Legasthenia and Osteopathy

Can the performance of dyslectic children be improved by osteopathic treatments?

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1 Introduction

1.1. Discovering Possible Correlations

Dyslectic conditions improved enormously in two cases ago during my osteopathic work with children two years ago. One of the children was undergoing osteopathic treatment from me due to scoliotic deformation of the spinal column, and the other one was receiving treatment for chronic knee pains. The case of an 11-year-old boy referred to me because of his scoliosis was particularly impressive; some days after treating him, I received a telephone call from his mother, who asked me if the treatment could somewhat affect his legasthenia (which I hadn't known he had). The boy had taken a legasthenia test (which he did regularly) and, instead of the usual 19 to 22 mistakes, he only made 2(!). Now, during the second treatment, the focus of attention was primarily on examining the causes and treating them. It was especially gladdening to see the enormous, permanent and sustained improvement in the boy's school grades over many years now (and those are the only hard "facts" in this case).

Since, in my experience, both children and adults suffer enormously from legasthenic conditions, the news of the potential for improving those conditions with osteopathic treatment quickly spread around among the parties concerned. Since then, I have been treating children regularly with varying degrees of success. The effects range from little or no change to the complete disappearance of the dyslectic conditions.

I have chosen this topic as the subject of my diploma thesis in order to elucidate it somewhat more thoroughly.

1.2. The Importance of Treating Dyslectic Conditions

Due to the massive pressure on both children and parents, the importance of detecting and treating legasthenic conditions cannot be emphasised too greatly. For the most part, it is the mothers who first sense that “something isn’t right.”[1] Remarks from teachers such as “That’ll be all right with time / The child must practise more / Your child could do it if he wanted to”[1] are often heard; they do not help the mothers any more than frequently heard comments from the fathers, such as “That’s all in your head / Don’t be so ambitious / You’re too inconsistent / Everything’s all right with my child.”[1] But then, when professional help is first sought – usually from a paediatrician or family doctor – helplessness and perplexity increase all the more, leading to remarks such as “The child is developing normally anyway / Don’t put such pressure on him to achieve / Be happy that the child is healthy.” [1]

The longer a case of legasthenia remains undetected and untreated, the likelier it becomes that consequences will develop; “I can’t do anything / Learning is useless / What’s the sense of paying attention?”[1], as well as mental problems, peculiar behaviour, psycho-social and psychosomatic problems.[2] On the other hand, mastery of reading and writing to a minimum extent in the industrial countries of our time is a prerequisite for actively participating in social life and assuring one’s livelihood.

Experience and related examinations have shown that children in Grade 2 of elementary school who have great problems with reading and/or spelling barely succeed in overcoming those difficulties by the end of their school years without special help.[3]

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[1] The mothers of Johannes H., Jasmin D., Lilia G., David S., personal communication 2005-2006
[2] Legasthenie-umschriebene Lese- Rechtschreibstörung, E. Klasen, 1999, p. 35 *et seq.*
[3] Schneider et al, 97a, 127

1.3. Definition of Dyslexia / Legasthenia

It is often said that dyslectic disturbance is not a disturbance at all, since there are no clear options for diagnosing it.

According to the World Health Organisation, dyslexia (dys: faulty, incomplete, Lexis: word, language) is "A condition in which reading and writing achievements are below the level to be anticipated according to age, general intelligence and schooling. The disturbance is found in all known languages, but it is not certain whether its frequency is influenced by the type of language and writing."[4]

According to German child and youth psychologists, "The main symptom of legasthenia is a circumscribed curtailment in the development of reading and spelling skills not explicable by a general curtailment of mental development, specific detriment to the senses or inadequate schooling."[5]

"Legasthenia is a partially impaired brain capacity due to development and the brain's neurophysiological functions important for learning, such as retention capacity, memory or perception processing. This partial learning disturbance impairs the process of learning the written language and makes converting the letters into language and vice-versa difficult and full of errors."[6]

"Legasthenia is a special weakness beyond the scope of other performance in learning to read and write where intelligence is otherwise sound and good."[7]

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[4] WHO, ICD-10, 1993 classification schema
[5] Deutsche Gesellschaft für Kinder- und Jugendpsychologie, "Stellungnahme zur Legastheniefrage," 1994
[6] E. Klasen, Legasthenie-umschriebene Lese-Rechtschreibstörung, 1999, 14
[7] Schenk-Danzinger, 1971, 23

1.4. Osteopathy's Options and Chances

Reading the relevant literature, I cannot help but feel that there is a vast number of causes and approaches, yet every one of them alone is inconclusive, conceived one-dimensionally or unevenly provable.

Osteopathy's chance lies in its multi-systemic approach, in which finding the cause is at the forefront (as A.T. Still, the founder of osteopathy defined it), rather than compensating for or training away the symptoms (as is also the case in the legasthenia therapy of today).

When studying the anamnesis and examination findings of a dyslectic patient, my uppermost thought is always, "What is disturbing this nervous system? What could the problems be that caused this brain to select these symptoms?"

The remarkable thing in osteopathic treatment is that the approach is multi-layered; "Is the displaced sacral bone via the cerebral membrane disturbing the central nervous system, is the metabolism overloaded due to the poor liver activity, is this rotated 2nd neck vertebra disrupting the brain's blood circulation in 'important' areas, is this blocked cranial suture to blame for the disruption of the transmitter metabolism?" etc.

This plenitude of approach options does not make it easier to find the (actual) causes (which, unfortunately can never be said with certainty due to such a large number of techniques, therapeutic interventions and detected lesions); but the joy at seeing an enormous reduction of times of doing homework or studying, improved concentration, better school grades and better functioning of the parent-child relationship makes the effort more than worthwhile.

2. Fundamentals

2.1. Causes of Dyslexia

Seeking a therapy to treat the problems of reading and spelling difficulties (not really acknowledged until the early 20th century), we soon turn to the research of its causes. However, the problem is that dyslectic people have no other peculiarities, disturbances or problems other than the difficulty of turning words into writing when they are heard, and the problems of making spelling errors without any special pattern, not being able to match the lettering of the original, and receiving information – decoding it – and reproducing it.

There are various reasons why the frequency of dyslexia cannot be stated with accuracy; (1) to the present day, it is still unclear what the term legasthenia includes, (2) Are only severe or mild cases included in the statistics? (3) Did a layman or an expert make the diagnosis? (4) Are the children undergoing treatment? A frequency of 5 – 15% of the populace is assumed according to these criteria.[8]

German psychologists proceed on the assumption of 8% of schoolchildren aged 6 to 18 who attend a psychosocial institution.[9]

The actual causes are being sought today in biology, neuropsychology, linguistic development obstructions, visual and auditory perception weaknesses, and in social life.[10]

Biological causes

In almost all examinations of children and juveniles attending clinical or special pedagogical institutions due to reading and spelling difficulties, the reports show a conspicuously greater number of boys than girls (3:2 to 3:1).[11] The cause could be seen in the

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[8] E. Klasen, Legasthenie-umschriebene Lese-Rechtschreibstörung 1999, 21
[9] Zeitschrift für Kinder- und Jugendpsychiatrie, No. 22, 1994, 74-78
[10] Klicpera et al, Legasthenie, 2003, 114-189
[11] *Ibid.*, 124

girls' greater motivation to read and the superior chances to practise in class due to differing kinds of teacher-student interaction.

In genetic terms, the Linkage Method (statistical analysis in family examinations to research the possible coupling between phenotypes and specific gene regions or to test possible linkage between two gene regions [Deutsche Zeitschrift für Sportmedizin, Year 53, Issue 12, p. 382, 2002]) is applied to the reading and spelling gene on the long arm of the 15th chromosome.[12] This chromosome is believed to be involved in 1/3 of legasthenic persons. Other genes perhaps implicated in familial heredity include nos. 1, 2 and 18.[13]

Neuropsychological and anatomical causes:

Anatomically structural causes are assumed after dissecting the brains of eight legasthenic persons who had died at an early adult age.[14] The planum temporale of the right hemisphere is perceived to be larger than on the left side; normally, the reverse is the case with right-handed persons. Precise imaging procedures yield no confirmation; rather, there is also a reduction of the 1st and 2nd transverse convolutions of Henschl's gyrus and of the cerebellum's anterior lobe in the left hemisphere and an additional transverse gyrus at the operculum parietale.[15]

In the corpus callosum, the hemispheres' fibrous connections are less developed regarding the anterior part, although the posterior part is actually connected to the temporal region.[16]

According to blood-flow measurements on the Positrons Emissions Tomography (PET), the normal reading function is localised in the left prestriat occipital lobe.[17]

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[12] Grigorenko et al, American Journal of Human Genetics 60, "Susceptibility loci for distinct components of developmental dyslexia on chromosome 6 + 15," 1997, 27-39
[13] Schulte-Körne, Journal of Child Psychology 42, "Genetics of reading and spelling disorders," 2001, 985-997
[14] York Press, "Anatomy of Dyslexia : Argument against Phrenology," 1991, 119-131
[15] C. Leonard, Learning Disability Quarterly 24, "Imaging Brain Structure in Children," 2001, 158ff
[16] Hynd et al., Psychological Bulletin 106, "Dyslexia and Brain Morphology," 1995, 447-482
[17] Petersen et al., Journal of Cognitive Neuroscience 1, "Positron emission tomographic studies of the processing of single words" 1989, 153-170

Successful reading depends on billions of brain cells functioning flawlessly in groups of cells engaged in alternation and impeccable transmitter metabolism. Thus, in order to detect “authentic” legasthenia, an examination of visual, auditory and motor-function capabilities is initially necessary, as well as an examination of general intelligence and any psychological disturbances. Unfortunately, these examinations do not begin for the most part until children have withstood two to four frustrating years of school, filled with shame and failure. Statements from their parents confirm that such children frequently evince a general refusal to perform and peculiar behavioural traits.

Visual Perception Deficiency:

The functioning of the organs of sight and the brain areas controlling them are the basic capacities necessary for learning to read and write. Although the eyes, optic nerves and the occipital lobes (optic centre) are not impaired, there are vision-related problems. The phenomenon of lateral masking[18] causes children with reading and writing problems to learn the visual strategies necessary for reading (following the lines, correct sequence of letters, etc.) only with difficulty or not at all.

Inadequate control of vision movement is responsible for the impairment of focused attention and/or targeted looking. Deficiencies in the magno-cellular system[18] entail problems in perceiving rapidly changing optical stimuli in the sense of initial universal information processing of what has been read. The magno-cellular system closely interplays with the parvo-cellular system, which is responsible for recognising small details in what has been read. Spatial orientation deficiency is often the first indication of a symptom of legasthenic disturbance, entailing confusion of b with d or w with m, for example.

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[18] Klicpera et al, Legasthenie, 2003, 176-179

Impediments to linguistic development

Language is a fundamental tool in human society, and it is also indispensable for learning and extending reading and writing skills. Insufficient linguistic development entails the risk of further reading and writing difficulties,[19] which in turn make linguistic dealings, encouragement and interaction extremely important (especially within the family).

Auditory perception deficiencies:

Intact functioning of the hearing is just as important as the functioning of the sight. Problems in perceiving and differentiating stimuli in rapid sequence and quick transitions[20] entail the loss of key information used to filter useful input from what has been heard.

Social causes

Social causes may play a direct role (living conditions, family size) or indirect role (poverty) in the formation of legasthenia.

The probability of legasthenic disturbance increases depending on the duration and degree of poverty (which especially affects single mothers, even in highly developed industrial countries). Poverty itself is not originally responsible; rather, it is the circumstances accompanying poverty: greater expense in living a "normal" life, hopelessness, depression, alcohol or drug problems, assistance programmes unaffordable, and thus less time for interaction, learning, and talking with children.

Higher education for mothers and adequate, imaginative, varied and regular activity with the children stimulate them toward better cognitive advancement.

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[19] B.K. Shapiro, "Precursors of Reading Disorders," Pediatrics 85,1990, 416-420

[20] Tallal et al, "Temporal information processing in the nervous system: special reference to dyslexia", Annals of the NY Academy of Science 682, 1993, 27-42

Family size influences the statistical probability of legasthenic disturbance. The number of siblings correlates negatively with reading and writing skills, and those born later run a greater risk of developing reading and writing problems.[21]

The importance of living conditions and interaction within the family must not be underestimated; a regular, constant “workplace” for a child is just as important as the absence of regular disruptions when reading or practising. Slight social involvement within the family makes the problems even worse.[21]

[21] Klicpera et al, Legasthenie, 184-189, 2003

2.2. Prerequisites for normal learning Achievements

Non-pathological functioning of the senses is necessary to receive, evaluate, integrate and further use sensory perceptions. Other important factors include the following:

Undisrupted auditory perception is necessary in order to receive, structure and associate acoustic stimuli with previous occurrences or experiences. Auditory differentiation is based on specific characteristics of the acoustical stimuli, whereas auditory formation structures the complex auditory impressions. Legasthenics cannot perceive sounds correctly, filter them out from the background and have difficulty in separating the essential from the ephemeral.[22] Other developments include the inability to differentiate between hard and soft consonants and confusion of diphthongs and mutations. Legasthenic children, for example, are affected with the problem of not being able to filter out the their teacher's words from the variety of noises (i.e. auditory information) in the classroom.

Visual decoding is just as necessary for understanding and interpreting what one sees (i.e. comprehending the meaning of images, symbols and letters) as visual perception, which recognises, differentiates and interprets optical stimuli.[23]

But above all, it is seriality – the ability to record, remember and reproduce stimuli in temporally correct sequence – which is of the greatest importance in transforming what has been seen, heard or written from one to the other.

Pedagogical psychology defines five alphabetical prerequisites for fundamental reading and writing comprehension:[24]

1. the ability to learn the letters of the alphabet (grasping the interactive processes among linguistic, visual and acoustical stimuli)
2. the ability to learn the letters and to hear them in the sound of a word as well

[22] Schenk-Danzinger, "Legasthenie. Zerebral-funktionelle Interpretation", 1991
[23] J.Bush/T.Giles, „Psycholinguistischer Sprachunterricht", 1982, 66
[24] Schenk-Danzinger, "Legasthenie. Zerebral-funktionelle Interpretation", 1991

3. the ability to identify various symbols (recognising the difference between symbols of the same form or facing in different directions [b – d])
4. attainment of an objectification level in speech: taking apart and combining the acoustical word pattern
5. the ability to perceive directional sequences (e.g. to write from left to right).

In view of the large number of potential problem factors which can be responsible for reading and writing deficiencies, it is amazing that the number of persons affected is not appreciably greater. This makes the osteopathic approach to treating dyslectic disturbances even more exciting (maybe the causes are located elsewhere after all?).

2.3. Test options if Dyslexia is suspected

Since it is the parents, for the most part, who suspect reading and spelling deficiencies prior to or along with the teachers, the difficulty lies with the psychologists or legasthenia therapists to diagnose their tendency and general existence. Various test procedures are used to examine the following deficiencies/disturbances: acoustical/optical differentiation deficiency, spatial instability, correlating/sequencing deficiencies, performance fluctuations, disinclination to read, mistakes in applying orthographic rules.[25]

Acoustical differentiation deficiency makes it difficult to hear individual sounds, or else causes confusion with similar sounds (e.g. g – k, ü – ö).

Optical differentiation deficiency makes perception of small visual differences difficult and very susceptible to error (e.g. line – tine, c – o, m – n).

Difficulty in spatial decision is called spatial instability, causing letters to be switched around – a symptom which, for the most part, is the first one that parents and teachers notice (e.g. b – d, p – q, n – u).

Correlation deficiency explains the inability to combine letters to form words (e.g. h-a-n-d instead of hand).

Sequencing deficiency makes it difficult for children to notice and recall temporal and spatial sequences (successions) (e.g. the alphabet, the sequence of the months or weekdays, dog – god, cats - scat).

Parents often report apparently groundless fluctuations in learning achievements and concentration – learning fluctuations must be examined.

Disinclination to read may sooner or later be the result of untreated legasthenia; children read slowly, sluggishly, without enthusiasm, and do not recognise mistakes when looking for them, and they only learn basic rules (e.g. spelling) with difficulty.

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[25] E. Klasen, „Legasthenie-umschriebene Lese-Rechtschreibstörung“, 1999, 26 ff.

There are many options for testing, classifying and evaluating these deficiencies. Tests frequently used include the "80-Word Test" (Burgstaller, 1973), in which a "crucial" word is to be inserted in 2 x 40 sentences which evinces visual, acusto-motor and logical errors. In Austria, the Salzburg Reading and Spelling Test is often employed; it reveals orthographic, non-phonetic and capitalisation errors.[25a]

In my opinion, the AFS test chosen for this examination covers a large percentage of potential disturbances; it is easy for the children, amusing to solve and provides results which are easily understandable to laymen not versed in psychology or legasthenia research and therapy.

[25a] Landerl + Wimmer, Inst. f. Psychologie/Uni Salzburg „Salzburger Lese und Rechtschreibtest: Verfahren zu Differentialdiagnose von Störungen der Teilkomponenten des Lesens und Schreibens", 1997

2.4. Therapy options to date

It has proved to make especially good sense to try to intervene at as early a time as possible. If legasthenia is suspected already in kindergarten, efforts are made to counter it by way of game activities; listening to sounds, repeating rhymes, breaking sentences down into words and dividing words into syllables.[26] Within the family circle, joint discussions and reflections are very important, just like imparting the enjoyment of reading.

"Real" training begins if the dyslectic disturbance has not disappeared or is just beginning to emerge by the time school starts; multi-sensorial exercises stimulate the senses, and phonetic exercises focus on acoustical arrangement of entire words. Spatial orientation exercises coupled with functional training improve the gross and fine motor functions, as well as the child's speed coordination. In the linguistic area, exercises in increasing vocabulary, speech-motor function exercises and sequencing exercises (practising the regular stringing together of syllables and letters)[27] have proved to be useful. Learning the rules of spelling often proves to be protracted, but it is a fundamental instrument for laying a "plan" in the reading and spelling landscape.

There are a large number of therapeutic approaches and ideas on the international level; however, all of them involve "training away" the symptoms or compensating for them.

[26] Klicpera et al., „Legasthenie" , 2003, 117
[27] E. Klasen, „Legasthenie-umschriebene Lese-Rechtschreibstörung", 1999, 75

2.5. The importance of osteopathic treatment

My perception is, that the profession of osteopath is mostly taken up by people who want to see further behind the scenes, who want to discover the core of the problem rather than remaining on the surface. And that drive is also the reason in my case for becoming involved in this topic; there must be a cause, after all! If I have pains in my shoulder, I cannot train my hand and elbow joint better to compensate for the shoulder. How does a dyslectic disturbance arise, then? That question, along with an osteopath's inherent curiosity and the sight of the frustration of the children concerned motivate me strongly in my approach to the children's treatment.

The approach of Andrew Taylor Still, the founder of osteopathy, in which treatment provides the initial ignition and then the body is given time to react and heal, has proved to be useful in working with dyslectic children as well; "Find it, fix it, leave it alone."

Find a problem, solve it and let the body react and carry on working. Treatment has shown that sometimes weeks and months pass in which other changes occur before the next development and/or reaction stage is reached through the next treatment. Osteopaths specialising in treatment of children often enthuse about how easy it is to treat children, as opposed to adults (the young organisms are "more consistent," more reactive, and respond quicker to the lightest stimuli) and, on the other, about how long the treated child's organism "continues to work."

When treating an adult, I often have the feeling that it is more difficult to "enter" the organism. Traumas experienced through life – physical, mental, spiritual, energetic – may perhaps be responsible for the grave difference in treatment between adults and children; at least, no osteopath would dispute it.

Great respect and a feeling of responsibility generally develop in the course of working with children – and in working with dyslectic children in particular, one has the feeling of positively co-designing their future journey through life

3 Methods

3.1. Explanation of the AFS test

As I have mentioned, I chose the AFS test as an investigative procedure since, in my experience, it is quick (about 20 – 40 minutes), simple (input with the computer mouse or keyboard), and the children like it (computer-game components).

The Attention, Function and Symptom Test has been in use since it was developed by Dr. Astrid Kopp-Duller[28] in 2000.

Attention training is for correcting perceptual errors and slight distraction, Function training aims at rectifying visual, acoustical and spatial perception problems, and the Symptom training focuses on the errors themselves.

To mention it in advance, items not assessed and/or detected in the AFS Test procedure include medical and psychological problems, lowered intelligence, retarded development, gross or fine motor-function problems, and (medical) linguistic, speech, hearing and seeing problems.

[28] Kopp-Duller, Astrid, Duller,Livia: „Dyskalkulie-Training nach der AFS Methode", KLL Verlag, 2001

<u>Clear results are obtained in these areas:</u>

- in testing attention: how attentive the child is during about 15 minutes in the image area (finding the same smileys – cf. Fig. 1)

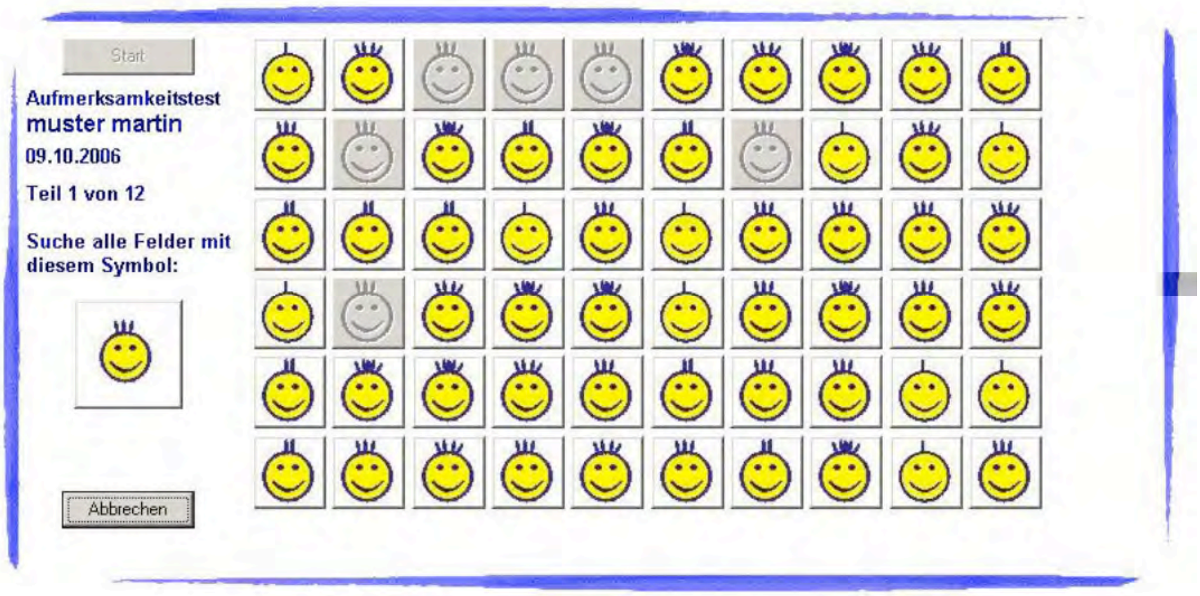


Fig. 1 (AFS Test, Kopp-Duller, 2003, monitor screen view)

in the semi-symbol area (various “E” settings – cf. Fig. 2)

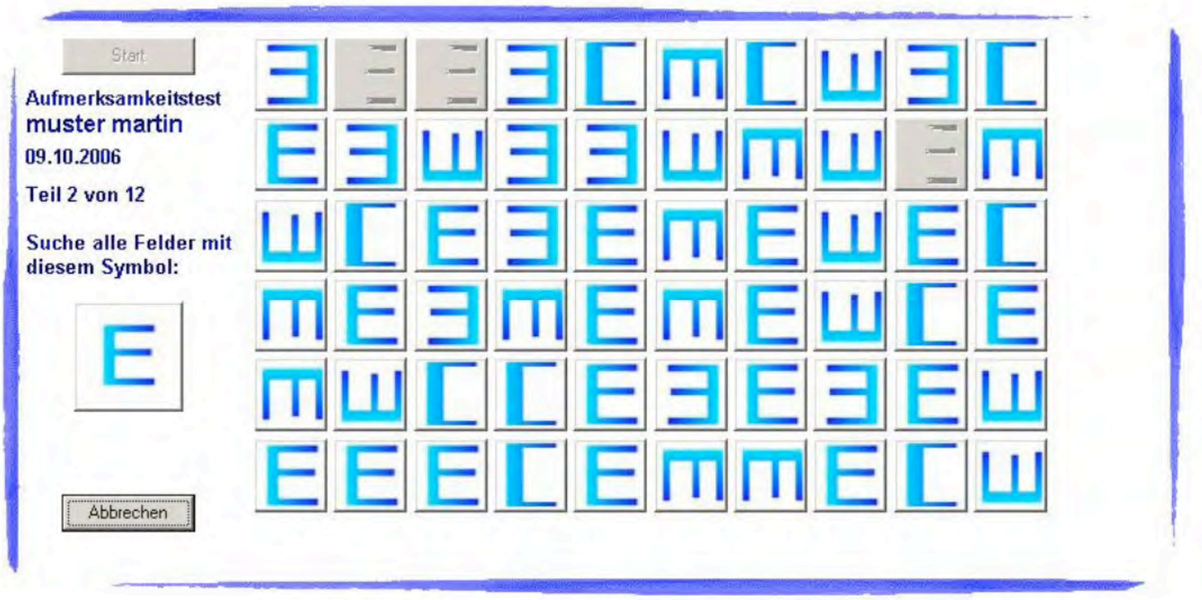


Fig. 2 (AFS Test, Kopp-Duller, 2003, monitor screen view)

in the symbol area (p-g-q-p, cf. Fig. 3)

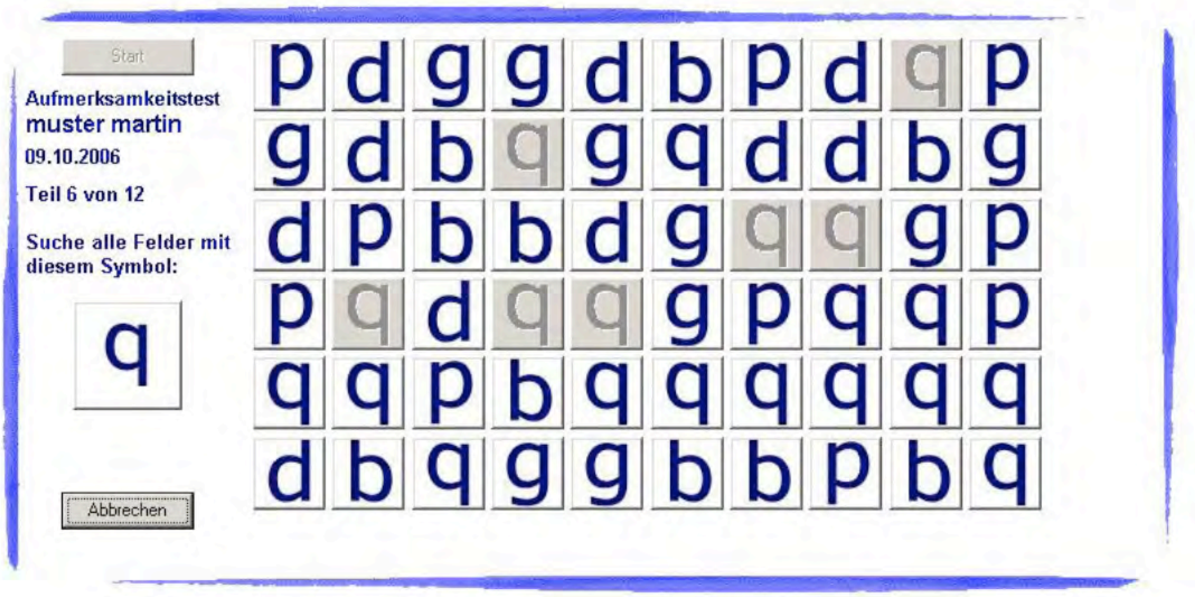


Fig. 3 (AFS Test, Kopp-Duller, 2003, monitor screen view)

Optical differentiation when testing sensory perception ("2 of the 6 birds match – which ones?" Fig.4)

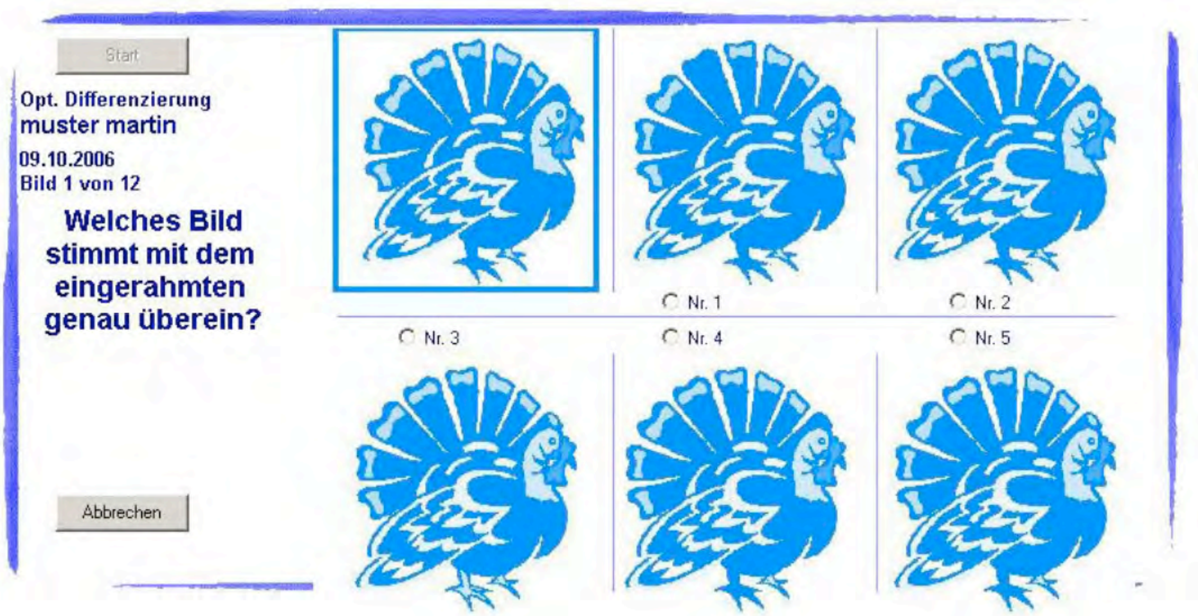


Fig. 4 (AFS Test, Kopp-Duller, 2003, monitor screen view)

visual memory (8 images slowly open and then close – note the positions of the images – cf. Fig. 5)

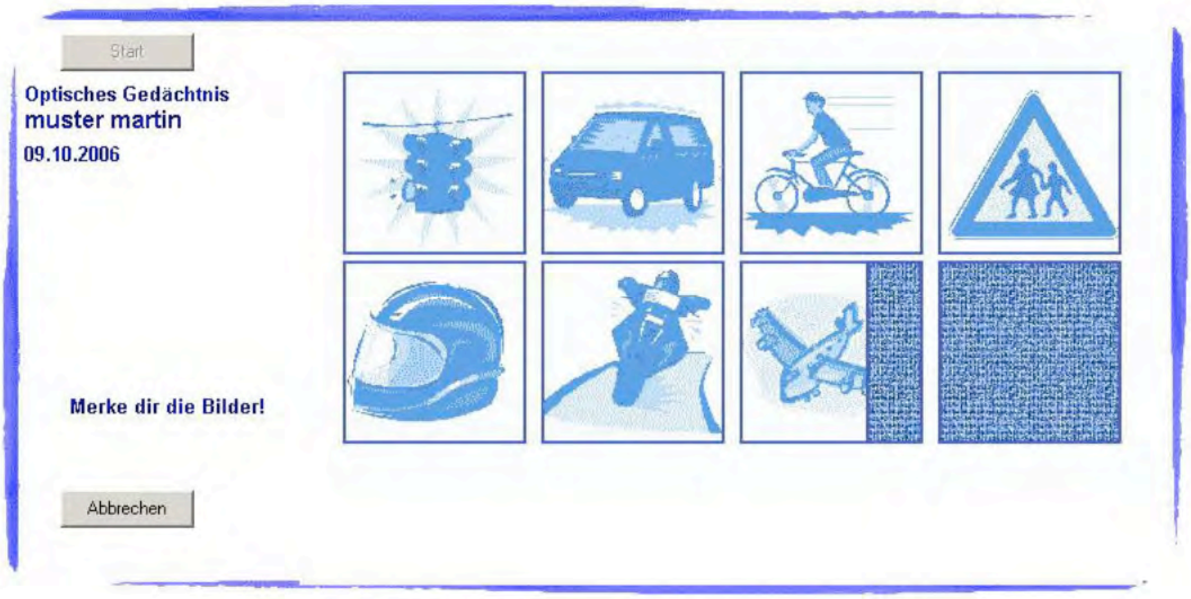


Fig. 5 (AFS Test, Kopp-Duller, 2003, monitor screen view)

visual seriality (box with 4 colours, the figures illuminate in a specific sequence – click on the same sequence – cf. Fig. 6)

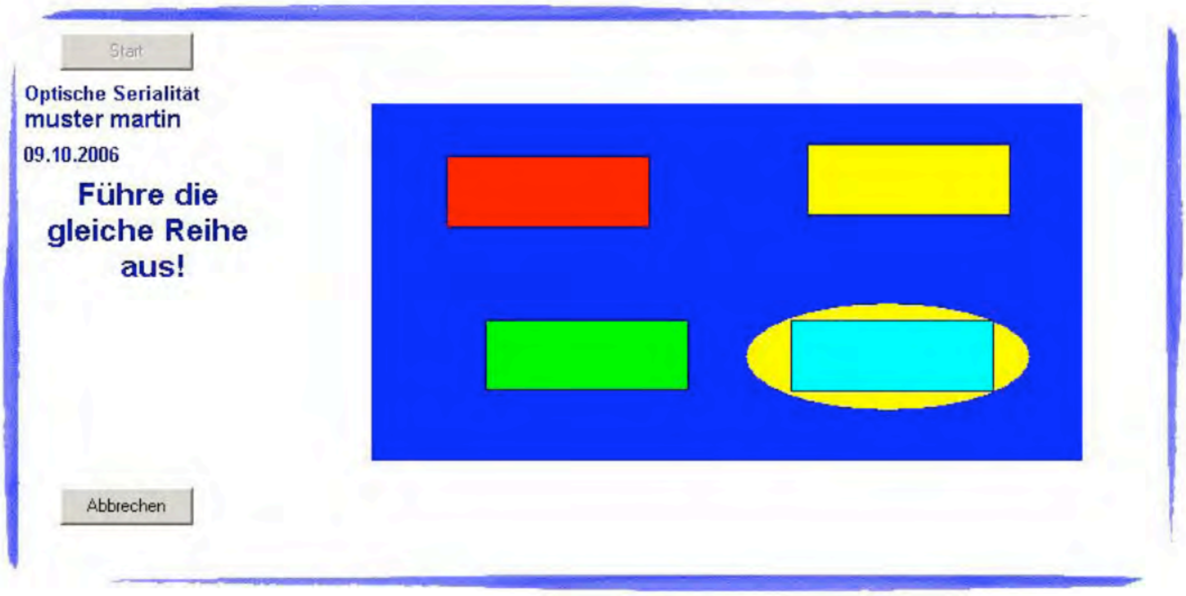


Fig. 6 (AFS Test, Kopp-Duller, 2003, monitor screen view)

acoustic differentiation (listen carefully to which word is said twice – cf. Fig. 7)

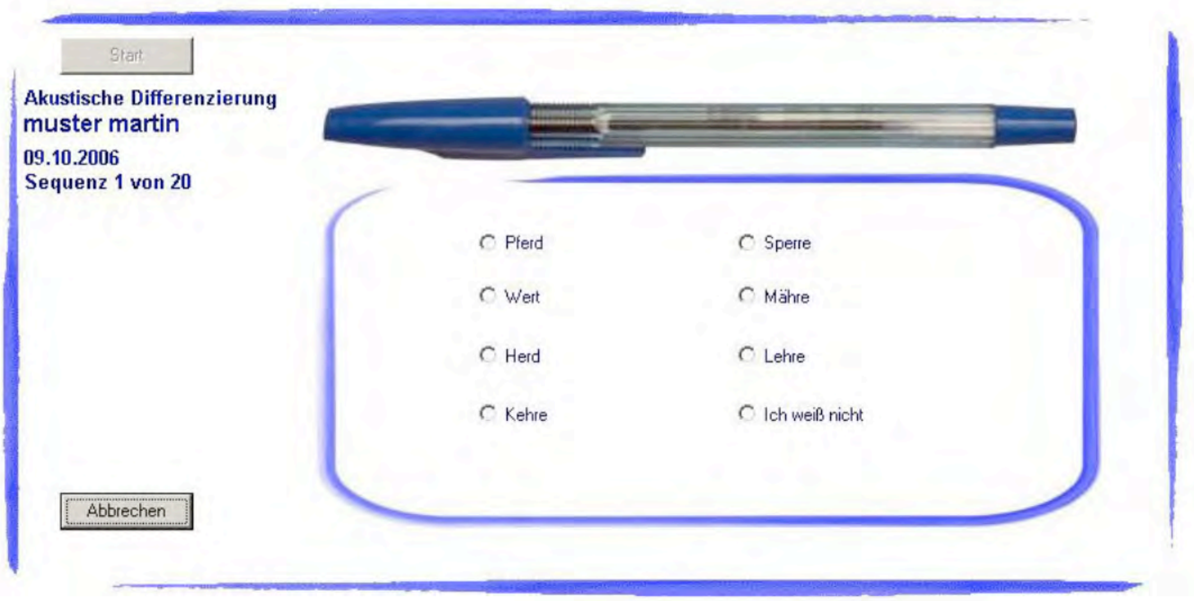


Fig. 7 (AFS Test, Kopp-Duller, 2003, monitor screen view)

acoustical memory (listen to the story being told, then you'll be asked questions about it – cf. Fig. 8)

Fig. 8 (AFS Test, Kopp-Duller, 2003, monitor screen view)

acoustical seriality (four images, each with a sound – click and repeat the sequence that was given – cf. Fig. 9)

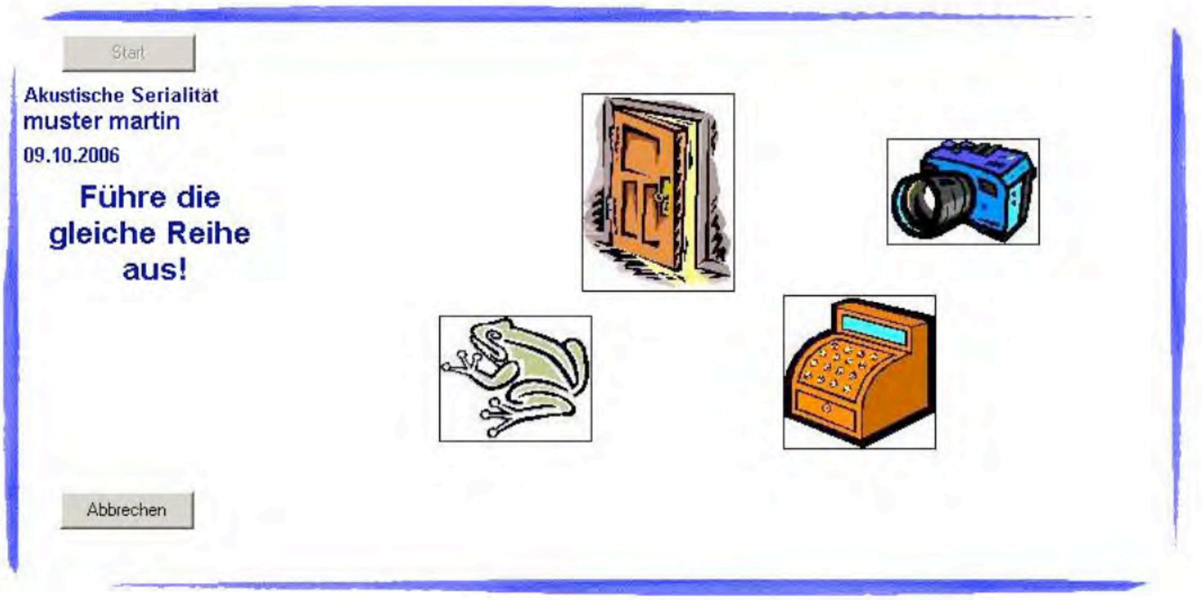


Fig. 9 (AFS Test, Kopp-Duller, 2003, monitor screen view)

Spatial orientation (watch the image – it will turn 90° - allocate the images becoming visible to their correct position – cf. Fig. 10)

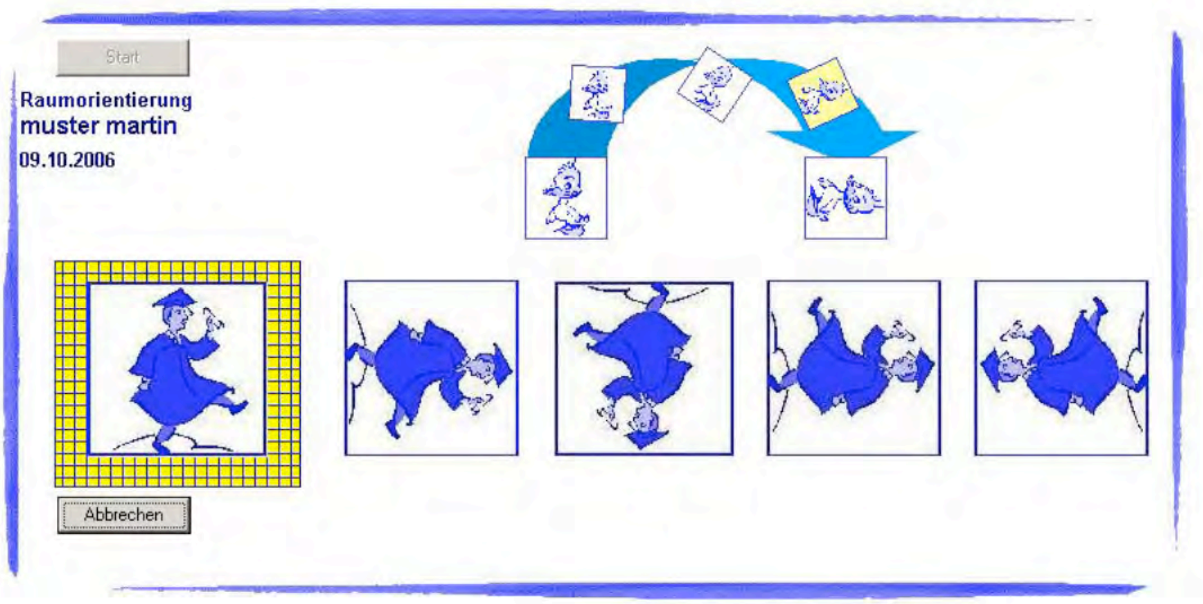


Fig. 10 (AFS Test, Kopp-Duller, 2003, monitor screen view)

body schema (the girl asks you where your shoulders, legs, hands, etc. are – quickly click on the correct button, even if the girl has turned – cf. Fig. 11)

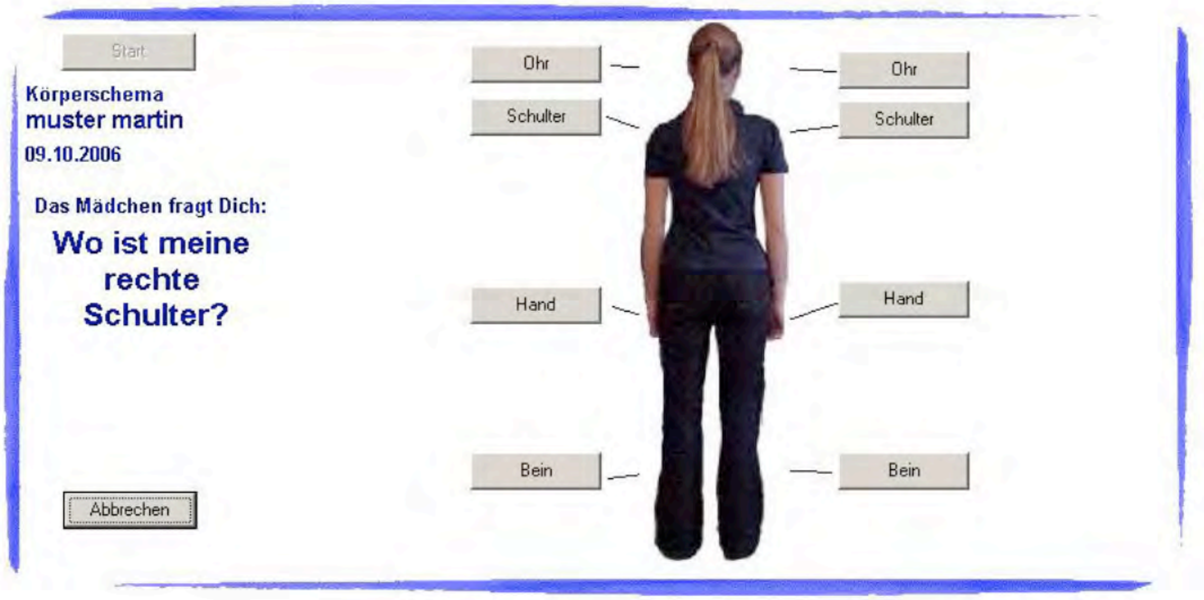


Fig. 11 (AFS Test, Kopp-Duller, 2003, monitor screen view)

The children are given test assignments on all these sensory perceptions according to the principle of random generation (thus there is no learning effect during repeated tests).

* Symptom training takes place on various levels:

Sometimes it becomes necessary to "re-learn" the alphabet during ABC training.

In phonetics, the child in training learns the difference between vowels (a,e,i,o,u), consonants (b,c,r,x…), diphthongs (consisting of two vowels: oi, ai, etc.) and syllables (be, co, de, per, etc.).

Word training demonstrates the difference between nouns (substantives), verbs and adjectives.

Word exercises teach the image, sound and meaning of words.

3.2. Explanation of the osteopathic approach

The approach in the osteopathic treatment of dyslectic children does not differ from the fundamental approach in treating “normal” patients. The question of wherefrom, why and how allows the therapist to examine, adjudge and, if necessary, treat all the anatomic levels, structures and locations.

Apart from diagnostic candour with regard to finding the actual cause of a problem, special attention is paid to examining and adjudging the patient’s central nervous system when beginning to work with legasthenic children.

The question is always, “What is irritating and/or disturbing this nervous system to yield a partial achievement deficiency?”

In the course of my work, frequently occurring structural lesions were revealed which, upon closer observation, could have a more or less massive influence on a person’s brain performance:

- false positioning of or in the pelvis, especially the os sacrum (sacral bone)
- blockages of the upper thoracic spinal column with blocked 1st ribs and multiple high-cervical dysfunctions (false position of the upper neck vertebra)
- dysfunction of the sutura sphenobasilaris (interconnection of two bones of the skull base) and/or one or both of the suturae occipitomastoideae (cranial suture behind the ear)
- extremely “hard” or weak quality at slight movement amplitude of primary respiration (pull on the cerebral membranes, plasticity of the skull bones, fluctuation within the head)

Pelvic lesions

Except for one child, I found false positioning within the pelvis in all study participants, in particular rotational flexions or extension lesions in the sacral bone. As unfavourably as those lesions can affect the movement system (functional difference in leg length, oblique pelvic condition, false positioning of the spine's fundament), as unfavourably as such false positioning effect the central nervous system's basic tension, the cerebral membranes are fixed at S2. If one knows the thin but coarse quality of this structure, the notion arises that during a (rotational) pull at the lower end of the cerebral membranes, a certain tension is directed upward into the remaining central nervous system. Not that a disturbance within the central nervous system is triggered thereby, but the extent to which this condition forms a "breeding ground" is not germane.

Dysfunction of the thoracic and neck vertebrae

Blockades of the upper thoracic spine with mostly cranial (upwards) fixed 1st ribs on one or both sides were discovered with surprising regularity in the study participants. A lesion pattern which is found in adults practising sedentary professions was discovered which was not so regularly found in the 6 – 14 age group. The dysfunctions of the neck vertebrae regularly found with upper thoracic/upper costal blockades could have a persistent influence particularly in dyslectic children, and there is influence on the arteria vertebralis in cases of false positioning of the upper spine. Since it then joins with the arteria basilaris and passes over into the two arteriae cerebri posteriors, it may result in a reduced blood supply to the occipital and the temporal lobe (cf. Fig. 12)

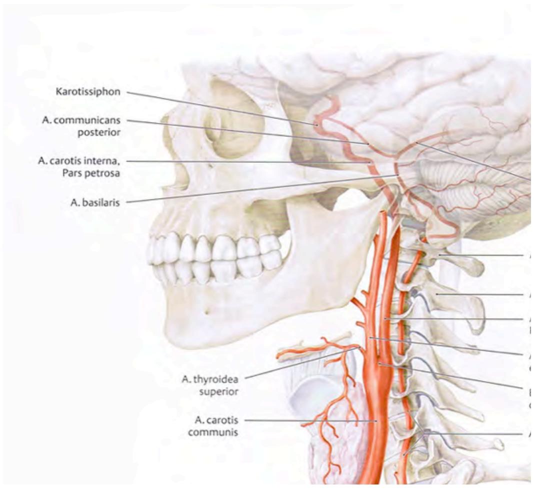


Fig. 12 (Arterial supply to the brain/Prometheus/Thieme Pub. Schünke et al, 2006, p. 246)

If we consider that the converging acoustical signals and the entry of visual associations occur in the Wernicke region (upper temporal lobe, cortex area 22), the importance of the undisturbed performance capacity of these areas becomes clear. The activity of reading means that information from the primary visual centre of the occipital lob in the left temporal lobe is switched over and processed in the Wernicke region (cf. Fig. 13).

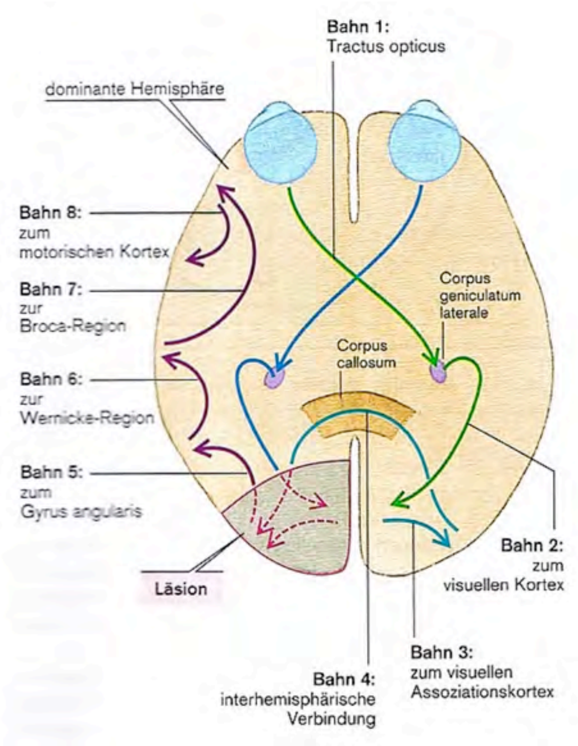


Fig. 13 (Schema of lesion in a case of reading disturbance, Klinke et al, Lehrbuch der Physiologie, 2002, 702)

Information passes via the tractus opticus (Path 1) to the corpus geniculatum laterale, to the visual cortex (Path 2) to the visual association cortex (Path 3) into the corpus callosum (Path 4), via the gyrus angularis (Path 5) into the Wernicke region (Path 6), to the Broca region (Path 7) into the motor-function cortex (Path 8).[29] In a case of "true" lesions in the

[29] Klinke/Silbernagel, „Physiologie des Menschen", 2002, 702 ff.

Wernicke region, we speak of a Wernicke aphasia, whereby the person concerned has a distinct deficiency in understanding speech and cannot understand something written.

Dysfunction of the cranial system:

Lesions within the system of the osseous skull (blockades of cranial sutures, increased tension in specific cerebral membrane sections) are regularly found in a case of somewhat increased appearance of disturbances in the sutura sphenobasilaris (skull base). Due to the incredibly complex interplay of osseous, meningeal and fluid structures, a “sample problem” cannot be determined; rather, it seems that the problem is forwarded: blocked cranial suture – poor bone “movement” – asymmetrical pull on the cerebral membrane – less liquor fluctuation. See Fig. 14 for examples:

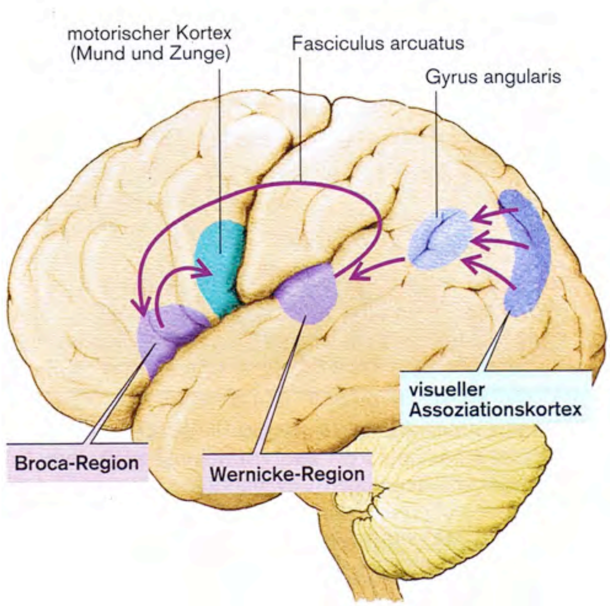


Fig. 14 (Speech region of the dominant hemisphere,Klinke et al,Lehrbuch der Physiologie, 2002,S.703)

Dysfunctions which concern the left half of the brain can reveal themselves in processing reading, writing and speaking. Within the right half of the brain, spatial perception and melody processing would be affected. With pre-frontal problems, speech and language deficiencies may arise in the Broca region (left frontal lobe, cortex area 44). It is impressively evident in Broca aphasia, where a patient can barely speak, forgets grammatical rules and is enormously impeded in expressing himself in writing.

The lesion areas described here (pelvis, neck vertebrae, skull) are mentioned at this point only because a remarkable number of children evince problems in those areas.

Blockades, dysfunctions, movement restrictions and other lesions can be found right across the anatomic structures (skeleton, organ, muscle, nervous systems); however, the problem areas described are found massively in a large percentage of the study participants.

3.3. Criteria for inclusion and preclusion

In view of the definition of dyslexia (which is still not 100% clear), only children participated in the study; they were tested or classified as dyslectic once or several times by psychologists, paediatricians and legasthenia trainers. The gravity and tendency of the dyslectic disturbance was not taken into consideration in the study. The participants were between 6 and 14 years old.

Reasons for precluding some of the children included medical or psychological problems, lowered intelligence, retarded development, disturbances of the gross or fine motor-functions, problems with speech, language, seeing or hearing, ongoing dyslexia training and dyslexia-specific treatments (acupuncture, hypnosis, homeopathy, kinesiology, tomatis, etc.).

4. Results

4.1. AFS measuring results—statistical results

Description of random sampling

A total of 22 children were tested in this study during the first half of 2006. Two children were eliminated from the evaluation, since they had only undergone four and five tests respectively. The other children were tested six times in total. On the average, there were 52.1 days (Sd =8.2) between the first and final test, i.e. the children were tested at approx. 10-day intervals.

Nine children were allocated to the control group and 11 were assigned to the test group. In the latter, there were 51.5 days (Sd =8.4) between the first and last test; the interval in the control group was 52.9 days (Sd =8.4).

According to the random sample according to sex, nine girls (45%) and 11 boys (55%) were tested. The test group was comprised of 27.3% girls and there were 66.7% girls in the control group. The difference is tendentially significant (x2(1) = 3.104, p = 0.078). Thus, girls were somewhat over-represented in the test group.

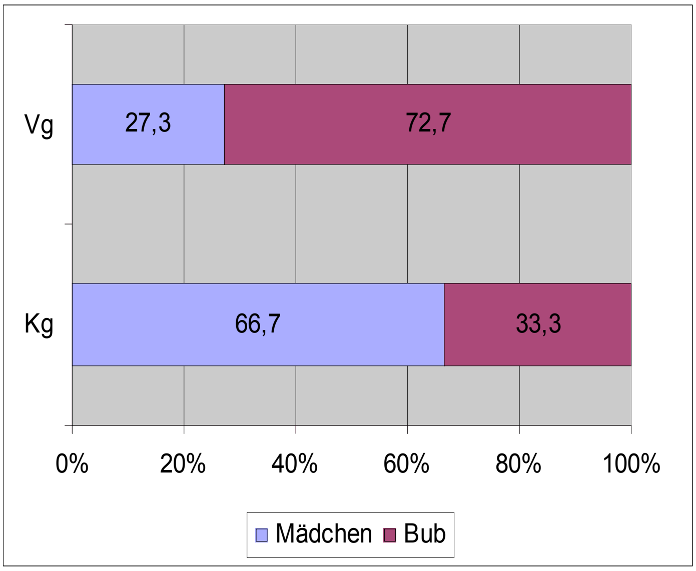


Table 1: Distribution of sexes according to test groups in per cent

(Brix-Samoylenko H., Statistic outcome, 2006)

The average age of the random-sample test was 10.35 (Sd = 2.2). The children in the test group were 9.64 years old on average (Sd = 2.3), whereas the mean age of the children in the test group was 11.22 (Sd = 1.7). The difference is not significant (t(18) = 1.673, p = 0.112).

The girls were 10.78 years old on average (Sd = 2.2), the boys 10.00 (Sd = 2.2). The difference is not significant (t(18) = 0.776, p = 0.448).

1. Initial values of the function test

The initial values of the function test show the most striking obstruction of optical differentiation; only 41% of the maximum was attained. This function differs significantly from all the others. Optical memory was the second-most obstructed function; it differs significantly from the body schema and optical differentiation.

The body schema function was the least obstructed. This function differentiates significantly from other functions, except for optical seriality and acoustical memory.

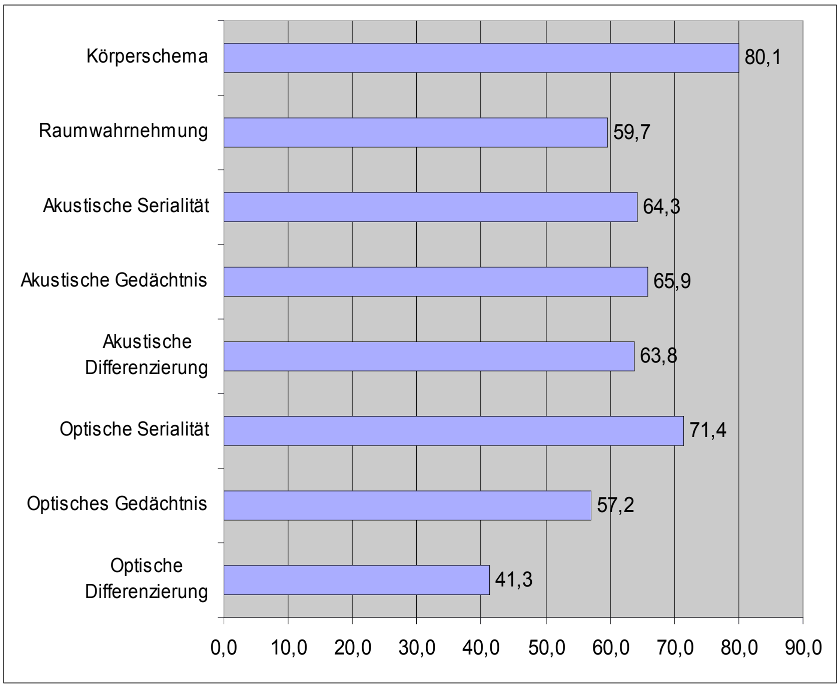


Table 2: Mean values of individual functions, first testing, 0=obstructed, 100=not obstructed

(Brix-Samoylenko H, statistic outcome, 2006)

There were no differences in both groups in any single function. The descriptively largest difference between the test group and the control group was discovered in optical seriality and acoustical memory. Whereas a larger amount of optical seriality was obstructed in the test group, more obstruction was found in acoustical memory in the control group.

	Kg	Vg	F	p
Optical differentiation	39.3	42.8	0.139	0.713
Optical memory	66.3	49.6	1.401	0.252
Optical seriality	82.0	62.7	2.327	0.145
Acoustical differentiation	61.9	65.4	0.178	0.678
Acoustical memory	60.8	70.1	1.928	0.182
Acoustical seriality	70.6	59.2	0.716	0.408
Spatial perception	68.7	52.4	1.360	0.259
Body schema	80.0	80.1	0.000	0.995

Table 3: Mean values of individual functions, first testing, 0=obstructed, 100=not obstructed, separated according to test groups (Brix-Samoylenko H, statistic outcome, 2006)

Dividing the test-persons according to whether training in these functions would be advisable results in the following picture: training in optical differentiation was advisable for every child. 80% of those in the random-sample test needed training in acoustical memory, 75% in acoustical differentiation and 70% in optical memory.

Training in body schema was only advisable for 35% of the children.

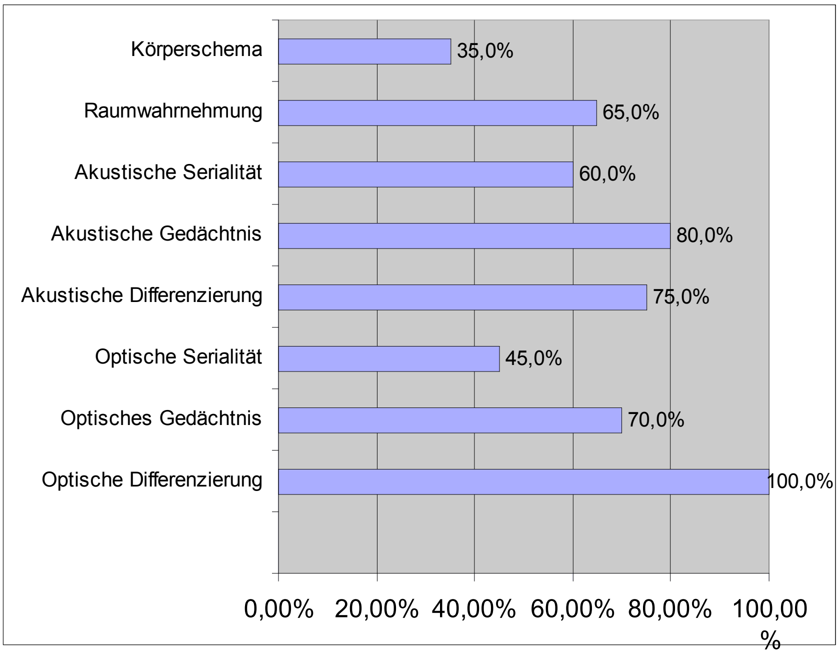


Table 4: Subdivision of the test-persons according to whether training in the functions would be advisable: “Body schema, spatial perception, acoustical seriality,acoustical memory, acoustical differentiation, optical seriality, optical memory, optical differentiation.” Brix-Samoylenko H, statistic outcome, 2006)

There were no differences between the groups in terms of the question as to whether training was advisable in any single function. Optical differentiation was most descriptively remarkable; 82% of the children in the test group needed training, whereas the figure was only about 56% in the control group.

	Kg	Vg	F	p
Optical differentiation	100	100		
Optical memory	55.6%	81.8%	1.593	0.223
Optical seriality	33.3%	54.5%	0.848	0.369
Acoustical differentiation	77.8%	72.7%	0.061	0.808
Acoustical memory	88.9%	72.7%	0.758	0.395
Acoustical seriality	55.6%	63.6%	0.122	0.731
Spatial perception	66.7%	63.6%	0.018	0.895
Body schema	33.3%	36.4%	0.018	0.895

Table 5: Differences in advisability of training (Brix-Samoylenko H, statistic outcome, 2006)

Changes

Optical differentiation

As regards optical differentiation, only a tendentially significant result with respect to change in performance over the six measuring times can be determined ($F(5.90) = 2.194$, $p = 0.064$).

Comparison of the initial measuring point with all the following ones reveals significant differences vis-à-vis the third and the sixth points. Performance at both those times was significantly greater than the initial value.

	Mean value
Optical differentiation T1	41.3
Optical differentiation T2	42.5
Optical differentiation T3	48.7
Optical differentiation T4	43.8
Optical differentiation T5	44.6
Optical differentiation T6	52.2

Table 6: optical differentiation at the six measuring points (Brix-Samoylenko H, statistic outcome, 2006)

No significant correlation exists between the treatment group and change over the time ($F(5.90)=1,156$, $p = 0.337$). That means that the osteopathic treatment did not lead to improvement of performance in that function.

Analysis of optical differentiation in terms of whether training would be advisable shows no significant result over time ($F(5.90)=1.892$, $p = 0.104$). Descriptively, however, it can be determined that training was advisable for all the children at the beginning of the test, whereas the figure was only 75% by the end of testing.

	Mean value
Optical differentiation T1	100.0%
Optical differentiation T2	90.0%
Optical differentiation T3	90.0%
Optical differentiation T4	90.0%
Optical differentiation T5	85.0%
Optical differentiation T6	75.0%

Table 7: percentage of children for whom training in optical differentiation would be advisable (Brix-Samoylenko H, statistic outcome, 2006)

There was no correlation between the treatment groups and the measuring times. ($F(5.90)= 1.582$, $p = 0.173$). That means that the effect was the same for both groups. However, considering the results merely descriptively reveals that only about 65% of the test group needed training at the end of measuring , whereas almost 90% of the control group did.

Optical Memory

A significant change (F(5.90)=2.445, p = 0.040) over time was determined regarding optical memory. The individual comparisons made (whereby the respective initial value was compared with all the others) reveals significant changes at Measuring Points 2 (p=0.024), 3 (p=0.043) and 5 (p=0.027). Performances in optical memory tests were better at those points than at the initial time.

	Mean value
Optical memory T1	57.2
Optical memory T2	71.6
Optical memory T3	67.7
Optical memory T4	55.6
Optical memory T5	72.2
Optical memory T6	67.4

Table 8: Mean value of the function test for optical memory over all six measuring points, total random-sample (Brix-Samoylenko H, statistical outcome, 2006)

There was no significant correlation between treated groups and changes over time (F(5.90)=0.790, p=0.386). That means that both groups progressed the same way.

On the other hand, evaluation according to those data on whether training is advisable shows no significant effect (F(5.90)=1.600, p=0.168). At the beginning of the study, training was necessary for 70% of the total random sample in that function, whereas 55% required it at the sixth measuring point.

	Mean value
Optical memory T1	70.0%
Optical memory T2	45.0%
Optical memory T3	55.0%
Optical memory T4	70.0%
Optical memory T5	45.0%
Optical memory T6	55.0%

Table 9: Percentage of children for whom training in optical memory is advisable (Brix-Samoylenko H, statistic outcome, 2006)

There is no interplay between treated groups and change ($F(5.90)=0.563$, $p=0.463$). The same changes occurred in both groups.

Optical Seriality

In terms of the entire random sample, significant changes took place in optical seriality ($F(5.90)=2.987$, $p=0.016$). However, the changes are to be adjudged as unsystematic over time. The initial measuring value does not differ significantly from any other measuring point. Consideration of the mean values reveals that a fall-off occurred from Measurement 1 to Measurement 2 and that performance was best in this function at Measuring Point 5.

	Mean value
Optical seriality T1	71.4
Optical seriality T2	63.1
Optical seriality T3	67.6
Optical seriality T4	64.7
Optical seriality T5	80.6
Optical seriality T6	75.0

Table 10: Mean value, function test of optical seriality over six measuring points, total random sample (Brix-Samoylenko H, statistic outcome, 2006)

The correlation between treated groups and change over time is not significant ($F(5.90)=0.357$, $p=0.876$). Osteopathic treatment had a statistically provable influence on performance development in this function.

Now, analysis of whether the percentage changes over time of those children for whom training would be advisable reveals a significant result ($F(5.90)=3.664$, $p=0.005$). No linearity can be determined here, either. The percentage rate increased over the initial measurement at Measuring Points 2, 3 and 4, whereas it is descriptively slighter than the initial measurement at Measuring Points 5 and 6.

	Mean value
Optical seriality T1	45.0%
Optical seriality T2	65.0%
Optical seriality T3	60.0%
Optical seriality T4	65.0%
Optical seriality T5	30.0%
Optical seriality T6	35.0%

Table 11: Percentage of children for whom training in optical seriality is advisable (Brix-Samoylenko H, statistic outcome, 2006)

Acoustical Differentiation

No significant effect in acoustical differentiation occurred over time for the entire random sample ($F(5.90)=0.492$. $p=0.781$). That means that performance remained practically unchanged over the six measuring points.

	Mean value
Acoustical differentiation T1	63.8
Acoustical differentiation T2	59.7
Acoustical differentiation T3	62.1
Acoustical differentiation T4	58.9
Acoustical differentiation T5	66.5
Acoustical differentiation T6	63.5

Table 12: Mean value of function test, acoustical differentiation over all six measuring points, entire random sample (Brix-Samoylenko H, statistic outcome, 2006)

Similarly, no significant correlation between treated groups and performance development over time was detected ($F(5.90)=1.038$, $p=0.400$). Thus no effect of treatment can be determined here, either.

Assessment of the necessity for specific training for this function revealed no significant result ($F(5.90)=0.503$, $p=0.773$).

	Mean value
Acoustical differentiation T1	75.0%
Acoustical differentiation T2	80.0%
Acoustical differentiation T3	70.0%
Acoustical differentiation T4	75.0%
Acoustical differentiation T5	60.0%
Acoustical differentiation T6	65.0%

Table 13: Percentage of children for whom training in acoustical differentiation would be advisable (Brix-Samoylenko H, statistic outcome, 2006)

The correlation between the treated group and temporal change is similarly insignificant ($F(5.90)=0.724$, $p=0.608$). Osteopathic treatment had no provable influence on the question of whether training in acoustical differentiation was necessary for the children.

Acoustical Memory

In terms of the entire random sample, a distinct, provable improvement occurred in acoustical memory ($F(5.90)=13.666$; $p=<0.001$). Performance increased continually from measuring point to measuring point.

	Mean value
Acoustical memory T1	65.9
Acoustical memory T2	74.8
Acoustical memory T3	78.3
Acoustical memory T4	85.3
Acoustical memory T5	89.0
Acoustical memory T6	90.7

Table 14: Mean values of the function test in acoustical memory over all six measuring points, entire random sample (Brix-Samoylenko H, statistic outcome, 2006)

A tendentially significant result ($F(5.90)=2.032$, $p=0.082$) was detected in the correlation between treated group and measuring point. The control group's performance increased more steeply than the test group. Individual comparisons of the measuring points reveal that the difference between Time 1 and 6 is larger for the control group than for the test group ($p=0.010$). This result implies that osteopathic treatment had no effect on the performance development in acoustical memory. Also, the result is very distinct if one analyses the training recommendation ($F(5.90)=10.151$, $p=<0.001$). Whereas 80% of the children needed training in this function at Test 1, only 15% did at Test 6.

	Mittelwert
Acoustical memory T1	80.0%
Acoustical memory T2	55.0%
Acoustical memory T3	45.0%
Acoustical memory T4	25.0%
Acoustical memory T5	20.0%
Acoustical memory T6	15.0%

Table 15: Percentage of children for whom training in acoustical memory would be advisable (Brix-Samoylenko H, statistic outcome, 2006)

There was no correlation between treated group and measuring point ($F(5.90)=1.334$, $p=0.257$).

Acoustical Seriality

No significant changes in acoustical seriality occurred over the entire random sample (F(5.90)=0.223, p = 0.952).

	Mean value
Acoustical seriality T1	64.3
Acoustical seriality T2	66.0
Acoustical seriality T3	64.5
Acoustical seriality T4	60.8
Acoustical seriality T5	67.3
Acoustical seriality T6	66.4

Table 16: mean values of the function test in acoustical seriality over all six measuring points, entire random sample (Brix-Samoylenko H, statistic outcome, 2006)

The correlation between treated groups and measuring times is similarly insignificant (F(5.90)=0.253, p=0.937). Here as well, it was determined that osteopathic treatment had no effect on development in this function.

The assessment of whether training is advisable in this function is likewise insignificant (F(5.90)=0.154, p =0.978). 60% of the children needed training at the outset of the testing, whereas the figure was 50% at the end.

	Mean valuet
Acoustical seriality T1	60.0%
Acoustical seriality T2	55.0%
Acoustical seriality T3	55.0%
Acoustical seriality T4	55.0%
Acoustical seriality T5	60.0%
Acoustical seriality T6	50.0%

Table 17: Percentage of children for whom training in acoustical seriality would be advisable (Brix-Samoylenko H, statistic outcome, 2006)

The correlation between treated group and measuring points is insignificant (F(5.90)=0.574, p=0.720). Here as well, the result shows that the treatment had no effect.

Spatial Perception

A significant improvement in the children's performance in spatial perception was observed over the six measuring points (F(5.90=5.742, p=<0.001). The initial measuring value differed significantly from Measurements 3 and 6.

	Mean value
Spatial perception T1	59.7
Spatial perception T2	62.5
Spatial perception T3	70.0
Spatial perception T4	81.5
Spatial perception T5	73.4
Spatial perception T6	77.3

Table 18: Mean values of the functional test in spatial perception over all six measuring points, entire random sample (Brix-Samoylenko H, statistic outcome, 2006)

There was no effect of correlation between treated groups and measuring points (F5.90)=1.137, p=0.264). Thus the treatment revealed no significant influence on performance development in this function.

The percentage rate for perception is also significant for children who need assistance in this function (F(5.90)=4.925, p=0.001). 65% required assistance at the outset of testing, whereas only 30% did at the end.

	Mean value
Spatial perception T1	65.0%
Spatial perception T2	60.0%
Spatial perception T3	45.0%
Spatial perception T4	20.0%
Spatial perception T5	35.0%
Spatial perception T6	30.0%

Table 19: Percentage of children for whom training in spatial perception is advisable (Brix-Samoylenko H, statistic outcome, 2006)

There was no correlation between treated groups and measuring points ($F(5.90)=1.312$, $p=0.266$). This means that osteopathic treatment had no influence on spatial perception.

Body Schema

The measuring points show no significant differences regarding body schema (F(5.90)=2.091, p=0.074). However, individual comparisons reveal significant differences between Measuring Points 5 and 6 and Measuring Point 1. Remarkably, the performances at the later measuring times were worse than at the initial measurement.

	Mean value
Body schema T1	80.1
Body schema T2	80.1
Body schema T3	77.0
Body schema T4	75.4
Body schema T5	70.4
Body schema T6	68.4

Table 20: Mean values of the function test in body schema over all six measuring points, entire random sample (Brix-Samoylenko H, statistic outcome, 2006)

Correlation between treated group and measuring times is insignificant (F(5.90)=1.7.7, p=0.141). However, it is noticeable that the control group did distinctly worse than the test group during the last measurement in comparison to the first; the test group's performance values remained practically unchanged. These differences between Tests 1 and 6 are to be classified as significant (p=0.041).

Assessment of the need for training reveals a tendentially significant result over the entire random sample (F(5.90)=2.067, p=0.077). In turn, results showed that more children needed training at Measurements 5 and 6 than at Measurements 1 and 2.

	Mittelwert
Body schema T1	35.0%
Body schema T2	25.0%
Body schema T3	35.0%
Body schema T4	40.0%
Body schema T5	50.0%
Body schema T6	50.0%

Table 21: Percentage of children for whom training in body schema is advisable (Brix-Samoylenko H, statistic outcome, 2006)

There was no correlation between treated groups and the measuring points ($F(5.90)=1.261$, $p=0.288$). The differences between T1 and T2 are significant ($p=0.041$).

4.2. Subjective parental experiences

Apart from the results, parents reported regularly on the effects of treatment beyond dyslexia; homework and study times decreased, concentration was more focused and sustained longer, more study material was absorbed in a shorter time.

Frequently, the parents described notable improvement in their children's posture and/or poise, especially during static activities. A possible explanation could be the changed static of the spine due to the influence of the corrected pelvis and/or the changed proprioception of the head by releasing blockades in the upper neck vertebrae. Dissolution of asymmetrical, intradural traction pattern in the vertebral sections of the dura in particular could be significant.

They also frequently reported the side-effect of better concentration, together with improved ability to unwind and relax. Parents of boys in particular often reported on their offspring's aimless hyperactivity; especially active all the way to restless, dynamic – but "coming down" from an activity, the transition from an active phase to a relaxed one was very difficult for many of the study participants. Now, parents were frequently describing better activity-relaxation equilibrium.

Girls experienced great advances in physical coordination; exercises suddenly became easier in gymnastic or riding sports, and some of the girls were able to do them at all for the first time.

The parents' general tenor was that "the treatment had done the children good."

5. Discussion

5.1. Limits/Critique of the AFS test

As graphic, comprehensible and agreeable the test is, there are still a few points worthy of discussion.

- As with this test, repeated hearing produces a learning effect during testing acoustical memory ("the cockatoo story"), the test questions are always the same; variation of the questions/content or the option of selecting various stories would be desirable.
- Would there be the possibility of a learning or remembering effect in the test of optical differentiation (which image matches?)
- The words used in the test of acoustical differentiation seem too catchy ("pipette," for example); words devoid of sense would be more objective.
- We regularly heard of insecurities due to stress during the concentration test (recognising smileys), among the younger participants in particular. The assignments call for recognition within a certain period of time; with children who have no concept of time or only a slightly developed one, the risk develops of falsified results due to stress.
- In the test of acoustical seriality it would be useful not to attempt to see the images simultaneously while hearing the sample sound. Children with problems of acoustical seriality compensate by forming a visual association during the test ("first bottom right, then top right, then top left, then bottom left" – placing a "main thread" across the monitor screen). It would be more meaningful to hear the sample sound while the screen was empty, and THEN display the images.

- More frequent (and unannounced) change of the location, posture and position of the girl in the test of body schema would be desirable, and less- to-no labelling of the body parts would make the test more challenging and/or unambiguous. (Merely the announcement that "The girl is turning around" forewarns the test person of what is coming next).
- How can it be that the parents of two participating children reported enormous improvements in the areas of schooling, concentration and study, whereas the test results look that much different? (large-scale change in Child B.G. cf. Fig. 15 through 19, almost no change in Child P.P., c.f. Fig. 20 through 25).

Fig. 15 (AFS Test Sheet, Macho B., 2006)

Fig. 16 (AFS Test Sheet, Macho B., 2006)

Fig. 17 (AFS Test Sheet, Macho B., 2006)

Fig. 18 (AFS Test Sheet, Macho B., 2006)

Fig. 19 (AFS Test Sheet, Macho B.,2006)

P P	Testperson
13.02.2006	Datum
6	Alter
1	Schulstufe

Erster Österreichischer Dachverband Legasthenie ®

ADA Austrian Dyslexia Association

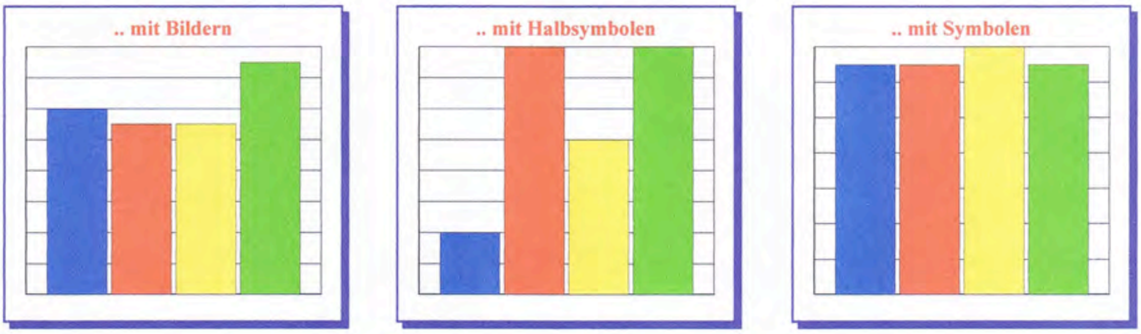
Birgitt Macho
Reg. Nr. 2127
Diplomierter Legasthenietrainer ®
des EÖDL

Firstcybertrade Inc.
DYSLEXIA RESEARCH CENTER
DISTANCE LEARNING COURSES

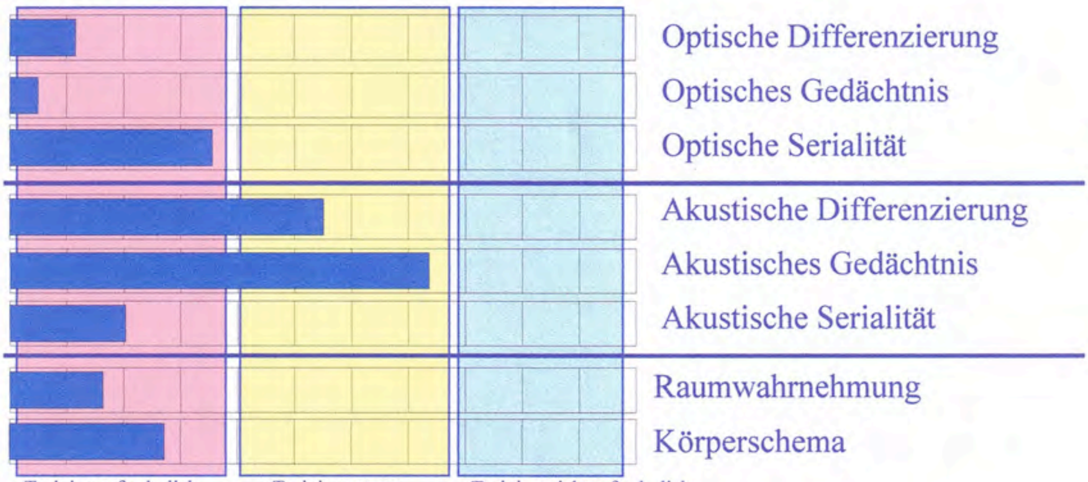
AFS-Computertest

Pädagogisches Testverfahren zur Feststellung einer eventuell vorliegenden Legasthenie

Aufmerksamkeitstest



Funktionstest



Symptomtest

Birgitt Macho
Diplomierter Legasthenietrainer ®
Erster Österreichischer Dachverband Legasthenie ADA
Birgitt Macho 13.2.06

Fig. 20 (AFS Test Sheet, Macho B., 2006)

Fig. 21 (AFS Test Sheet, Macho B., 2006)

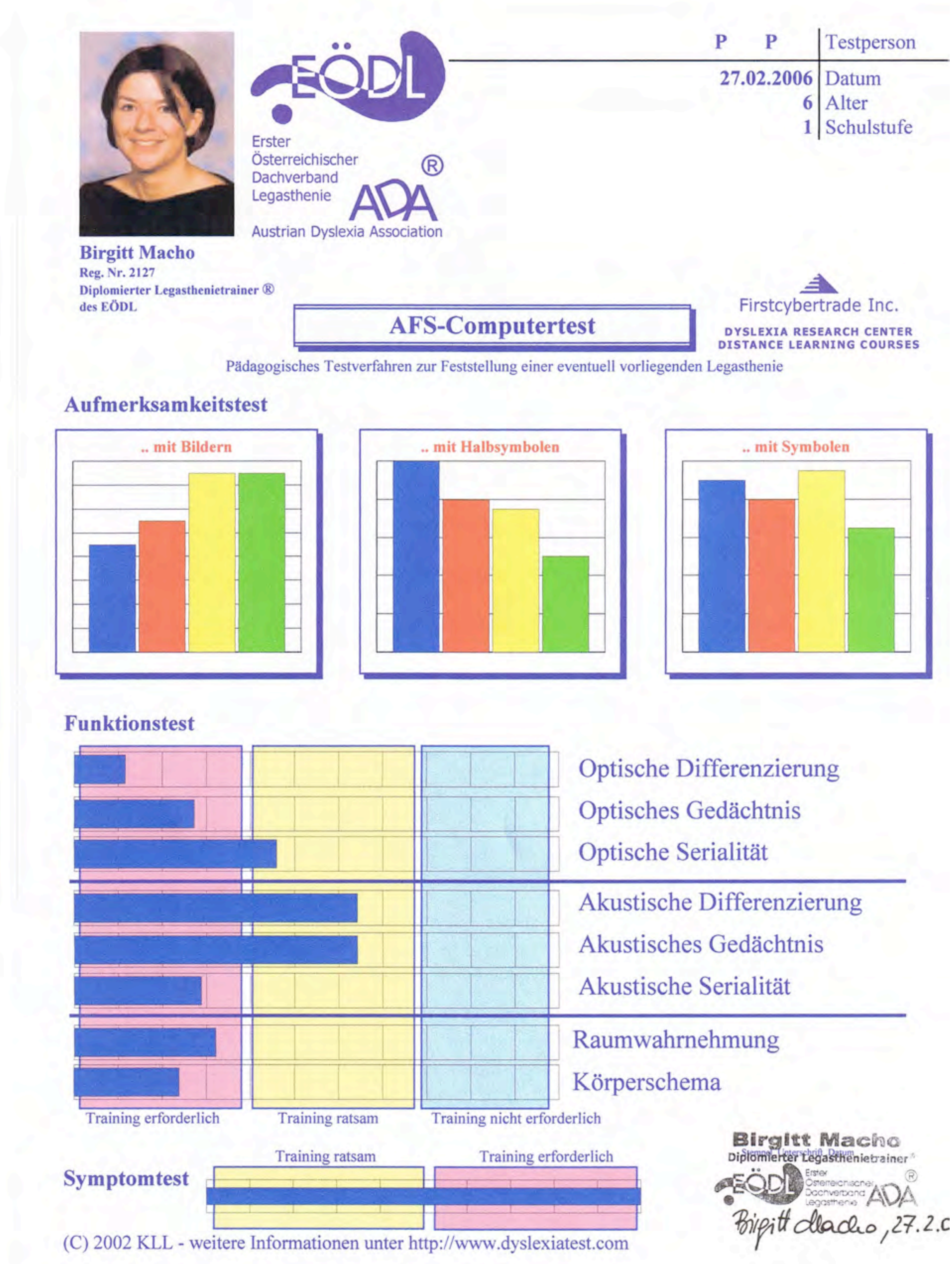


Fig. 22 (AFS Test Sheet, Macho B., 2006)

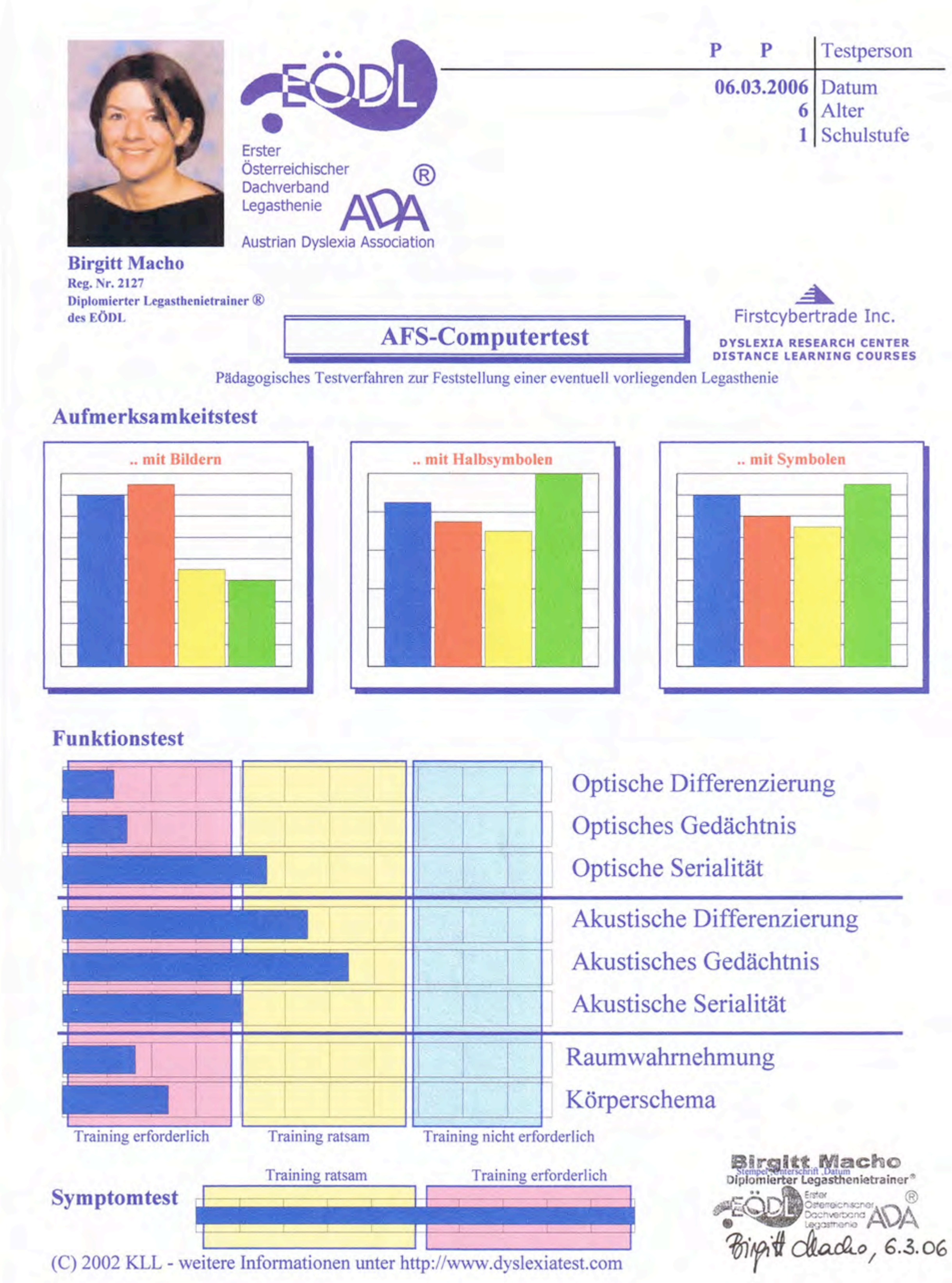


Fig. 23 (AFS Test Sheet, Macho B., 2006)

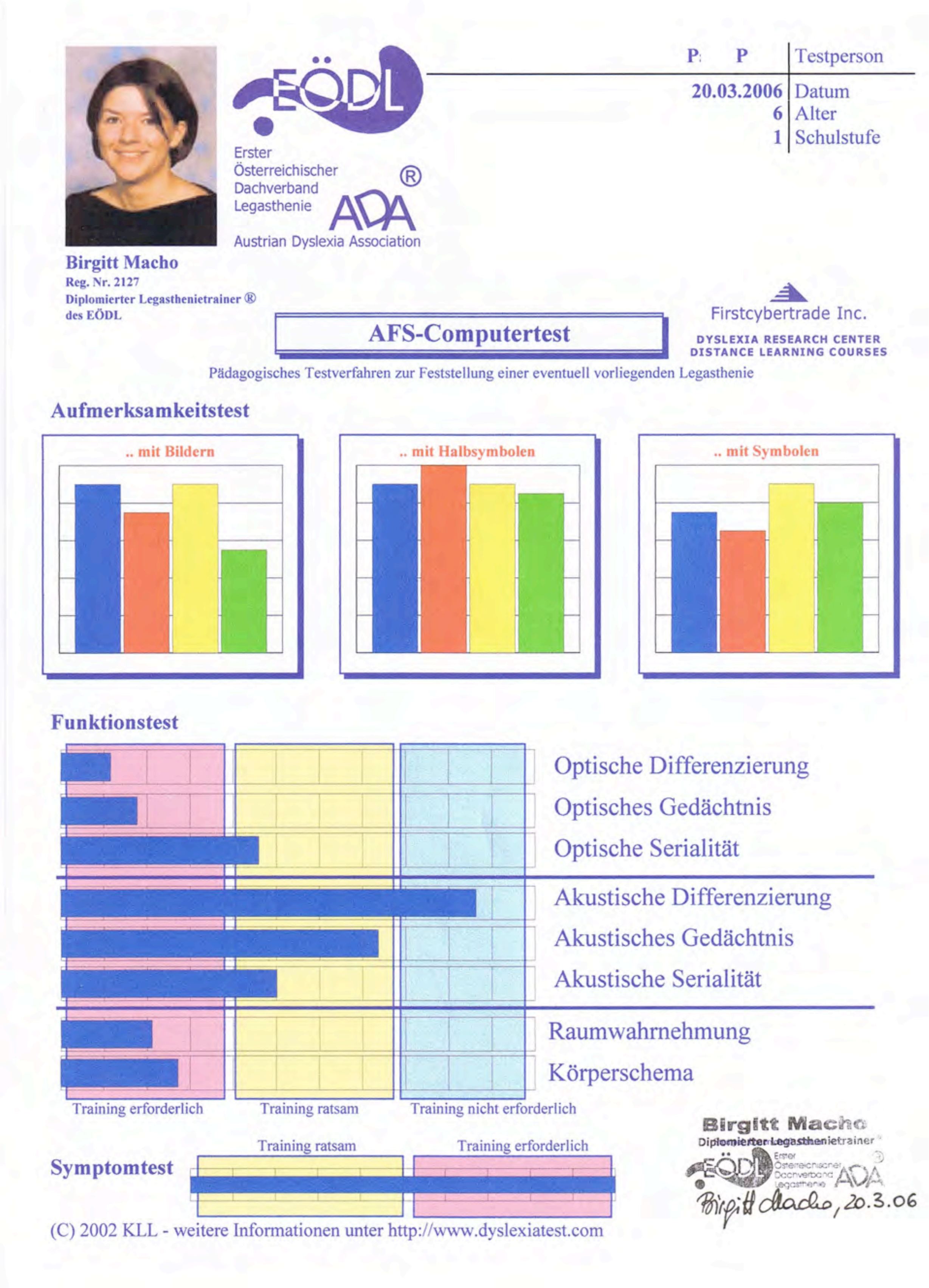


Fig. 24 (AFS Test Sheet, Macho B., 2006)

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Erster Österreichischer Dachverband Legasthenie
ADA®
Austrian Dyslexia Association

Birgitt Macho
Reg. Nr. 2127
Diplomierter Legasthenietrainer ®
des EÖDL

P P:	Testperson
27.03.2006	Datum
6	Alter
1	Schulstufe

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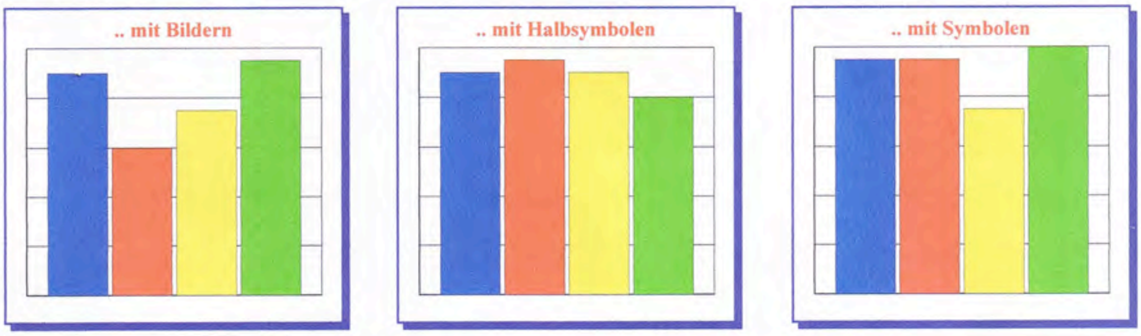
AFS-Computertest

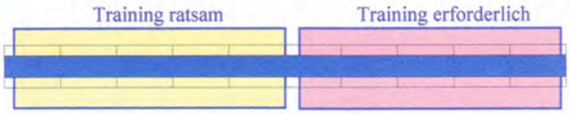
Pädagogisches Testverfahren zur Feststellung einer eventuell vorliegenden Legasthenie

Aufmerksamkeitstest



Funktionstest

Symptomtest



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Stempel, Unterschrift, Datum
EÖDL Erster Österreichischer Dachverband Legasthenie ADA®
Birgitt Macho, 27.3.0

Fig. 25 (AFS Test Sheet, Macho B., 2006)

5.2. Problems of osteopathic treatment times

The present examination provides for one computerised test each in Weeks 1 and 2, osteopathic treatment in Week 3, one test each in Weeks 4 and 5, osteopathic treatment in Week 6 and one further test each in Weeks 7 and 8.

In terms of continuing examination, a larger observation time period would be interesting, especially in view of the long reaction times observed in children after receiving treatments. Frequently, parents of “normal” children still reported changes which were attributable to treatment after six weeks. Parents of legasthenic children I have treated report that in individual cases a sudden, enormous change took place seven months (!) after the end of treatment, although no therapy of any kind had been given.

This leads to the implicit conclusion that the brain requires an inestimable time to catch up with developments which are obstructed or slowed down by manifest lesions. The time span during which the brain reacts to changes can evidently extend from one day (first case of “coincidence” treated) to almost one year.

Furthermore, regular treatment over a longer time would be interesting, whereby in frequent practice no difference in the result can be detected between dyslectics treated two to three times and those who are undergoing regular therapy. (Observation time of approx. two years; legasthenics who are treated regularly at their parents’ request “because it does them good”).

5.3. Self-Critique

My most urgent wish is for a longer observation and/or testing time including long intervals of check-up treatments. Treatments going into ever more detail are taking place every three to four months. Observing school grades, study and homework times and subjective parental experience would be fascinating over a period of two to three years. A much larger treatment group would also be desirable, especially if it were treated by different osteopaths: “Will another therapist find completely different lesion patterns? Are there changes after treating those lesions?”

The frequency of the tests must be thought over, since compliance is not outstanding with that number of tests (interestingly, although they involve children whose parents are mostly willing to take on more effort and trouble), whereby fewer children are considered in the study than have been (only partially) tested.

Furthermore, I could imagine augmenting the procedure with various test methods (80 Word Test, Salzburg Reading and Spelling Test, etc.); “are there different treatment results in other tests?”

The question of cost must also be addressed, since the individual tests are expensive and, due to multiple repetitions, high financial burdens ensue which an individual therapist can no longer bear if the group of test persons is large – would developing a test procedure make sense and would it consequentially be cheaper?

6. Summary

Presentation:

The study examined the question of whether osteopathic treatment improves legasthenic conditions in children aged 6 to 14. The computerised tests were given by a registered legasthenia trainer, whereas I performed the osteopathic treatments myself. The result shows that they yielded changes on various levels which the parents noted, including schooling (study times, concentration), spiritual performance (improved calmness and ability to relax) and physical improvements (better posture and coordination skills), while the test and statistic results point to the conclusion that the test and treatments given had no influence on legasthenic disturbance.

Design:

In order to observe any changes in legasthenic disturbances, the participants were tested twice prior to treatment, twice after the first treatment and twice after the second treatment. Six tests and two osteopathic treatments were given (TTtTTtTT). The control group was only tested 6 times (TT TT TT). The entire test and treatment cycle extended over eight weeks. The legasthenic trainer performing the tests did not know how the children were divided into a test group and a control group.

Method:

Randomised controlled trial with repeated measure design.

Intervention:

I administered osteopathic treatment twice to the participating children. The treatments were comprised of techniques of structural, visceral, cranio-sacral and biodynamic osteopathy. All lesions found on the levels mentioned were treated. Dysfunctions in the pelvic area (especially the os sacrum) were found with particular frequency, and at the upper ribs (especially costae 1); dysfunctions in the upper neck vertebrae were detected as well.

Measuring method:

The legasthenia trainer tested the study persons according to the random-sample principle (she did not know which children belonged to the control or the test group) using a computerised AFS (Attention/Function/Symptom) test form the Austrian Legasthenia Umbrella Organisation (ADA – Austrian Dyslexia Association). The test examined attention easy enough for the children to cope with, as well as optical, acoustical and coordinative parameters. The system operates with a random generator; thus no learning effect was anticipated. The children were tested six times in eight weeks; there were no tests in Weeks 3 and 6 ("treatment weeks"). Similarly, there were no tests in Weeks 3 and 6 for the control group (no osteopathic treatment; instead, a "waiting list" and treatment after the sixth test).

Results:

Statistical assessment revealed no proof of significant changes attributable to osteopathic treatment.

Conclusion:

Although statistical assessment showed no improvement of the dyslectic symptoms, some of the parents declared that they had the impression that there was visible improvement and/or alleviation in the schooling area. In this context, re-testing the children after six months and a year would be extremely interesting, if only to determine whether a long-term effect ensued from the treatment. Regular treatment over a long period of time would also be desirable, accompanied by tests; however, the factor of time-consumption and above all the cost (especially that of the AFS test) make it seem unlikely that that will be workable for an individual therapist.

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