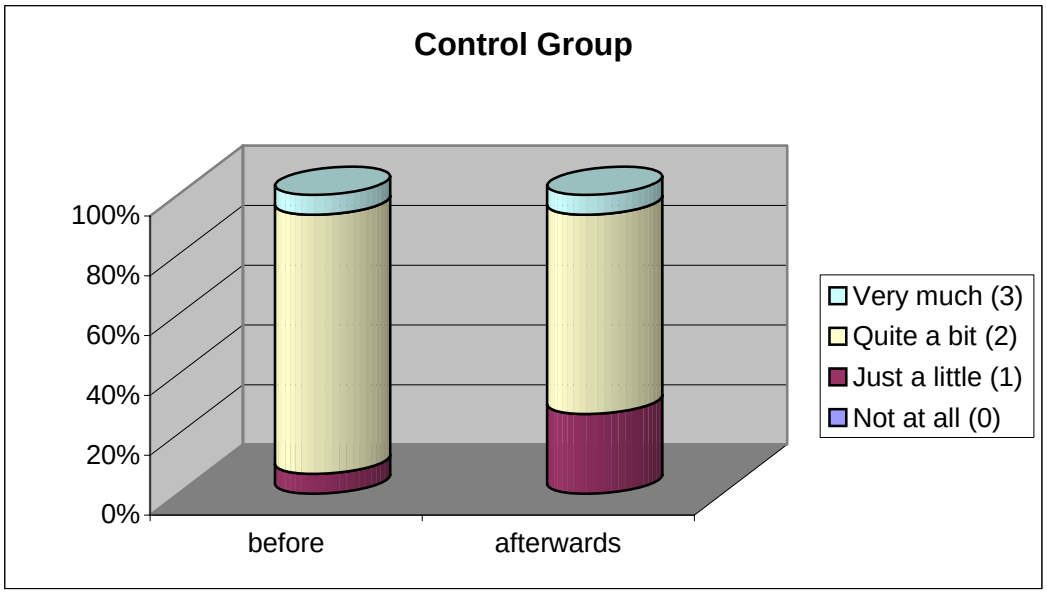




Patients in EG could reduce their score from 27 to 23 (-4 = -14.81 %), the score in CG remained the same, i.e. 30.

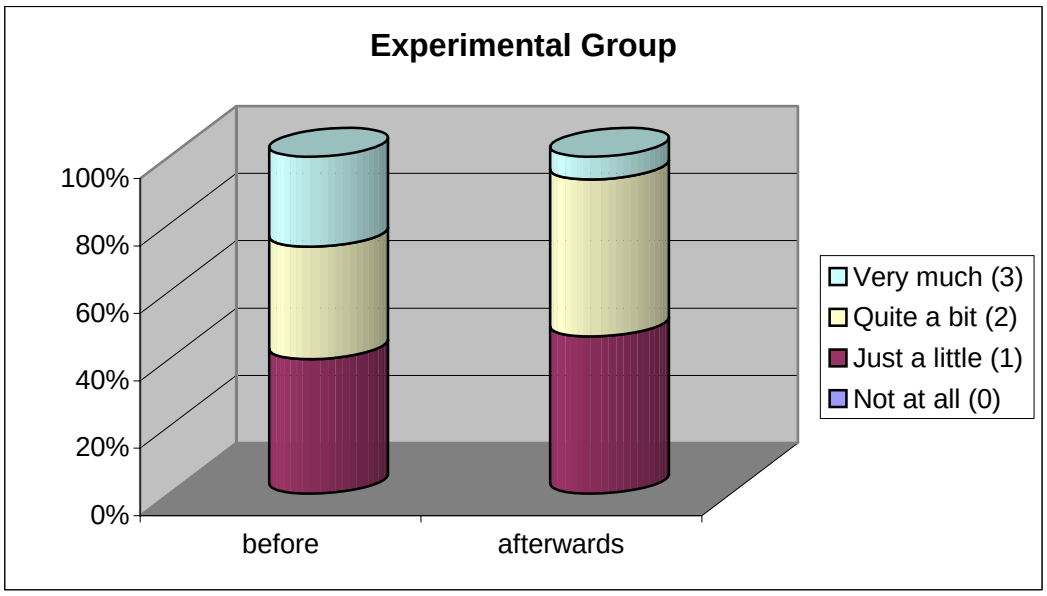
11.4.6. Item 6: Inattentive, easily distracted?

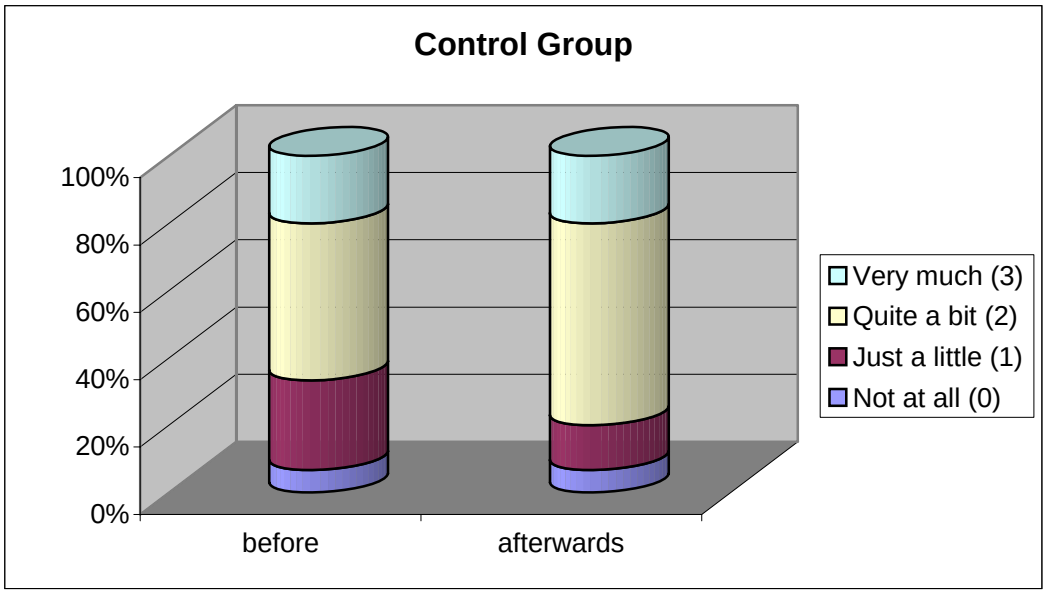




With regard to this item patients in EG showed a considerable improvement from 35 to 24 (-11 = 31.43 %), compared to CG, where the improvement was only from 30 to 27 (-3 = -10.00 %).

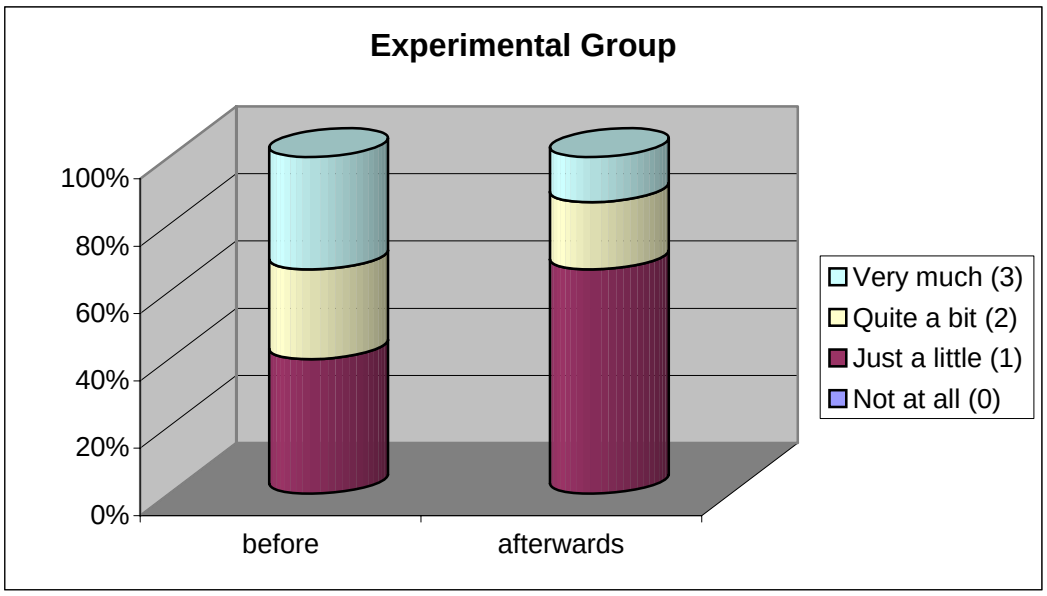
11.4.7. Item 7: Demands must be met immediately, easily frustrated?

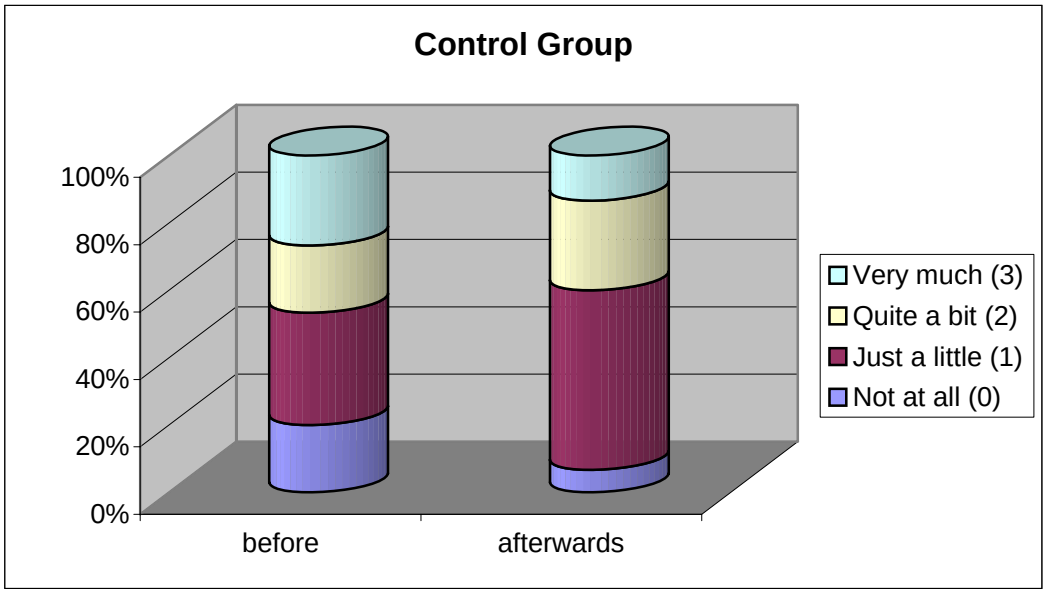




In this item patients in EG showed a slight improvement from 28 to 24 (-4 = -14.29 %), in CG, however, there was a deterioration from 27 to 29 (+2 = +7.41 %).

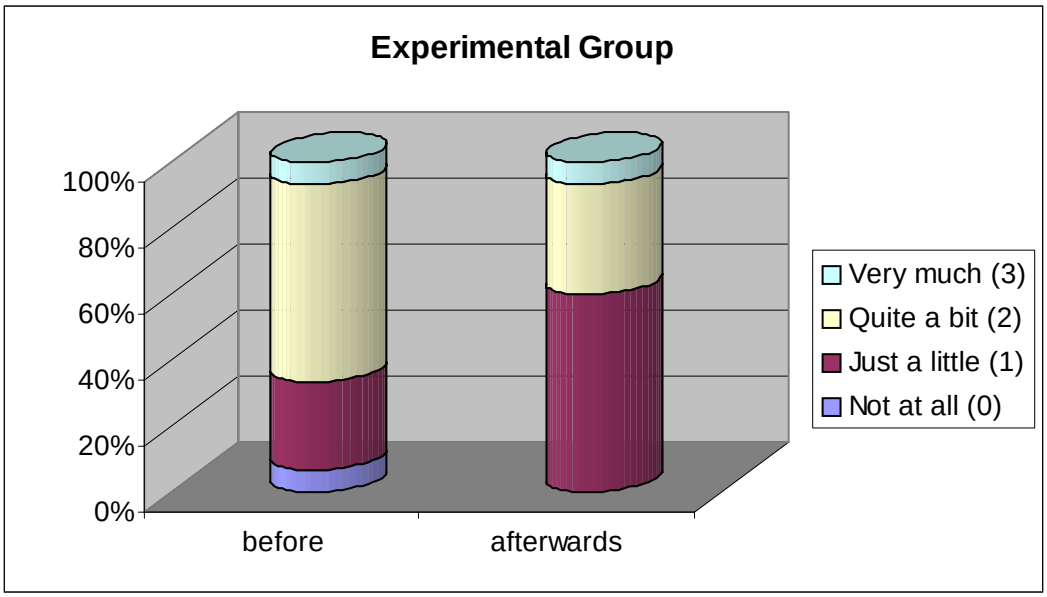
11.4.8. Item 8: Cries often and easily?

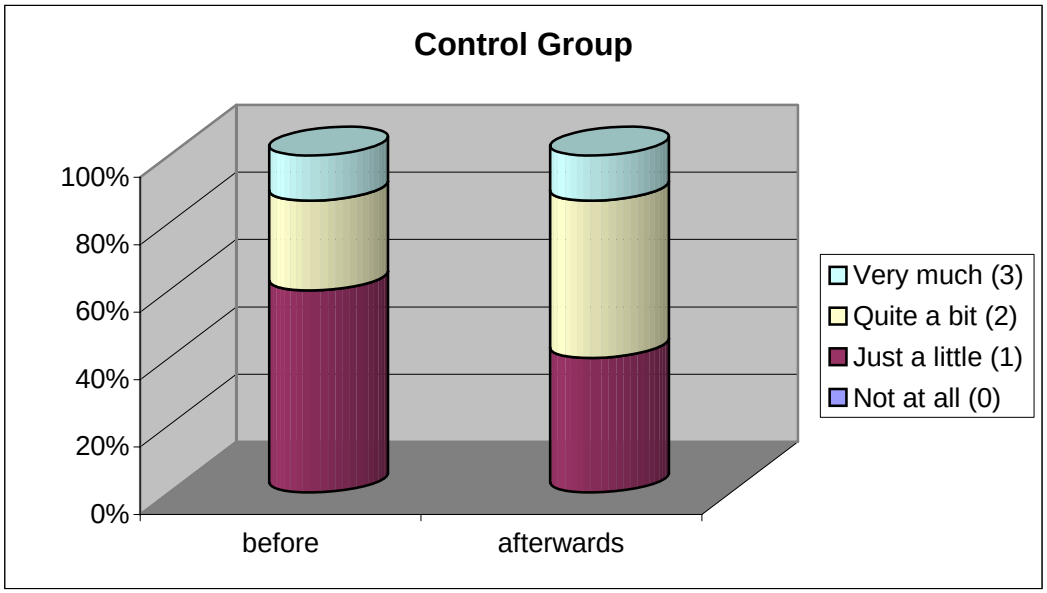




In this item the result of EG is again better than that of CG. In EG the score could be reduced from 29 to 22 (-7 = -24.14 %), whereas CG improved only by 1 (= -4.35 %) , i.e. from 23 to 22.

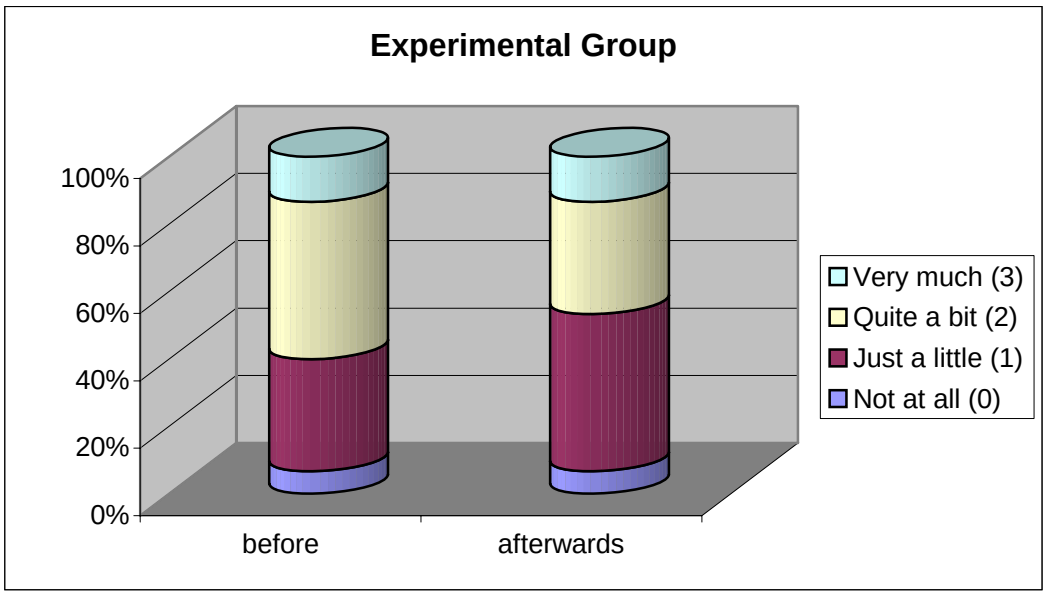
11.4.9. Item 9: Mood changes quickly and drastically?

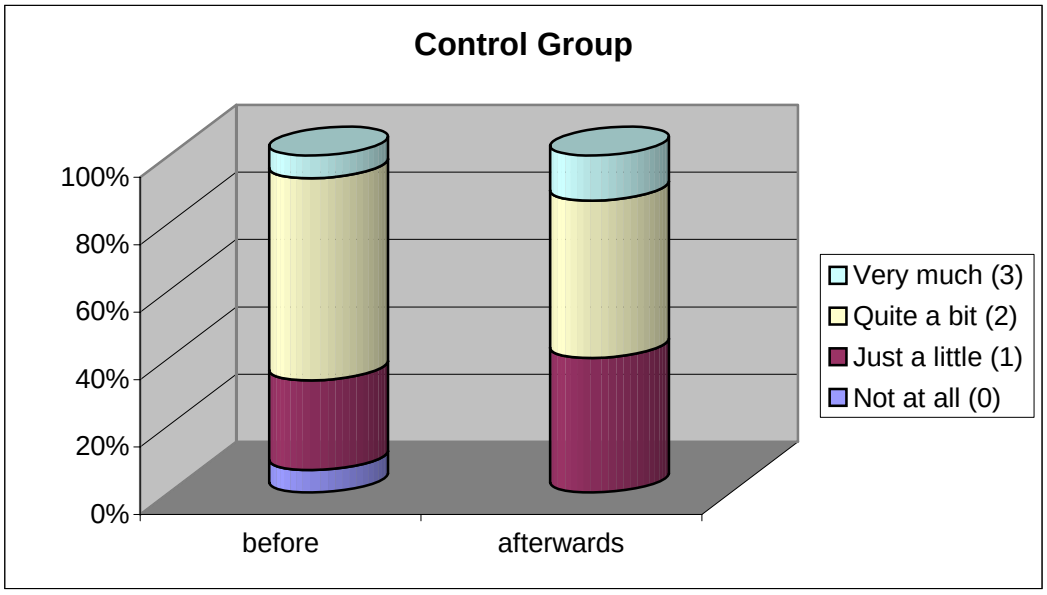




Concerning mood changes, in EG there was an improvement from 25 to 22 (-3 = -12.00 %) and in CG a deterioration from 23 to 26 (+3 = +13.04 %).

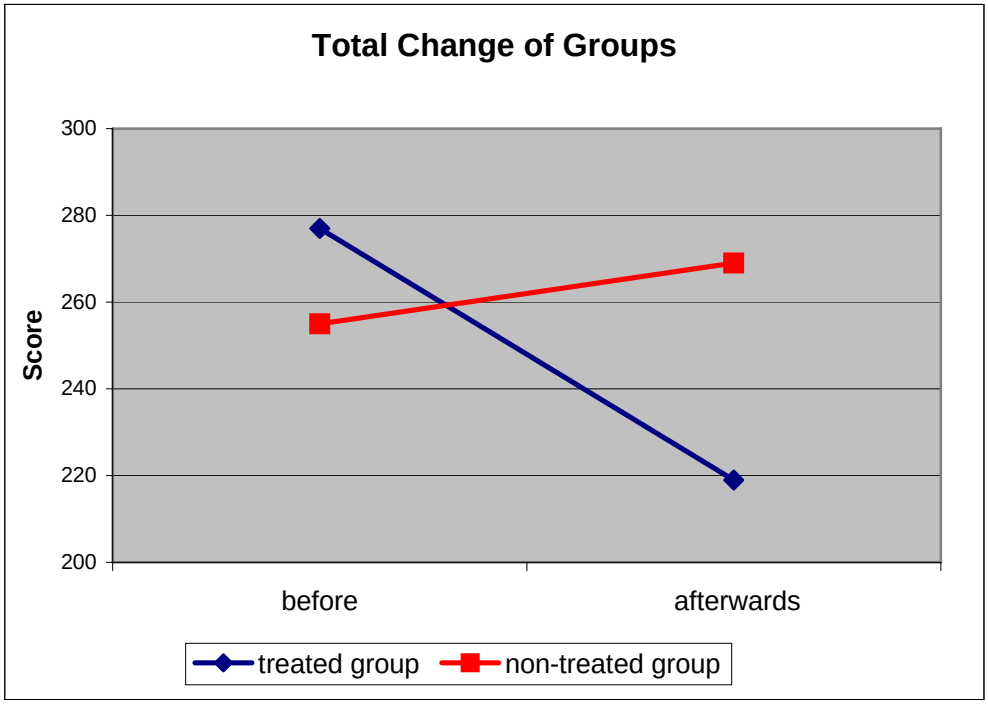
11.4.10. Item 10: Temper outbursts, explosive and unpredictable behavior?





In this item there was only little difference between EG and CG. Patients in EG improved from 25 to 23 (-2 = -8.00 %), those in CG deteriorated from 25 auf 26 (+1 = +4.00 %)

11.5. Chart Total Change



This charts clearly shows the changes in EG and CG. The severity of symptoms described in items 1 – 10 improved in children of EG due to osteopathic treatment from 277 to 215, i.e. improved by 52 = 18.77 %.

Children in CG who were not treated in this period showed a deterioration of symptoms from 255 to 269, i.e. they deteriorated by 14 = 5.49 %.

11.6. Osteopathic Treatment

For this study I decided to use a general osteopathic treatment and not a specific treatment technique. Therapy was individually adjusted to each child. So it is difficult to exactly describe the changes that occurred after the treatments.
However, it was striking that many children showed changes in the occiput area, particularly in C0-C1, the diaphragm and intracranial membranes. By treating these areas and other dysfunctions the severity of the symptoms hyperactivity and attention deficit could be reduced and the general condition improved.

12. Discussion of Results

The results of my study show that osteopathy has a positive influence on ADHD symptoms. As shown in the charts there is a significant difference between the treated group (EG) and non-treated group (CG). While patients in EG reached an improvement in all ten items, children in CG showed a slight deterioration in items “disturbs other children”, “inattentive, easily distracted”, and “cries often and easily”. A comparison of individual results between children in EG and CG reveals that 14 children of EG showed an improvement of the symptoms and one child stayed the same, whereas 6 children in CG showed an improvement, 6 showed no changes and 3 children even deteriorated.
Based on my work experience with ADHD children I expected to win more patients for this study. Unfortunately, I was not successful in this respect because of the limited time frame. So this is a small study with 15 children in EG and 15 children in CG.
I think this study could be improved by including a larger number of patients, extending the time frame and increasing the number of treatments. Additional measurement parameters such as the evaluation of patients by other persons (teachers, educators, grandparents, etc.) by means of questionnaires would lead to a more precise and thus more significant result.
I am glad that the result of my small study has been that positive and that my hypothesis – the positive influence of osteopathy on ADHD symptoms – has been confirmed.

13 Common Features and Differences Between my Study and Those Mentioned in Chapter 9

One common feature is that perception and/or processing problems, which, in turn, indicate disorders in certain brain regions, are the underlying cause of the symptoms that have been treated.

Thanks to intense research in neuroscience and functional imaging (SPECT, PET, etc.) we know that the regions affected by ADHD, i.e. prefrontal and premotor cortex, basal ganglia and cerebellum, are more or less underdeveloped.

The difference among the studies is that in each study one or more different symptoms have been examined and treated using different treatment techniques.

My own study is very similar to that of Bierent-Vass, Lang and Neumann. In both cases it was examined whether the symptoms attention deficit and hyperactivity could be improved by osteopathic treatment. The main differences are frequency and period of treatment. The studies' results show that all studies mentioned led to an improvement of symptoms.

From this it may be concluded that osteopathic treatment has a positive influence on the function of affected brain regions and, consequently, on the general condition of patients suffering from perception and processing disorders.

15. Summary

In daily work in my practice I am frequently confronted with the problems of ADHD. This is why I have decided to carry out this study titled “The influence of osteopathic treatment on ADHD”. This is a small study including 15 patients in EG and 15 in CG.
Due to the symptoms attention deficit, hyperactivity and impulsiveness children affected by ADHD have enormous problems in dealing with their family and their environment. They face constant rebuke, reproach and exclusion leading to a reinforcement of symptoms and weaking of the children’s self-esteem.
ADHD is a multi-factor disorder which should be seen and treated from different angles in order to improve the quality of life of children and their environment. Physicians, psychologists, practitioners of ergonomic, learning and motion therapy, physiotherapists and, of course, osteopaths should be involved in the therapy of affected children.
In this study I have treated children who were under drug therapy in order to show the effects of osteopathic treatment in these cases.
Fortunately, this study produced favorable results and it is appropriate to say that osteopathic treatment has a very positive influence on the patient’s general condition and therefore on ADHD symptoms.
An intense cooperation with physicians, psychologists and therapists working with ADHD would be desirable to contribute to a better quality of life of children and people caring for them.

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17. Attachment

17.1. Diagnostic Criteria of an Attention Deficit – Hyperactivity Disorder According to DSM IV

A. Either (1) or (2) must apply:

(1) Six (or more) of the following symptoms of *inattention* have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Inattention

(a) often fails to give close attention to details or makes careless mistakes in schoolwork, work or other activities,
(b) child often has difficulty sustaining attention in tasks or play activities,
(c) doesn't seem to listen when spoken to directly,
(d) often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions),
(e) often has difficulty organizing tasks and activities,
(f) often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework),
(g) often loses things necessary for tasks or activities (e.g. toys, school assignments, pencils, books, or tools),
(h) is often easily distracted by extraneous stimuli,
(i) is often forgetful in daily activities

(2) Six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Hyperactivity

(a) often fidgets with hands or feet or squirms in seat,
(b) often leaves seat in classroom or in other situations in which remaining seated is expected,
(c) often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness),
(d) often has difficulty playing or engaging in leisure activities quietly,
(e) is often "on the go" or often acts as if "driven by a motor",
(f) often talks excessively .

Impulsivity

(a) often blurts out answers before questions have been completed,

(b) often has difficulty awaiting turn,

(c) often interrupts or intrudes on others (e.g., butts into conversations or games)

B Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before 7 years of age.

C Some impairment from the symptoms is present in 2 or more settings (eg, at school or work or at home).

D There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E The symptoms do not occur exclusively during the course of a pervasive developmental disorder, schizophrenia, or other psychotic disorder and are not better accounted for by another mental disorder (eg, mood disorder, anxiety disorder, dissociative disorder, or personality disorder). (Mumbach 2005)

17.2. Operationalized Criteria of ICD-10 for the Core Features of Hyperkinetic Disorders

1.Inattention

At least six of the following symptoms of attention have persisted for at least six months, to a degree that is maladaptive and inconsistent with the developmental level of the child::

1. often fails to give close attention to details, or makes careless errors in school work, work or other activities
2. often fails to sustain attention in tasks or play activities
3. often appears not to listen to what is being said to him or her
4. often fails to follow through on instructions or to finish school work, chores, or duties in the workplace (not because of oppositional behaviour or failure to understand instructions)
5. is often impaired in organising tasks and activities
6. often avoids or strongly dislikes tasks, such as homework, that require sustained mental effort
7. often loses things necessary for certain tasks and activities, such as school assignments, pencils, books, toys or tools
8. is often easily distracted by external stimuli
9. is often forgetful in the course of daily activities

2. Hyperactivity

At least three of the following symptoms of hyperactivity have persisted for at least six months, to a degree that is maladaptive and inconsistent with the developmental level of the child:

1. often fidgets with hands or feet or squirms on seat
2. leaves seat in classroom or in other situations in which remaining seated is expected
3. often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, only feelings of restlessness may be present)
4. is often unduly noisy in playing or has difficulty in engaging quietly in leisure activities
5. exhibits a persistent pattern of excessive motor activity that is not substantially modified by social context or demands.

3. Impulsivity

At least one of the following symptoms of impulsivity has persisted for at least six months, to a degree that is maladaptive and inconsistent with the developmental level of the child:

1. often blurts out answers before questions have been completed
2. often fails to wait in lines or await turns in games or group situations
3. often interrupts or intrudes on others (eg butts into others' conversations or games)
4. often talks excessively without appropriate response to social constraints

(Steinhausen2002)

17.3. Conners Scale

Questionnaire on symptoms of activity and attention disorders.

Please evaluate:

Name of child_____
with regard to the listed behaviors.

Date_____

	Not at all (0)	Just a little (1)	Quite a bit (2)	Very much (3)
1. Restless or overactive				
2. Excitable, impulsive				
3. Disturbs other children				
4. Fails to finish things- short attention span				
5. Constantly fidgeting				
6. Inattentive, easily distracted				
7. Demands must be met immediately, easily frustrated				
8. Cries often and easily				
9. Changes mood quickly and drastically				
10. Temper outbursts, explosive and unpredictable behavior				

17.4. Findings Sheet

Osteopathic Findings Date:

Surname: First name:

Date of birth: Age:

Address: City: Zip code:

Phone number:

Names of parents:

Siblings:

Anamnesis:

Symptoms:

Pain:

Since:

Caused by:

Pain progression:

Deterioration / Improvement:

Examinations already carried out:

_____

Course of pregnancy:

_____

Birth:

_____

Growth and Development:

Accidents:

Diseases:

Surgeries:

Medication:

Nutrition:

Psychological state:

Family history:

Therapies (currently) carried out:

Inspection and Palpation:

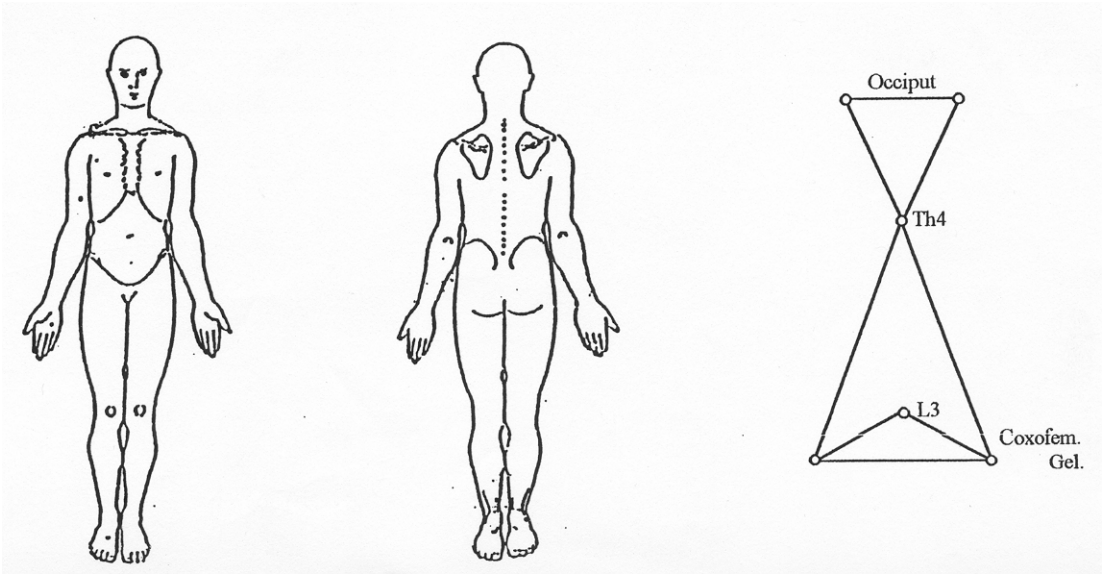
General listening:

Thorax:

Spinal column:

Pelvis:

Extremities:



Head and neck:

Internal organs:

Functional Tests:

Vestibular system:

- **Status**
- **Post-rotatory nystagmus**
- **Tonic labyrinth reflex**

Vestibular system and cerebellum:

- **Walking on a line**
- **Standing on one leg**

Cerebellum:

- **Standing on one leg and counting backwards**
- **Running the sole of one foot up and down the shin of the opposite leg while lying**
- **Touching thumb and fingers together**

Brain stem:

- **Moro Reflex**
- **Asymmetric tonic neck reflex**
- **Symmetric tonic neck reflex**

Visual area:

- **Tracking test (tracking moving objects with eyes)**

17.5. List of Abbreviations

ADHD ..... Attention deficit hyperactivity disorder

ADD ..... Attention deficit disorder

HKD ..... Hyperkinetic Disorder

POS..... Psycho-organic syndrome

ICD ..... International Classification of Diseases

DSM ..... Diagnostic and Statistic Manual of Mental Disorders

APA..... American Psychiatric Association

WHO ..... World Health Organization

CNS ..... Central nervous system

SBS..... Sphenobasilar synchondrosis

LCS..... Liquor cerebrospoinalis

EEG ..... Electroencephalogram

EP ..... Evoked potentials

CT..... Computed tomography

MRI ..... Magnet resonance imaging

PET..... Positron emission tomography

SPECT..... Single photon emission computed tomography

CRS ..... Conners rating scales

CBCL ..... Child behaviour checklist

TRF..... Teacher Rating Form

EG..... Experimental Group

CG ..... Control Group

DV ..... Dependant variable

IV..... Independent variable

17.6. List of Figures

Fig. 1 Courses of the neurotransmitters from H.Brandau, Das ADHS puzzle, p.32

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Fig. 3 Affected regions of the brain from Spectrum der Wissenschaft, Digest ND 4/2004, p. 85

Fig. 4 Limbic system from R.Rohkamm, Taschenatlas der Neurologie p.145

Fig. 5 How a synapsis works from N.Andreasen, Brave new brain, p.91

Abstract

Aim of the study: The aim of this study is to show the influence of osteopathic treatment on ADHD symptoms such as attention deficit and hyperactivity.

Type of study: Controlled, randomized clinical trial including an experimental group (EG) and a control group (CG).

Patients: Children, male and female, aged between 6 and 10 years showing the symptoms attention deficit and hyperactivity.
The children received drug treatment – but no other therapies. EG, including 15 children, was compared to CG, which also included 15 children.

Target parameter: The Conners Scale was used. This rating scale was completed by the parents before the first and after the last treatment. An osteopathic findings sheet served as the second target parameter.

Treatment: General osteopathic treatment, adjusted to individual problems (dysfunctions) of each patient. The children were treated 3 times at intervals of approximately 4 weeks. Before and after treatment Conners Scale and osteopathic findings sheets were completed. The same procedure was carried out in CG, however, without osteopathic treatment.

Results: After osteopathic treatment EG showed a clear improvement in all 10 items of the Conners Scale. In CG a slight deterioration in some items could be seen.

Conclusion: On the basis of these results it can be stated that osteopathic treatment has a very positive influence on the symptoms attention deficit and hyperactivity and is therefore a promising treatment approach.