The influence of the osteopathic treatment on the vegetative neural system

The technique “ compression of the 4th ventricle ” changes brain activity, blood pressure, heart frequency and respiratory rate

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Eidesstattliche Erklärung

Hiermit versichere ich, die vorgelegte Masterthese selbstständig verfasst zu haben.
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Die Arbeit wurde in dieser Form noch keiner anderen Prüfungskommission vorgelegt.

Salzburg September 2007 Ludwig Brandstötter

Thanks

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Thesis:

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Hypothesis:

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1. Introduction

In the osteopathic literature it is often said, that CV4 brings relaxation on the whole brain and thereby works also on the whole organism.

Sutherland is the first who is mentioning this technique in his book “contributions of thought” in 1939. He describes the relaxation in the spine because of the effect on the neighbouring centers of the vegetative autonome brain centers especially breathing and cardiovascular centers. He also uses the technique for general relaxation. ” He sais:” If you don´t know what else to do use the CV4”

Magoun writes about the technique “Hence it favours resolution of all membranous and ligamentous strains, lowers blood pressure, quiets nervous tension and facilitates any type of manipulative work”

Alain Gehin sais that the CV4 should be used "Most commonly to bring about a general relaxation of the patient ."

Liem writes that the CV4 can be used as a technique for blood highpressure.

Upledger gives as indications: Lowering of of the sympatic nerve system tonus and positive influence on stress symptoms as well as fear and insomnia.

Lippincott writes about a stronger movement of the fluids and therefore a better fluidexchange within the brain.

Within the scope of the ostepathy education – in the DOK (Deutsches Osteopathie Kolleg) as well as WSO (international School for Ostepathy Vienna) we were taught over and over again of the importance of this technique for the body regulation. (Arlot, Shaver, Druelle…) Besides, above all, the vegetative relaxation was mentioned.

The range of reactions of our own praxis patients with this technique reached from restlessness and light aggression during the technique up to deep relaxation after the technique.

Still all these reports seem to be based on subjective experiences as we had difficulties to find experiments on the CV4.

As osteopathic medicine is one that is given by mouth from experienced practitioners to students, we became curious to the question whether it´s vegetative effect is possible to be measured with modern measuring technique and if the subjective impression of relaxation or effect that we all have as osteopaths can be expressed objectively measured.

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2. Anatomy

2.1. The nervous system of the person

The nervous system of the person is arranged basically in 2 big segments:

1) Central nervous system
2) Peripheral nervous system

The peripheral nervous system (PNS) exists of the sum of all peripheral nerves (spinal nerves and brain nerves) and their ganglions. The central nervous system (ZNS) exists of the brain (Cerebrum) and the spinal cord (Medulla spinalis). The visceral nervous system steering the intestinal functions is part of the central and the peripheral nervous system.

2.1.1. Arrangement of the brain

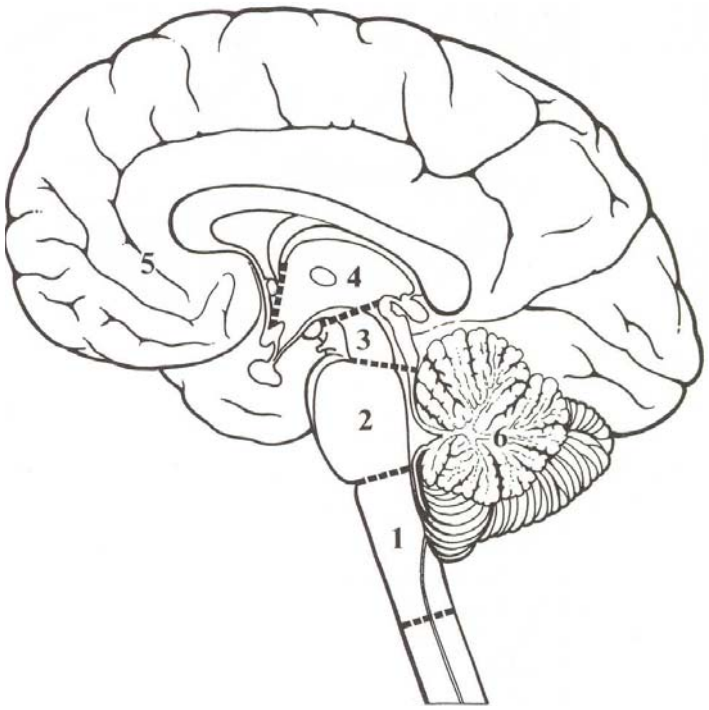

Fig. 1: Segments of the brain

1 Medulla oblongata
2 Pons
3 Mesencephalon
4 Diencephalon
5 Telencephalon
6 Cerebellum

The older brain trunk lies to the cranial base in the area of the Clivus and the sphenoid bone body. He is covered dorsal by the small brain (Cerebellum), dorsal and lateral by both hemispheres of the cerebrum or final brain (Telencephalon). The brain trunk starts immediately cranial to the uppermost segment of the spinal cord. As a border between spinal cord and brain (brain trunk) counts the crossroad of the motor pyramid roads (Decussatio pyramidum).

This crossroad occurs approx. at the height of the Foramen magnum.
With the brain trunk one makes a distinction: Medulla oblongata, Pons, Mesencephalon and Diencephalon.

2.1.2. Ventriculus quartus (IV. Ventricle)

The fourth Ventricle lies in the crossing of Pons to the Medulla oblongata. The take away of the small brain (Cerebellum) at it´s handles (Pedunculi cerebelli) gives the look in 4. Ventricle. The ground of this ventricle is formed by Pons and Medulla oblongata together. Because of the rhombs-like form one calls it Fossa rhomboidea. Cranial arises the Fossa by widening from the Aquaeductus mesencephali. Caudal it narrows and goes over in the Canalis centralis of the spinal cord. In the centre line runs the Sulcus medianus from the Aquaeductus up to the central canal. On both sides of this "middle channel" lies the Eminentia medialis which is limited lateral there by the Sulcus limitans. In the cranial part of the rhomb pit the Eminentia medialis has it´s clearest elevation: the Colliculus facialis which is caused by the fibers of "inner Fazialisknee". In the lateral area of the rhomb pit immediately beside the Pedunculus cerebellaris rostralis there is a blue coloured area, the Locus coeruleus. This colouring is caused by the Nucleus pigmentosus pontis. In the biggest width of the rhomb pit it is crossed by the Eminentia medialis from 1 to 3 white stripes (Striae medullares ventriculi quarti). Caudal of the Striae it narrows itself to the Eminentia medialis strongly to the Trigonum nervi hypoglossi. Lateral of it there lies the Trigonum nervi vagi and the area postrema.
At the widest place of the rhomb pit the 4. Ventricle has the Recessus lateralis which reaches around the lower small brain up to ventral the Apertura lateralis ventriculi quarti. Up to there is also the Plexus choroideus and it´s attachementline, the Taenia ventriculi quarti. In the ground of the Recessus lateralis there are two Nuclei cochleares, media of it there lies the vast field of the area vestibularis, from four Nuclei vestibulares.

The roof of 4. ventricle (tegmen ventriculi quarti) is formed in the upper part by the small brain handles (Pedunculi cerebellares superiores) and the marrow sail lying

between them (Velum medullare rostrale). The gable (Fastigium) lies in the area of the middle and lower small brain handles (Pedunculi cerebellares medii et inferior). The caudal part of the Ventricleroof is formed by the short Velum medullare inferius and exists partly of a Tela choroidea. There are after taking a away the Cerebellum in the lower edge of the rhomb pit on both sides the Taenia ventriculi quarti which come together in the Obex.

In the Tegmentum in the area of the ground (rhomb pit) lie the brain nerves cores in the the Formatio reticularis, especially the respiratory centre and circulatory centre.

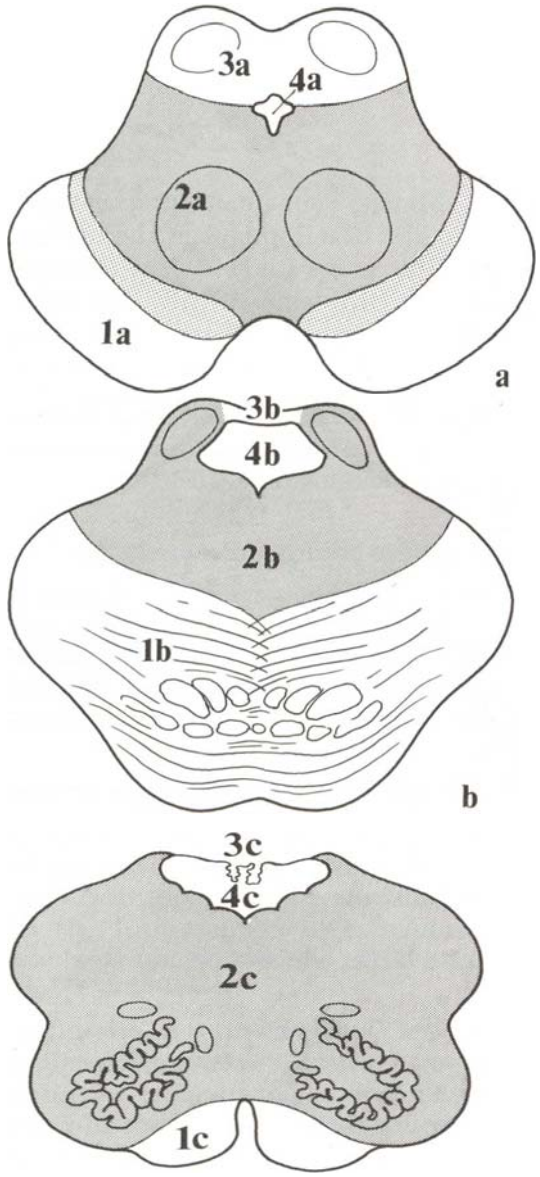

Fig. 2: Cross section arrangement of the brain trunk

a) Midbrain, b) bridge, c) extended marrow

1 base (Pes) = new brain shares
1a base pedunculi cerebri (= Crus cerebri)
1b par ventralis pontis 1c pyramid

2 bonnets (Tegmentum)
2a Tegmentum mesencephali
2b Tegmentum pontis
2c Tegmentum medullae oblongatae

3 roofs (Tectum)
3a Lamina tecti
3b Velum medullare rostrale
3c Lamina epithelialis ventriculi quarti

4 ventricleystem
4a Aquaeductus cerebri
4b Ventriculus quartus (rostrale half)
4c Ventriculus quartus (caudal half)

2.1.2.1. Neural pipe segment

The segments of the Neural pipes (ventricleystem) are in the midbrain of the Aquaeductus mesencephali, in the bridge upper half of the Ventriculus quartus, in the upper "open" interest of extended marrow lower half of the fourth ventricle and in the lower "closed" interest of extended marrow the uppermost segment of the Canalis centralis.

2.1.2.2. The roof

The roof (Tectum) is well developed only in the midbrain as a Lamina tecti (4 hill record, Lamina quadrigemina). Above the 4. Ventricle there is the so-called Tegmens ventriculi quarti which on height of the bridge is formed by the upper marrow sail (Velum medullare rostrale), caudal of it by the open part of extended marrow and by the lower marrow sail (Velum medullare caudal) and the Lamina epithelialis of the vein network of the fourth ventricle (Plexus choroideus ventriculi quarti).

Reference to "brain trunk"

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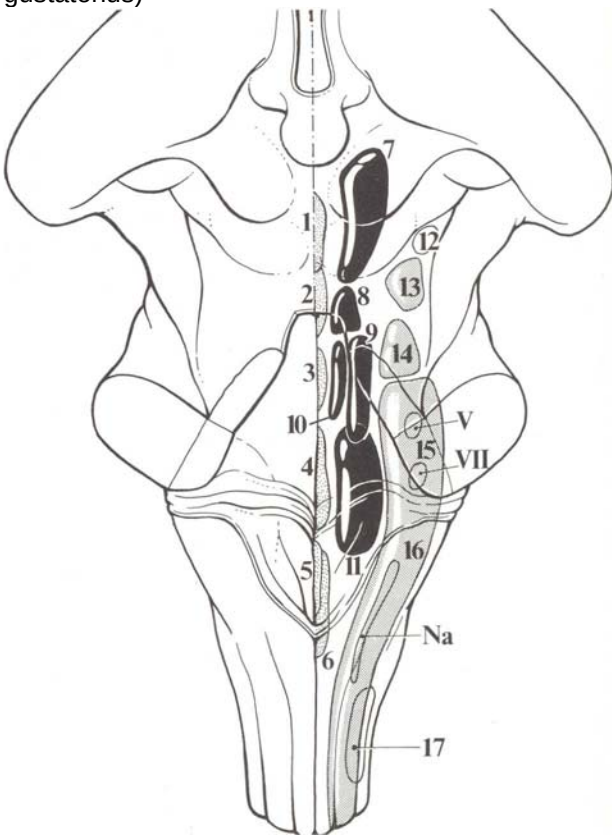
Kahle W.: Taschenatlas der Anatomie - Band 3 Nervensystem und Sinnesorgane, 5. Auflage, Thieme Stuttgart New York Dt. Taschenbuch-Verlag München,1986 pp124

2.2. Brain nerves cores

Fig. 3: Pattern of the brain nerves cores

on the left: motor cores; on the right: sensitive final cores
Origin cores (= motor cores)
A Somatomotoric nuclear row
1 Nucleus n. oculomotorii
2 Nucleus n. trochlearis
3 Nucleus n. abducentis
4 Nucleus n. hypoglossi
B In general viszeromot. Nuclear row
5 Nucleus oculomotorius accessorius
6 Nucleus salivatorius rostralis
7 Nucleus salivatorius caudalis
8 Nucleus dorsalis n. vagi
C Especially viszeromotoric nuclear row
9 Nucleus motorius n. trigemini
10 Nucleus n. facialis
11 Nucleus ambiguus
12 Nucleus n. accessorii
Terminal cores (= sensitive final cores)
D In general somatosensible nuclear row
13 Nucleus mesencephalicus n. trigemini
14 Nucleus sensorius principalis n. trigemini
15 Nucleus spinalis n. trigemini
E Especially somatosensible cores
16 Nuclei cochleares (dorsalis et ventralis)
17 Nuclei vestibulares
And the following In general viszerosensible core
18 Nucleus solitarius (caudal interest)
G Especially viszerosensible core
19 Nucleus solitarius (rostraler interest = Nucleus gustatorius)



The brainnerv couples are numbered after the order of their origin from the brain (I-XII). The "real" brain nerves or head nerves (Nn. Craniales, No. III to IIX) resign from the brain trunk.

2.2.1. Position of the brain nerves cores

All motor cores lie media: The somatomotoric cores lie beside the centre line: Nucleus n. hypoglossi, Nucleus n. abducentis, Nucleus n. trochlearis, Nucleus n. occulomotorii.

The visceromotoric cores join a little bit lateral, besides, one makes a distinction: real visceromotoric (belonging to the Parasympathicus) cores and the formerly visceromotoric cores of the converted Gillarcmuscles.

Parasympathic cores:
Nucleus dorsalis n. vagi and the praganglionar fiber cores: Nucleus salivatorius inferiorly (Parotis), the Nucleus salivatorius superior (Submandibular-and Sublingualdrüse) and the Nucleus Edinger-Westphal (M. sphincter pupillae and M. ciliaris).

Cores of the motor Gillarcmuscles nervs – beginning from caudal:
Nucleus spinalis n. accessorii (applies till the Zervikalmarrow), Nucleus ambiguus, Nucleus n. facialis and Nucleus motorius n. trigemini. (The Fazialiscore lies, like all motor cores of the Arcnervs, in the depth. It´s fibers describe a dorsal directed curve, run on the ground of the rhomb pit [Colliculus facialis] round the Abduzenscore [Fazialisknee, Genu internum n. facialis] to descend then again to the lower bridge edge where they resign from the Medulla.)

Lateral there lie the sensitive cores – beginning from media:
Nucleus solitarius (viszerosensibel), then the central area of the N. trigeminus, this has with the Nucleus pontinus n. trigemini (Nucleus principalis), to the Nucleus mesencephalicus n. trigemini and the Nucleus spinalis n. trigemini the biggest expansion of all brain nerve cores. Farthest lateral there lies the area of the Nuclei vestibulares and the Nuclei cochleares.

2.2.2. Arrangement of the brain nerves cores

III. Brain nerve: The N. oculomotorius has 2 central areas in the Tegmentum mesencephali near the aqueduct on height of the upper hills:
Nucleus nervii oculomolorii (main core): for all external eye muscles (except to the upper sloping and external straight eye muscles)
Nuclei accessorii nervi oculomotorii (Edinger Westphal core) called. parasympathic cores for 2 3 internal eye muscles (M. sphincter pupillae, M. ciliaris). The Besidecore lies media from the main core so near the centre line that the cores of both sides partially melt.
IV. Brain nerve: The N. trochlearis leads only motor fibers for the upper sloping eye muscle. They arise from the midbrain Nucleus nervi trochlearis to (Trochleariscore) on height of the lower hills in the bonnet.
V. Brain nerve: The N. trigeminus has according to the thickness also a vast central area: from the upper cervical marrow up to the midbrain. It encloses three final cores and an origin core:

Nucleus spinalis nervi trigemini (spinal to Trigeminuscore): in extended marrow down to C2, sensoric (protopathic sensitivity, above all, pain and temperature sensation). Besides, the nervous fibers of the 1-st main branch end predominantly in the lower one, those of 2. + of 3-rd main branch predominantly in the upper part of the core.

Nucleus principalis nervi trigemini (main core of the Trigeminus): in the bridge, sensoric (epikritic sensitivity).

Nucleus mesencephalicus nervi trigemini (midbrain core of the Trigeminus): sensoric (propriozeptive sensitivity of muscle spindles of the jaw muscles).

Nucleus motorius nervi trigemini (of motor Trigeminuscore): for jaw muscles, oral ground etc.

VI. Brain nerve: The N. abducens leads only motor fibers for the external straight eye muscle. They arise from the Nucleus nervi abducentis to (Abducenscore).

VII. Brain nerve: The N. facialis leads motor, secretoric and sensoric fibers, must have 3 coreareas in the brain trunk:

Nucleus nervi facialis to (Fazialiscore): motor.

Nucleus salivatorius superior (upper salivary core): parasympathic, for tear glands, nasal glands, palatal glands, undertongues glands and lower jaw glands.

Nuclei tractus solitarii (lat. solitarius = single): sensoric, common cores of the nerves VII, IX and X - taste fibers and fibers of the intestinal sensitivity.

VIII. Brain nerve: The vast central area of the N. vestibulocochlearis is separated after hearing aid and balance apparatus:

Nucleus cochlearis anterior + posterior (cochleariscore = snail cores).

Nucleus vestibularis superior + medialis + inferiorly (Vestibulariscore = forecourt cores).

Nucleus vestibularis lateralis (Deiters core) belongs to the big cellen cores of the Formatio reticularis. He receives only few shares of the N. vestibularis. The main interest comes from the Purkinje cells of the small brain. It is less a final core than a coordination core. About him the connections of the balance apparatus run to the cervical muscles and body muscles.

IX. Brain nerve: The N. glossopharyngeus has only for his secretoric fibers an independent core:

Nucleus salivatorius inferiorly (lower salivary core): for the Glandula parotidea.

The taste fibers end in the Nuclei tractus solitarii, the fibers of the mucous membrane sensitivity presumably in spinal to Trigeminuscore. The motor fibers come together with those of the N. vagus and N. accessorius from him

Nucleus ambiguus (motor double core: for cross-striped muscles).

X. Brain nerve: The sensoric fibers of the N. vagus presumably end partly in the spinal Trigeminuscore, partly with the taste fibers in the Nuclei tractus solitarii. The motor fibers for the cross-striped muscles of larynx and pharynx arise from the Nucleus ambiguus with the N. glossopharyngeus. There comes as own core:

Nucleus posterior [dorsalis] nervi vagi (of dorsal Vaguscore): parasympathicer origin core for the breast and belly intestine.

XI. Brain nerve: The fibers of the brain part of the N. accessorius come from it

Nucleus ambiguus, the fibers of the cerebral part from him

Nucleus nervi accessorii (Aczessoriuscore): in the Columna anterior of the spinal cord to C5 descending.

XII. Brain nerve: The N. hypoglossus leads only motor fibers for the tongue. They come from it

Nucleus nervi hypoglossi to (Hypoglossuscore).

2.2.3. Formatio reticularis

Under the concept Formatio reticularis are summarized to scattered nervous cell groups and short fiber cells between the bigger cores. The branches of these Dendrit trees form together net-like federations. Hence, one calls this vast central structure Formatio reticularis (net substance, net formation).

The Formatio reticularis fills in the brain trunk big parts of the bonnet region (Tegmentum) from the extended marrow up to the midbrain. It also spreads out in the spinal cord and has narrow relations with the interbrain (Thalamus). Some of the brain nerves cores are stored in it.

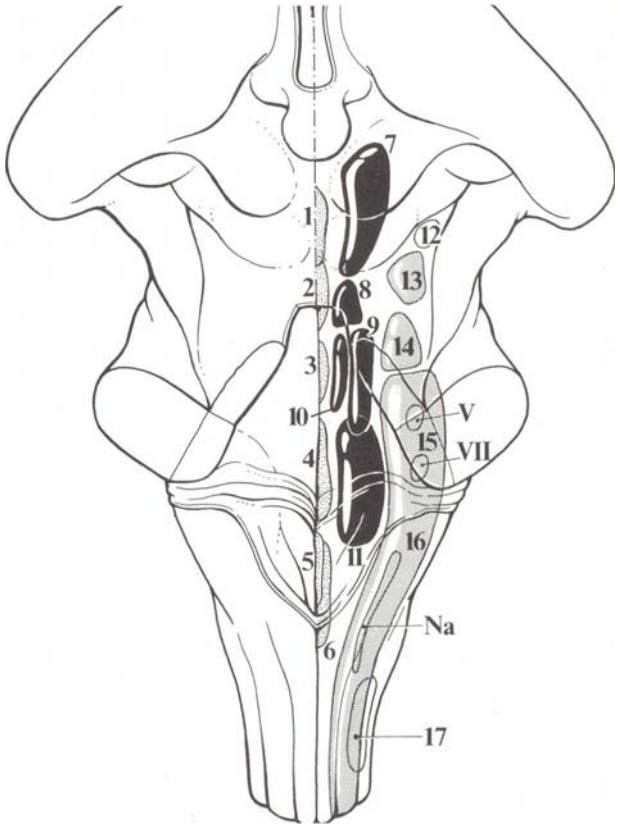


Fig. 4: Pattern of the central areas of the Formatio reticularis

Mediane zone (= Raphecoree)
1 Nucleus raphae dorsalis
2 Nucleus centralis superior
3 Nucleus raphae pontis
4 Nucleus raphae magnus
5 Nucleus raphae pallidus
6 Nucleus raphae obscurus

Media (motor) zone
7 Nucleus cuneiformis et Nucleus subcuneiformis
8 Nucleus reticularis pontis oralis
9 Nucleus reticularis pontis caudalis
10 Nucleus reticularis tegmenti pontis (NRTP)
11 Nucleus reticularis gigantocellularis

Lateral (sensoric) zone
12 Nucleus tegmenti pedunculopontinus, pars compacta
13 Nucleus parabrachialis lateralis
14 Nucleus parabrachialis medialis
15 Nucleus pontis centralis
16 Nucleus medullae oblongatae centralis
17 Nucleus reticularis lateralis (LRN)

V Nucleus motorius nervi trigemini
VII Nucleus nervi facialis
Nucleus ambiguus

The arrangement occurs in 3 nuclear groups:
big celle cores:
mainly media situated
small cell cores:
mainly lateral situated
Raphecore (Nuclei raphies): median

2.2.3.1. Tasks of the Formatio reticularis

1. Coordination of the brain nerves together and with other parts of the central nervous system: This coordination is necessary with the brain nerves because afferente and efferente fibers with the Spinalnervs are not united by an easy reflex curve within a segment. They run in different nerves with partly far apart recumbent central areas. One can equate the Formatio reticularis, hence, to a great extent with the association apparatus of the brain trunk.

2. Vegetative centres: The regularisation of respiration, circulation, gulps and break occurs in the Formatio reticularis of the brain trunk. These vegetative centres apply about bigger areas of the Formatio reticularis because mostly also bigger peripheral areas must be co-ordinated.

   Respiratory centre (in extended marrow): With irritation of small cell one breathes out and inhalesd with irritation of big cell parts. One can distinguish an ex- and an inspiration centre.

   Circulatory centres: A Pressorcentre raises the blood pressure, a Depressorcenter lowers it. There are even other centres for gulps, vomiting, absorption of nutrients etc.
3. Cocontrol of the Sensomotoric: The Formatio reticularis influences:

   the afferent systems, e.g., the pain threshold.

   the efferent systems. e.g., the muscle tone.

   Influencing of the consciousness and the feeling:
4. The climbing up retickular awake system, often shortened ARAS (ascending reticular activating system) has essential interest in the control of the awake consciousness.

   Serotoninerg Raphecore belong to the limbic system.

Reference to " position of the brain nerves cores “

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Lippert .: Lehrbuch der Anatomie, Urban & Fischer München - Jena, 5. Auflage 2000, p447, 476, 477, pp480

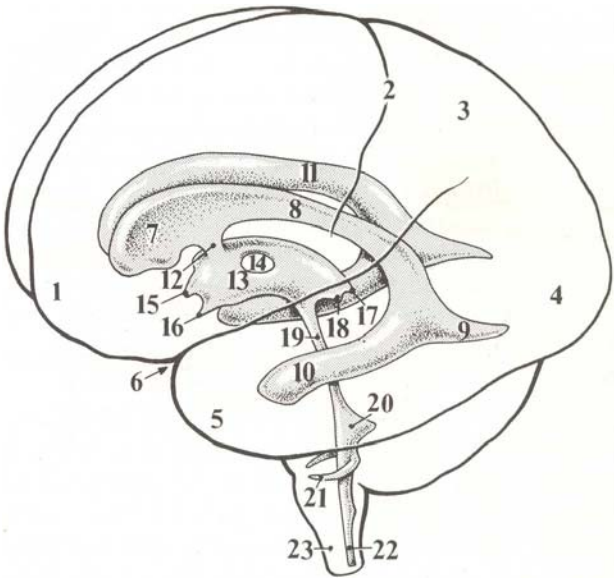

Fig. 5: ventricleystem of the brain

1 Lobus frontalis
2 Sulcus centralis
3 Lobus parietalis
4 Lobus occipitalis
5 Lobus temporalis
6 Sulcus lateralis (Ramus post.)
Ventriculus lateralis
7 Cornu frontal
8 pars centralis (on the left)
9 Cornu occipitale
10 Cornu temporale
11 pars centralis (on the right)
12 Foramen interventriculare
Ventriculus tertius
13 3. Ventricle
14 Adhaesio interthalamica
15 Recessus opticus
16 Recessus infundibuli
17 Recessus suprapinealis
18 Recessus pinealis
19 Aquaeductus mesencephali Ventriculus quartus
20 Ventriculus quartus
21 Recessus lateralis ventriculi quarti
22 Canalis centralis
23 Medulla oblongata

2.3. Liquorsystem

The ZNS is surrounded from a liquid, the Liquor cerebrospinalis. The clear and colorless Liquor fills on the one hand the 4. Ventricle of the brain (internal Liquorspace) and, on the other hand, the Cavitas subarachnoidealis in the skull and whirl canal (external Liquorspace). Internal and external Liquorspace are linked in the area of IV. ventricle with each other.

2.2.4. Internal Liquorspaces

The ventricleystem exists of four Ventricle: both Sideventricle (Ventriculi laterales, I and II) of the final brain hemispheres, the III. Ventricle of the interbrain and IV. Ventricle of the rhomb brain. Two sideventricle are in connection with III. Ventricle by the Foramen interventriculare (Monroi) anterior of the Thalamus. The III. Ventricle communicates again by a bottleneck, the Aquaeductus cerebri (Sylvii) with the IV. Ventricle. The Sideventricle has the form of a semicircle with a horn reaching to caudal-anterior.

2.2.4.1. Sideventricle

In the Sideventricle we distinguish several segments: In the frontal part the front horn (Cornu frontal),limited lateral from the Caudatum head, media from the Septum pellucidum and dorsal from the Corpus callosum with the narrow pars centralis (cella media). Above the Thalamus in the Temporallob lies the lower horn (Cornu temporale) and posterior the back horns (Cornu occipitale) in the Occipital lob.

2.2.4.2. III. Ventricle

The side wall of III. ventricle is formed of the Thalamus with the Adhaesio interthalamica and the hypothalamus. From III. Ventricle there come out the Recessus opticus and the Recessus infundibularis, caudal the Recessus suprapinealis and the Recessus pinealis.

2.2.4.3. IV. Ventricle

The IV. Ventricle forms a tent-shaped space between small brain and Medulla about the rhomb pit and sends after both sides a long Recessus lateralis at whose end the Apertura lateralis ventriculi quarti (Foramen Luschkae) are. With the beginning of the Velum medullare inferius lies median the Apertura mediana (Magendii).

2.2.5. External Liquorspaces

The external Liquorspace lies between both sheets of the soft cerebral membranes. Inwards it is limited by the Pia mater and outwardly by the Arachnoidea (Subarachnoidealspace). It is narrow in the convexiity of the hemispheres and increases only in the brain base in some districts to the "cisterns". While the Pia mater of the surface of the ZNS lies close, the Arachnoidea stretches about furrows and pits, so that in the area of deeper wholes bigger rooms full with Liquor originate (Cisternae subarachnoideales). The biggest space is the Cisterna cerebellomedullaris between small brain and Medulla. In the corner of interbrain ground between Pedunculi cerebri and Pons lies the Cisterna interpeduncularis and

before it, in the surrounding of the Chiasmas, the Cisterna chiasmatis. The small brain surface, 4 hill record and epiphysis limit the Cisterna ambiens.

2.2.6. Liquorcirculation

A part of the Liquors cerebrospinalis comes from the intercellular fissures of the cerebral production, while approx. two thirds of the liquid amount are produced in the Plexus choroidei of the brainventricles by secretion. Here the epithelium retires over active transport up to two thirds of the day amount (200-300 ml) in Liquor in the Ventricle. (Firbas S8) It flows from the Sideventricle into III. Ventricle and from this by the aqueduct in the IV. Ventricle.

The only openings which connect internal and external rooms lie in "corners" of 4. ventricle. These passages are central for the Liquorcirculation.

- Apertura mediana: median recumbent opening (Magendie - hole)
- Apertura lateralis: lateral opening to the left and on the right (Luschka - hole)

Other openings of 4. ventricle are:

- Aquaeductus mesencephali (to cranial "Ductus Sylvii")
- Canalis centralis (caudal in the spinal cord)

The run-off occurs, primarily, about the Granulationes arachnoideales in the venous blood of the sine sagittalis superior. A part flows back into the intercellular rooms of the brain. Another runs off over the resigning brain nerves and spinal nerves. In the end, here the liquid should pass into lymphatic vessels.

Normally the total quantity amounts in Liquor about 125 ml, so about 1/8 litres.

With atrophy of the brain this volume can be increased around a multiple. The Liquor is renewed daily one to two times. The functional meaning of the Liquors lies in the mechanical protective function for the ZNS, because his specific weight is slightly lower only than that of the brain. The brain floats in the liquid and is surroundet by it. The Liquor has the role of a transport medium for hormones and Pharmaka within the ventricleystem.

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3. Physiology

In the physiology chapter the areas of Breath physiology and circulatory physiology are described. The third part of this chapter contain a short introduction to the activity of the ZNS and gives an overview about the connection to ZNS activity and Elektroencephalogramm (EEG).

3.1. Respiration

3.1.1. Respiratory network

The breath rhythm originates from a neural network of the Medulla oblongata whose neurons are localised in so-called ventral respiratoric group (VRG). A longitudinale fabric column forms these VRG along the Nucl. ambiguus. A special role has the so-called Prabötzinger Complex. The neurons of this network are coupled together, but also in connection with other synaptic networks which influence the tone (basic activity) of the bronchial musculature, the likeable one and the parasympathic nervous system.

3.1.2. Respiratory neurons

On the basis of animal-experimental investigations one makes a distinction with medullar respiratoric neurons between three different classes:

- the inspiratoriic (I neurons) which unload during the inhalation,
- the post inspiratoriic (PI neurons) which unload during the first, passive exspirationsphase (post inspiration) and
- the exspiratoriic (E2 neurons) which unload during the second, active Exspirationphase.

Different respiratoric neurons the so-called ventral respiratoric group (VRG) are

panelled together to a neural network in ventrolateral Medulla oblongata. The network produces a rhythmical activity which will transfer via retikulospinal to inspiratoric and exspiratoric motoneurons in the spinal cord. The neurons of the dorsal respiratoric group (DRG) are localised in the ventral part of the Ncl. tractus solitarius. These are interneurons for the afferent influence from the respiratory tract, the lung and the heart-circulatory system.

3.1.3. Coinervations

Through respiratoriic coinervation of the cranial moto neurons (IX., X., XII-th brain nerves) as well as the bronchomotoric neurons the tonus of the tongues musculature, Pharynx-musculature, larynx musculature and bronchial musculature is adapted rhythmically to the respiration and therefore the access of the upper aerial way the flow of the air is regulated.

3.1.4. Bases of the Rhythmogenese

The respiratoriic rhythm shows an oszillatoric activity change between inspiratoric, postinspiratoric and ordinarily, but not necessarily, also with exspiratoric neuron classes. Basis of this rhythmogenese are restraining and exciting synaptiic interactions between the neurons of the VRG and the modulation of the neurons by membrane qualities dependent on activity and dependent on tension.

3.1.5. Chemical respiratory regulation

The chemical respiratory regulation stands in the service of the Homöostasis and controls the adaptation of the ventilation that the cellular metabolism of the organism needs.

The values of the PaCO2 (arterial CO2 partial pressure), the PaO2 (arterial O2 partial

pressure) and [H +] (arterial H + concentration) are decisively determined by the external respiration and the gas exchange and regulate for their part the functions of respiration and circulation. The in the following described reflektoriic ventilation adaptation guarantees that the breath gases are held steady in the arterial blood.

3.1.5.1. ventilation answer CO2

The most actual respiratory impulse ordinarily occurs about the arterial PaCO2; the answer curve CO2 rises up to a breath time volume of 70-80 l / min with a PaCO2 from 60-70 mmHg. Besides, raised PaCO2 values are connected with an increasing feeling of the breathlessness (dyspnoea). With PaCO2 values more than 70 mms of Hg a narcotic effect enters, and the ventilation drops again.

3.1.5.2. pH-ventilation answer

The physiological pH-answer curve shows only one unexpectedly level increase (approx. 2 l / min per 0.1 pH changes) with norespiratoric acidosises. This apparently low delicacy of the physiological respiratory regularisation explains itself by the hyperventilation-conditioned increased delivery of CO2. It is just this delivery of CO2 which causes a respiratoriic compensation of a not respiratoric acidosis. With a consistently held PaCO2, the steepness of the pH-answer curve on 20 l/min per 0.1 pH-change increases.

3.1.5.3. O2 – ventilation answer

By decrease of the PO2 in the inspiration air and therefore of the PaO2 in the arterial blood one observes an increase of the breath time volume by rise of the breath volume and increase of the respiratory rate. A rise of the PaO2 leads against it only to a slight ventilation increase. An arterial Hypoxy can appear with a stay in surroundings with degraded PaO2 (e.g., big heights), but be also result of ventilation disturbances or disturbances of the gas exchange in the lung. Practically an increase of the breath time volume appears at first if PaO2 values from 50-60 mmHg appear. An arterial Hypoxy exists.

3.1.6. Arterial Chemorezeptors

The PaO2-, but also PaCO2-and [H +] answers of the respiratory regularisation are given substantially by arterial Chemorezeptors. Such sensors are found bilaterally in the Glomus caroticum, in a Paraganglion, at the division place of the A. carotis communis into the Aa. carotis externa and interna. The Glomus caroticum is inervated from the Carotissinusnerv, a branch of the N. glossopharyngeus (IX), Other chemorezeptors are in the Paraganglien of the aortic curve and right A. subclavia (Glomera aortica), those of the aortic nerve are innervated by a branch of the N. laryngeus superior.

The Paragangllias are supplied by small side arteries and belong to the best supplied organs with blood of all of the body.

3.1.7. Coinnervations with the cardiovaskular system

A sufficient gas exchange and gas transport is only possible if the respiratoric movements with the cardiovaskular functions are coordinated. For example, a raised oxygen need at physical work must be covered by a suitable rise of the lung ventilation, the heart volume and the blood circulation of the musculature.
In addition, the respiration with almost all sensomotoric reactions must be co-ordinated. This is important at certain expression actions, as for example speech and laughter. Also reflektoriic processes, like cough, sneeze and vomiting require an exact regulation of the respiration with preservation of the rhythmics. Influences from many structures of the ZNS as well as over peripheral sensors released reflexes form the condition for this dynamic adaptation of the respiration.

3.1.8. Own reflexes of the breath musculature

Spinalown reflexes, in particular such of the intercostal respiratory muscles, are also involved in the control of the respiratory movements. Like the other cross-striped

muscles the breath musculature also contains muscle spindles and tendon organs. About spinal reflexes a fine adaptation of the breath movements can occur through it.

3.1.9. Breath way protection reflexes

The respiratory tract and the specific lung is equipped with chemo-and mechanosensible sensors from which important protective reflexes (Sneeze, cough, aspirating, lung stretch reflex, juxtakapillar reflex) are released. Most afferent nervous fibers move via the N. vagus or the N. glossopharyngeus to the Nucl. tractus solitarius. There lie interneurons which change the activity of the respiratoric network about oligosynaptiic connections and adapt the respiration to the respective situations.

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3.2. Bloodcirculation

3.2.1. Regularisation of the whole circulation

The varying blood circulation requirements of the single organs competing with each other require a higher coordination; the central-nervous structures which belong to the medulla oblongata and the hypothalamus fulfil this task

The functional state of the circulation is constantly controlled by sensors at different places of the cardiovaskular system. For the afferent impulses of these receptors the Nucleus tractus solitarii in dorsomedial Medulla oblongata forms the first central synapse from which run connections to the different areas of the brain trunk, but also to higher regions. This net of neural conections in the area of the Formatio reticularis of the Medulla oblongata steers the efferent activity of praganglionar sympathic and vagal neurons. The classical medullar concept of one (rhombenzephal) circulatory centre is in view of the scattered localization of neurons today more than obsolete.

3.2.1.1. Short-term regulation of the arterial blood pressure

The short-term regulation of the arterial blood pressure is given by arterial pressorezeptors (Barorezeptors) which are localised in the carotissinus and in the aortic curve. The nervous impulses run by the N. glossopharyngeus or N. vagus to the first central synapse in the Nucleus tractus solitarii of the Medulla oblongata. From here the neurons responsible for the Sympathikus-basic activity are inhibited by polysynaptiic ways in rostral ventrolateral Medulla oblongata and the praganglionar neurons of the N. vagus are activated in the Nucleus ambiguus.

3.2.1.2. Long-term regularisation of the arterial blood pressure

The long-term mechanisms of the blood pressure regularisation are based, primarily, on processes which influence the intravasal liquid volume in relation to the vascular capacity. An adaptation of the capacity to the intravasal volume occurs, , through the already shown vasomotoric reactions as well as the Renin Angiotensin system
Hence, the regularisation by the renale system is extremely important not only for a well-balanced water household and electrolyte household, but also for the normal circulatory function

3.2.2. Central-nervous control of the circulation

3.2.2.1. Medulla oblongata influence

In the Formatio reticularis of the Medulla oblongata and the bulbar segments of the Pons lie several populations of circulation-regulating neurons by which under rest terms a normal middle blood pressure can be maintained. The toniic activity of the sympathic praganglionar neurons in the side horn of the spinal cord is given basically by the circulation-steering neurons in rostral ventrolateral Medulla oblongata which are inhibitied through a polysynaptic way by the activity of neurons in the Ncl. tractus solitarii. All influences activate these neurons in the ventrolateral Medulla.

3.2.2.2. Hypothalamic influence

Already under rest terms the hypothalamus influences constantly the toniic activity as well as the reflektoric reactions of the medullar circulation-steering neurons.
Thus irritations of the rear hypothalamus segments are connected with an activation of the dilatatoric influence on the sceletal musculature and the adrenerg system on the remaining effektors. Damping effects on the circulatory system and other functions go out from front hypothalamus segments which serve the rest of the organism and stand in connection with the absorption of nutrients and the digestion.

3.2.2.3. Cerebellar influence

Also from the phylogenetic older medianparts of the Cerebellum in the area of the Vermis cardiovaskulare reactions can be released. Thus it comes with stimulation of the uvula to an increase of the activity in the kidney and in the heart, as well as a vasodilatation in the skeletal musculature, i.e. to a vegetative reaction pattern similarly with beginning of a physical work.

3.2.2.4. Cortical influence

In the brain cortex numerous areas are found by which with irritation heart reactions and vascular reactions are released. An accumulation of such places is found in neocortical areas of the external convexity of the hemisphere, esp. in the area of the motoric and premotoric fields and in palaeocortikal areas, especially in the media surfaces of the hemisphere as well as the basal surface of the frontal lob

3.2.2.5. Spinale influence

The influence comes from praganglionar sympathikusneurons in the side horn of the spinal cord which have a certain independence. Thus sensoriic afferences (full bladder, skin irritation) can release a strong sympathikusakctivation and thereby massive blood pressure increases.

3.2.3. Adaptation of the circulation to varying conditions

The arterial blood pressure depends on age, gender, genetic factors as well as environmental factors and increases in physical and psychic load situations.

3.2.3.1. Standard values, age dependence

In observation of the diagnostically important rest blood pressure factors of influence are taken into consideration. With healthy adults between the 20th and 40th year the frequency summit lies for the systolic pressure with 120 mms of Hg, for the diastolic pressure with 80 mms of Hg. The number predominating by far of all values lies between 100 and 150 mms of Hg for systolic and between 60 and 90 mms of Hg for the diastolic pressure. With increasing age stronger increases of systolic than the diastolic pressure appear. These effects are based basically on elasticity losses of the vessels. Women show at the age up to 50 years an average lower, at the age more than 50 a little higher blood pressure than men of the same age.

3.2.4. Pathophysiology of blood pressure

According to the definition of the World Health Organization (WHO) values from systolic more than 160 mms of Hg and diastolic more than 95 mms of Hg characterise a hypertension and, nevertheless, because of the changes dependent on age these values may not be looked as a stiff border between normotone and hypertension. On the basis of extensive investigations in bigger population groups it seems better to accept upper norm border of the following values: 140/90 mm of Hg up to 40th year, 150/90 mm of Hg up to 60th year, 160/95 mm of Hg from the 60th year.

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3.3. Brain physiology and EEG

3.3.1. Introduction

The big majority of the cortical neurons is from the type of the pyramid cells, the remaining ones are summarised as star cells. Pyramid cells are exzitatoric, most star cells inhibitoric. All axons which leave the cerebrum come from pyramid cells. Every pyramid cell is connected with thousands of other pyramid cells synapses. Their synapses are modifiable dependent on activity (plastically).

To a great extent exzitatoriic construction of the brain cortex causes synchronous electric unloadings and oscillations of single brain areas which could illustrate the meaning of cognitive representations. The synchronous oscillations are the result of added up exzitatory potentials (EPSPs) in the upper cortex layers.

3.3.1.1. Rest potentials and action potentials

Pyramid cells have rest potentials of from-50 to-80 mV, and the amplitude of the action potentials, with a duration of from 0.5 to 2 ms, is 60-100 mV. The action potentials start in the axon of the cells and spread out from there. Pyramid cells can unload up to 100 Hertz. Pyramid cells are exzitatoric, while most star cells work inhibitoric (otherwise her biophysical properties are apparently widely identical with those of the pyramid cells).

3.3.1.2. Synaptiic potentials

Compared to the moto-neural postsynaptic potentials the cortical potentials are longer. Exciting postsynaptiic potentials often have an increase time of several milliseconds and a fall time from 10-30 ms, while restraining postsynaptiic potentials last mostly even longer, about 70-150 ms. In apical dendrites potentials which continued several seconds were registered.

3.3.1.3. Inhibiting postsynaptiic potentials

are rarer in the spontaneously active cortex than exciting potentials. The frequency of the cortical impulse activity released by postsynaptiic potentials is low. It mostly lies less than 10 Hertz and often less than 1 Hertz.

3.3.2. Analysis of the cerebrum activity with EEG and ECoG

Electric potential variations can be measured between the electrodes with person and other vertebrates. Their frequency lies between 0-80 Hertz and the amplitudes in the scale of 1-100 microvolts.

If the deduction occurs directly from the brain surface one receives the Elektrokortikogramm, EcoG, whose potential variations distinguish themselves by little bigger amplitudes and better frequency reproduction. Analoge potential variations can be measured by surgically introduced electrodes also from deeper brain structures.

3.3.2.1. EEG in alert rest state

The rhythm, which rules with healthy, human adults in the alert, but inattentive state (closed eyes) is clearly focused especially around the Occipitallbrain and has a frequency of 8-13 Hertz (on an average 10 Hertz). These waves are called alpha waves.

3.3.2.2. EEG with attention and learning

The disappearance alpha waves while opening the eyes or also with other sensory stimuli is called alpha blockade. Higher frequent beta waves can be measures (15-30 Hertz, on an average 20 Hertz with smaller amplitude). The EEG becomes also mostly irregular and the measurements of the single deduction places show big differences in amplitude, frequency and phase position.
One calls waves more than 30 Hertz gamma waves which can appear with learning processes and attention processes.

3.3.2.3. EEG in the sleep

Delta and theta waves are two important basic forms of the EEG, theta waves4-7 Hertz, delta waves 0-4 Hertz. They ordinarily do not appear with the adult in the awake state. However, they are observed, in the sleep and with pathological states.

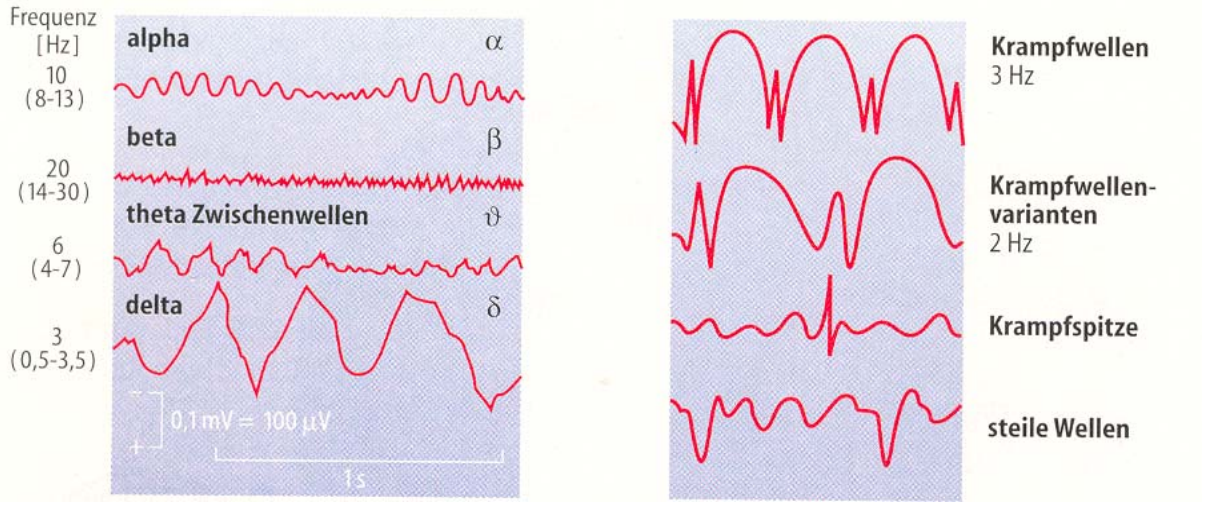

Fig. 6: Main forms of the EEG.

On the left the different kinds of waves which can appear. On the right examples of cramp potentials with epilepsy.

3.3.3. Clinical applications

The recording of the electric activity of the brain is used in the clinical-diagnostic area for the localisation and diagnosis of epilepsy, for the diagnosis of the cerebral death, for the evaluation of the brain activity in poisoning, in the anaesthesia for the evaluation of the anaesthesia depth, in the pharmacology for the investigation of medicaments and in the neurology for the evaluation of cerebral disturbances after blood circulation problems.

3.3.4. Psychophysiology

In psychophysiological research the registration of the electric and magnetic activity of the brain is the most important methodical access for the investigation of the connection between brain and behaviour with the person. As the processes run very

quickly (in millisecond intervals), the measurement requires a time resolution which picture-giving procedures do not show yet. The disadvantage of elektroencephalographic methods consists in the fact that they must buy her exact time structure with relative local inaccuracy about the anatomical origin of a certain tension variation. The EEG is the most important methodical instrument of the sleeping research.

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4. Technique of 4th ventricle

The effect of the technique of 4. ventricle (or CV4) is based on the manual influence of the therapist on the cranial movement. The cause of this low movement of the cranial bones is based in the in the so-called concept of the "MRP".

4.4. MRP

MRP stands for „ Mécanisme Respiratoire Primaire “, or „ Primary respiratoric mechanism “ (PRM).

This concept was found by Dr. Sutherland. After him the so-called primary respiration begins in the central nervous system.
"Primarily", because of the MRP is first even before the pulmonal respiration in action, already with the embryo it is provable and for Sutherland has big meaning for the whole organism.
"Respiratoric" because the MRP, just as the lung respiration, shows a rhythmical process which deals with exchange processes. It shows an anabolic as katabolic metabolism process.
"Mechanism", because it exists of parts linked with each other from whose teamwork a certain effect originates.

The origin of the MRP lies on the one hand in the motility of the ZNS and, on the other hand, in the fluctuation of the Liquor cerebrospinalis (LCS). The MRP movement exists of two parts (expansion and contraction) and is cyclic.
The Liquor cerebrospinalis, produced in the PIexus choroideus of the ventricleystem. transfers a pulsation on the dural membranes which transmit this movement to the cranial bones. After the expansion comes the return in the beginning position: the contraction.
The central "joint" for the cranial movement is the Synchondrosis between the base of the Occiput and the Spenoid. In the Expansion phase Os sphenoidale and Os

occipitale turn around a transversal axis. Thereby the Sphenobasilar-Synchondrosis lifts. This rising is called flexion, the way in the starting position back extension.

4.4.1. Movement of the Occiput

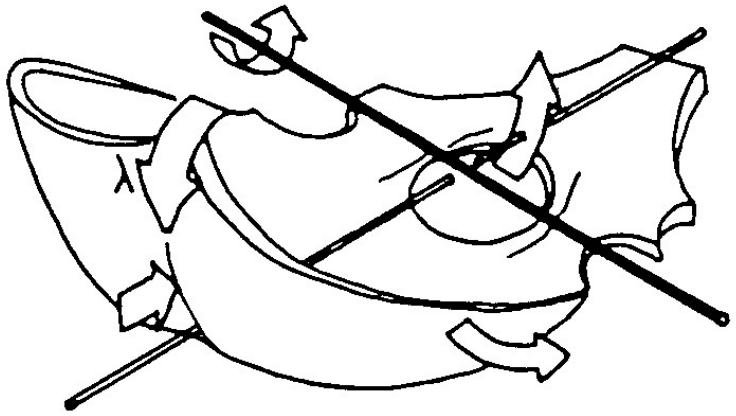

Fig. 7: Movement of the Occiputs in detail

The back of the Occiput has a key position and moves the temporalia and the Ossa parietalia. The physiological axis of rotation runs transversal, above the Processus jugularis on height of the Sphenobasilar-Synchondrosis.

1. Pars basilaris: This does a Cirkumduction forwards on top. The Foramen magnum goes forward, the front edge lifts.

2. Partes condylares: They are pulled forwards.

3. Upper corner: The Lambda goes to the back below, while the back of the bone does a Cirkumduction around it´s transverse axis.

4. Lateral corner: The Asterion goes down lateral.

5. Margo mastoideus: owns a postero lateral divergency which goes forwards.

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4.5. Effect of the technique CV4

The back of the head scale answers with a minimum movement. This adaptation is reduced by a compression in the lateral parts of the back of the head. The intracranial pressure thereby increases whicht creates an increase of the liquid movement and the liquid exchange.
This promotes the care of the cells, improves the lymphatic movement, regenerates the fabrics and stimulates the brain nerve centres in the 4. Ventricle. All exchange processes of the body are stimulated by the biodynamic, bioelectric and biochemical qualities of the LCS.

4.5.1. Indications after Liem

- Normalisation of the MRP rhythm.
- Tonus lowering of the sympathic nervous system (positive influence with stress symptoms, states of anxiety and sleeplessness).
- Tonus lowering of the whole connective tissue (hence, helpfully by acute and chronic muscle disturbances, degenerative joint disturbances, menstrual pains).
- Fever lowering (up to 2°C within 30-60 min).

- Rise of the body core temperature with compression of the Squama occipitalis.
- With high blood pressure and tachycardia.
- With edemas on account of venous buildups.
- With inflammations and infections.
- With bad calcification of the bones (the ossification is supported).
- With depression.
- With headaches because of venous drainage disturbances.
- With neuroendocrine disturbances.
- With hyerthyreosis.
- With shock (e.g., anaphylaktiic shock).
- However, epilepsy (besides, an attack can be released).
- The natal process and the labour pains introduction is promoted (supports the uterin contractions).
- With arthritic discomfort.
- Secondary, light Dysfunktionen of the spine can free themselves.
- Works as a lymphatic pump.
- Primary Dysfunktionen of the body can become apparent by this technique and are recognised thus.
- "Forgiveness technique": The negative effects of a technique can be repaired by the CV-4 technique.
- Blood glucose-lowering.

4.5.2. Other indications after Magoun

- Surgical anaesthesia
- Reduction of localised edemas as a result of traumas (fracture) and inflammations of joints (e.g., ankle).
- Parasthesia in the extremities can be influenced favourably.
- With an infection of the respiratory tract (reduces the vague feeling).
- Muscular fascial stress can be removed.

- Help with stagnation of the body liquids (degenerative or metabolic states, e.g., poisoning) by intensification of the liquid exchange in the body:

  „ *The reaction occurs without doubt methodically, it resembles the effect of "lymphatic pumpings". The short, rhythmical movementrashes of the diaphragm influence the Cisterna chyli, the Ductus thoracicus and all Fascia of the body. On account of the continuity of the liquids and the tissue the whole body can be influenced by this action.* "from ostepathy in the cranial field " - S130

4.5.3. Contraindications

With danger of brain bleeding by the increase of the intracranial pressure, e.g., with acute stroke, with Aneurysm, with malignant high pressure.

Cranial base fractures, head injuries, especially fractures of the Os occipitale.

Pregnancies from the 7-th month, because under circumstances contraction waves can be evoked be.

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4.6. Protocol of the CV4 technique

The therapist sits in the head of the patient. Ulnar side of hand contact each other, the fingers crosswise about one another, the thumbs touch in the area of the basic joint of the forefinger; thus the hands form a "bowl" as if one drank „ water with the hands “.

The therapist asks the patient to lift the head and lays his hands under the Occiput. The balls of the thumb lie media with the back of the Occiput, approx. 2 fingerbroad behind the Processus Mastoidei. The patient should lie calmly and push his chin easily in the posterior direction.
The therapist approximates his forearms stored at the table a little bit to each other, the contact of the balls of the thumb in the back of the head thereby increases. Now under preservation of this narrow contact a movement occurs in the direction of table and the anterior and longitudinale part of the ventricle comes under tension. The holds of this contact can be compared to pushing away a boat of the quay: Go and continuously keep to it.

During the exspirationsphase the therapist follows with his thumbs the narrowing of the back of the Occiput. In the inspiration phase the balls of the thumb prevent the outside rotation or the widening of the Occiput. In the next exspirationsphase the hands accompany the back of the head even further in the inside rotation and resist in the inspiration phase of the widening.
After some cycles the pressure decreases against the balls of the thumb in the inspiration phase. The inflexion and extension movement has come to the shutdown: Still point. The hands remain during the still point in the back of the head, follow, perhaps, appearing micromovements of the cervical musculature. These show a kind disentanglement and relaxation of the fascia, muscles and bones.
The duration of the quiet Stillpoint can need some seconds till several minutes.

Signs for a successful stillpoint are: the deepening of the respiration, a light sweat on the forehead, the lowering of the muscle tone, the patient falls asleep.

At the end of the stillpoint the therapist feels a strong, steady pressure on both sides of the back of the head in the direction of outside rotation. He follows this impulse passively and reduces after several cycles slowly the contact of the balls of the thumb. Now the head of the patient rests on the palms of the therapist. The therapist finishes the technique with solving the contact.

Reference to " protocol of the technique CV4 “

Liem T.: Praxis der Kraniosacralen Osteopathie, Hippokrates Verlag, Stuttgart 2000, p27

Magoun H.I.:, Osteopathy In The Cranial Field, Denver Colorado– Second Printing 1997 Sutherland Cranial Teaching Foundation, Inc, 1951. p 82

Magoun H.I.:, Osteopathie in der Schadelsphare, Übersetzung der dritten Ausgabe “Osteopathy in the cranial field”, Erste deutsche Ausgabe, Éditions Spirales, Collège d´Études Ostéopathiques de Montréal, 2001 pp130

Druelle Ph.: training of the DOK, “LWS” 16. - 19.10.1997

Druelle Ph.: training of the DOK, “LWS” 14. - 17.10.1999

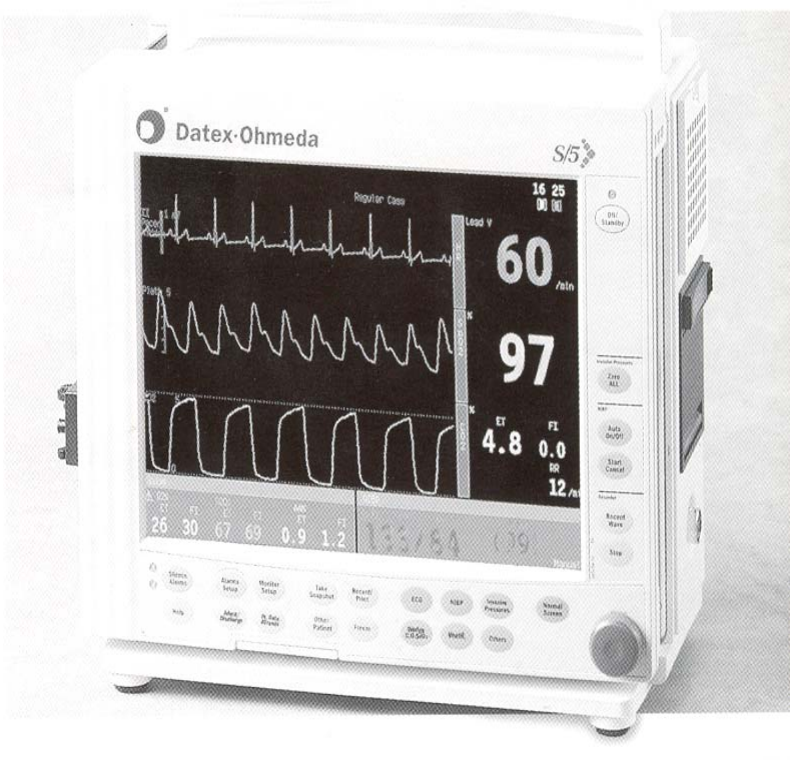
5. Measuring equipment

All measurements are done by using an instrument, which is used worldwide in intensive care units for patients monitoring:

Cardiocap/5 (S/5 Light Monitor)
Producer: Fa. Datex-Ohmedia Inc., USA Massachusetts
Address: 3 Highwood Drive/ Tewksbury, Ma 01876
Homepage: www.us.datex-ohmedia.com

5.1. Features

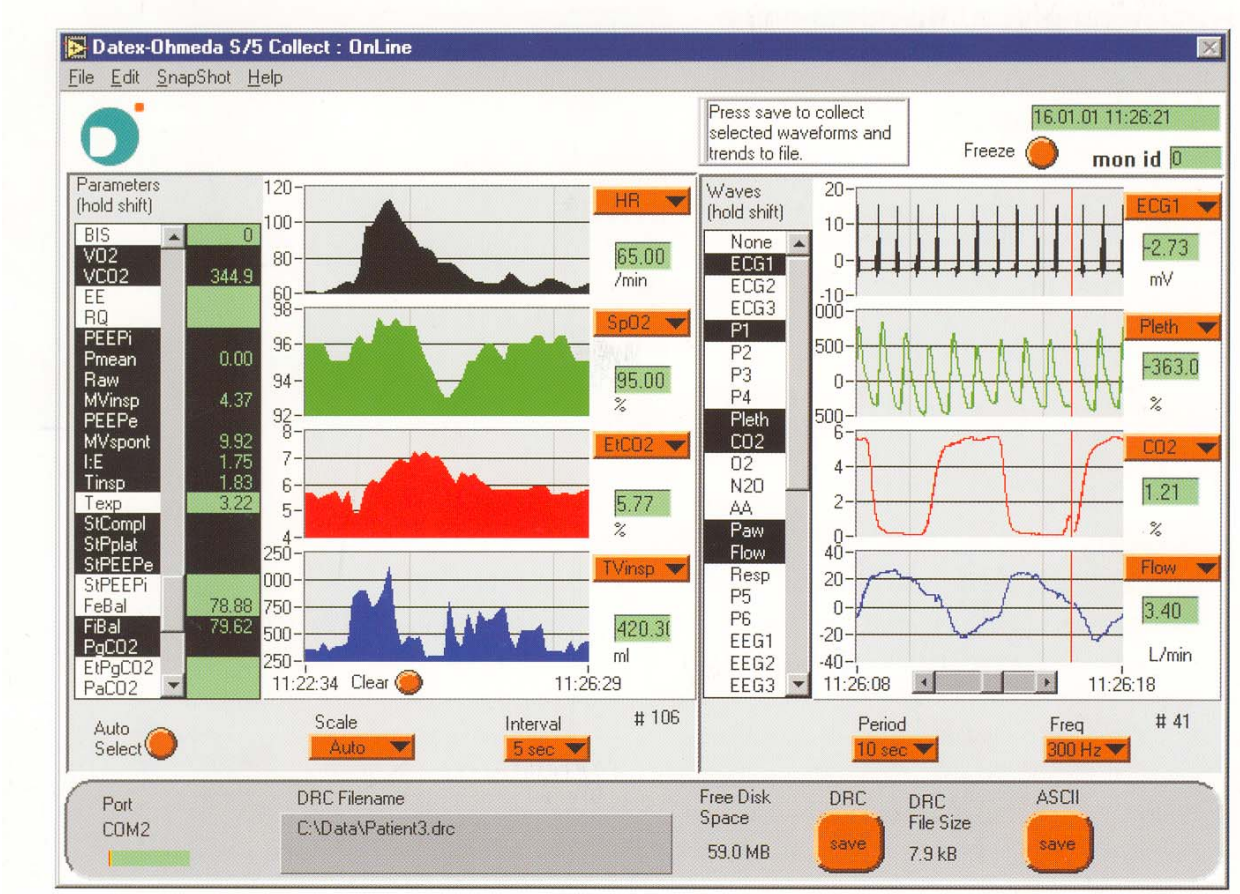
- Collects trend curves and alarm datas using the RS 232 interface and shows them visually and offline for scientific research.
- Saves selected information numerically in ASCII format, which can be analysed in programs for tabular calculation (e.g. MS-Excel).
- Saves any kind of configuration.and supports the analysis of different cases, which are part of the study.
- Allows the input of footnotes and markers during data-collection to simplify analysis.
- Looking at and analyzing the datas offline by using a menue similar to a VCR.
- Snap shots can be saved.
- Update of the parameters for the further use is possible.



Datex Ohmeda Cardiocap/5 (S/5 Light Monitor)

5.2. System requirements

- The PC has to be a Pentium-PC with at least 4 MB RAM
- 10 MB memory capacity is required for the Program Data-Collect
- To run the PC you need Windows 95 or higher
- For the communication between Datex OhmedaCardiocap/5 (S/5 Light Monitor) and PC you need a serial PC-cable link



For collecting the datas this ICU-monitor is connected with a serial interface (RS 232) with the personal computer. Syncronisation of PC and monitor is done by the program „Data-Collect“. This software enables to transfer and save the measured datas on the PC. In our paper the parameters were saved every 30 seconds.

The datas were converted into Microsoft - Excel 97 and for statistic analysis into Statsoft – Statistica 6.0.

5.3. EEG electrodes

Self adhesive one way electrodes with low impedance of the Zipprep® company were used.
To make the measurement possible, the impedance at every contact must be under 5 kOhm, the maximal impedance difference at any side must be below 2 kOhm.

Zipprep® produce for Aspect Medical System
2 Vision Drive, Natick MA 01760-2059
USA 1-800-442-7688

5.4. EKG electrodes

Self adhesive one way electrodes with sticky transparent tape tyco Healthcare company were used.

Typ: Kendall Excel ™ AV3010.50 radiolucent electrodes

producer: tyco Healthcare The Ludlow Company LP
Two Ludlow Park Drive Chicopee, Ma 01022
USA: 800-669-1009 International: 413-593-6400

5.5. Disruptive factors in measurement

- Bad contact of the electrodes caused by dry adhesive.
- High resistence caused by poor cleaning of the skin.
- High electromyogramactivity on the forehead, caused by itching; therefore no EEG-measurement possible.
- High difference in skin resistence between frontal and mastoidalic electrodes. To eliminate these measurement failures the electrodes were regulary controlled during the measurement (every 3 minutes). We used a automatically working routine of the S5 Light Monitor.

5.6. Treatment couch and therapyroom

As a treatment couch we used a Vojta couch (size 180 cmtimes 120 cm). To exclude a disruption of the EEG measurement there was no socket or other electrical wire two meters away from the machine.

The distance from the ICU monitor to the client´s head was 180 cm, to the PC 240 cm. In the room we avoided disrupting devices like mobile phones, handhelds or puls count machines. The patients did not wear any watches.

Reference to "measuring instruments"

Datex Ohmeda page/5 User's manual, PDF file, datex-ohmeda div., instruments corp., Fin-00031 datex-ohmeda, Finland

Datex Ohmeda compact monitor page/5 device descriptions, PDF file, datex-ohmeda div., instruments corp., Fin-00031 datex-ohmeda, Finland

Sanitas training documents to the EEG, provided by Karl Heinz Aigner-Mühler Fa. Sanitas, A 5071 Wals near Salzburg in 2001

www.aspectms.com Homepage ASPECT Medical

www.us.datex-ohmedia.com Homepage of Datex-Ohmeda Inc./ 3 Highwood drive Tewksbury, Massachusetts 01876 USA

6. Measurement parameters

6.1. ECG - Elektrocardiogramm

A bipolar ECG deduction was used. (ECG deduction 2 after Goldberger). Therefore you need 3 electrodes. Two are situated accordingly in the area of the 2nd and 3rd intercostal area. The third is caudal of the heart on the left side. The ECG was measured continiously.

6.2. Breathing frequency by means of impedance

The breathing frequency was calculated by the instrument via the impedance of the skin resistance through the ECG deduction.

From the ECG deduction the instrument could calculate the following parameters:

Abbreviation	Parameter	Unit	Norm according to Cardiocap
HR	Heartrate	Beats / min	40-160 / min depending on age and fitness
HR min	Heartrate minimal	Beats / min	40-160 / min depending on age and fitness
HR max	Heartrate maximal	Beats / min	40-160 / min depending on age and fitness
Imped	Breathing frequency calculated impedance	breaths / min	10-20 for an adult in quiet condition

6.3. NIBP - non invasive blood pressure

The measurement follows the oszillometric principle through a blood pressure cuff. The measurement point is the a. brachialis on the inner side of the left ellbow. The NIBP was measured every 5 minutes. A more frequent compression of the arm would not make sense, as (according to information of Datex Ohmeda) this pressure would cause changes on the a. brachialis. This might alter the measuring results.

Through the blood pressure measurement the instrument could calculate the following parameters.

Abbreviation	Parameter	Unit	Norm according to Cardiocap
NIBP sys	systolic non invasive bloodpressure	mmHG	Hypertony > 160 Hypotony < 100
NIBP dia	diastolic non invasive bloodpressure	mmHG	Hypertony > 95 Hypotony < 40
NIBP mean	mean non invasive bloodpressure	mmHG	
PR (NIBP)	Pulsrate deleted from bloodpressure measurement	Beats / min	See heartrate

6.4. Oxygen saturation

With a fingerpeg on the right index the following parameters could be measured by means of an infrared LED

Abbreviation	Parameter	Unit	Norm according to Cardiocap
SPO2	Oxygensaturation of the blood in %	%	> 90 %
PR SPO2	Pulsrate deducted through fingerpeg	Beats / min	See Heartrate

6.5. EEG – Electroencephalogram

Fig. 10: Basis EEG deduction

6.5.1. Basis EEG deduction

We used a deduction with 5 electrodes, the basis EEG deduction or 2 channel deduction.

Therefore you need 5 electrodes. 4 measurement electrodes and one as earthing

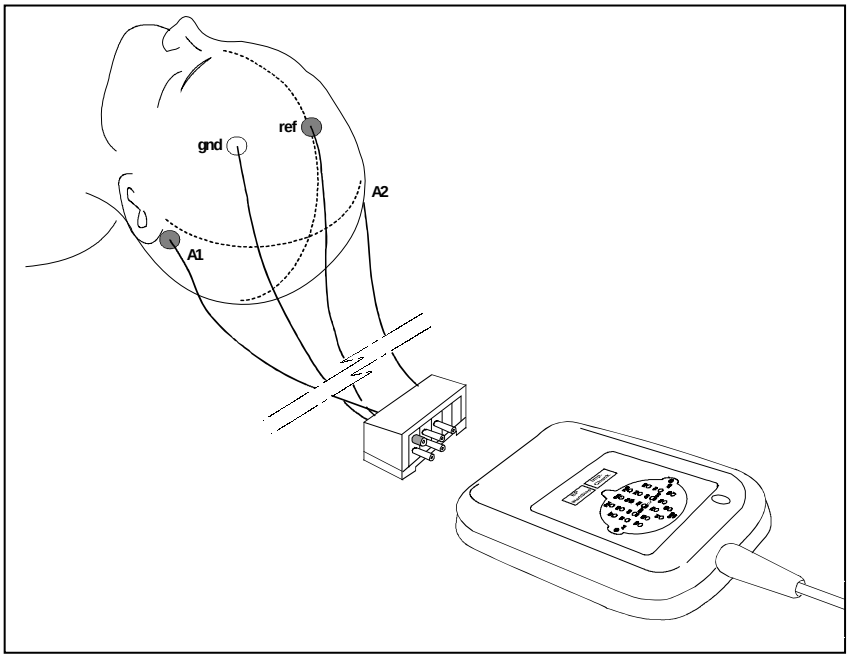


Fig. 11:
Scheme of the basis EEG deduction:

- A1 – Fp1
- A2 – Fp2
- Earthing

A1: is positioned on the left Mastoid

Fp1: left Tuber Frontal

A2: : is positioned on the right Mastoid

Fp2: right Tuber Frontal

Neutralelectrode: above the Glabella

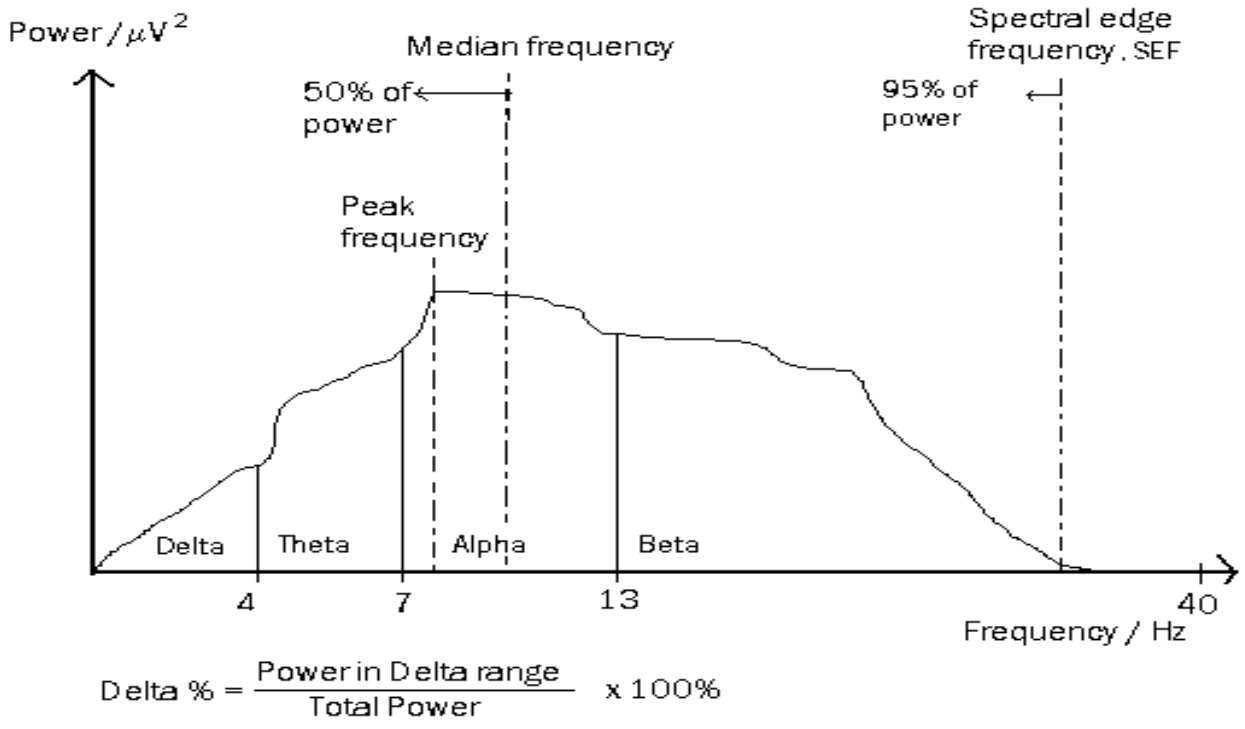
From the Basis deduction you get the “Raw EEG”: the temporal chronolgy of the measured potentials.

Fig.12: Raw EEG

In the raw EEG all the frequencies are overlapped. They are seperated by a spectral analysis. This is done mathematically by means of a “Fourier Transformation”. As a result you receive for any frequency a calculated number.
The area under the curve represents the total energy of the absolute amplitude of the deduction.

6.5.1.1. Spectral edge frequencies (SEFs)

As these results are difficult to read, SEFs are calculated. These are edge frequencies which include a certain percentage of the absolute energy of the signal.



Fi

Fig. 13 Spectral edge frequencies

6.5.1.2. Kinds of spectral edge frequencies

SEF 50% = Median frequency – MF: This value devides the area under the curve into two equal parts. The area left and right of this frequency is the same.

SEF 95%: 95% of the area is positioned left of the frequency. Through the spectral edge frequencies you can estimate the grade of activity and relaxation.

6.5.1.3. Burst Suppression Rate (BSR)

The rate of the suppressed peaks is measured by the BSR. A possible definition is given by Dr. Anne Vakkuri (e-mail):

„BSR is the % of time of flat EEG (less than 5 microVolts) from the whole EEG, so if flat EEG lasts 1 sec and the whole epoch is 3 sec, then BSR is 1/3 = 33%.
Burst suppression is seen during deep anesthesia, deep hypothermia after brain ischemia. In normal awake person can not be in burst suppression. Suppression is longer period of flat EEG, without any activity in between."

6.5.1.4. Parameters deducted from the EEG

Through EEG deduction the instrument could calculate the following parameters.

Abbreviation	Parameter	Unit
FEMG	Frontal electromyogram	µV (MicroVolt)
Ampl1	left amplitude = total energy of the left deduction	µV (MicroVolt)
SEF1	Spectral edge frequency left	Hz (Heart)
MF1	Median frequency left	Hz (Heart)
Delta1	Deltawaves left	% (Precent)
Theta1	Thetawaves left	% (Precent)
Alpha1	Alphawaves left	% (Precent)
Beta1	Betawaves left	% (Precent)
BSR1	Burst suppression rate left	% (Precent)
Ampl2	Right amplitude = total energy of the right deduction	µV (MicroVolt)
SEF2	Spectral edge frequency right	Hz (Heart)
MF2	Median frequency right	Hz (Heart)
Delta2	Deltawaves right	% (Precent)
Theta2	Thetawaves right	% (Precent)
Alpha2	Alphawaves right	% (Precent)
Beta2	Betawaves right	% (Precent)
BSR2	Burst Suppression Rate right	% (Precent)

Reference to "measuring parameter"

Datex Ohmeda page/5 User's manual, PDF file, datex-ohmeda div., instruments corp., Fin-00031 datex-ohmeda, Finland

Datex Ohmeda compact monitor page/5 device descriptions, PDF file, datex-ohmeda div., instruments corp., Fin-00031 datex-ohmeda, Finland

E-mail "BSR" of Anne Vakkuri, MD, PhD, Surgical hospital of P.O. Box 263 (Kasarmikatu 11-13) Fin-00029, Finland

E-mail "measuring parameter" of K.H.Aigner-Mühler, fa Sanitas, A - 5071 Wals

www.us.datex-ohmedia.com Homepage of the fa Datex-Ohmedia Inc./ 3 Highwood drive Tewksbury, Massachusetts 01876

H. Viertiö-Oja, P. Merilainen, M. Sarkela, P. Talja, H. Tolvanen-laakso and a. Yli-Hankala "Spectral entropy, approximate entropy, complexity, fractal spectrum, and bispectrum of eeg during anaesthesia", PDF file, datex-ohmeda div., instruments corp., Fin-00031 datex-ohmeda, Finland

Korhonen I. "Processing of Biomedical Signals", Lecture 8 - event detection, PDF file, datex-ohmeda div., instruments corp., Fin-00031 datex-ohmeda, Finland

Vakkuri A.: "EEG Monitoring in ICU", (Summery of the presentation in the Datex-Ohmeda's Clinical Window symposion at the ISICEM 2001 congress in Brussels, Belgium), PDF file, datex-ohmeda div., instruments corp., Fin-00031 datex-ohmeda, Finland

7. Course of examination

For our survey we invited 50 persons. We got complete datas from 43 clients which could be used for the analysis.

7.1.Criteria of choice of patientes

7.1.1 Including criteria

The age of the probands had to be under 40 years because it is easier whith young clients to cause a vegetative reaction.
All probands were between 18 and 39 of age with a n average of 22,8 years (See thesis-evaluation of anamnesis).

7.1.2 Excluding criteria

Alain Gehin writes on page 46: *“This maneuver must be avoided with any patient having recent cranial trauma, cerebral hemorrhage, other cerebrovascular accidents of recent onset or malignant hypertension.”*

- malignant hypertension: According to WHO definition you can speak of malignant hypertension if the systolic pressure is over 160 mmHg and the diastolic bloodpressure is higher than 95 mmHg. Schmidt, Thews p 545
- Pregnancy
- Pacemaker
- Acute pain symtoms.

7.1.3 There was no pretreatment. Why?

Harald Ives Magoun writes in “Osteopathy In The Cranial Field” on page 82:
“Dr. Sutherland has often said that no one is to sick for fourth ventricle compression and in almost any case, if you do not know what else to do, compress the fourth ventricle. It is the one most comprehensive and effective therapeutic procedure available.”

.

7.1.4 Presentation and examination

As our probands were students of the academies for physiotherapy and ergotherapy in Salzburg we did first of all an introductary lecture on both schools. In this lecture we informed the probands on the one hand generally about osteopathy and on the other hand specially about the course and background of the tests.
Every proband got an information sheet which contained the important informations about our tests. (see appendix – patient info sheet).
Furthermore, every proband got two week before the tests an anamnesis sheet, which should be brought filled in for the tests. (see appendix) With the anamnesis sheets it was possible to see the effects of the CV4 technique compared to different preresults.

7.1.5. Informations for probands

We especially adviced our clients about the following points (excerpt of the info sheet):

- The whole procedure lasts for 2 hours. We ask you to arrive 10 minutes prior to the set appointment (not stressed or hungry).
- Please go, if necessary, to the bathroom before.

- If you are wearing contact lenses, please take them out before. For the measurement you have to lie down on the back 2 x 40 minutes with your eyes closed.
- Please don´t use any make up or any form of skin cremes in the frontal and neck area. It might disdurb the measurement of the EEG electrodes.
- We ask you not to bring your mobile phone, palm tops or any other electronic equipment, which could influence the EEG measurement.

7.2. Procedure of measurement

7.2.1. Fixation of the EEG and ECG electrodes

To receive perfect conditions with all clients for the EEG deduction all clients were cleaned in the frontal and mastoid area with soapwater and cotton wool. In the preparation of our testing this proved to be as the most effective and inexpensive way to achieve with all clients a good skin conductivity for the EEG adhesive electrodes.

To guarantee always the same procedure in our tests, the cleaning and fixation of the EEG electrodes was always done by W. Winkler and the cleaning of the ECG electrodes was always done by L. Brandstötter.

Fixing the electrodes lasted for 10 minutes. Specially the EEG electrodes needed some time to get dry. So we got the best conductivity.

7.2.2. Positioning

The clients were asked to lie down on their back. To guarantee a relaxing and agreeable position for a time period of 40 minutes The clients neck and lowere legs were supported by smooth cushions. The legs were covered with a blancket. The probands were asked to open narrowing colthes.

Fig. 14: Positioning of the clients

7.2.3. Fixation of the wires

The wires were always fixated after a set routine.
W. Winkler was responsible for The EEG electrodes, L. Brandstötter for the ECG electrodes, the bloodpressure cuff on the left upper arm and for the peg of the oxygen saturation on the right index.

7.2.4. Eyespatch and earplugs

To exclude outer influences, the clients received a black velvet patch covering the eyes. All probands were reminded to lie as quiet as possible and to leave the eyes shut.

Fig. 15: Shielding outer influences

7.2.5. Checking the electrodes

After lying down, fixation of wires and positioning we checked the electrodes manually. The foremost goal was to test the resistance of the electrodes. Low impedance was the requirement for a correct EEG measurement.

7.2.6. Present persons in the therapyroom

During the control and test measurement the client and the authors of this paper were in the therapyroom. It was necessary to control the Datex Ohmeda, the PC and the running software. During the testing one was the osteopath. The other one was engaged in setting the markers, writing the duration of the different steps and noting down the impedance values.

7.3. Control measurement

After the mentioned steps had been done we began with the control measuring. The client liay as mentioned above for 40 minutes relaxed on is back, eyes shut, as calm as possible. There were no therapeutic stimulations. The datas were passed on from the Datex Ohmeda via a serial wire with the RS 232 interface to a PC. There the information was memorized by the Data Collect software.

7.3.1. Purpose of the control measurement

- Was to receive a reference value, how the vegetative neural system reacts without any therapeutic stimulation.
- Was to understand how long it takes until the vegetative neural system calms down. In a preparation maesurement we found out a period of 10 minutes as sufficient.

7.4. Elevation of the osteopathic diagnosis

The next step in our testing series was an exact osteopathic diagnosis (duration: 20 min). The osteopathic diagnosis was set consciously at this point of the testing series. Through different body positions as well as physical activity the level of the vegetative neural system should be brought to the same level of activity, which was the status quo before the control measurement.

7.4.1. Purpose of the osteopathic diagnosis

With the osteopathic diagnosis it was possible in the statistic analysis to compare groups with different blocks or symptoms to a group without symptoms or blocks, eg. clients with and without blocks of the SSB. We tried in the statistic analysis to show different kinds of reactions.

7.4.2. Tests of diagnosis

Observation from the side in standing position
Observation in standing position ant./ post.
“Hearing“ in standing position
“Hearing“ at the heels
“Hearing“ of the abdominal area
Palpation of the abdominal area
“Hearing“ the thorax through the sternum
Test of mobility for the spinal column
Mobility of the pelvis
Testing of the dura
Testing of the head, grip after Sutherland

7.5. Treatment measurement

The osteopathic diagnosis was followed by the actual testing measurement. Here the CV4 technique was used.

7.5.1. Informations for the proband

Before the measurement the client was informed that the osteopath would touch the right shoulder 9 minutes and 30 seconds after the beginning. The client should lift the head. The therapist would position his hands for the CV4 technique. The proband got the information to relax the head in the client´s hands. The pressure inducted by the osteopath´s hands would increase slowly and smoothly. The treatment should not be painful. After a certain time the therapist would slowly open the hands and remove the hands from the head. The proband should stay calm in his lying position, eyes shut and wait till the measurement is over.

7.5.2. The 5 steps of the testing measurement

7.5.2.1. Step 0: Forerun

The first 9 minutes and 30 nseconds were needed to calm down the client´s vegetative system. The proband should stay calm in supine position, eyes shut.

7.5.2.2. Step 1 beginning of the CV4 technique

After 9 minutes and 30 seconds the osteopath sat down cranial of the client´s head and touched as mentioned above the right shoulder of the client. The client lifted the head. Then the therapist positioned his hands for the CV4 technique. The proband relaxed the head in the client´s hands. After 10 minutes the person who watched the software signaled to start the CV4 technique by nodding the head (marker 1 in the

Data Collect Software). The therapist tried to come in contact with the Cranio Sacral Rhythm (CSR) and started to intensify the pressure at the occiput. This step of the treament lasted to the beginning of the stillpoint, when the CSR stopped.

7.5.2.3. Step 2: Stillpoint

By nodding with the head the osteopath signaled when the stillpoint started and when it stopped to set marker 2 and 3 into the running and measuring Data Collect software.

Fig. 16 CV4 - treatment

7.5.2.4. Step 3: Restart of the Cranio Sacral Rhythm

This step was measured from the restart of the CSR to the “broadening” of the occiput and moving the hands away from the head. The osteopath again showed this by noding with the head and marker 4 was set into the software.

7.5.2.5. Step 4: Time of rest after the CV4 technique

The proband should stay calm on his back, eyes shut. This step ended the 40 minutes of the treatmentmeasurement were reached.

7.6. Discussion with the client

After taking off the wires and electrodes we invited our clients for a 15 minute discussion. On the one hand we wanted to make sure that the clients felt well. On the other hand we wanted to inform the clients about their physical state seen from an osteopathic perspective. We wanted to show possible weak points, gave supportive tips about nutrition and physical exercises. When we had found strong lesions in the diagnosis process we told the clients that it would make sense to visit an osteopath.

Reference from

Gehin A: Manipulatives des Os du Crane et de la Face, Maisonneuve 1981 in Atlas of Manipulative Techniques for the Cranium & Face, Eastland Press Seattle 1985 p.46

8. Statistic Evaluation

8.1. 2D-Scatterplot

To get an overview of possible data mistakes we took 2D-Scatterplots as first statistic analysis.
„The Scatterplot shows the correlation of two variables x and y (eg.weight and bodysize). The datas are described in a two dimensional space. These axles represent the variables. x and y fixate the position of every point and represent the specific value of both variables. “Hilfe“ – Statistika Version 5.0 .

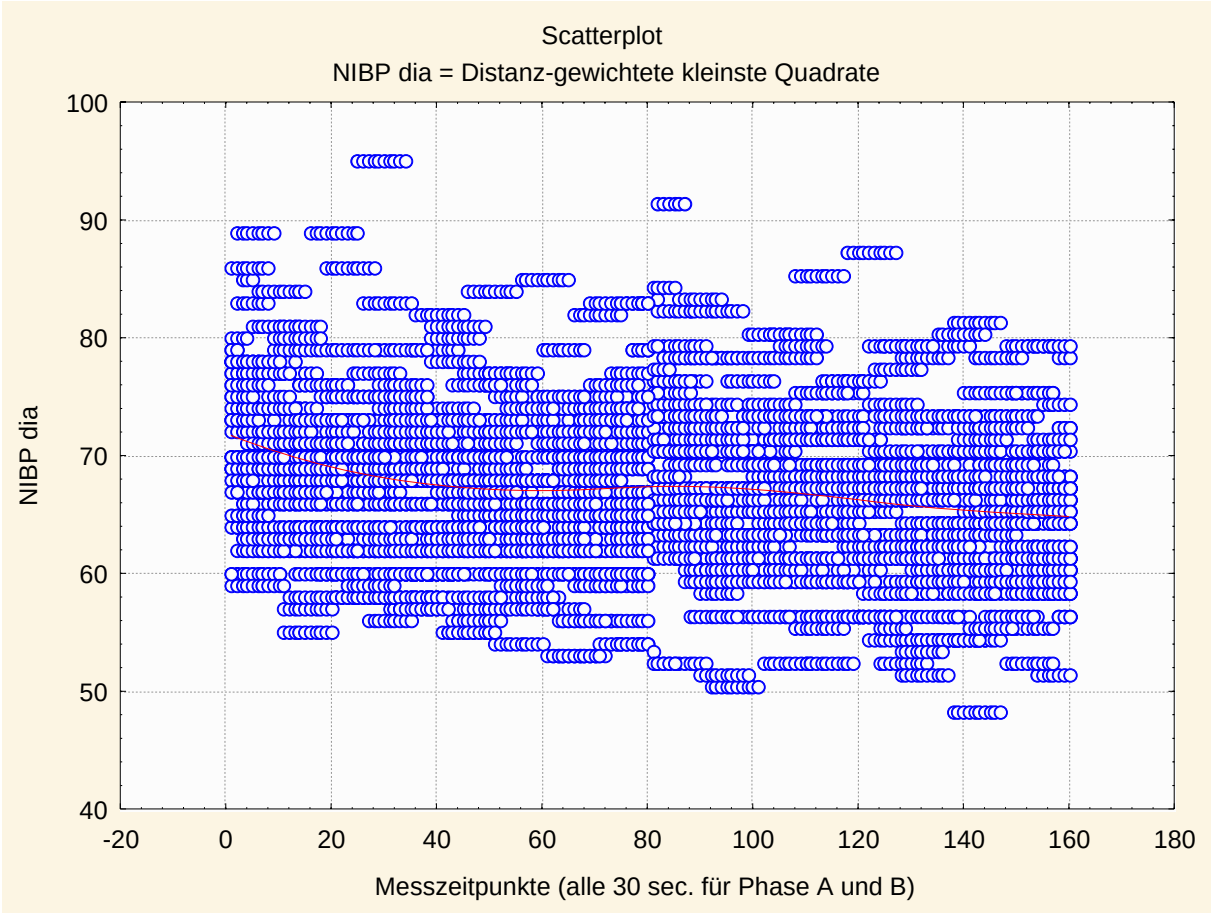
To give you an impression of the huge amount of datas you can find the Scatterplotts of the breathing frequency and the diastolic non invasive blood pressure as examples.

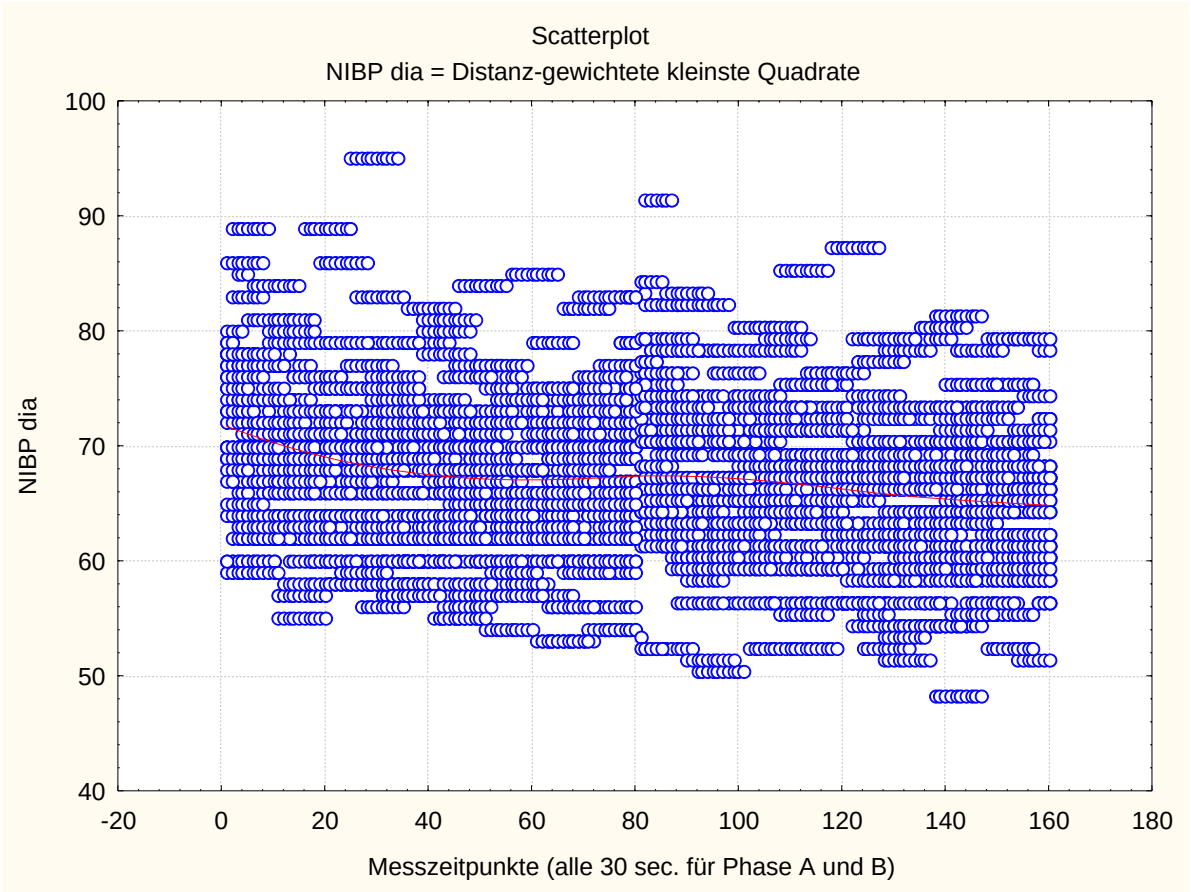
- The measurement values are represented by the y - axle.
- The x – axle demonstrates the time intervalls of the measurement. (every 30 seconds)

- Control measurement (Phase A) values 0-80 and
- Testing measurement (Phase B) values 81-160

The circles create a “cloud” to suspect the amount of datas. Statisic correlations cannot be calculated by that method.

The line, a polynom curve, represents the calculated mean.


Scatterplot
NIBP dia = Distanz-gewichtete kleinste Quadrate
NIBP dia
100
90
80
70
60
50
40
-20
0
20
40
60
80
100
120
140
160
180
Messzeitpunkte (alle 30 sec. für Phase A und B)


Scatterplot
NIBP dia = Distanz-gewichtete kleinste Quadrate
NIBP dia
100
90
80
70
60
50
40
-20
0
20
40
60
80
100
120
140
160
180
Messzeitpunkte (alle 30 sec. für Phase A und B)

8.2. Analysis of variance (ANOVA)

“Is a test for the equality of the means of measurement values, which are organized via group characteristics.“ (e-mail Dr. Ponn)

8.2.1. The purpose of the analysis of variance

„In general the purpose of an analysis of variance (ANOVA) is to test the significant mean differences.“ Statistika Help Version 5.0

8.2.1.1. Selcted measurement parameters of the ANOVA

F = Fisher-verteilte Schatzgröße (Fischer spread estimated size):

This is the central estimated size of the testing. The” Fisher-verteilte Schatzgröße” demonstrates a basic spread pattern of the values. By means of the ANOVA the datas are examined for that spread.“ (e-mail Dr. Ponn)

p = Statistic significance (p-level):

P-level is a measure of the grade of truth of the result. The value of the p-level shows a declining reference number for the reliabilty of a result. In many scientific papers a p-level of 0,05% as mistake level is accepted.” Statistica Hilfe Version 5.0

p = < 0,05%:

... represent 5% as the complement to the significance level of the testing. (95%)

“The complement to the significance level of the testing is the probability with which the test makes a mistake of the first kind. This means that the examined hypothesis seems wrong although the hypothesis is correct. (The means of the tested groups are equal)” (e-mail Dr. Ponn)

In the ANOVA the 5 steps of the treatment were compared with the corrresponding time periods of the control measurement.

These are the 5 treatment steps:

Step 0	Forerun
Step 1	Beginning of the CV4 technique
Step 2	Stillpoint
Step 3	Restart of the Cranio Sacral Rhythm
Step 4	Time of rest after the CV4 technique

8.2.2. Result of the variance analysis

analysis of varance : for p = < 0,05%, background grey i.e. a significant difference of the means.

Treatmentstep	Step 0		Step 1		Step 2		Step 3		Step 4	
	F	p	F	p	F	p	F	p	F	p
Heartrate	**28,06531**	**0,000000**	1,36503	0,243065	0,09046	0,763872	0,690222	0,407825	**22,64986**	**0,000002**
Resp.frequency	0,28786	0,591666	0,04474	0,832548	0,08747	0,767707	0,017337	0,895489	**2,76717**	**0,096293**
N. inv. bloodpr. syst.	**50,90191**	**0,000000**	3,35666	0,067357	0,13348	0,715197	0,106581	0,744670	**28,03544**	**0,000000**
N. inv. bloodpr. dia.	**45,10750**	**0,000000**	**11,83299**	**0,000616**	0,17558	0,675605	0,246482	0,620519	**44,49891**	**0,000000**
N. inv. bloodpr. mean	**60,54459**	**0,000000**	**11,59236**	**0,000700**	0,25734	0,612460	0,525744	0,469887	**42,58926**	**0,000000**
O_2-saturation in%	1,27081	0,259779	0,28364	0,594502	0,63265	0,427271	1,537969	0,217536	**9,33886**	**0,002258**
Heartrate maximal	**25,38357**	**0,000001**	1,42908	0,232318	0,02507	0,874347	0,168713	0,682029	**15,74583**	**0,000074**
Heartrate minimal	**24,70899**	**0,000001**	2,26892	0,132442	0,09001	0,764443	0,025795	0,872686	**17,36425**	**0,000031**
Amplitude left =1	**15,39244**	**0,000091**	2,06348	0,151331	0,04758	0,827542	0,187278	0,666017	**22,03685**	**0,000003**
Spect. edge frequ. le = 1	2,45772	0,117132	**10,14660**	**0,001510**	**8,75716**	**0,003421**	**6,060340**	**0,015322**	0,04582	0,830521
Mean freq. left = 1	1,13079	0,287757	**4,82709**	**0,028343**	**4,73100**	**0,030690**	0,039938	0,841957	0,05549	0,813776
Delta left = 1	**5,13008**	**0,023639**	**7,00838**	**0,008295**	**6,34153**	**0,012506**	0,009452	0,922722	2,51002	0,113200
Theta left = 1	**40,46562**	**0,000000**	0,67112	0,412940	2,61734	0,107134	0,001334	0,970934	1,51070	0,219102
Alpha left = 1	1,29106	0,256011	**5,28261**	**0,021833**	3,48199	0,063371	0,392578	0,532200	2,62238	0,105441
Beta left = 1	0,06802	0,794275	**6,83267**	**0,009143**	**6,16492**	**0,013778**	1,318679	0,253233	0,16834	0,681608
B. Sup. Rate, le =1	**53,37359**	**0,000000**	2,77937	0,095953	1,59475	0,208029	0,383352	0,537095	**41,34936**	**0,000000**
Amplitude right	**15,25496**	**0,000098**	0,22819	0,633028	0,72812	0,394467	0,186880	0,666350	**19,66151**	**0,000009**
Spect. edge frequ.. re = 2	1,79684	0,180272	**5,30648**	**0,021539**	**11,12292**	**0,001001**	**5,482627**	**0,020943**	0,32194	0,570473
Mean freq. right = 2	1,98941	0,158584	**6,69775**	**0,009854**	3,34162	0,068902	1,095040	0,297571	0,00098	0,974997
Delta re = 2	**5,58468**	**0,018229**	**4,29773**	**0,038529**	**7,64149**	**0,006188**	0,474882	0,492150	1,66824	0,196565
Theta re= 2	**40,43594**	**0,000000**	0,28954	0,590686	1,89680	0,169837	0,024874	0,874961	2,28769	0,130479
Alpha re = 2	1,83529	0,175681	2,51845	0,112973	3,63510	0,057876	1,914427	0,169176	1,77940	0,182295
Beta re = 2	0,04059	0,840351	**7,72995**	**0,005577**	**9,60671**	**0,002192**	2,220379	0,138961	0,70159	0,402298
B. Sup. Rate, re = 2	**49,74130**	**0,000000**	1,97330	0,160553	1,43150	0,232819	0,000364	0,984802	**30,37455**	**0,000000**

8.2.3. Reaction groups of the ANOVA:

You can see the following reaction groups.

Grey background means a significant difference.

Treatmentstep	Step 0		Step 1		Step 2		Step 3		Step 4	
	F	p	F	p	F	p	F	p	F	p
Heartrate										
Heartrate max.										
Heartrate min.										
N. inv. bloodpr.sys.					**GROUP 1**					
Amplitude left										
Amplitude right										
B. Sup. Rate le										
B. Sup. Rate ri										
Resp.frequency					**GROUP 2**					
O_2-saturation in%										
Theta left					**GROUP 3**					
Theta right										
Spect. edge frequ. le										
Spect. edge frequ. re										
Mean freq. li					**GROUP 4**					
Beta left										
Beta right										
Alpha left										
Mean freq. right										
N. inv. bloodpr.dia.					**GROUP 5**					
N. inv. bloodpr. mean										
Delta left					**GROUP 6**					
Delta right										
Alpha right					**GROUP 7**					

Reaction groups of the variance analysis:

Reaction group 1: The significant differences are and after the treatment namely in the step 0 and 4. This counts to 8 parameters, ~ 33%.

Reaction group 2: The significant differences lie after the treatment namely in the step 4. This counts to 2 parameters, - approx. 8%.

Reaction group 3: The significant differences lie before the treatment namely in the step 0. This counts to 2 parameters, - approx. 8%.

Reaction group 4: The significant differences lie during the treatment namely in the step from 1 to 3. This counts to 7 parameters, ~ 29%.

Reaction group 5: The significant differences are, during and after the treatment. This counts to 2 parameters, – approx. 8%.

Reaction group 6: The significant differences are and during the treatment. This counts to 2 parameters, – approx. 8%.

Reaction group 7: This parameter never shows a significant difference. This counts to 1 parameter – approx. 4%.

8.2.3.1. Reaction group 1

Step of treatment	Step 0		Step 1		Step 2		Step 3		Step 4	

- The following parameters show in step 0 and 4 significant differences
  - Heart rate
  - Heart rate minimally
  - Heart rate at most
  - Not invasive blood pressure Systolic
  - Amplitude on the left and on the right and
  - Burst Suppression rate on the left and on the right

8.2.3.2. Reaction group 2

Step of treatment	Step 0		Step 1		Step 2		Step 3		Step 4	

- The following parameters show in step 4 significant differences
  - Respiratory rate,
  - Oxygen saturation in %

8.2.3.3. Reaction group 3

Step of treatment	Step 0		Step 1		Step 2		Step 3		Step 4	

- The following parameters show in step 0 significant differences
  - Theta on the left
  - Theta on the right

8.2.3.4. Reaction group 4

Some parameters change only during the technique CV4 i.e. in the step of treatment 1, 2 and 3 significantly and point in the step of treatment 0 and 4 no significant differences.

A) Differences in step 1, 2 and 3:

Step of treatment	Step 0		Step 1		Step 2		Step 3		Step 4	

- This counts to the following parameters:
  - Spectral corner frequency on the left
  - Spectral corner frequency on the right

B) Differences in step 1 and 2:

Step of treatment	Step 0		Step 1		Step 2		Step 3		Step 4	

- This counts to the following parameters:
  - Middle frequency on the left
  - Beta on the left
  - Beta on the right

C) Differences in step 1:

Step of treatment	Step 0		Step 1		Step 2		Step 3		Step 4	

- This counts to the following parameters:
  - Alpha on the left
  - Middle frequency on the right

8.2.3.5. Reaction group 5

Step of treatment	Step 0		Step 1		Step 2		Step 3		Step 4	

- The averages which show significant differences are in step 0 and 1 of treatment
- Step of treatment 2 and 3 are not significant.
- The step of treatment 4 is significantly different again.
- This counts to the following parameters:
  - Not invasive blood pressure-diastolic
  - Not invasive blood pressure – average

8.2.3.6. Reaction group 6

Step of treatment	Step 0		Step 1		Step 2		Step 3		Step 4	

- The averages which show significant differences are in step 0, 1 and 2 of treatment
- Step of treatment 3 and 4 are not significant.
- This counts to the following parameters:

  - Delta on the left
  - Delta on the right

8.2.3.7. Reaction group 7

Step of treatment	Step 0		Step 1		Step 2		Step 3		Step 4	

  - Alpha shows on the right in none of the 5-th steps of treatment significant differences.

8.3. Interaction analysis

"... is the graphic comparison of the means of measurement values, which are spread into groups." (e-mail Dr. Ponn)

Below you find the analysis of interaction for two group characteristics:

- Test and control measurement
- Treatmentstep 0 to 5.

8.3.1. Interval of confidence

“Around the means (as a result of the method) you can find an interval of confidence. (usually 95% if p=0,05) “ (e-mail Dr. Ponn)

“If, for example, the mean of a spot check is 23 and the high and low intervals of confidence are 19 and 27, you can estimate that the mean of the whole is between 19 and 27 with a calculated probability of 95%.” Statistica 5.0 – Hilfe

8.3.2. Description of graphic

We used the analysis of interaction for all 24 parameters. (Heartrate to Burst suppression rate) The test measurement was always compared to the control measurement. The 5 steps of the treatment were defined on the x – axle.
The measured parameters (Heartrate...) are on the y – axle

The 5 steps were:

- Step 0 Forerun
- Step 1 Beginning of the CV4 technique
- Step 2 Stillpoint
- Step 3 Restart of the Cranio Sacral Rhythm
- Step 4 Time of rest after the CV4 technique

8.3.3. Numeric description

The following sizes were calculated and compared:

- Mean
- Numbers of measured 30 second intervals for every treatmentstep
- Standard divergence
- Minimum
- Maximuim
- 75 %-Percentil: is the size which has 75% of all measured values within.
- 25% Percentil: is the size which has 25% of all measured values within.
- Median: the 50%-Percentil is called Median.

In the following chapter the interaction analyses are divided after the reaction groups of the variance analysis.

8.3.3.1. Interaction analysis for the reaction group 1

In this reaction group the steps of treatment show 0 and 4 significant differences. Significant differences are deposited grey.

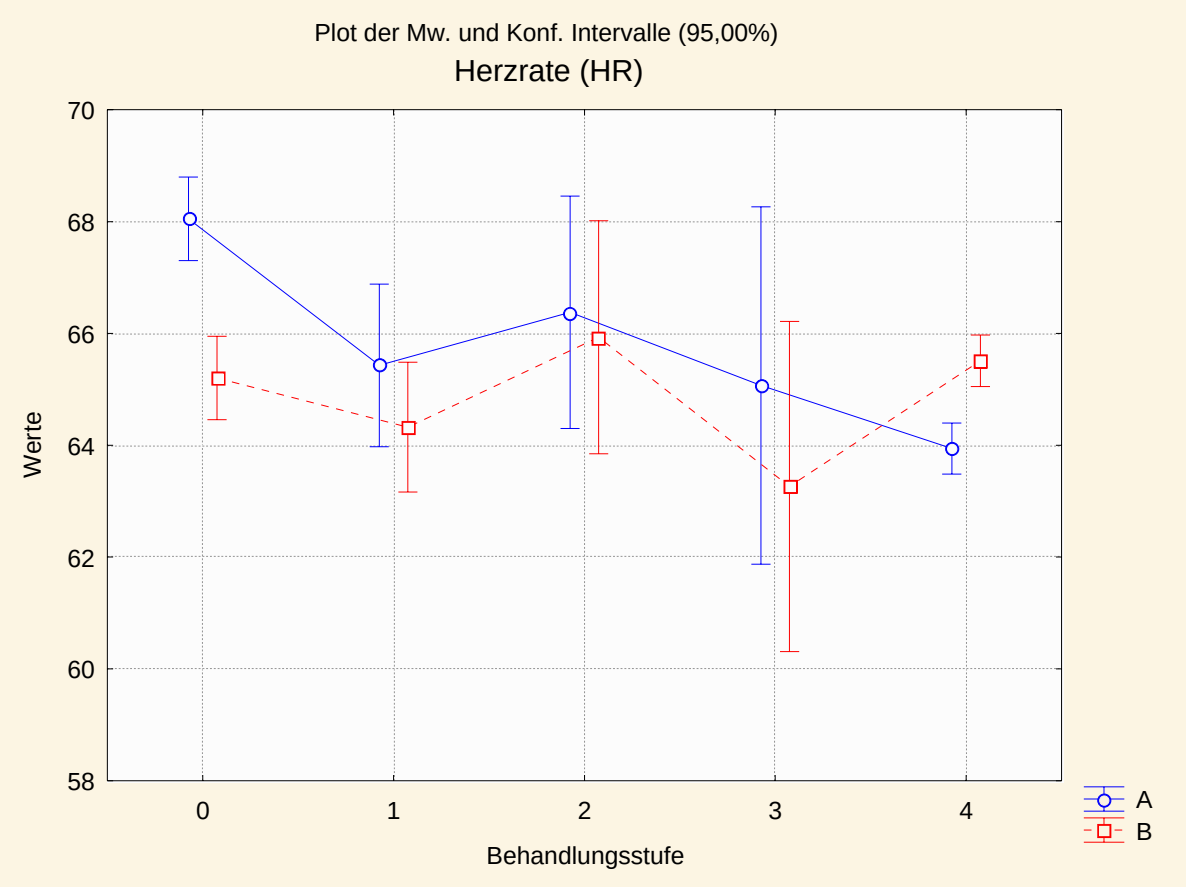
8.3.3.1.1. Description of the graphics

- A corresponds to the controlling measurement
- B corresponds to the test measurement
- On x - axis for B the averages of the different steps of treatment and for A the simultaneous correspondences.

- The steps of treatment were:

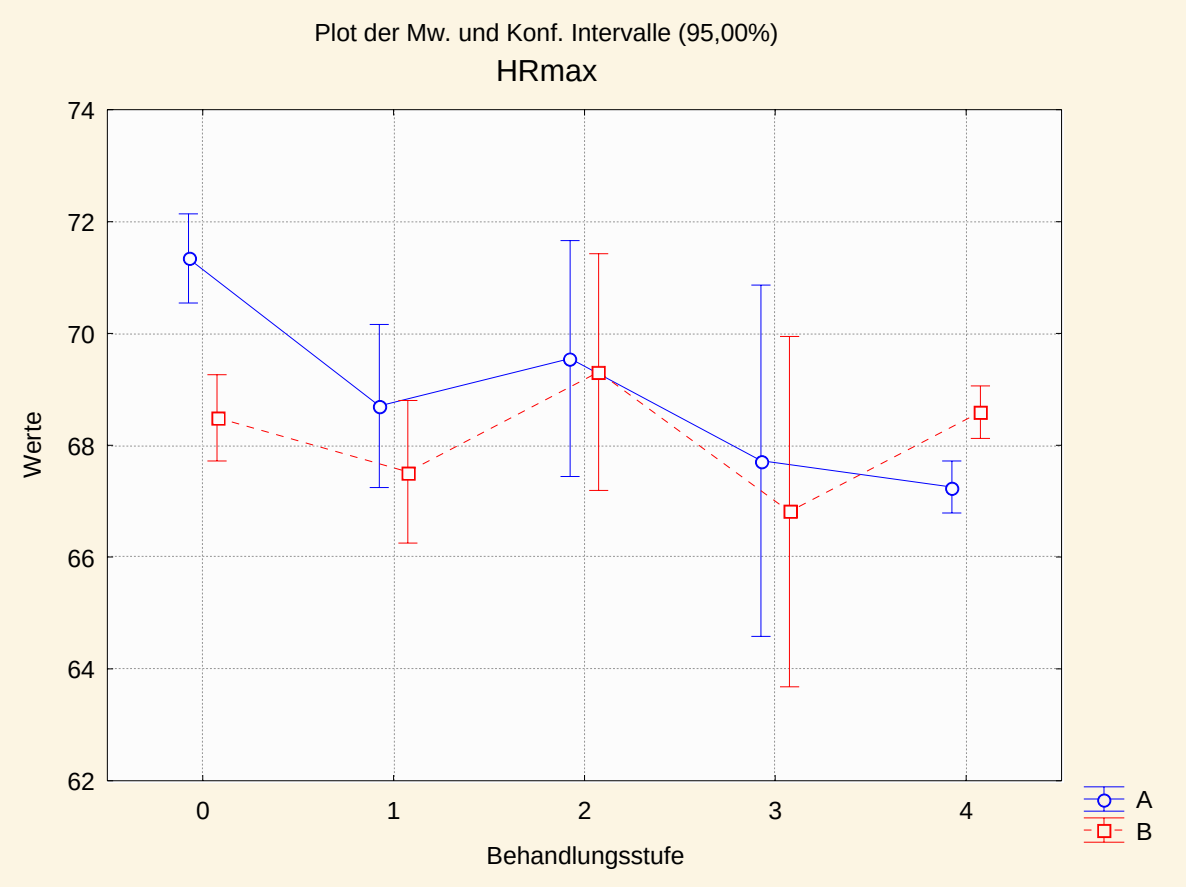
Step 0 Forerun
- Step 1 Beginning of the CV4 technique
- Step 2 Stillpoint
- Step 3 Restart of the Cranio Sacral Rhythm
- Step 4 Time of rest after the CV4 technique

8.3.3.1.2. Heart rate



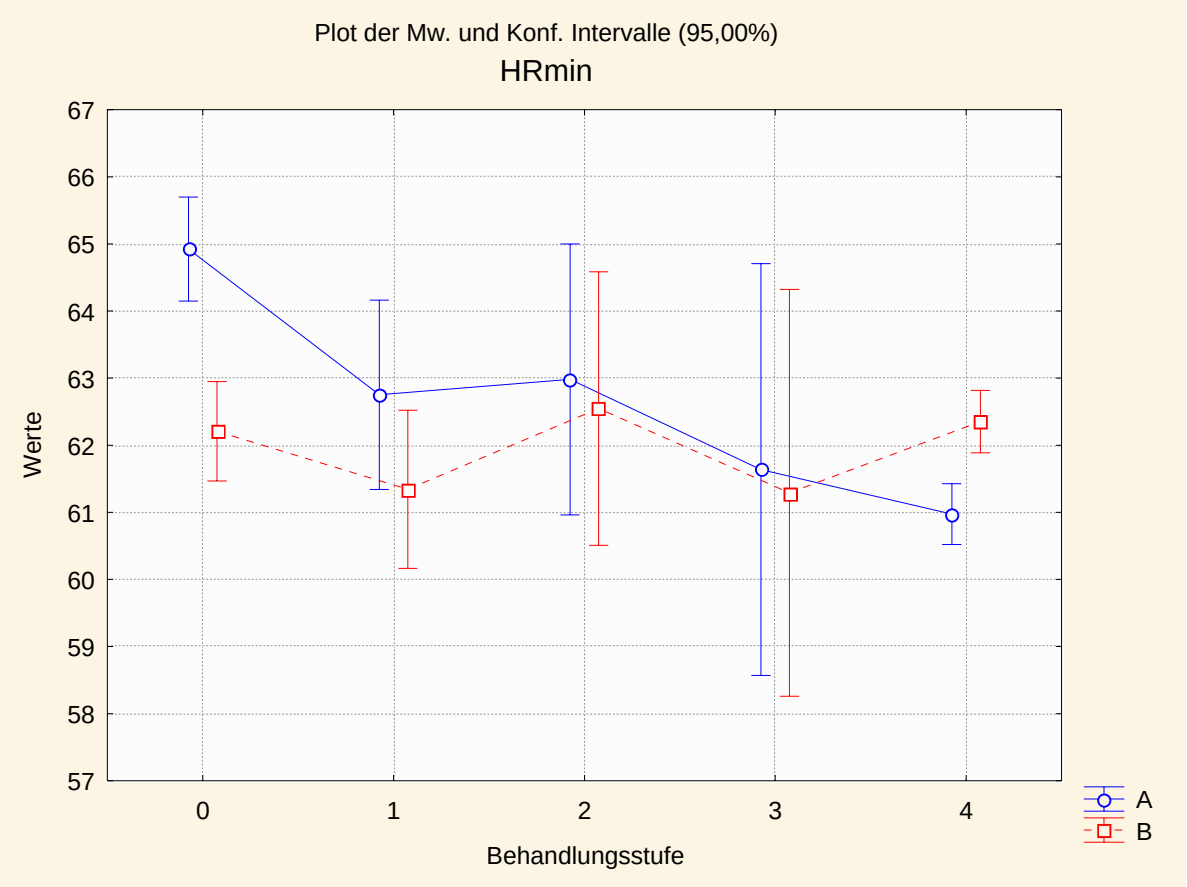
	Step 0		Step 1		Step 2		Step 3		Step 4	
Heart rate	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	68,05057	65,20325	65,42898	64,32421	66,37838	65,93165	65,06897	63,26327	63,94043	65,51165
Number	870	860	352	352	111	111	58	58	2115	2111
Standardabw.	11,22722	11,12663	13,86814	11,06393	11,04870	11,08135	12,15956	11,23075	10,68918	10,77277
Minimum	42,00000	43,62534	39,00000	43,62534	45,00000	47,62534	45,00000	44,62534	39,00000	43,62534
Maximum	99,0000	109,6253	126,0000	96,6253	94,00000	97,62534	99,00000	89,62534	101,0000	100,6253
25% Percentil	60,00000	57,62534	55,00000	55,62534	58,00000	56,62534	57,00000	54,62534	56,00000	57,62534
Median	67,00000	63,62534	64,00000	63,62534	67,00000	64,62534	61,50000	61,12534	64,00000	64,62534
75% Percentil	76,00000	69,62534	72,00000	69,62534	73,00000	71,62534	70,00000	69,62534	70,00000	70,62534

8.3.3.1.3. Heart rate max.



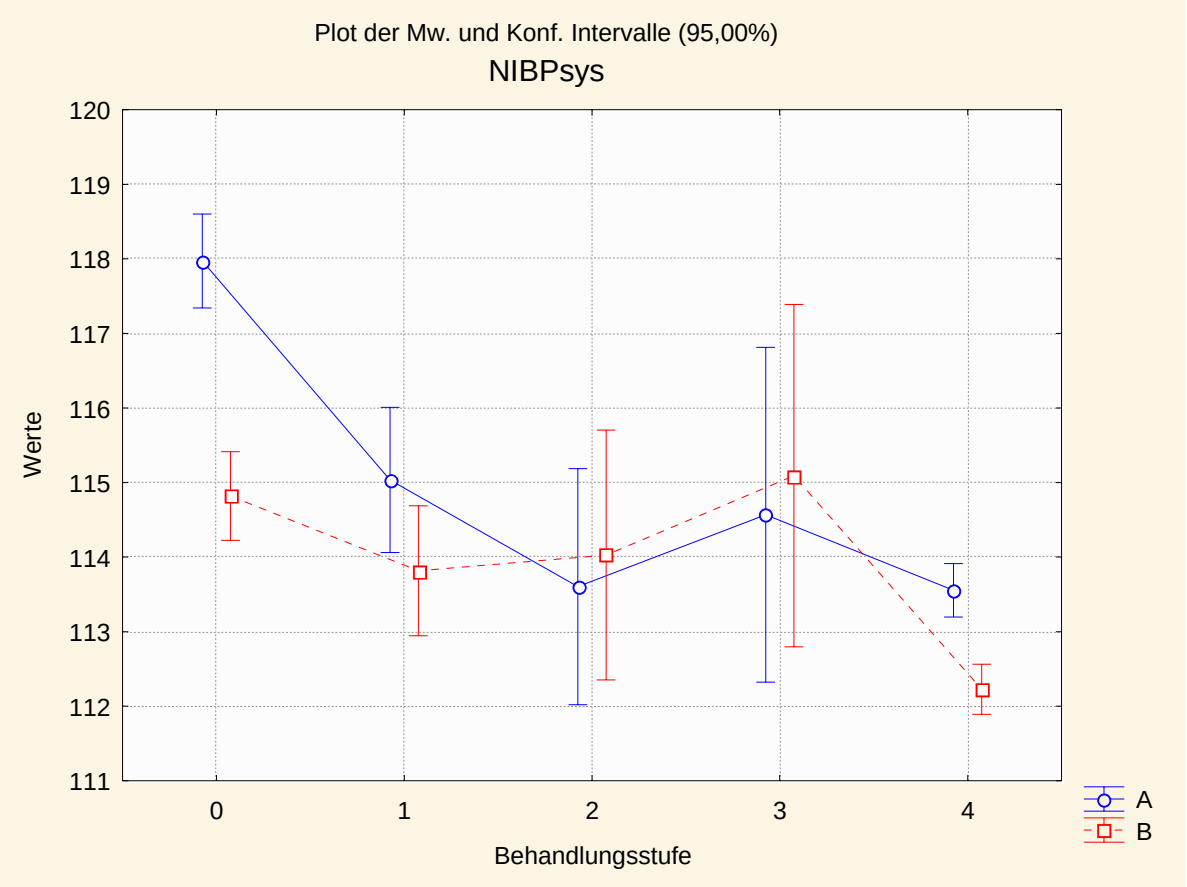
	Step 0		Step 1		Step 2		Step 3		Step 4	
Heart rate at most	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	71,34135	68,49131	68,70170	67,52469	69,54955	69,31076	67,72414	66,81417	67,25248	68,59287
Number	873	861	352	352	111	111	58	58	2115	2116
Standardabw.	12,00431	11,54328	13,90911	12,15586	11,21909	11,25342	11,94548	11,91497	10,92291	11,04870
Minimum	0,000000	1,590035	42,00000	1,59004	47,00000	49,59004	46,00000	46,59004	42,00000	1,59004
Maximum	108,0000	106,5900	122,0000	104,5900	100,0000	102,5900	99,0000	102,5900	105,0000	107,5900
25% Percentil	63,00000	61,59004	59,00000	59,59004	62,00000	61,59004	60,00000	57,59004	59,00000	61,59004
Median	71,00000	66,59004	67,00000	66,59004	70,00000	67,59004	65,00000	66,09004	67,00000	66,59004
75% Percentil	81,00000	72,59004	77,00000	72,59004	76,00000	73,59004	73,00000	73,59004	75,00000	73,59004

8.3.3.1.4. Heart rate min.



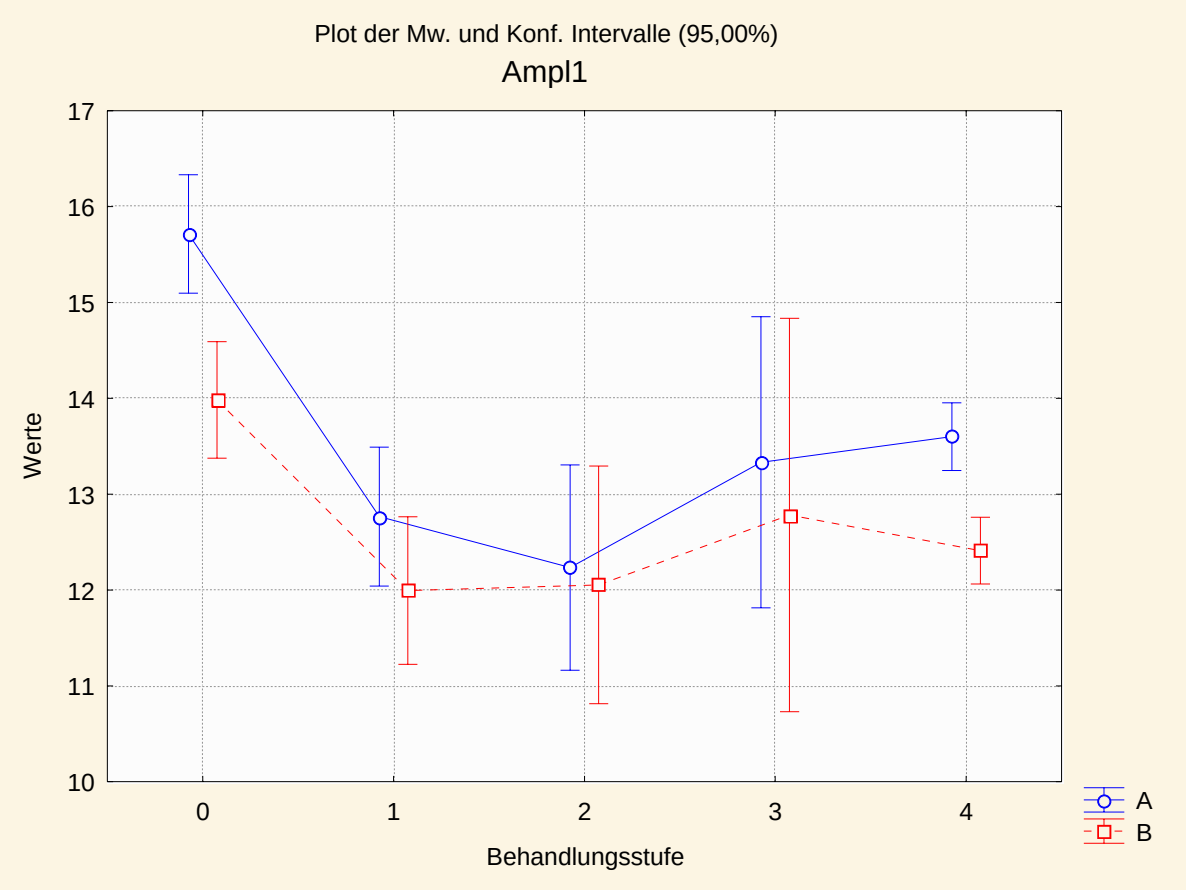
	Step 0		Step 1		Step 2		Step 3		Step 4	
Heart rate minimally	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	64,92440	62,20820	62,75284	61,34443	62,98198	62,54775	61,63793	61,29193	60,97447	62,35307
Number	873	861	352	352	111	111	58	58	2115	2116
Standardabw.	11,67630	11,06472	13,47357	11,23390	10,72972	10,83470	11,67348	11,52888	10,63416	10,88384
Minimum	0,000000	1,412616	38,00000	1,41262	39,00000	43,41262	43,00000	43,41262	37,00000	1,41262
Maximum	97,0000	102,4126	116,0000	97,4126	90,00000	92,41262	94,00000	95,41262	97,00000	98,41262
25% Percentil	57,00000	54,41262	54,00000	53,41262	56,00000	53,41262	54,00000	52,41262	54,00000	54,41262
Median	64,00000	61,41262	61,00000	60,41262	62,00000	61,41262	60,00000	59,91262	61,00000	61,41262
75% Percentil	74,00000	67,41262	68,00000	66,41262	67,00000	67,41262	66,00000	66,41262	67,00000	67,41262

8.3.3.1.5. Not invasive blood pressure - Systole



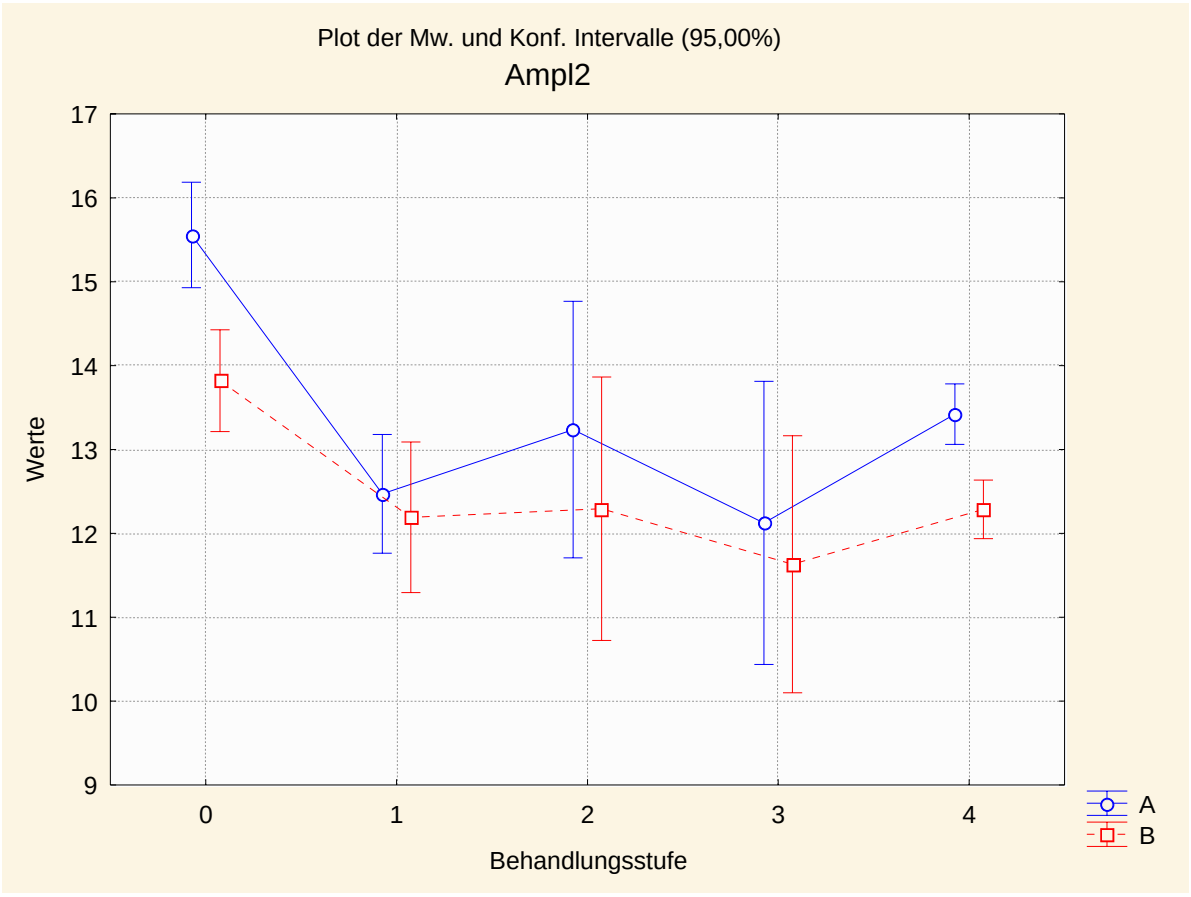
	Step 0		Step 1		Step 2		Step 3		Step 4	
N. inv. Blutdr. systolic	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	117,9724	114,8186	115,0341	113,8171	113,6036	114,0286	114,5690	115,0925	113,5541	112,2269
Number	868	845	352	352	111	111	58	58	2115	2116
Standardabw.	9,461592	8,811775	9,286757	8,310715	8,416736	8,909785	8,539099	8,730851	8,419201	7,876437
Minimum	100,0000	94,1097	95,00000	97,10972	97,00000	97,10972	97,00000	97,10972	92,00000	93,10972
Maximum	148,0000	141,1097	134,0000	133,1097	133,0000	133,1097	131,0000	133,1097	140,0000	133,1097
25% Percentil	111,0000	108,1097	108,0000	107,1097	107,0000	106,1097	109,0000	107,1097	107,0000	106,1097
Median	117,0000	114,1097	115,0000	113,1097	113,0000	114,1097	113,5000	114,1097	114,0000	112,1097
75% Percentil	124,0000	120,1097	122,0000	119,6097	120,0000	121,1097	122,0000	121,1097	120,0000	118,1097

8.3.3.1.6. Amplitude on the left



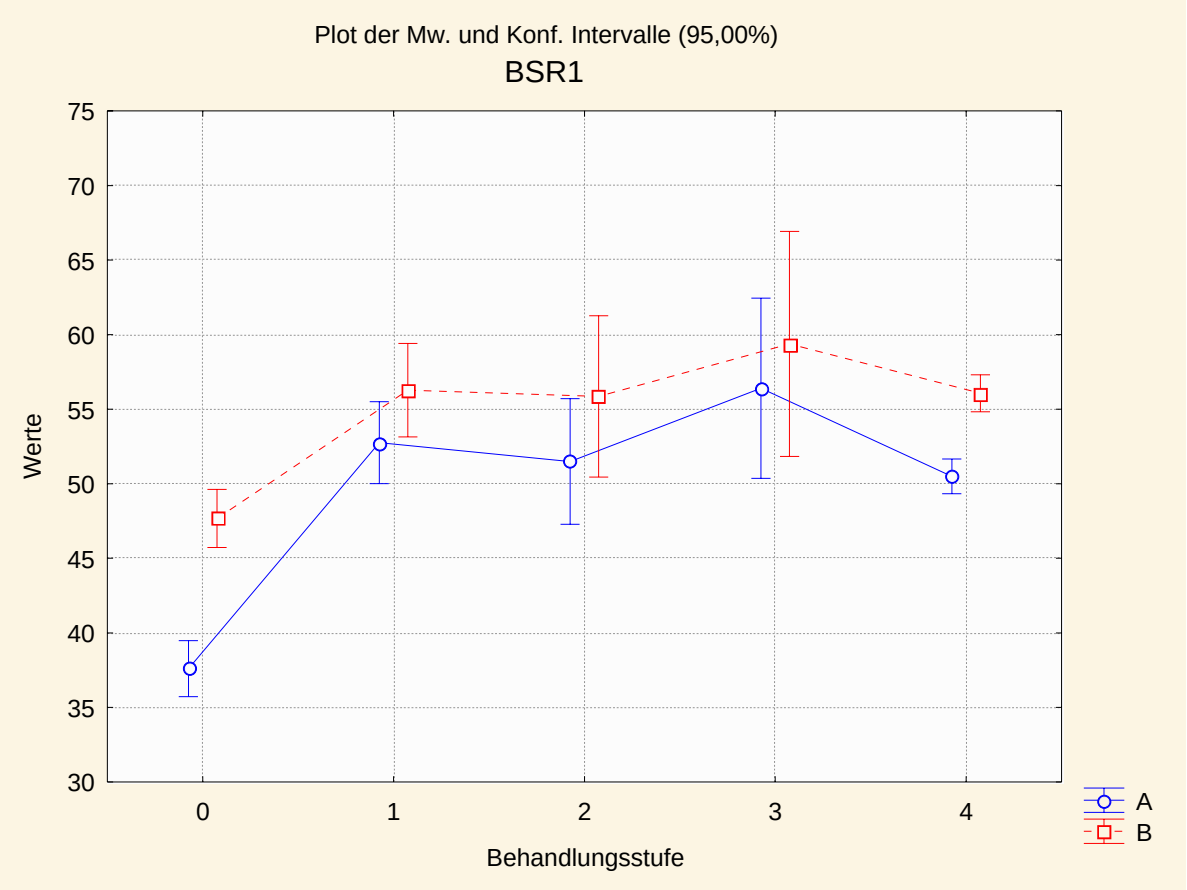
	Step 0		Step 1		Step 2		Step 3		Step 4	
Amplitude li	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	15,71444	13,98314	12,76627	11,99420	12,23426	12,05386	13,33276	12,78257	13,60010	12,41115
Number	810	815	332	341	108	108	58	57	IN 2032	IN 2021
Standardabw.	8,954497	8,834181	6,706628	7,219003	5,619894	6,502964	5,776856	7,732800	8,129753	7,993381
Minimum	4,800000	3,315900	5,400000	3,415900	4,500000	3,515900	4,900000	5,015900	3,400000	2,915900
Maximum	65,20000	70,31590	65,00000	52,61590	34,00000	42,91590	33,60000	38,81590	89,20000	81,81590
25% Percentil	9,300000	7,915900	8,500000	7,115900	8,700000	7,765900	10,40000	7,61590	8,450000	7,215900
Median	13,00000	11,61590	10,90000	10,01590	10,80000	10,46590	11,60000	10,61590	11,20000	10,01590
75% Percentil	19,30000	17,11590	14,30000	14,71590	14,25000	13,26590	14,20000	14,61590	15,50000	14,71590

8.3.3.1.7. Amplitude on the right



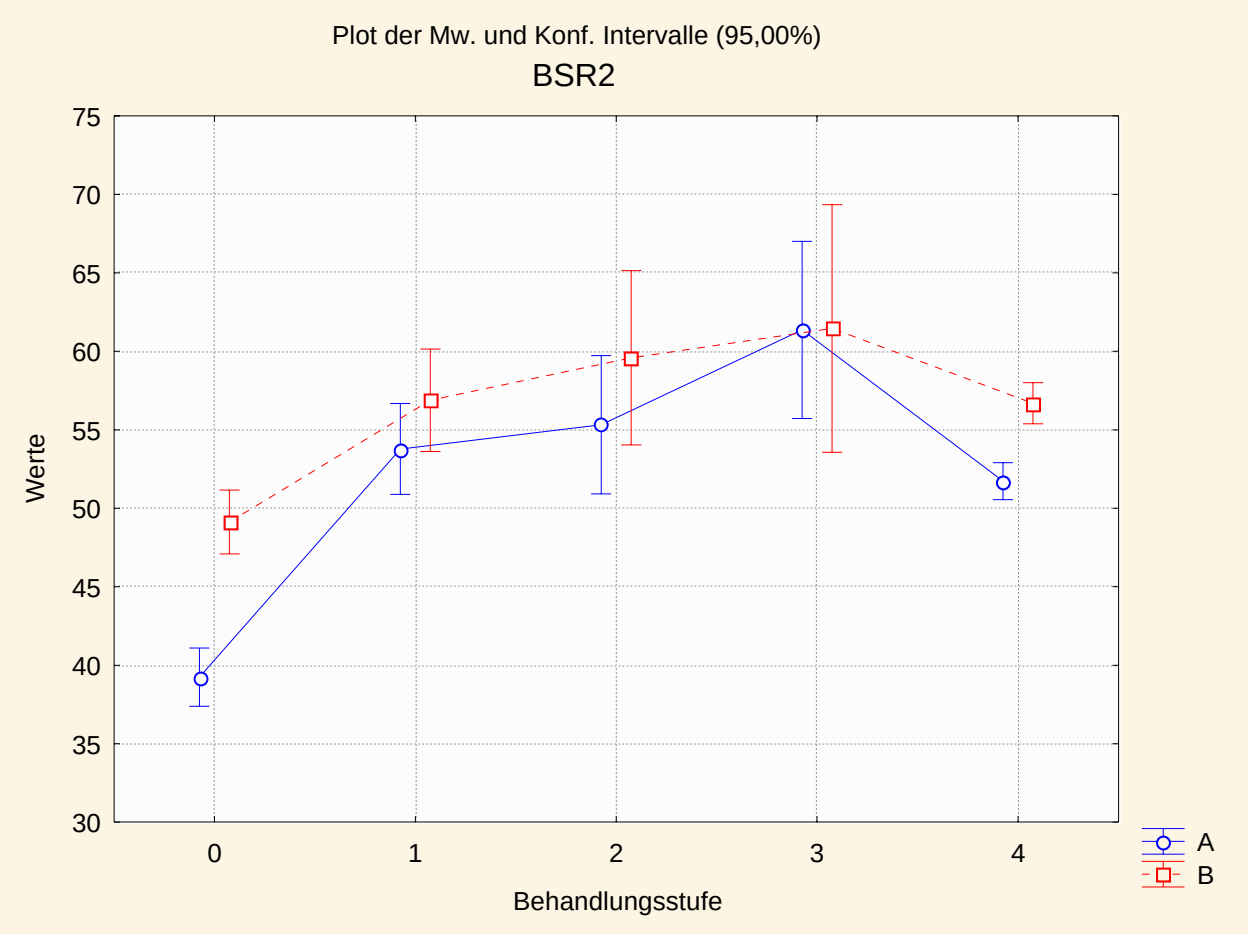
	Step 0		Step 1		Step 2		Step 3		Step 4	
Amplitude re	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	15,55795	13,82025	12,47082	12,19183	13,23704	12,29375	12,12414	11,63159	13,42163	12,28537
Number	811	815	329	342	108	104	58	57	IN 2025	IN 2025
Standardabw.	9,114572	8,824024	6,523807	8,442984	8,017534	8,076318	6,420589	5,774543	8,280620	8,025205
Minimum	4,400000	3,235100	4,200000	2,835100	5,200000	3,035100	5,700000	4,035100	3,900000	2,435100
Maximum	63,20000	62,83510	50,30000	64,53510	52,50000	54,03510	37,80000	26,93510	74,40000	73,93510
25% Percentil	9,300000	7,735100	8,100000	6,935100	8,250000	7,035100	7,900000	7,235100	8,400000	6,935100
Median	12,70000	11,13510	10,60000	9,88510	11,05000	10,18510	10,35000	10,13510	10,90000	9,93510
75% Percentil	18,90000	16,93510	14,60000	15,23510	15,10000	13,78510	13,00000	14,73510	15,20000	14,93510

8.3.3.1.8. Burst Suppression rate on the left



	Step 0		Step 1		Step 2		Step 3		Step 4	
Burst Suppr. Rate on the left	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	37,60264	47,67003	52,75371	56,27996	51,49074	55,85418	56,40351	59,38009	50,49633	56,07023
Number	833	829	337	335	108	107	57	55	IN 2045	IN 2076
Standardabw.	27,64693	28,52654	25,60358	29,12423	22,06934	28,24544	22,79557	27,90943	26,84827	28,74837
Minimum	0,000000	6,471000	0,000000	6,471000	10,00000	6,47100	11,00000	9,47100	0,000000	6,471000
Maximum	100,0000	106,4710	100,0000	106,4710	100,0000	104,4710	95,0000	104,4710	100,0000	106,4710
25% Percentil	15,00000	22,47100	33,00000	30,47100	35,00000	31,47100	46,00000	41,47100	28,00000	31,47100
Median	33,00000	46,47100	55,00000	52,47100	50,50000	52,47100	55,00000	51,47100	53,00000	57,47100
75% Percentil	58,00000	69,47100	73,00000	84,47100	69,00000	82,47100	73,00000	86,47100	73,00000	81,47100

8.3.3.1.9. Burst Suppression rate on the right



	Step 0		Step 1		Step 2		Step 3		Step 4	
BSR on the right	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	39,23653	49,12741	53,77586	56,88148	55,32432	59,59158	61,36207	61,45428	51,72506	56,69393
Number	854	844	348	337	111	109	58	57	IN 2095	IN 2078
Standardabw.	27,64933	30,10109	27,43756	30,38960	23,39703	29,23248	21,46208	29,74141	27,59590	30,58000
Minimum	0,000000	7,261300	1,000000	7,261300	6,00000	10,26130	3,00000	12,26130	0,000000	7,261300
Maximum	100,0000	107,2613	100,0000	107,2613	100,0000	105,2613	98,0000	107,2613	100,0000	107,2613
25% Percentil	16,00000	21,26130	31,00000	30,26130	37,00000	32,26130	50,00000	36,26130	29,00000	27,26130
Median	33,00000	47,26130	55,00000	53,26130	56,00000	58,26130	64,50000	60,26130	54,00000	58,26130
75% Percentil	60,00000	72,26130	76,00000	87,26130	76,00000	88,26130	76,00000	85,26130	75,00000	85,26130

8.3.3.2. Interaction analysis for the reaction group 2

In this reaction group the step of treatment shows 4 significant differences.
Significant differences are deposited grey.

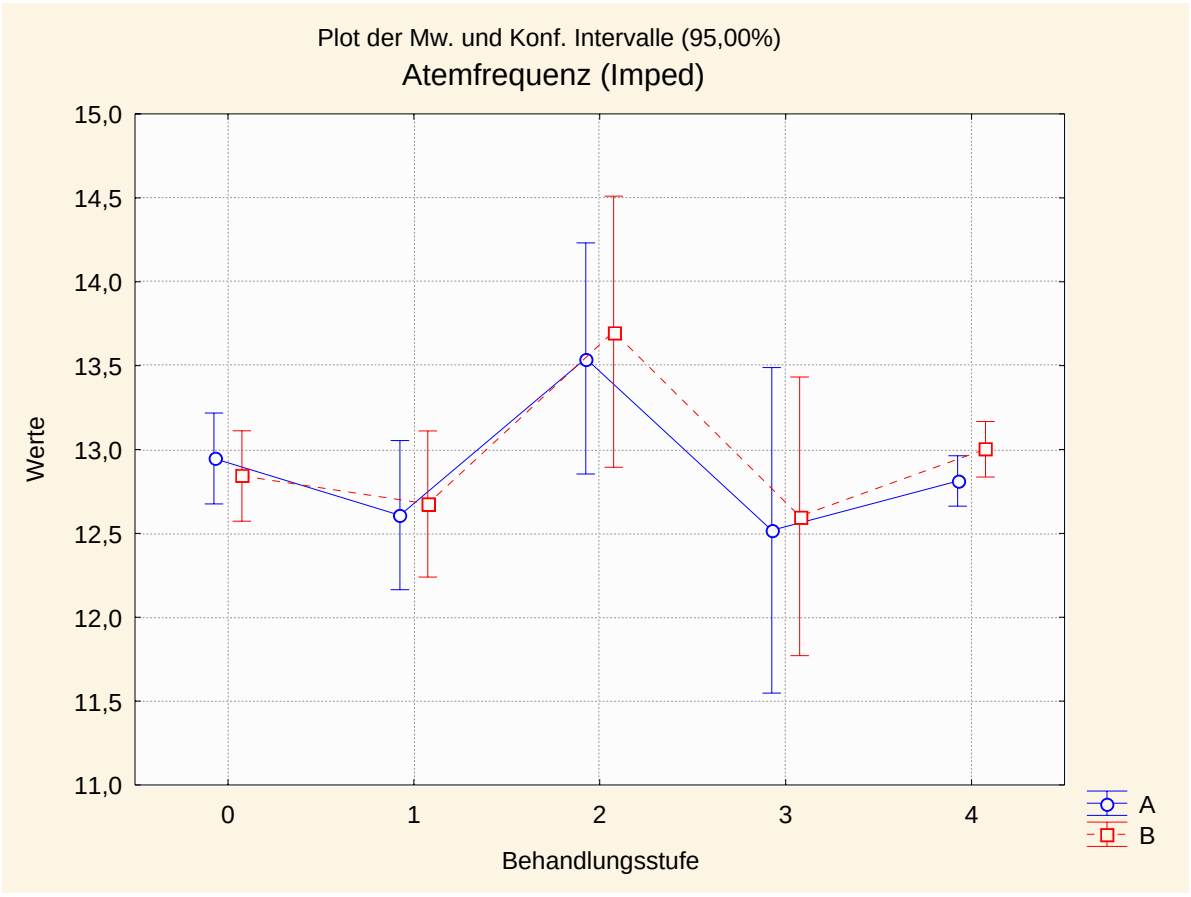
8.3.3.2.1. Description of the graphics

A corresponds to the controlling measurement
B corresponds to the test measurement
On x - axis for B the averages of the different steps of treatment and for A the simultaneous correspondences.

- The steps of treatment were:

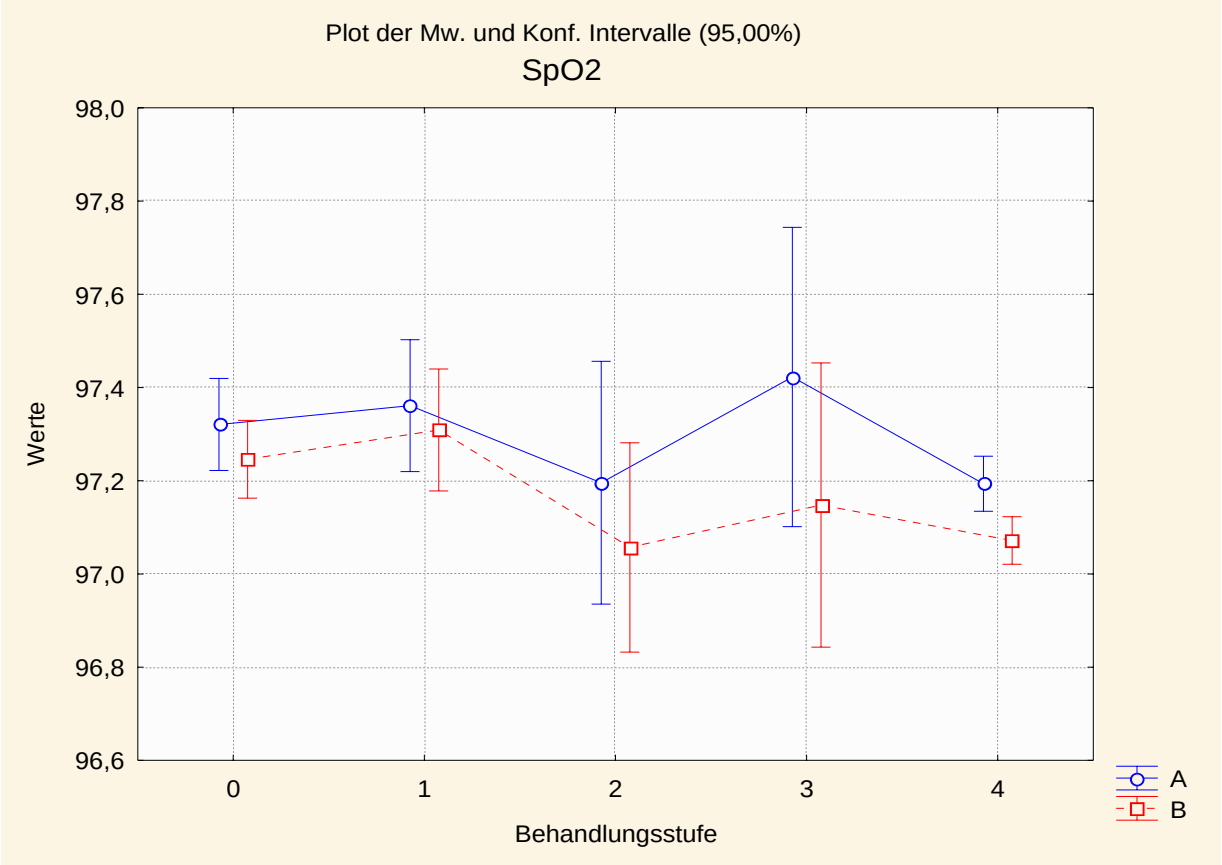
Step 0 Forerun
- Step 1 Beginning of the CV4 technique
- Step 2 Stillpoint
- Step 3 Restart of the Cranio Sacral Rhythm
- Step 4 Time of rest after the CV4 technique

8.3.3.2.2. Respiratory rate



	Step 0		Step 1		Step 2		Step 3		Step 4	
Respiratory rate	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	12,94673	12,84226	12,60819	12,67515	13,54286	13,70188	12,51786	12,60188	12,81222	13,00170
Number	826	815	342	335	105	110	56	55	IN 2029	IN 2039
Standardabw.	3,964640	3,922491	4,179793	4,055148	3,557302	4,275159	3,623113	3,072414	3,447225	3,807965
Minimum	4,000000	3,910974	4,000000	5,910974	5,000000	5,910974	6,000000	5,910974	5,000000	3,910974
Maximum	35,00000	35,91097	35,00000	27,91097	21,00000	28,91097	20,00000	20,91097	32,00000	33,91097
25% Percentil	10,00000	9,91097	10,00000	9,91097	11,00000	10,91097	10,00000	9,91097	10,00000	9,91097
Median	13,00000	12,91097	12,00000	11,91097	14,00000	12,91097	12,00000	11,91097	12,00000	12,91097
75% Percentil	15,00000	14,91097	15,00000	14,91097	16,00000	15,91097	15,00000	14,91097	15,00000	15,91097

8.3.3.2.2. Oxygensaturation



	Step 0		Step 1		Step 2		Step 3		Step 4	
Oxygen saturation	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	97,32054	97,24598	97,36095	97,30880	97,19545	97,05689	97,42241	97,14780	97,19350	97,07165
Number	847	806	338	341	110	105	58	55	IN 2062	IN 2013
Standardabw.	1,462786	1,207196	1,323116	1,226870	1,378231	1,161067	1,220446	1,128301	1,365300	1,170056
Minimum	90,00000	89,45689	91,00000	88,95689	93,00000	93,45689	94,00000	93,45689	91,50000	93,45689
Maximum	100,0000	99,4569	100,0000	98,9569	100,0000	98,4569	99,00000	98,45689	100,0000	99,4569
25% Percentil	97,00000	96,45689	97,00000	96,45689	96,50000	96,45689	97,00000	96,45689	97,00000	96,45689
Median	97,00000	97,45689	97,00000	97,45689	97,00000	97,45689	97,25000	97,45689	97,00000	97,45689
75% Percentil	98,00000	98,45689	98,00000	98,45689	98,00000	97,45689	98,00000	98,45689	98,00000	97,95689

8.3.3.3. Interaction analysis for reaction group 3

In this reaction group the step of treatment shows 1 significant differences.
Significant differences are deposited grey.

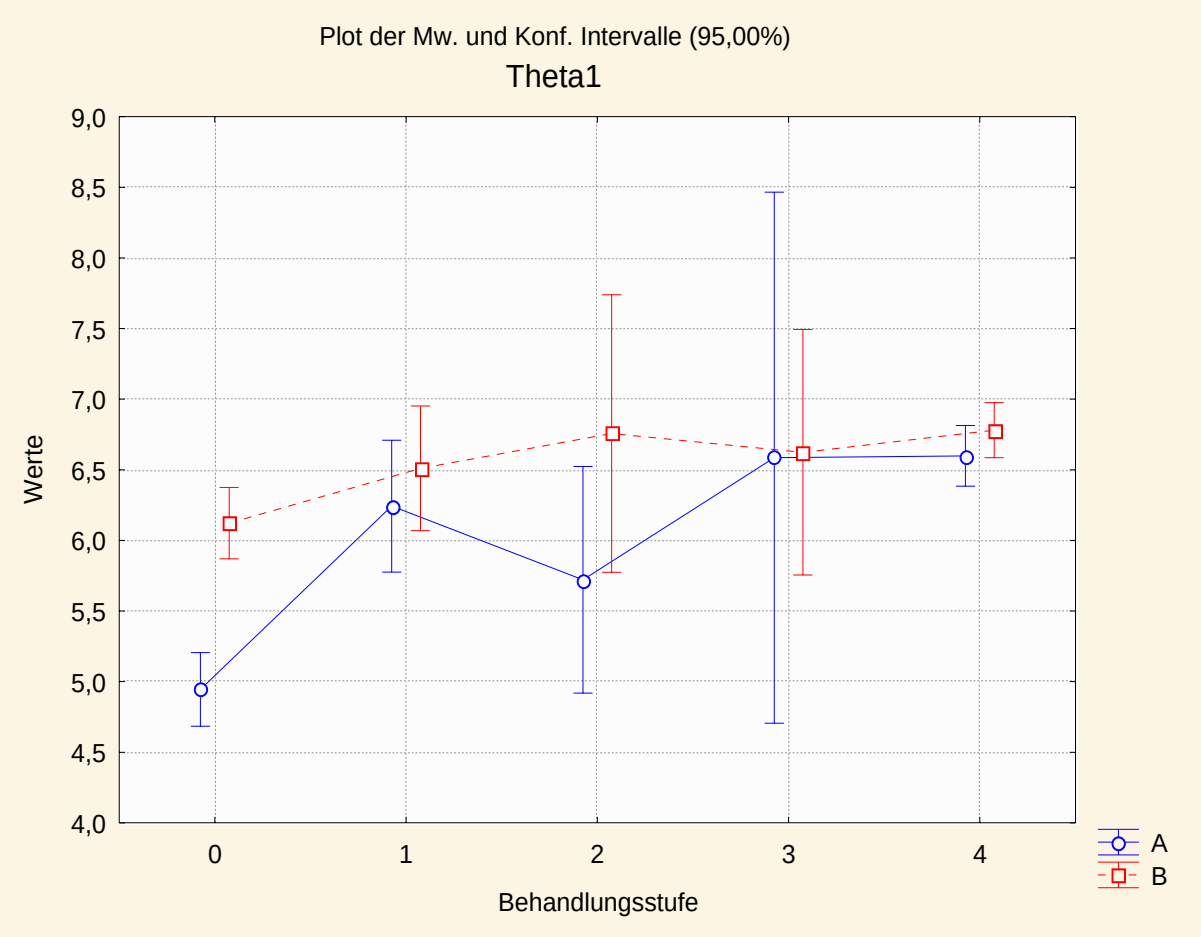
8.3.3.3.1. Description of the graphics

A corresponds to the controlling measurement
B corresponds to the test measurement
On x - axis for B the averages of the different steps of treatment and for A the simultaneous correspondences.

- The steps of treatment were:

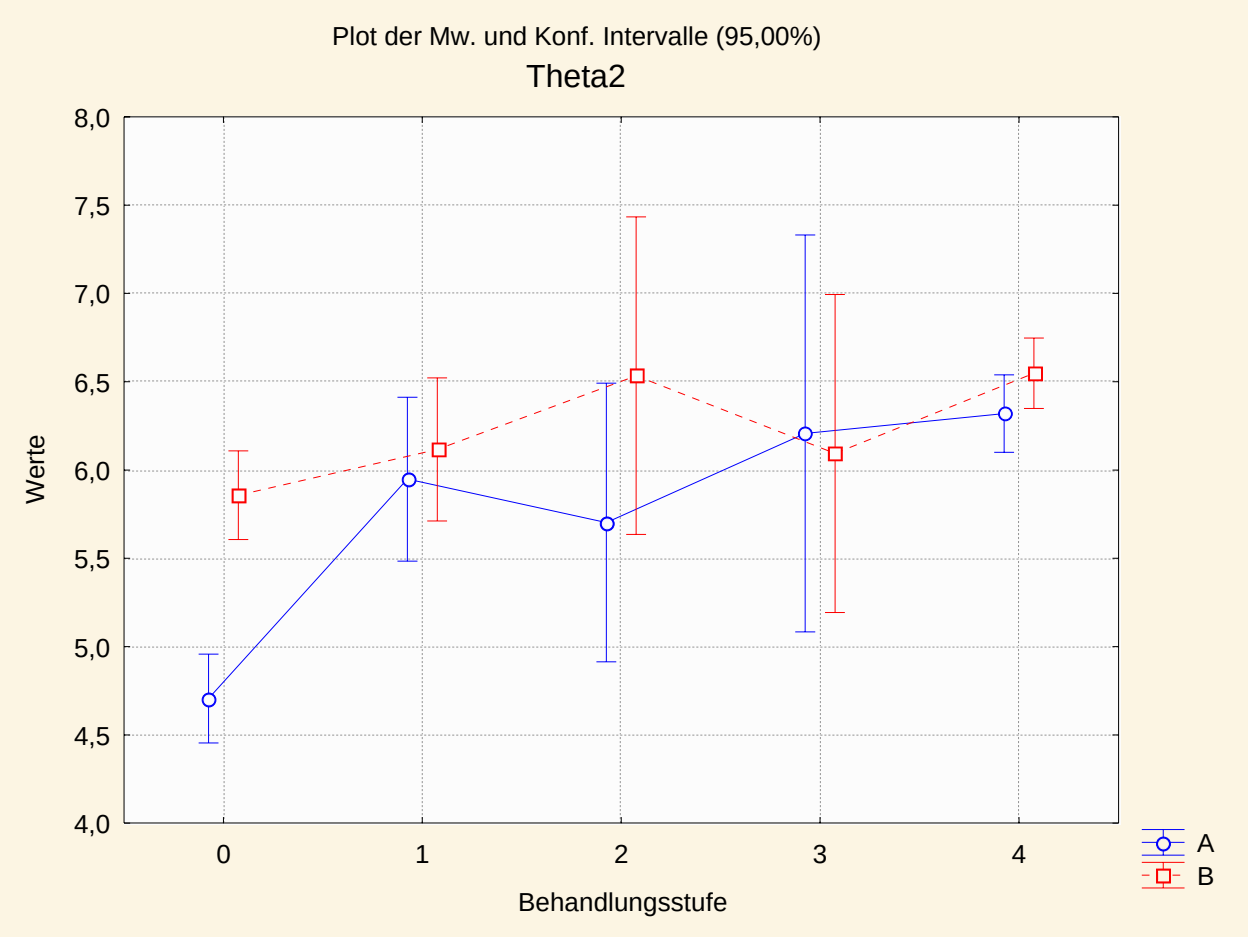
Step 0 Forerun
- Step 1 Beginning of the CV4 technique
- Step 2 Stillpoint
- Step 3 Restart of the Cranio Sacral Rhythm
- Step 4 Time of rest after the CV4 technique

8.3.3.3.2. Theta on the left



	Step 0		Step 1		Step 2		Step 3		Step 4	
Theta on the left	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	4,944637	6,122086	6,242857	6,510441	5,720721	6,756474	6,586207	6,623979	6,598571	6,780403
Number	867	856	350	352	111	111	58	58	IN 2100	IN 2094
Standardabw.	3,913225	3,767498	4,442036	4,209691	4,266511	5,224274	7,150106	3,306349	5,026589	4,541055
Minimum	0,000000	0,882600	0,000000	0,882600	0,000000	1,882600	0,000000	0,882600	0,000000	0,882600
Maximum	27,00000	26,88260	23,00000	25,88260	19,00000	33,88260	50,00000	15,88260	62,00000	36,88260
25% Percentil	2,000000	2,882600	3,000000	2,882600	2,000000	3,882600	2,000000	3,882600	3,000000	3,882600
Median	4,000000	4,882600	5,000000	5,882600	5,000000	5,882600	5,000000	5,882600	5,000000	5,882600
75% Percentil	7,000000	7,882600	9,000000	8,882600	8,000000	7,882600	9,000000	8,882600	9,000000	8,882600

8.3.3.3.3. Theta on the right



	Step 0		Step 1		Step 2		Step 3		Step 4	
Theta on the right	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	4,705882	5,857016	5,948424	6,116868	5,702703	6,534431	6,206897	6,093455	6,319696	6,548159
Number	867	855	349	352	111	111	58	58	2102	IN 2092
Standardabw.	3,776064	3,735413	4,408414	3,864153	4,196524	4,782407	4,274603	3,425687	5,123750	4,645511
Minimum	0,000000	0,903800	0,000000	0,903800	1,000000	0,903800	1,000000	1,903800	0,000000	0,903800
Maximum	24,00000	25,90380	24,00000	22,90380	19,00000	31,90380	22,00000	15,90380	48,00000	45,90380
25% Percentil	2,000000	2,903800	3,000000	2,903800	2,000000	2,903800	3,000000	2,903800	3,000000	2,903800
Median	4,000000	4,903800	5,000000	4,903800	5,000000	4,903800	5,000000	4,903800	5,000000	4,903800
75% Percentil	7,000000	7,903800	8,000000	7,903800	8,000000	8,903800	9,000000	7,903800	9,000000	7,903800

8.3.3.4. interaction analysis for reaction group 4

In this reaction group the step of treatment shows 1, 2 and 3 or 1 and 2 or only 1 significant differences. This signifies: the change occurs in each case during the CV4 technique!
Significant differences are deposited grey.

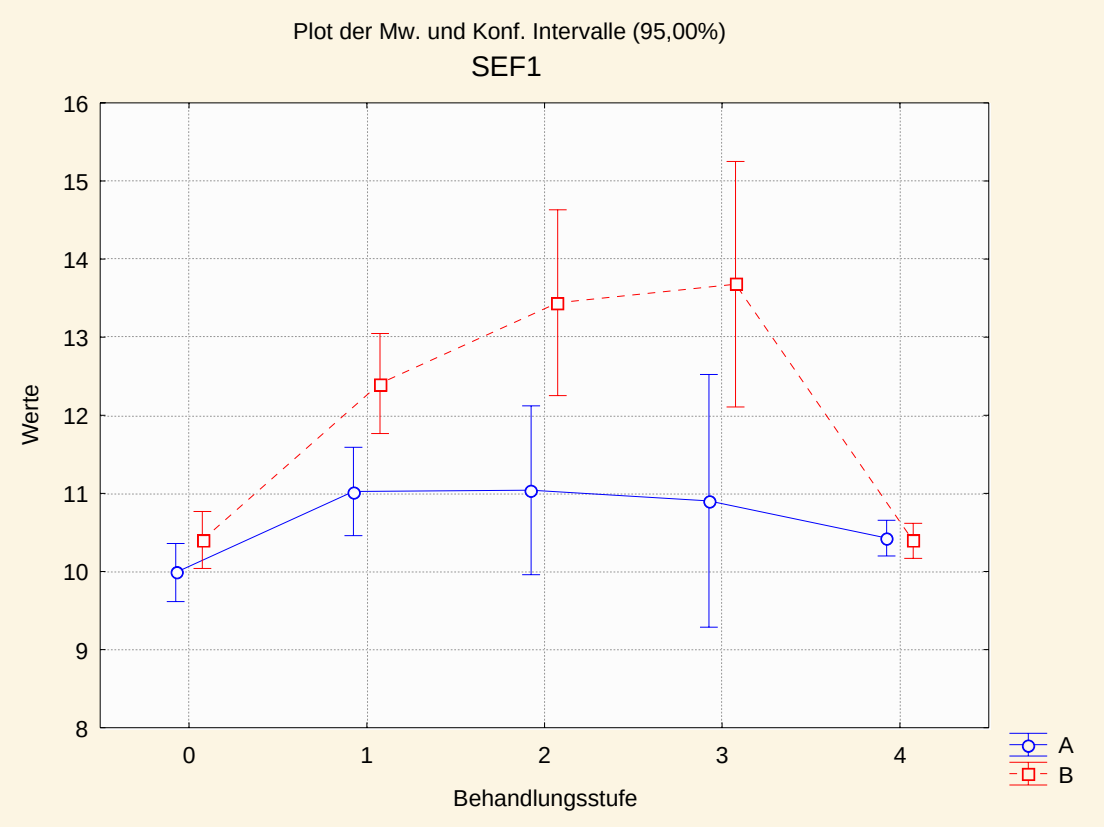
8.3.3.4.1. Description of the graphics

A corresponds to the controlling measurement
B corresponds to the test measurement
On x - axis for B the averages of the different steps of treatment and for A the simultaneous correspondences.

- The steps of treatment were:

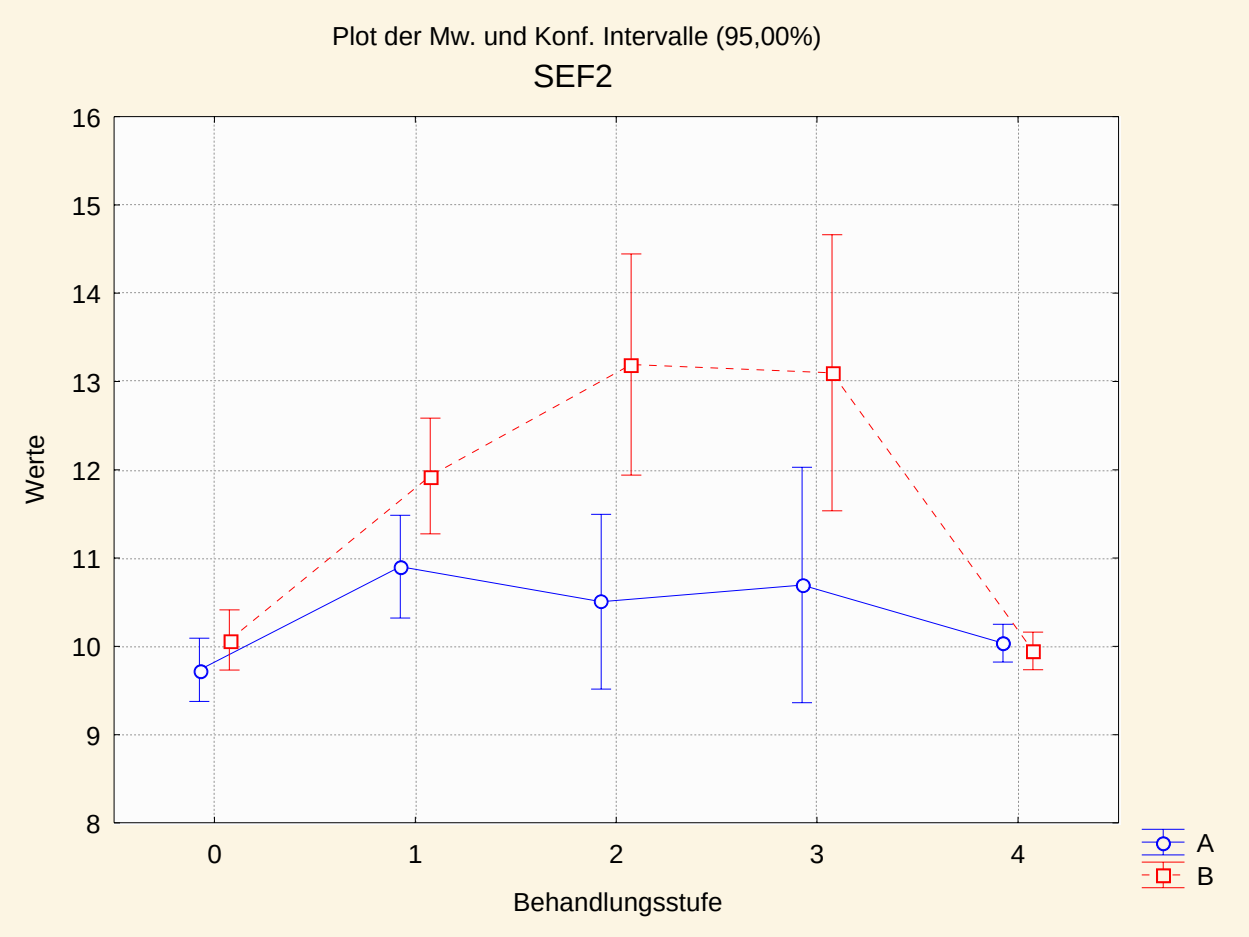
Step 0 Forerun
- Step 1 Beginning of the CV4 technique
- Step 2 Stillpoint
- Step 3 Restart of the Cranio Sacral Rhythm
- Step 4 Time of rest after the CV4 technique

8.3.3.4.2. Spectral edge frequency on the left



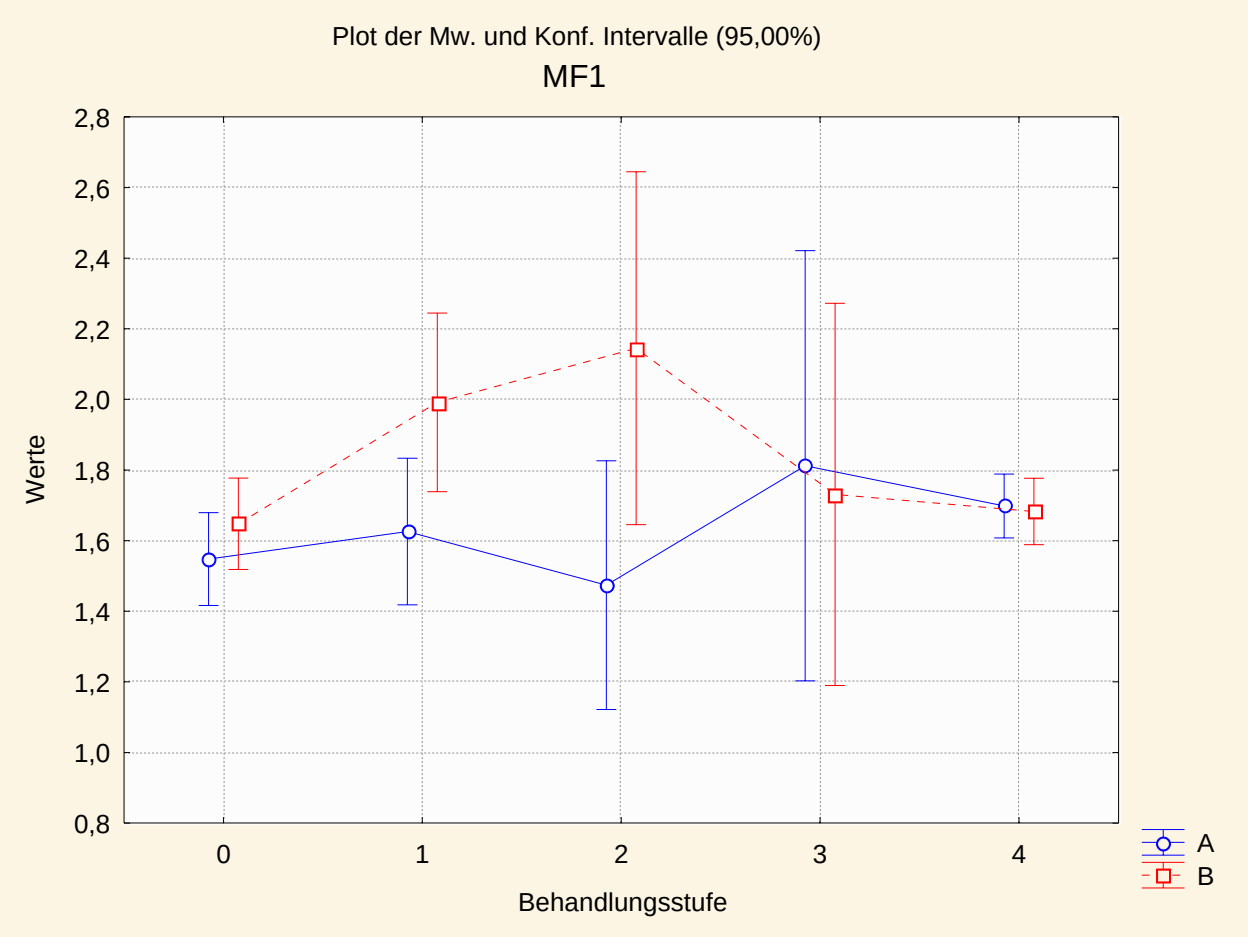
	Step 0		Step 1		Step 2		Step 3		Step 4	
Spektr. edge frequency on the left	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	9,98708	10,40372	11,02486	12,40836	11,04144	13,44149	10,90517	13,67973	10,42810	10,39316
Number	867	856	350	352	111	111	58	58	IN 2100	IN 2094
Standardabw.	5,590915	5,438442	5,373989	6,108116	5,745504	6,324738	6,157962	5,979503	5,336060	5,233027
Minimum	0,800000	0,948700	0,800000	0,948700	1,200000	2,448700	1,200000	2,448700	0,800000	0,548700
Maximum	27,00000	27,04870	25,80000	27,84870	23,40000	25,94870	25,00000	25,54870	28,10000	28,64870
25% Percentil	5,500000	6,748700	7,000000	9,148700	6,300000	9,148700	5,900000	9,548700	6,300000	6,748700
Median	9,800000	9,948700	10,50000	11,04870	10,20000	11,84870	10,50000	13,84870	10,20000	9,94870
75% Percentil	13,30000	13,04870	14,80000	16,54870	16,00000	17,34870	16,80000	18,54870	13,70000	13,84870

8.3.3.4.3. Spectral edge frequency on the right



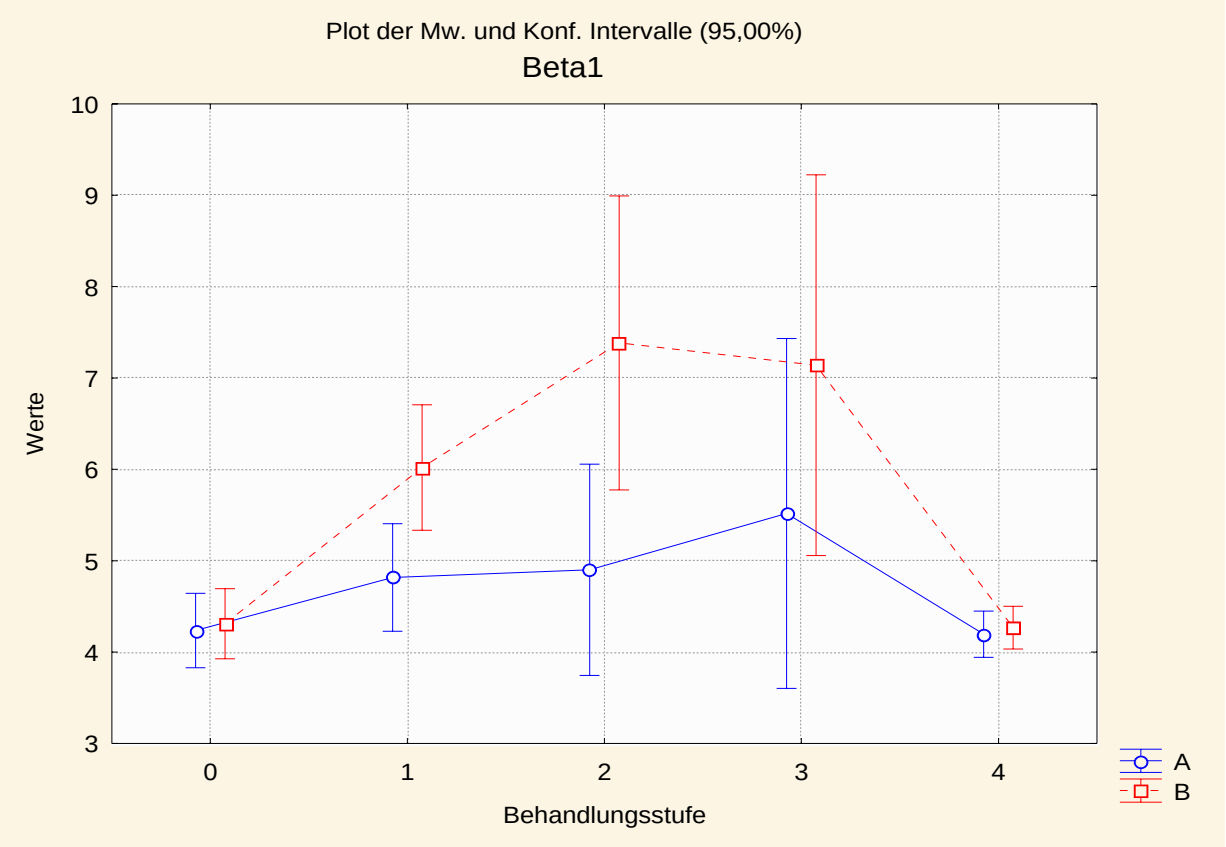
	Step 0		Step 1		Step 2		Step 3		Step 4	
Spektr. Eckfreq. on the right	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	9,73356	10,07112	10,90229	11,92983	10,50631	13,19224	10,69483	13,09825	10,03563	9,94826
Number	867	855	349	352	111	111	58	58	2102	IN 2092
Standardabw.	5,368202	5,075039	5,533502	6,251505	5,260976	6,657018	5,075618	5,945283	5,006178	4,966249
Minimum	0,800000	0,451700	0,800000	0,851700	1,600000	1,651700	2,300000	2,751700	0,400000	0,451700
Maximum	26,20000	28,15170	27,00000	27,75170	22,70000	27,75170	21,50000	23,45170	28,50000	27,75170
25% Percentil	5,100000	6,651700	7,000000	8,251700	6,300000	9,051700	7,400000	9,451700	6,600000	6,851700
Median	9,800000	9,851700	10,50000	10,55170	10,50000	11,75170	10,35000	11,75170	10,20000	9,85170
75% Percentil	12,10000	12,15170	14,50000	16,45170	13,70000	18,45170	13,70000	17,65170	12,50000	12,35170

8.3.3.4.4. Mean frequency on the left



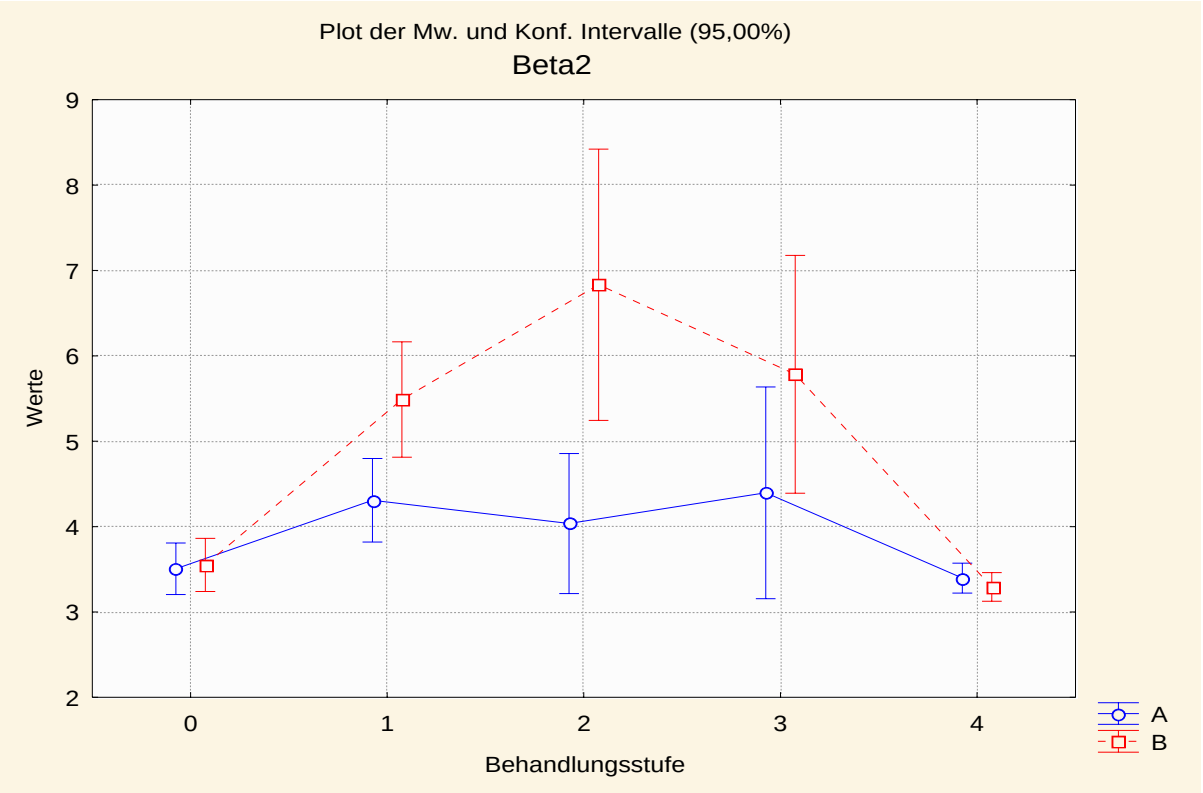
	Step 0		Step 1		Step 2		Step 3		Step 4	
Mean frequency on the left	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	1,547751	1,647699	1,625714	1,991582	1,473874	2,144909	1,812069	1,730728	1,698333	1,682653
Number	867	856	350	352	111	111	58	58	IN 2100	IN 2094
Standardabw.	1,972573	1,928273	1,974514	2,414373	1,872515	2,656777	2,317597	2,058480	2,115012	2,195118
Minimum	0,000000	-0,064100	0,000000	-0,064100	0,400000	0,335900	0,000000	0,335900	0,000000	-0,064100
Maximum	10,20000	13,63590	9,000000	9,735900	8,60000	10,43590	9,800000	9,735900	10,20000	19,43590
25% Percentil	0,400000	0,735900	0,800000	0,735900	0,400000	0,735900	0,400000	0,735900	0,400000	0,335900
Median	0,800000	1,135900	0,800000	1,135900	0,800000	1,135900	0,800000	1,135900	0,800000	0,735900
75% Percentil	1,600000	1,535900	1,600000	1,935900	1,200000	1,935900	1,600000	1,935900	1,600000	1,535900

8.3.3.4.5. Beta on the left



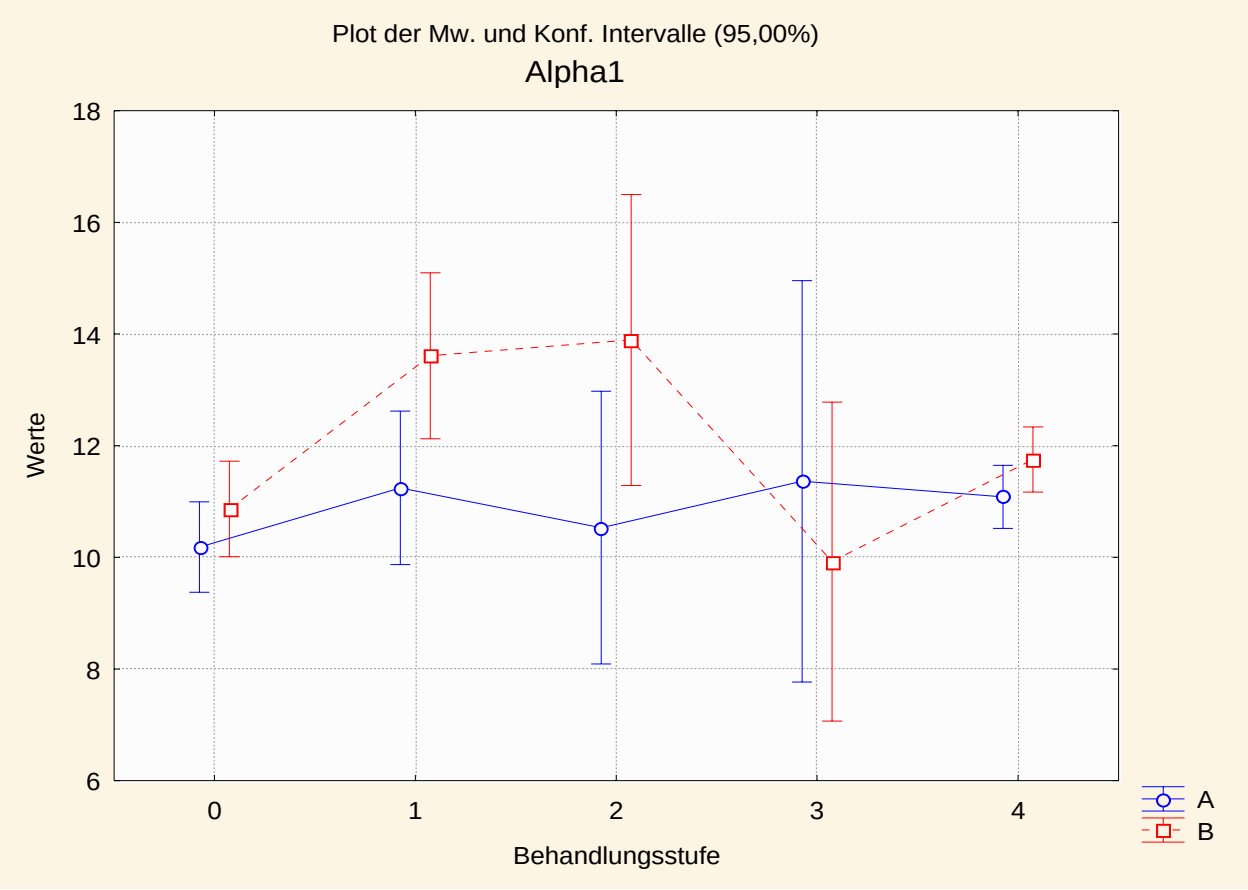
	Step 0		Step 1		Step 2		Step 3		Step 4	
Beta on the left	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	4,236448	4,310784	4,817143	6,020427	4,900901	7,383961	5,517241	7,139941	4,195714	4,267877
Number	867	856	350	352	111	111	58	58	IN 2100	IN 2094
Standardabw.	6,112922	5,708588	5,595305	6,560331	6,145146	8,558581	7,281896	7,923962	5,934314	5,444498
Minimum	0,000000	0,122700	0,000000	0,122700	0,000000	0,122700	0,000000	0,122700	0,000000	0,122700
Maximum	43,00000	52,12270	31,00000	39,12270	30,00000	44,12270	36,00000	42,12270	42,00000	64,12270
25% Percentil	1,000000	1,122700	1,000000	1,122700	1,000000	1,122700	1,000000	1,122700	1,000000	1,122700
Median	2,000000	2,122700	3,000000	4,122700	2,000000	4,122700	2,500000	6,122700	2,000000	2,122700
75% Percentil	5,000000	5,122700	6,000000	8,122700	7,000000	9,122700	7,00000	10,12270	5,000000	6,122700

8.3.3.4.6. Beta on the right



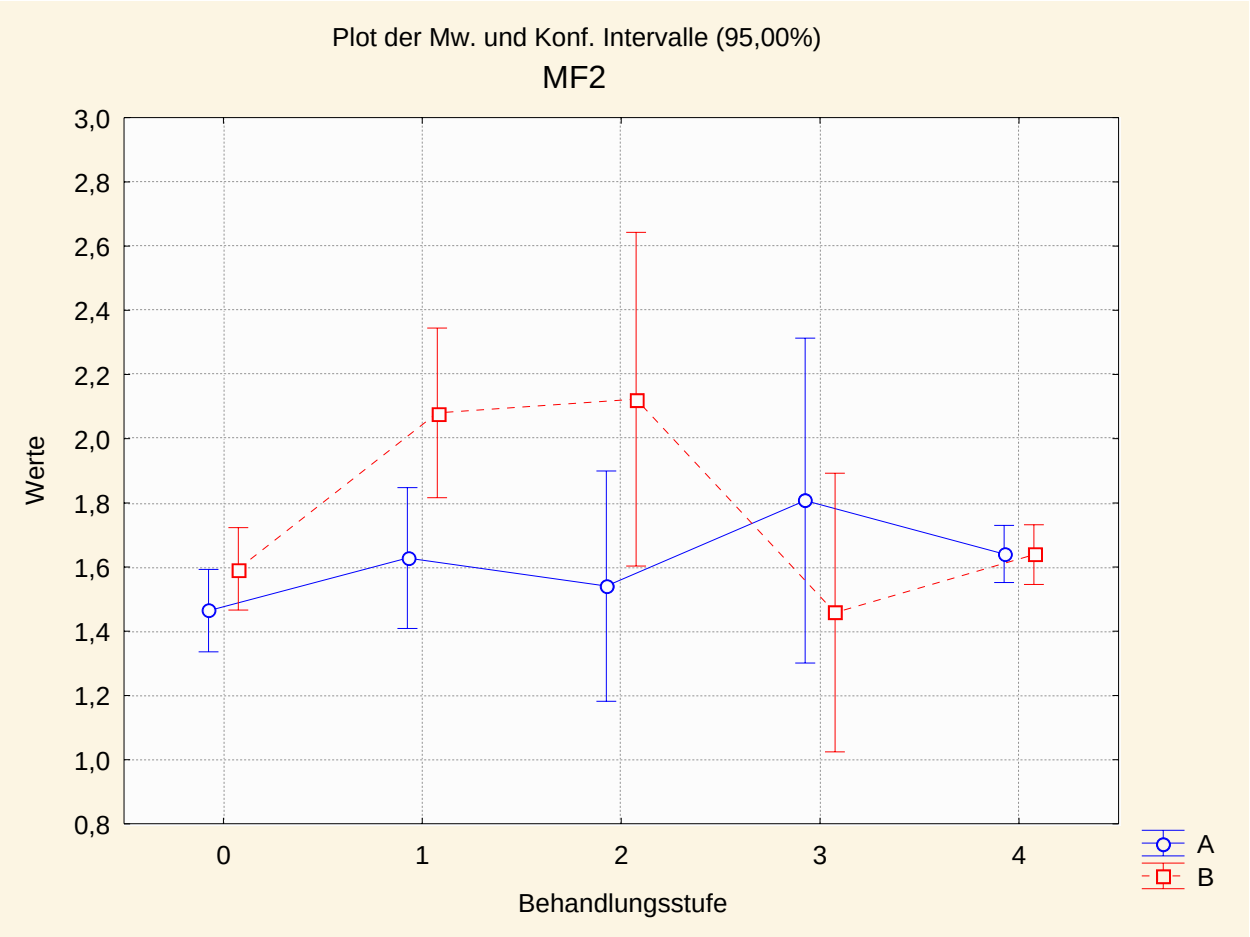
	Step 0		Step 1		Step 2		Step 3		Step 4	
Beta on the right	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	3,506344	3,550858	4,309456	5,489973	4,036036	6,833646	4,396552	5,784252	3,397716	3,294010
Number	867	855	349	352	111	111	58	58	2102	IN 2092
Standardabw.	4,532245	4,636050	4,646275	6,443336	4,358749	8,451829	4,716301	5,297102	4,098821	3,916918
Minimum	0,000000	0,112300	0,000000	0,112300	0,000000	0,112300	0,000000	0,112300	0,000000	0,112300
Maximum	43,00000	46,88770	29,00000	49,88770	25,00000	54,88770	24,00000	24,88770	33,00000	36,88770
25% Percentil	1,000000	0,887700	1,000000	0,887700	1,000000	0,887700	1,000000	0,887700	1,000000	0,887700
Median	2,000000	1,887700	3,000000	2,887700	2,000000	3,887700	2,500000	4,887700	2,000000	1,887700
75% Percentil	5,000000	4,887700	6,000000	7,887700	5,000000	8,887700	5,000000	7,887700	4,000000	4,887700

8.3.3.4.7. Alpha on the left



	Step 0		Step 1		Step 2		Step 3		Step 4	
Alpha on the left	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	10,18454	10,86642	11,24571	13,61119	10,53153	13,89366	11,36207	9,92535	11,08429	11,75468
Number	867	856	350	352	111	111	58	58	IN 2100	IN 2094
Standardabw.	12,13418	12,77115	13,07098	14,17208	12,98168	13,85016	13,67120	10,86551	13,19268	13,61470
Minimum	0,000000	-0,971200	0,000000	0,971200	0,000000	-0,971200	0,000000	0,028800	0,000000	0,971200
Maximum	67,00000	63,02880	70,00000	64,02880	65,00000	61,02880	63,00000	52,02880	71,00000	70,02880
25% Percentil	2,000000	2,028800	3,000000	3,028800	3,000000	4,028800	2,000000	2,028800	3,000000	2,028800
Median	5,000000	6,028800	6,000000	8,028800	5,000000	8,028800	5,500000	6,028800	6,000000	7,028800
75% Percentil	14,00000	15,02880	15,00000	21,02880	15,00000	20,02880	14,00000	14,02880	14,00000	17,02880

8.3.3.4.8. Mean frequency on the right



	Step 0		Step 1		Step 2		Step 3		Step 4	
Middle frequency on the right	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	1,464129	1,594649	1,628080	2,080366	1,540541	2,123161	1,806897	1,458452	1,640913	1,638860
Number	867	855	349	352	111	111	58	58	2102	IN 2092
Standardabw.	1,927303	1,912459	2,083546	2,520904	1,906991	2,763863	1,924802	1,651046	2,079100	2,163186
Minimum	0,000000	0,038100	0,000000	0,038100	0,400000	0,361900	0,400000	-0,038100	0,000000	0,038100
Maximum	11,70000	12,46190	9,80000	12,86190	8,20000	14,46190	8,200000	9,361900	10,20000	10,16190
25% Percentil	0,400000	0,761900	0,400000	0,761900	0,400000	0,761900	0,800000	0,761900	0,400000	0,361900
Median	0,800000	0,761900	0,800000	1,161900	0,800000	0,761900	1,000000	0,761900	0,800000	0,761900
75% Percentil	1,600000	1,561900	1,600000	1,961900	1,600000	1,961900	2,000000	1,561900	1,600000	1,561900

8.3.3.5. interaction analysis for reaction group 5

In this reaction group the step of treatment shows 1.2 and 4 significant differences. Significant differences are deposited grey.

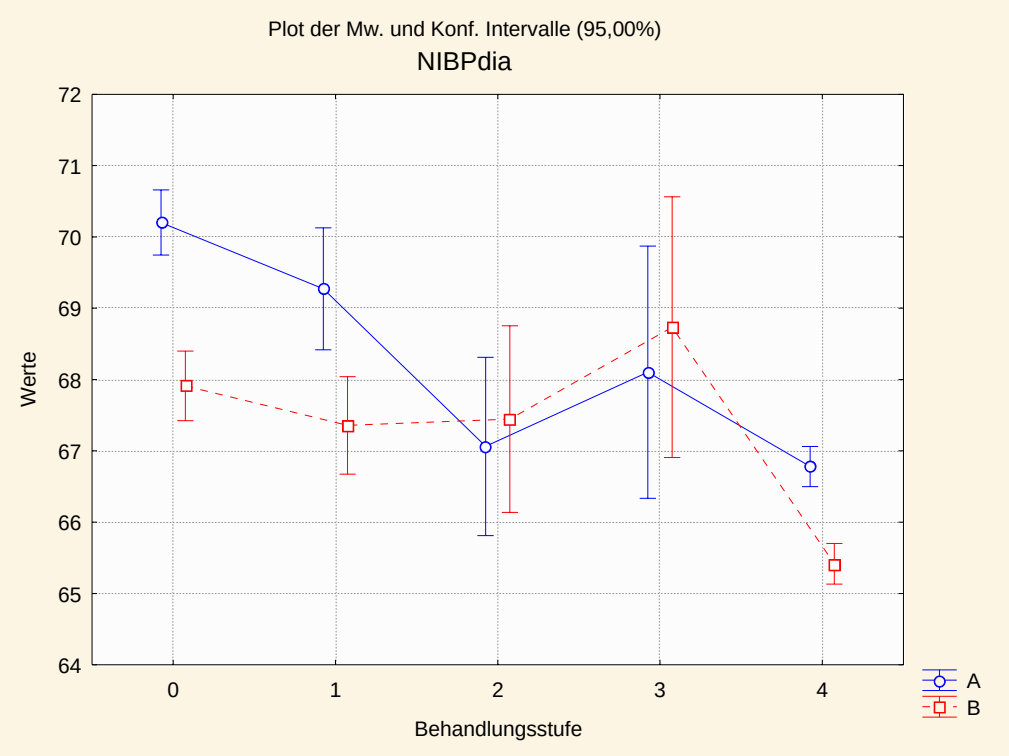
8.3.3.5.1. Description of the graphics

A corresponds to the controlling measurement
B corresponds to the test measurement
On x - axis for B the averages of the different steps of treatment and for A the simultaneous correspondences.

- The steps of treatment were:

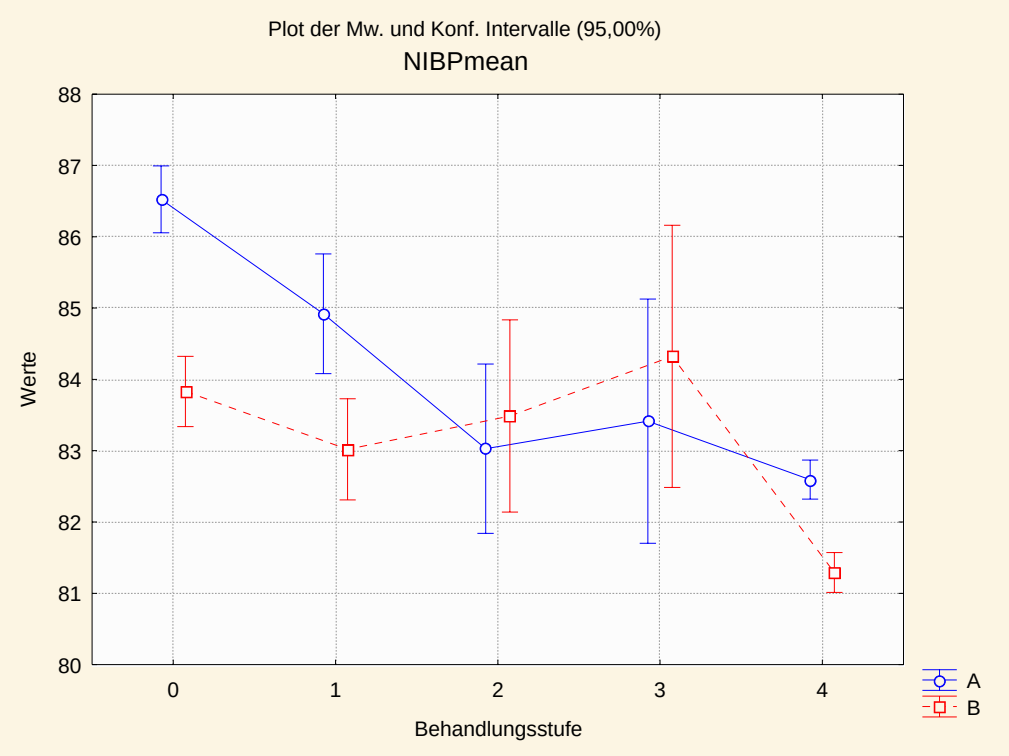
Step 0 Forerun
- Step 1 Beginning of the CV4 technique
- Step 2 Stillpoint
- Step 3 Restart of the Cranio Sacral Rhythm
- Step 4 Time of rest after the CV4 technique

8.3.3.5.2. Not invasive blood pressure - Diastole



	Step 0		Step 1		Step 2		Step 3		Step 4	
N. inv. Blutdr. diastolic	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	70,20276	67,91155	69,27273	67,35748	67,06306	67,44570	68,10345	68,73414	66,78051	65,41608
Number	868	845	352	352	111	111	58	58	2114	2115
Standardabw.	6,869883	7,248356	8,160746	6,520811	6,645955	6,956163	6,726981	6,953327	6,606661	6,694403
Minimum	55,00000	50,33759	57,00000	50,33759	56,00000	55,33759	56,00000	55,33759	53,00000	48,33759
Maximum	89,00000	91,33759	95,00000	85,33759	83,00000	85,33759	83,00000	85,33759	85,00000	87,33759
25% Percentil	66,00000	63,33759	63,00000	62,33759	62,00000	61,33759	63,00000	64,33759	62,00000	60,33759
Median	70,00000	67,33759	69,00000	68,33759	68,00000	66,33759	68,00000	68,83759	67,00000	65,33759
75% Percentil	74,00000	72,33759	73,00000	71,33759	71,00000	72,33759	72,00000	73,33759	71,00000	69,33759

8.3.3.5.3. Not invasive blood pressure average



	Step 0		Step 1		Step 2		Step 3		Step 4	
N. inv. Blutdr. Average	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	86,52535	83,83086	84,92045	83,01868	83,02703	83,48694	83,41379	84,32354	82,59385	81,29132
Number	868	845	352	352	111	111	58	58	2115	2116
Standardabw.	7,042501	7,289724	8,005300	6,762941	6,316586	7,164934	6,513237	6,991569	6,431361	6,550635
Minimum	71,00000	65,49595	70,00000	65,49595	70,00000	69,49595	70,00000	69,49595	65,00000	66,49595
Maximum	105,0000	103,4960	108,0000	101,4960	99,0000	101,4960	99,0000	101,4960	99,0000	103,4960
25% Percentil	82,00000	79,49595	79,00000	78,49595	79,00000	77,49595	79,00000	78,49595	78,00000	77,49595
Median	86,00000	83,49595	84,00000	83,49595	82,00000	82,49595	83,00000	84,49595	83,00000	81,49595
75% Percentil	91,00000	87,49595	90,00000	87,49595	88,00000	88,49595	88,00000	88,49595	87,00000	85,49595

8.3.3.6. Interaction analysis for reaction group 6

In this reaction group the step of treatment shows 1, 2 and 3 significant differences. Significant differences are deposited grey.

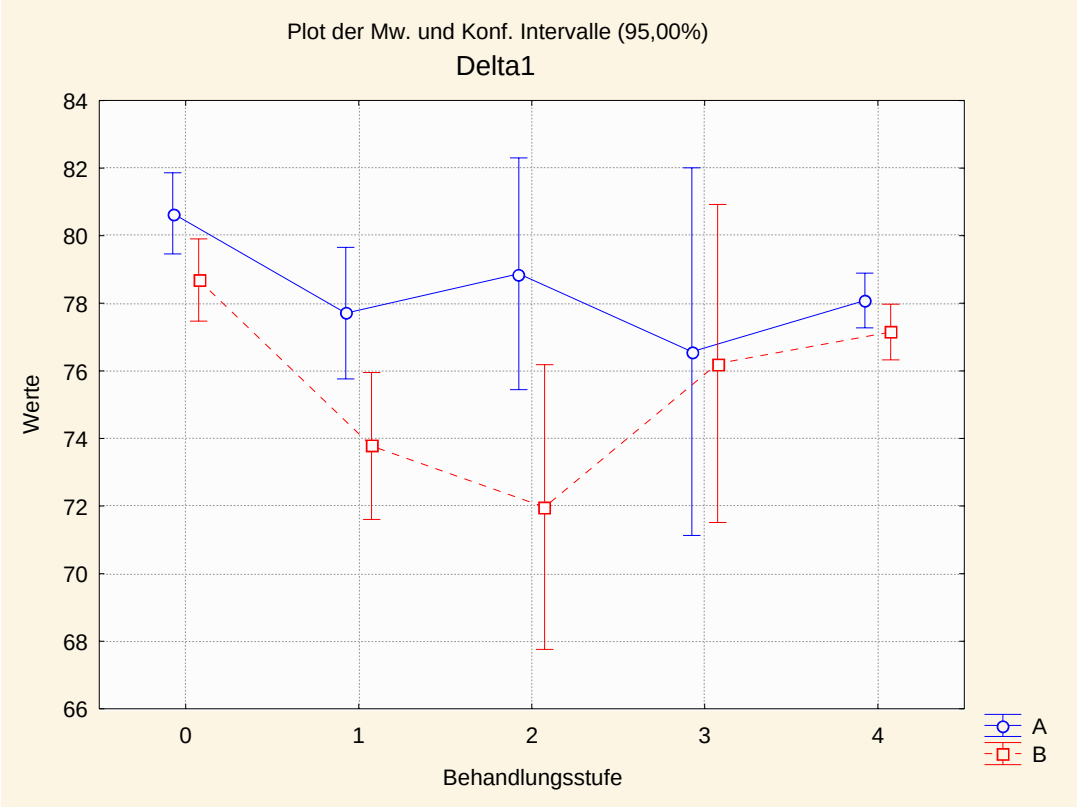
8.3.3.6.1. Description of the graphics

A corresponds to the controlling measurement
B corresponds to the test measurement
On x - axis for B the averages of the different steps of treatment and for A the simultaneous correspondences.

- The steps of treatment were:

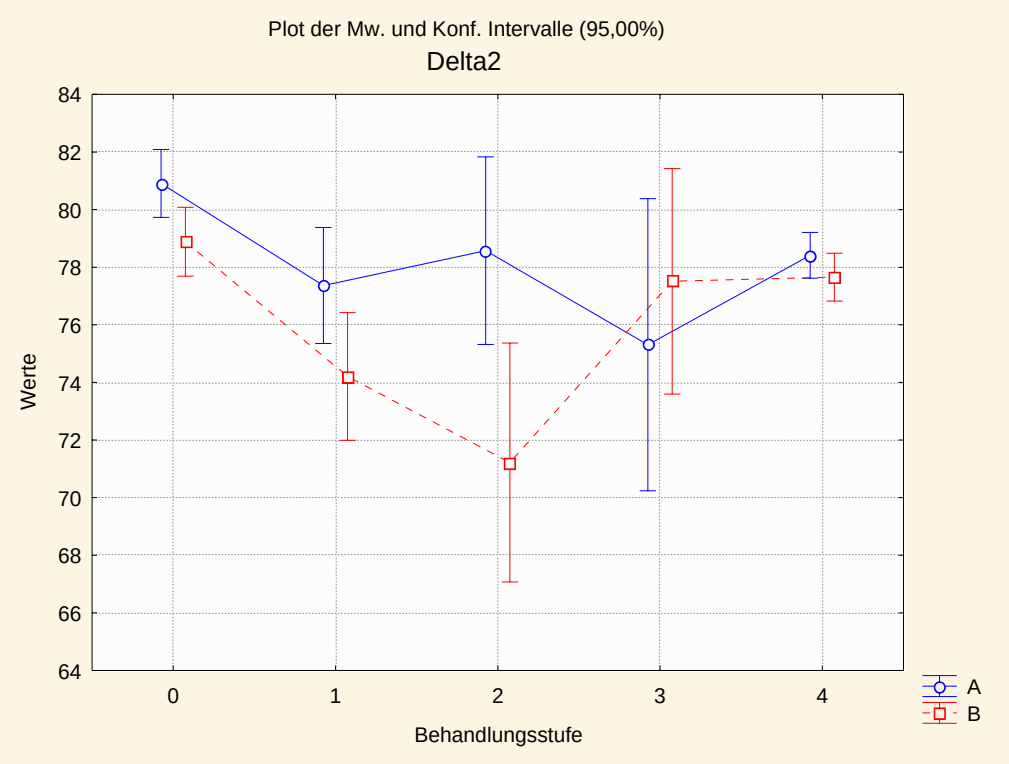
Step 0 Forerun
- Step 1 Beginning of the CV4 technique
- Step 2 Stillpoint
- Step 3 Restart of the Cranio Sacral Rhythm
- Step 4 Time of rest after the CV4 technique

8.3.3.6.2. Delta on the left



	Step 0		Step 1		Step 2		Step 3		Step 4	
Delta on the left	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	80,6609	78,68721	77,70857	73,77897	78,87387	71,97175	76,56897	76,2198	78,08286	77,15115
Number	867	856	350	352	111	111	58	58	IN 2100	IN 2094
Standardabw.	18,02674	18,14393	18,53258	20,72822	18,22542	22,39861	20,68571	17,89444	18,87987	19,20427
Minimum	16	9,9267	16	7,9267	15	9,9267	16	6,9267	9	9,9267
Maximum	99	98,9267	99	98,9267	99	97,9267	99	95,9267	99	99,9267
25% Quartile	73	70,9267	69	62,4267	72	62,9267	63	71,9267	71	68,9267
Median	87	84,9267	84	80,9267	86	77,9267	84	81,9267	84	83,9267
75% Quartile	94	90,9267	92	88,9267	93	88,9267	94	87,9267	92	91,9267

8.3.3.6.3. Delta on the right



	Step 0		Step 1		Step 2		Step 3		Step 4	
Delta on the right	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	80,90773	78,88593	77,36676	74,2074	78,57658	71,2216	75,31034	77,5147	78,41246	77,65563
Number	867	855	349	352	111	111	58	58	2102	IN 2092
Standardabw.	17,67184	17,83028	19,13691	21,15328	17,29348	22,0619	19,27475	14,8985	18,58302	19,35826
Minimum	13	12,2216	16	10,2216	27	11,2216	22	20,2216	12	7,2216
Maximum	100	99,2216	99	99,2216	99	97,2216	98	96,2216	100	99,2216
25% Quartile	73	71,2216	68	62,2216	72	60,2216	59	70,2216	71	69,2216
Median	87	84,2216	84	80,2216	83	76,2216	82	80,2216	84	84,2216
75% Quartile	94	92,2216	92	91,2216	93	88,2216	92	88,2216	92	91,2216

8.3.3.7. Interaction analysis for reaction group 7

In this reaction group shows in no step of treatment significant differences.

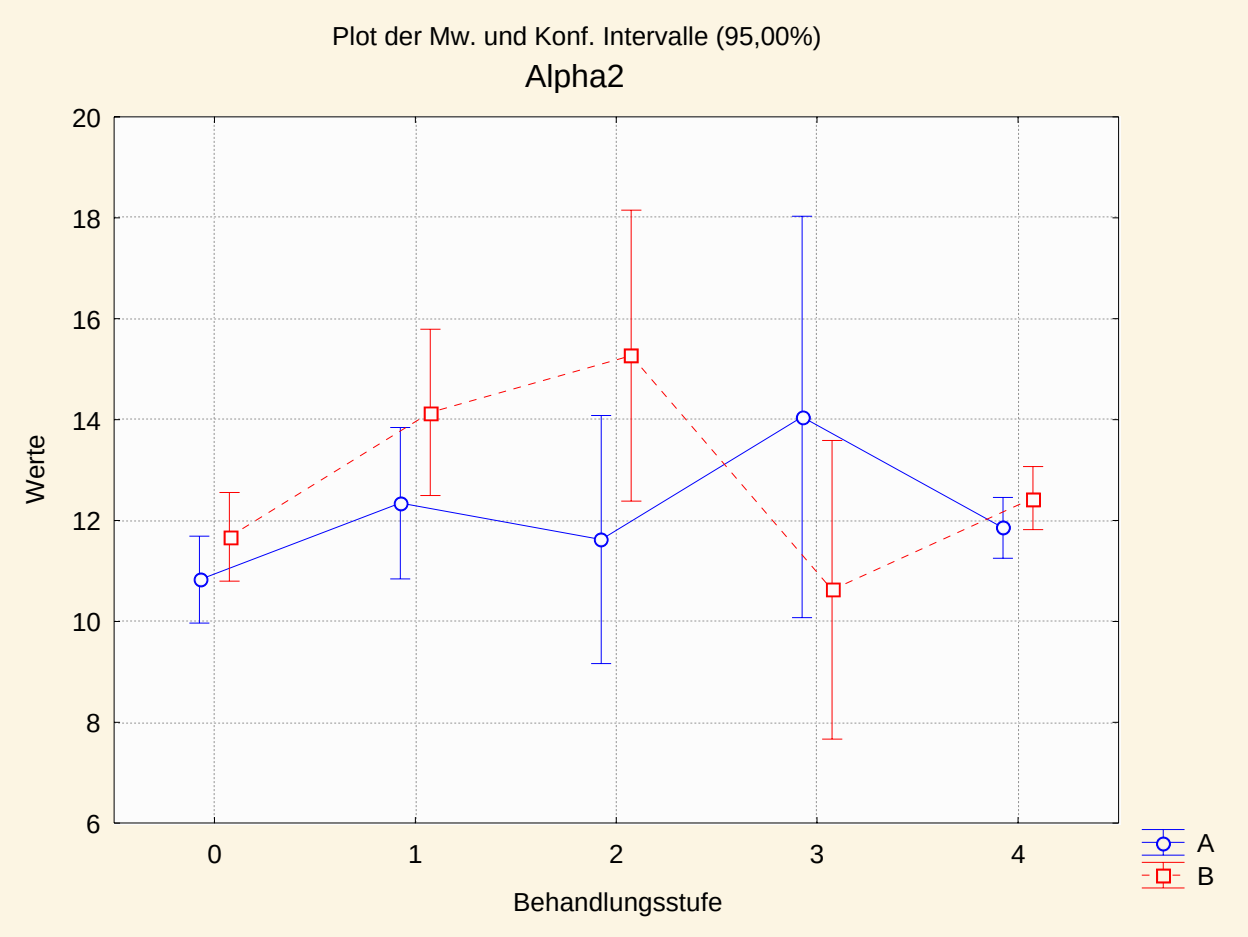
8.3.3.7.1. Description of the graphics

A corresponds to the controlling measurement
B corresponds to the test measurement
On x - axis for B the averages of the different steps of treatment and for A the simultaneous correspondences.

- The steps of treatment were:

Step 0 Forerun
- Step 1 Beginning of the CV4 technique
- Step 2 Stillpoint
- Step 3 Restart of the Cranio Sacral Rhythm
- Step 4 Time of rest after the CV4 technique

8.3.3.7.2. Alpha on the right



	Step 0		Step 1		Step 2		Step 3		Step 4	
Alpha on the right	A-0	B-0	A-1	B-1	A-2	B-2	A-3	B-3	A-4	B-4
Average	10,82699	11,67608	12,34384	14,14244	11,62162	15,26742	14,05172	10,62451	11,85205	12,44302
Number	867	855	349	352	111	111	58	58	2102	IN 2092
Standardabw.	12,91945	13,08909	14,24788	15,71689	13,07256	15,32911	15,13382	11,26147	14,11119	14,57694
Minimum	0,00000	-1,04790	0,00000	-1,04790	0,000000	-0,047900	0,000000	-0,047900	0,00000	-1,04790
Maximum	69,00000	66,95210	67,00000	69,95210	55,00000	71,95210	59,00000	54,95210	69,00000	77,95210
25% Percentil	2,000000	1,952100	3,000000	1,952100	3,000000	2,952100	3,000000	1,952100	3,000000	1,952100
Median	6,000000	6,952100	6,000000	8,952100	6,000000	9,952100	7,000000	7,952100	6,000000	6,952100
75% Percentil	13,00000	16,95210	17,00000	19,45210	17,00000	21,95210	26,00000	12,95210	15,00000	16,95210

8.4. Analysis of interaction with specific lesions and parameters

We made this analysis of interaction for the following prameters:

- SSB Compaction
- Compaction and Translation von C0, C1, C2
- Compaction and Translation Th3, 4
- Sensitivity to changes in the weather
- Comparison of normal treatment with bluff- and music treatment

In the English “short version” of our paper we only show you the SSB compaction. You can find the other comparative anlysis in the German version.

Different groups of clients were formed and compared with each other:

- **group 0**: are the clients without specific lesions. In the graphics the circles represent the means of the clients without the tested lesion
- **group 1**: are the clients with specific lesions. The squares in the graphics represent the means of the clients with the tested lesion. (eg. compaction of the SSB, ...)

The lines coming out of the sqaures and circles show the confidence interval. The more numbers the computer has to calculate the means, the shorter these lines are and the more the mean can be calculated exactly. When the two lines do not intersect the difference of group 0 and group 1 is significant.
If the lines that connect the squares and circles are parallel the groups react similar.

8.4.1. SSB compaction

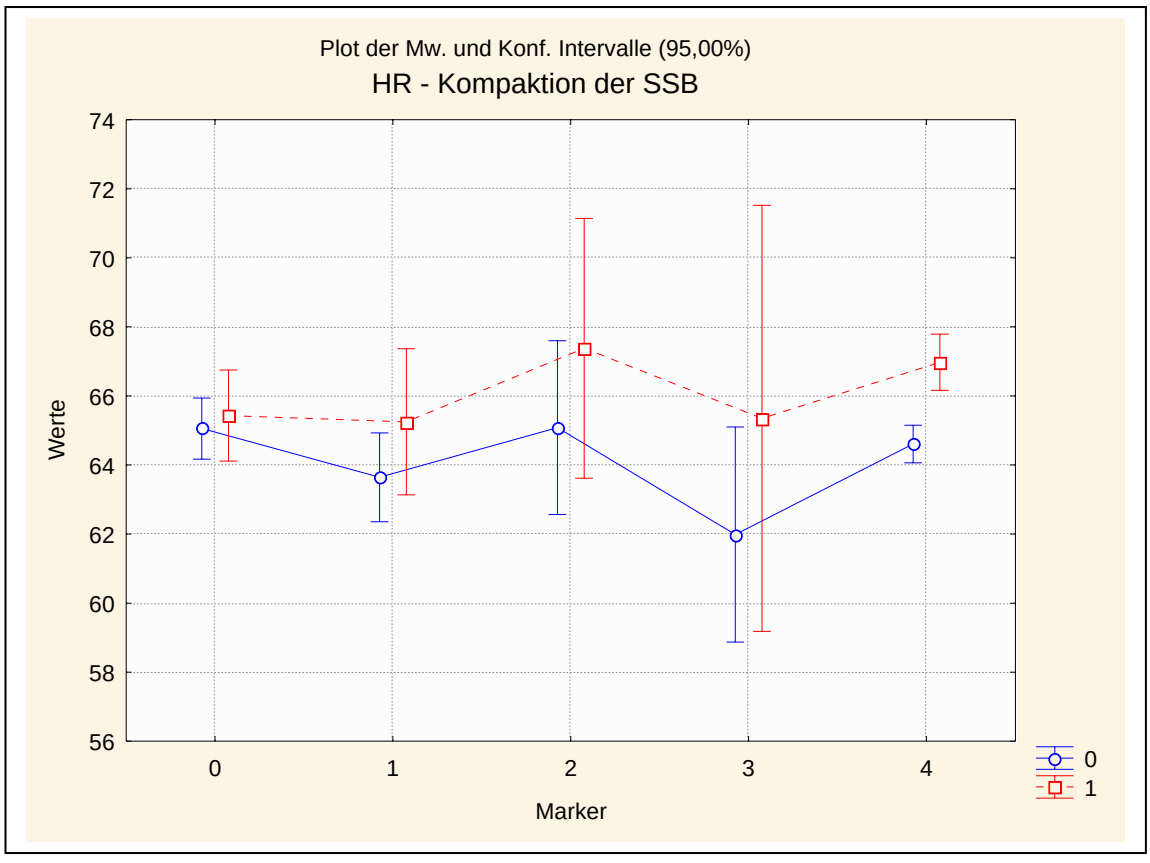
The following plots of interaction demonstrate the reactions of clients with SSB compaction with clients witout this lesion.

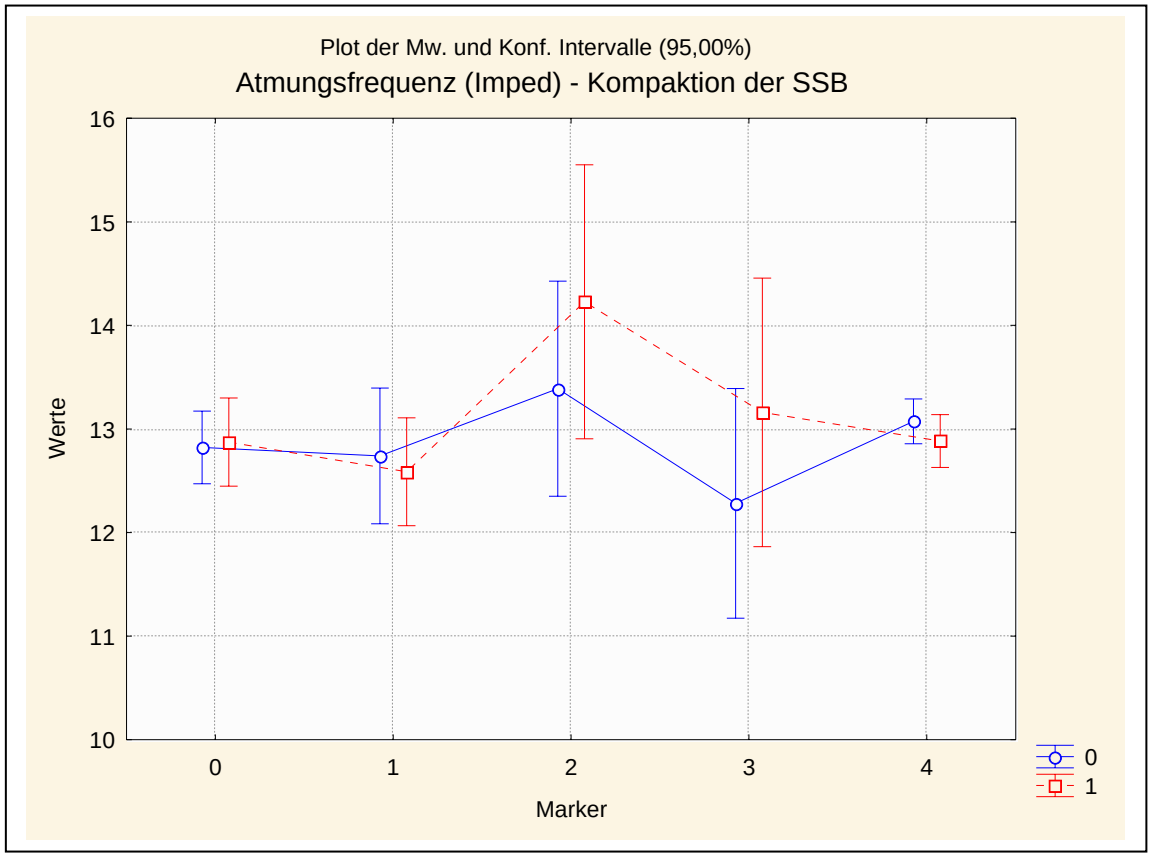
These parameters seemed to be interesting for us:

- Heartrate, Resp. frequency
- NIBP dia, NIBP mean, Oxygen saturation
- EEG-Parameters: Ampl1, MF1, SEF1, Beta1, BSR1 and Alpha2.

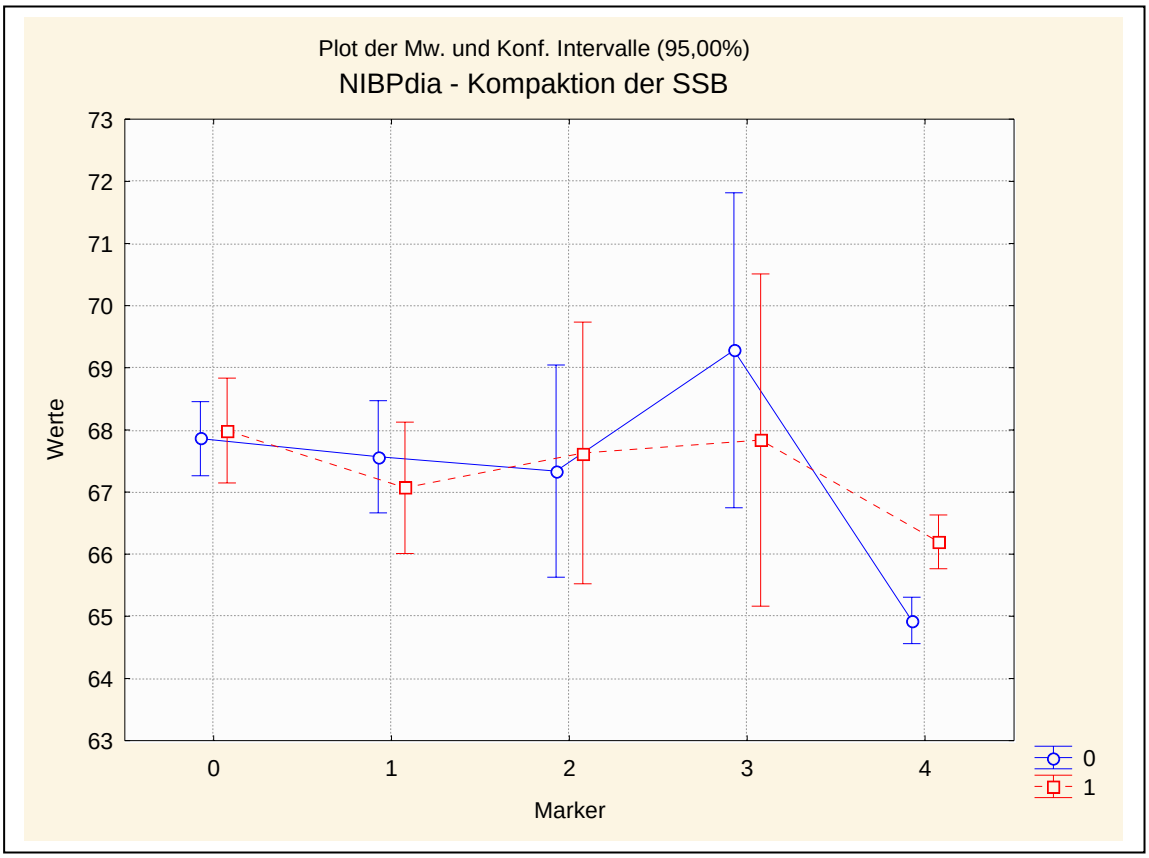
In our English paper we chose the heartreate, SEF and Alpha 2 as examples.

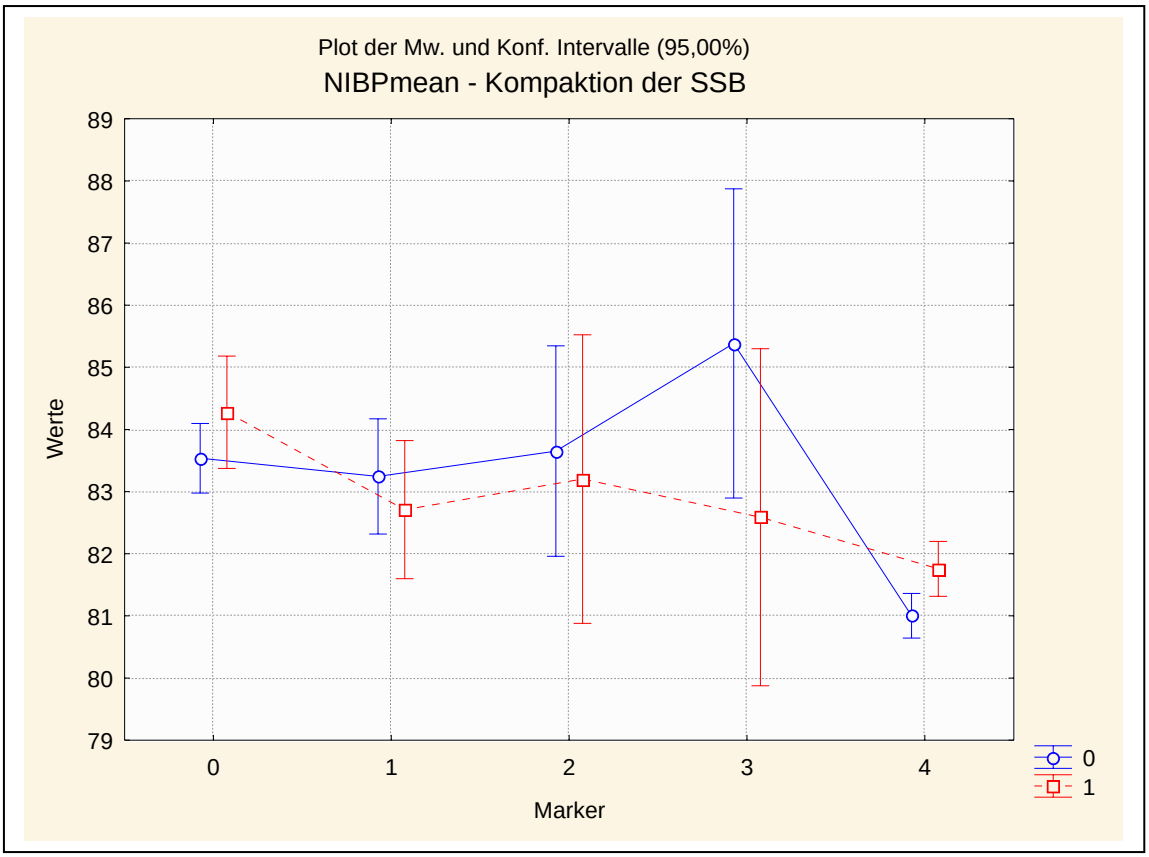
0 = Probands without comp, 1 = Probands with comp.



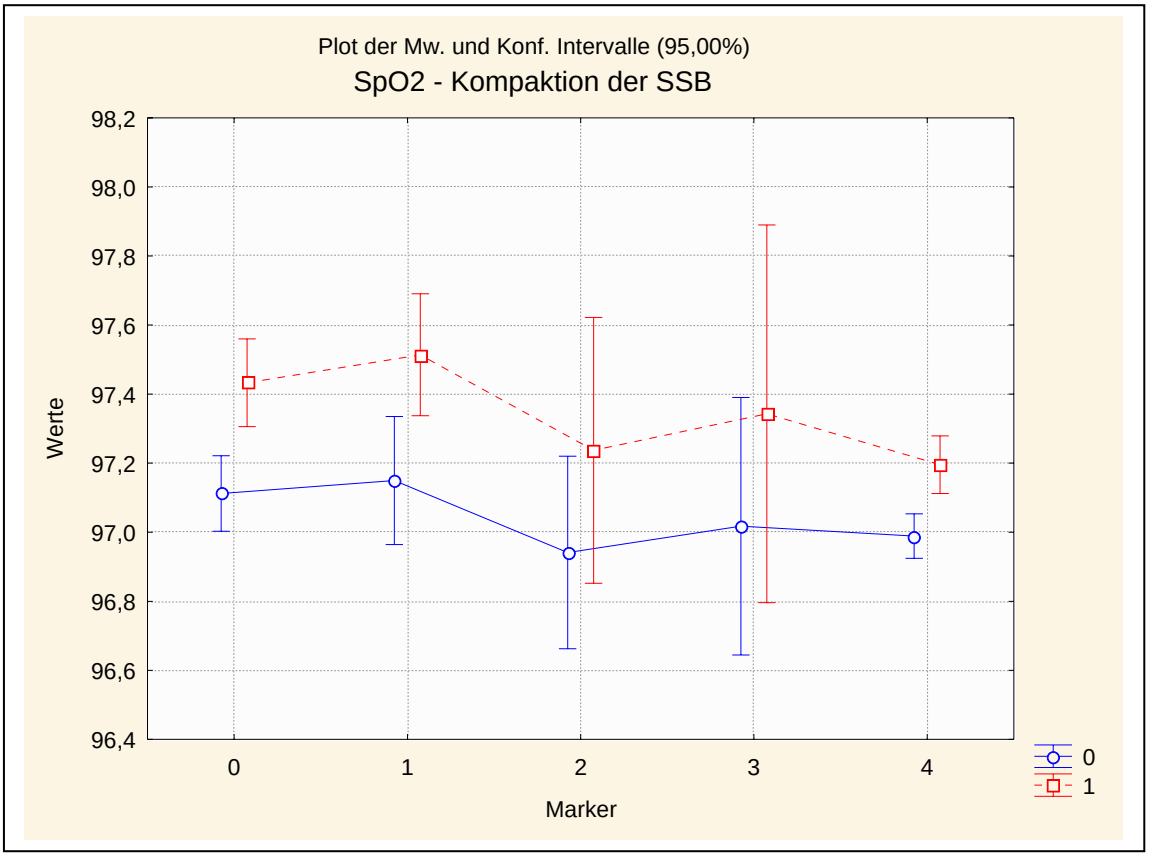


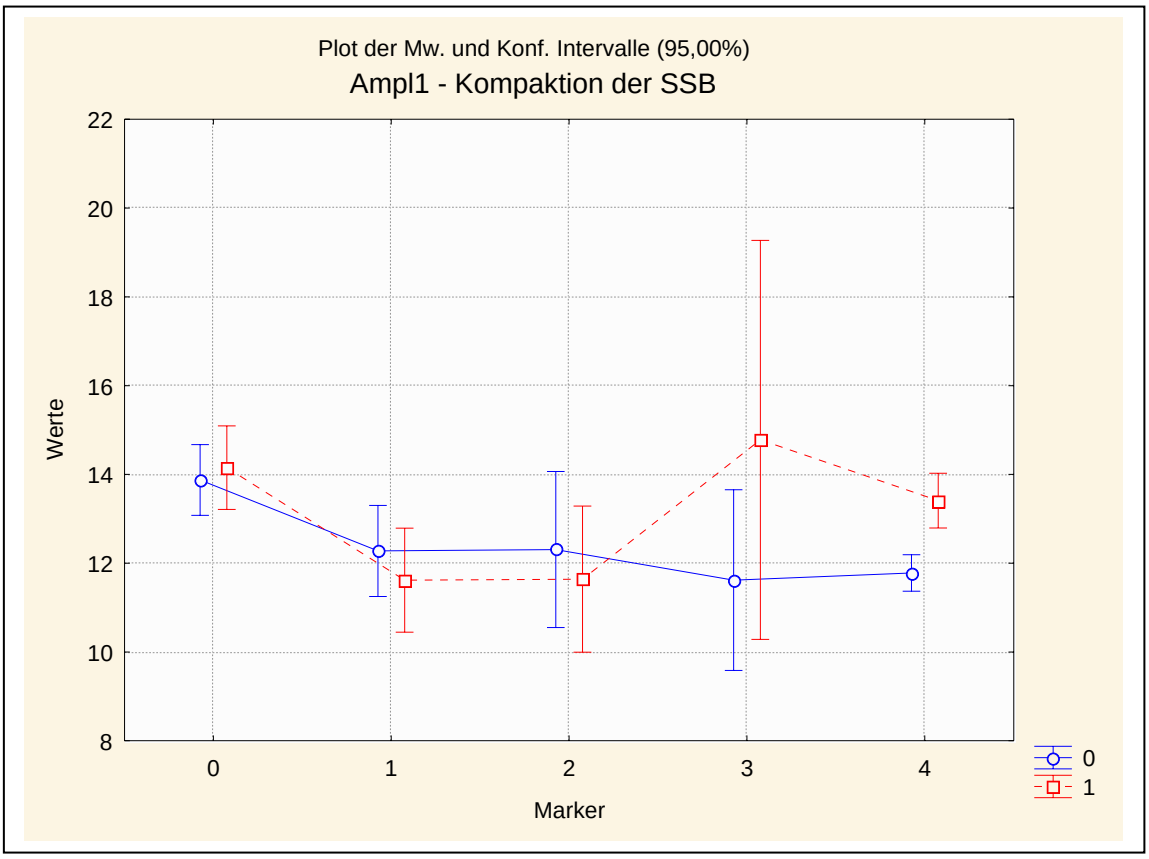
0 = test persons without comp, 1 = test persons with comp.



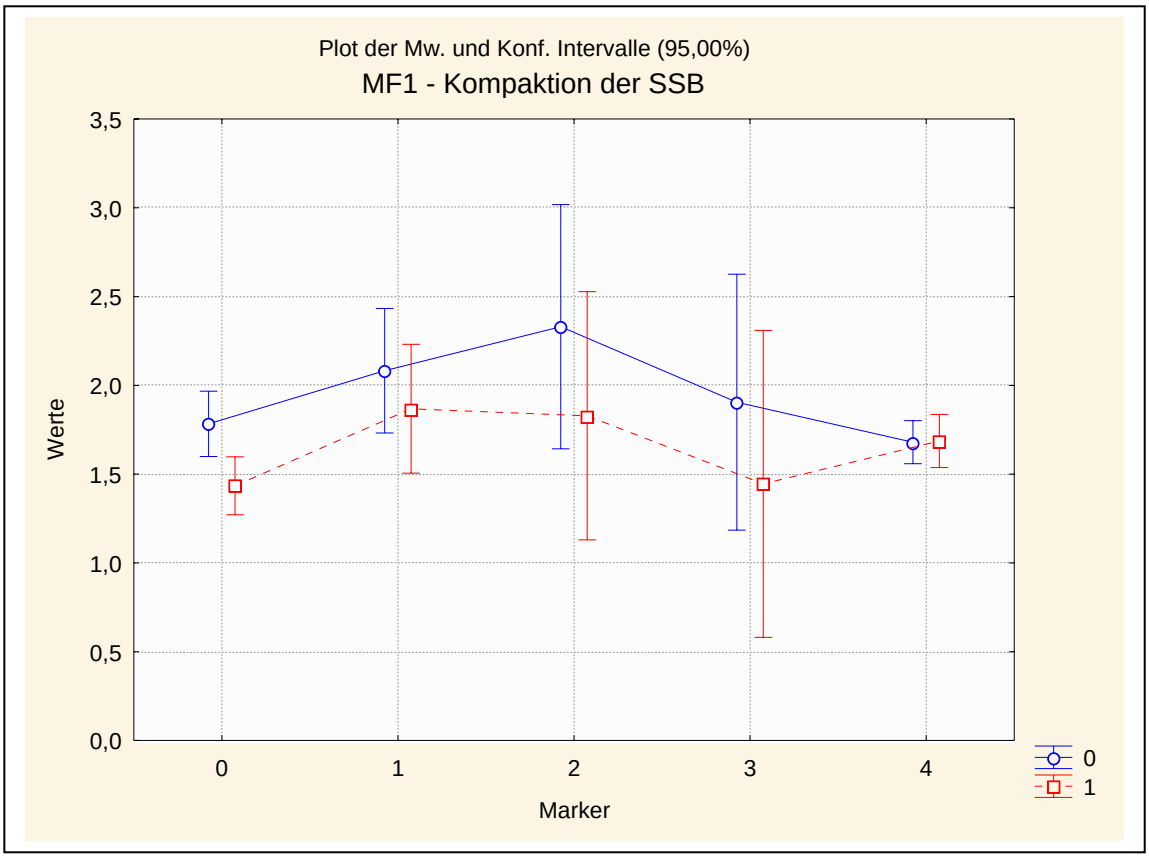


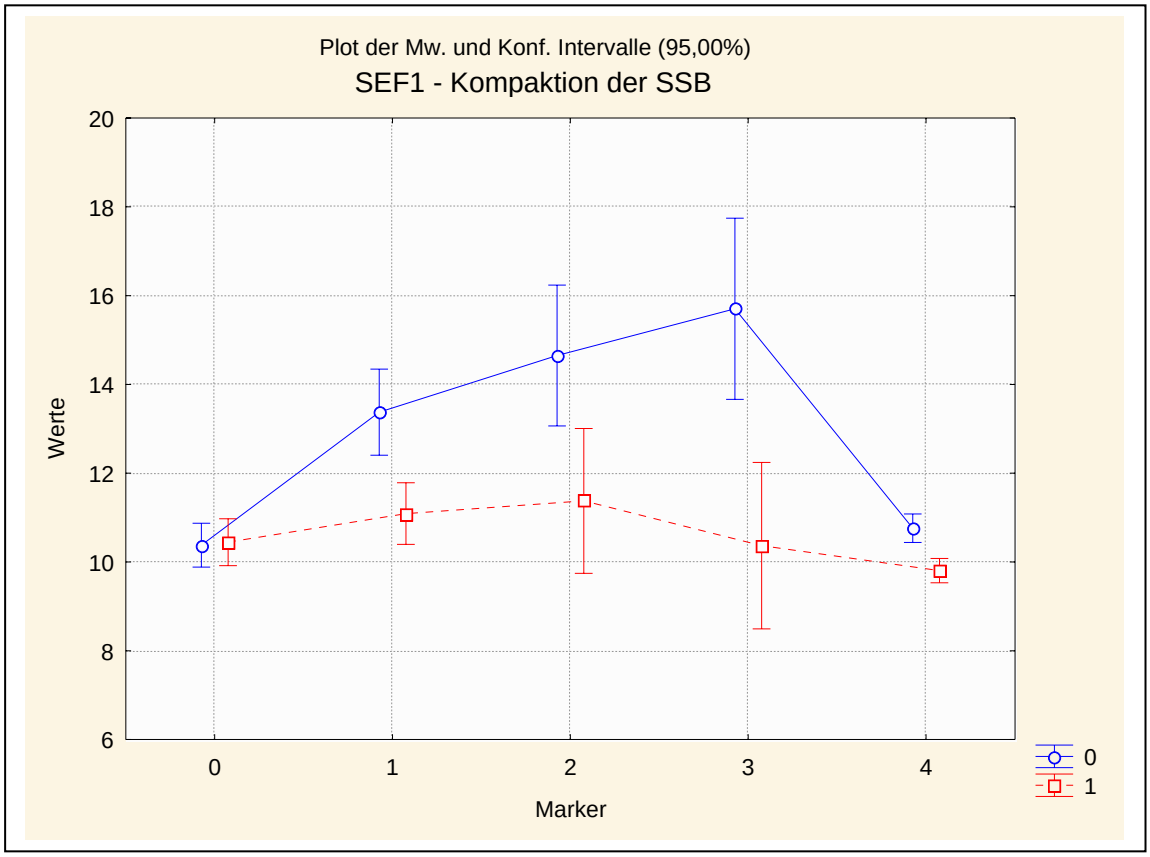
0 = test persons without comp, 1 = test persons with comp.



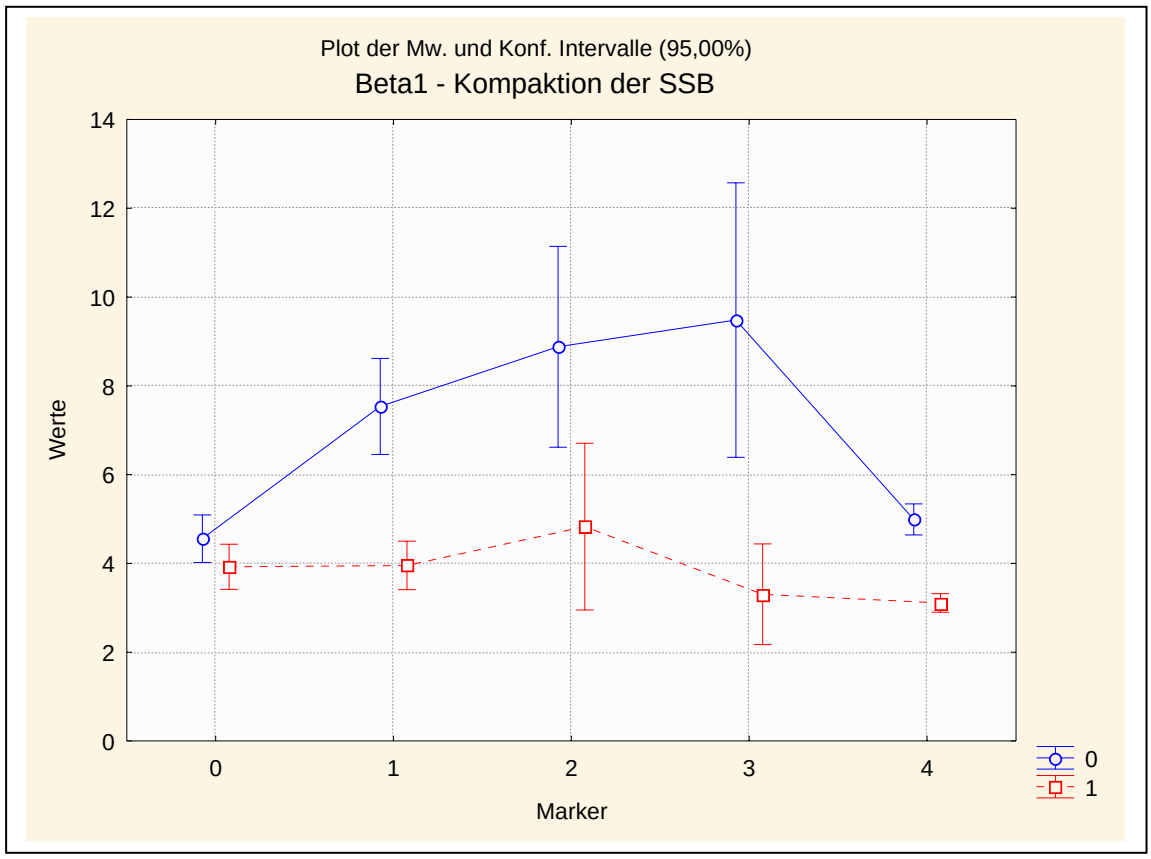


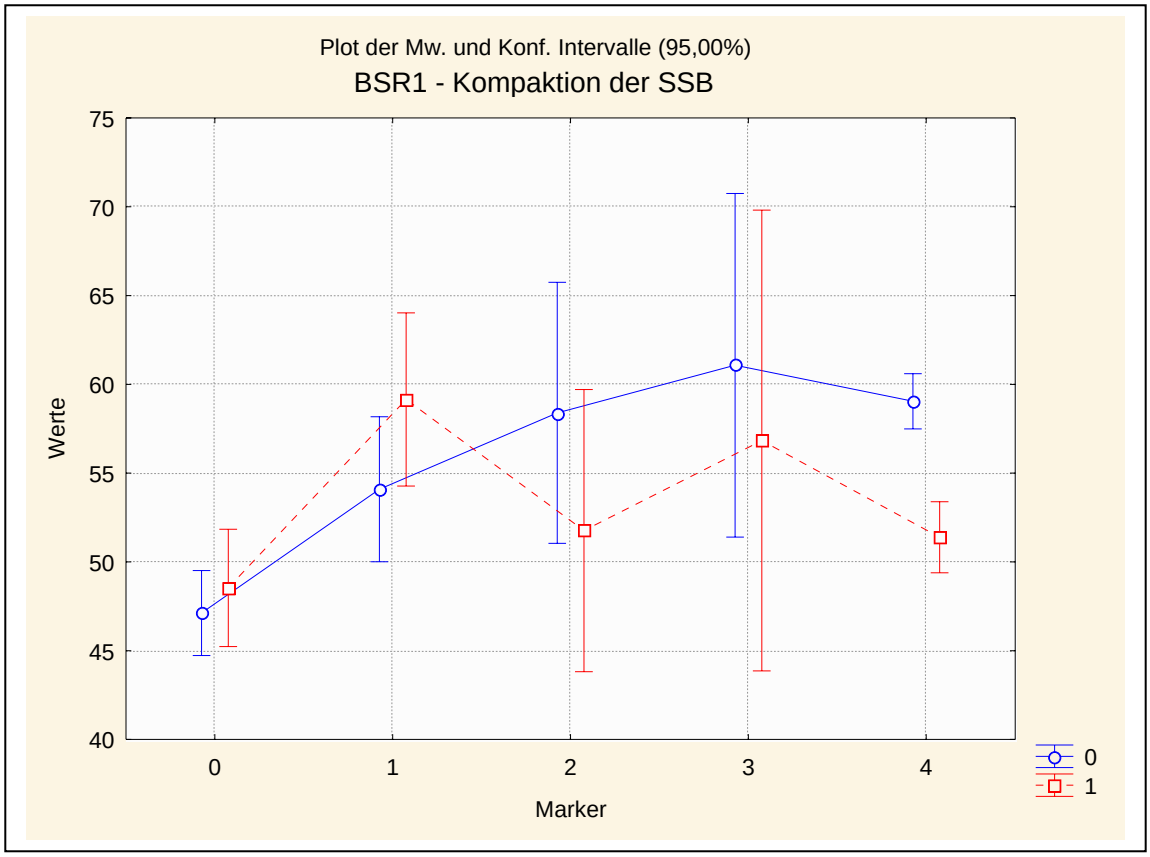
0 = test persons without comp, 1 = test persons with comp.



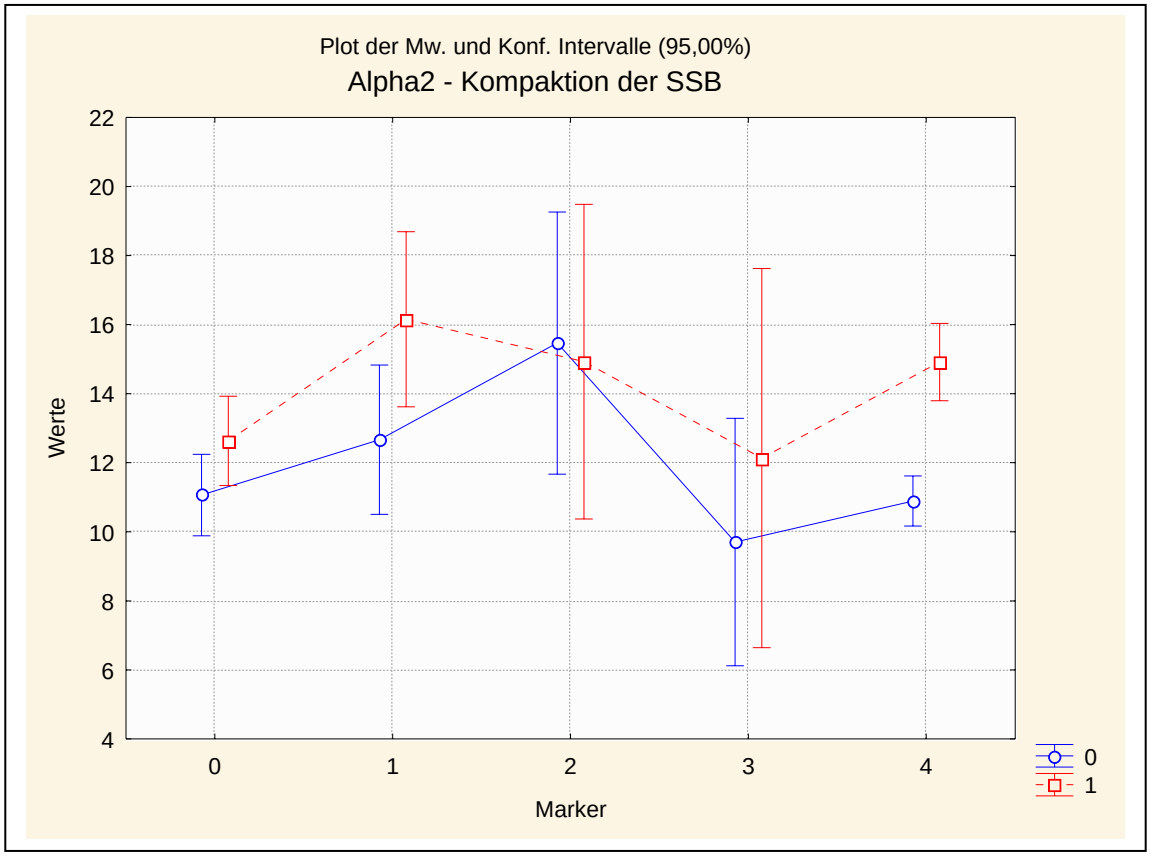


0 = test persons without comp, 1 = test persons with comp.





0 = test persons without comp, 1 = test persons with comp.



8.4.1.1. Results - Compaction of the SSB

Measurement values	Step 0	Step 1	Step 2	Step 3	Step 4
HR – Heartrate					
Respiratory frequency					
NIBP dia – Non inv. bloodpressure diastolic					
NIBP mean – Non inv. bloodpressure mean					
SPO2 - O_2-saturation					
Ampl1 – Amplitude left					
MF1 – Meanfrequency left					
SEF1 – spectral Edgefrequency left					
Beta1 – Beta left					
BSR1 – Burst Sup-pression Rate left					
Alpha 2 – Alpha right					

Symbols used:

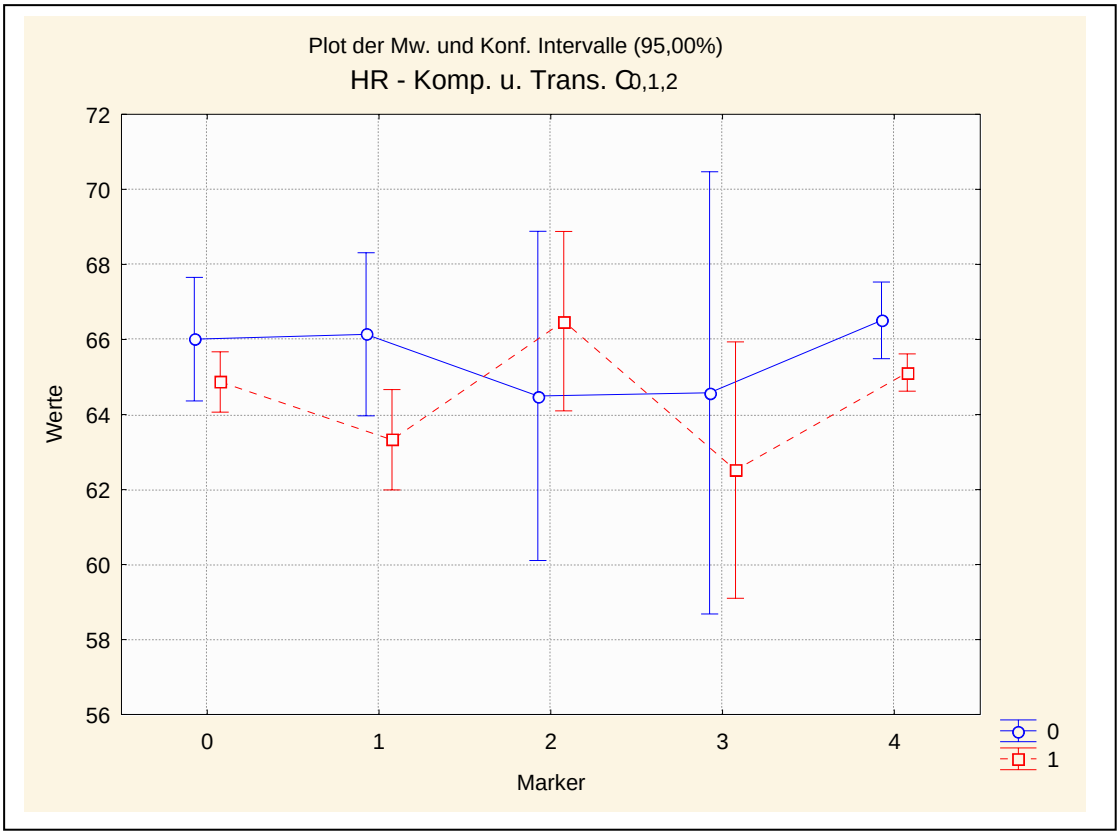
Significant difference: grey

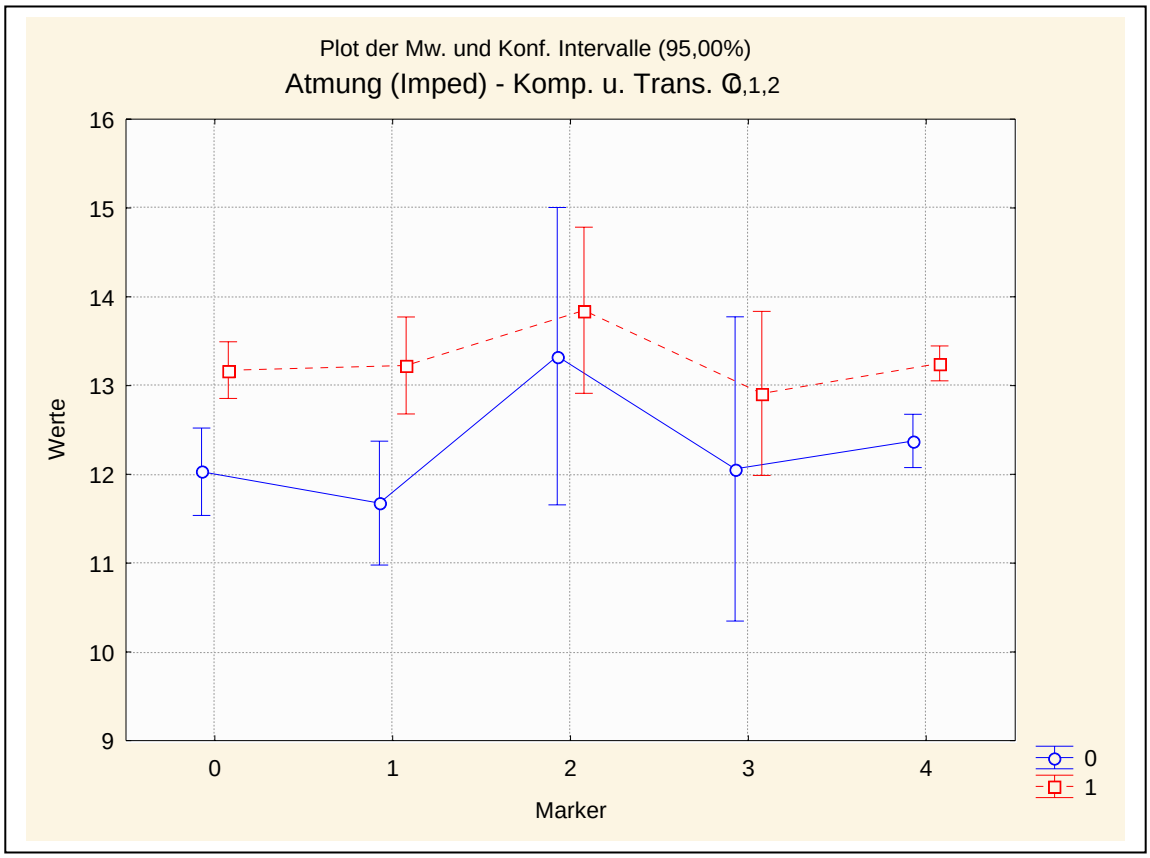
Interactions: low interaction , strong interaction

8.4.2. compaktion and translation of C0, C1, C2

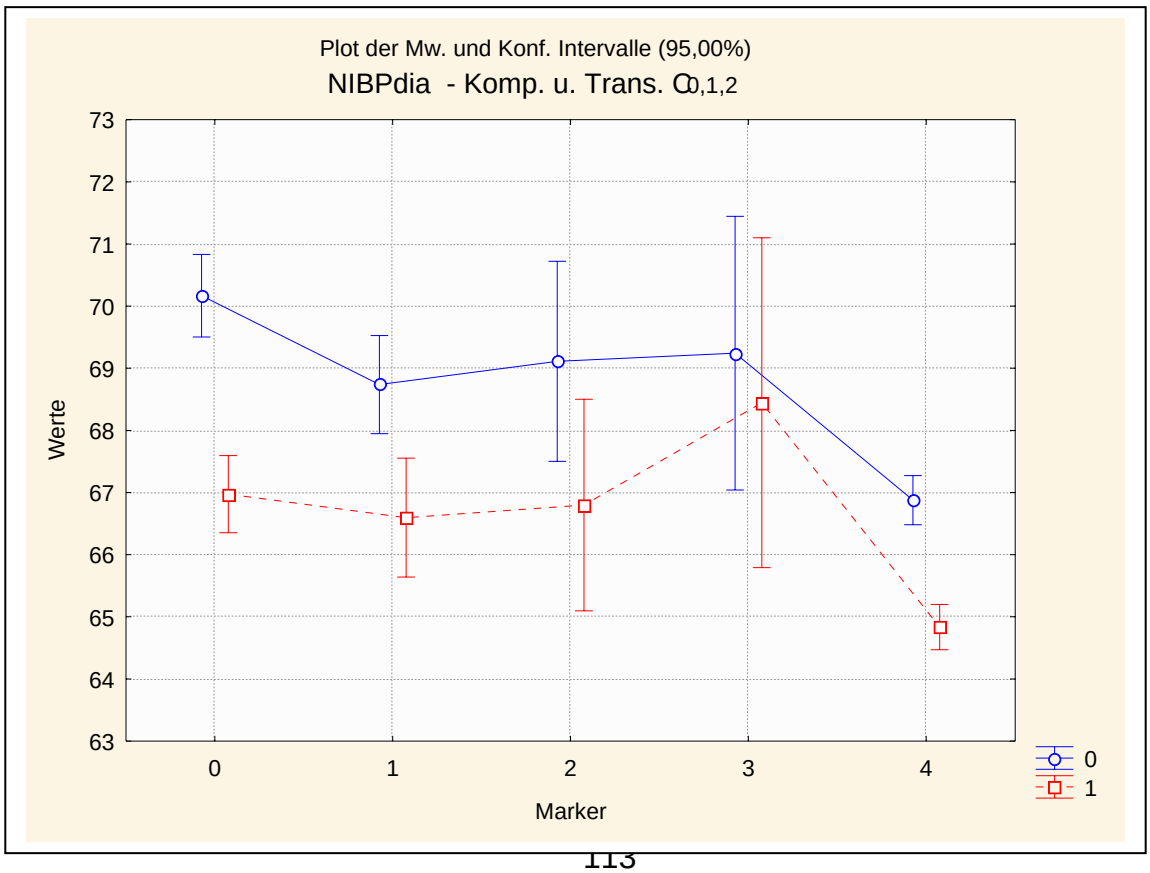
The following interaction plots show – with present compaktion or translation of C0, C1 and C2 - in each case the reaction course from: HR (heart frequency), respiration (respiratory rate), NIBPdia (not invasive blood pressure, diastolic), NIBPmean (not invasive blood pressure, average), SpO2 (oxygen saturation), as well as the EEG parameter Ampl1, MF1, SEF1, Beta1, BSR1 and Alpha2.

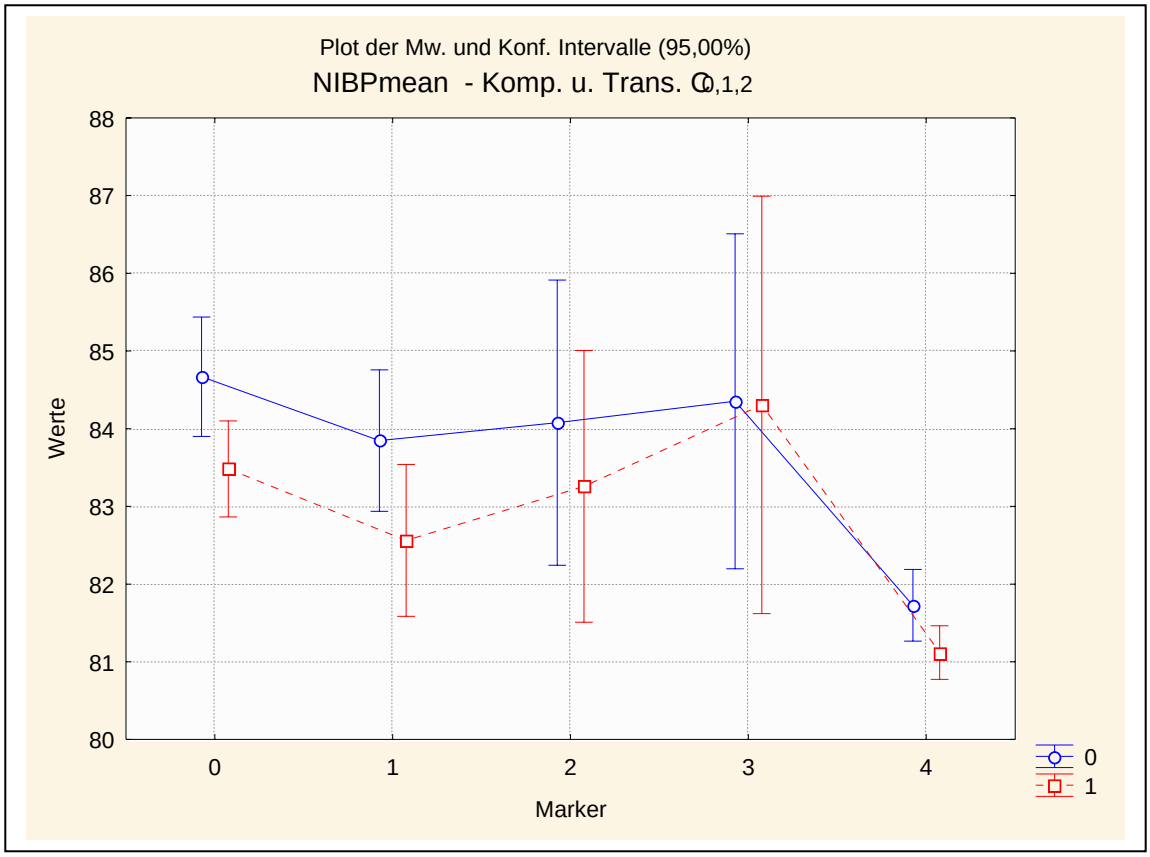
On the horizontal axis five phases of the treatment (from 0 to 4) are applied, along the vertical ones the respective measuring value (HR, respiration...).



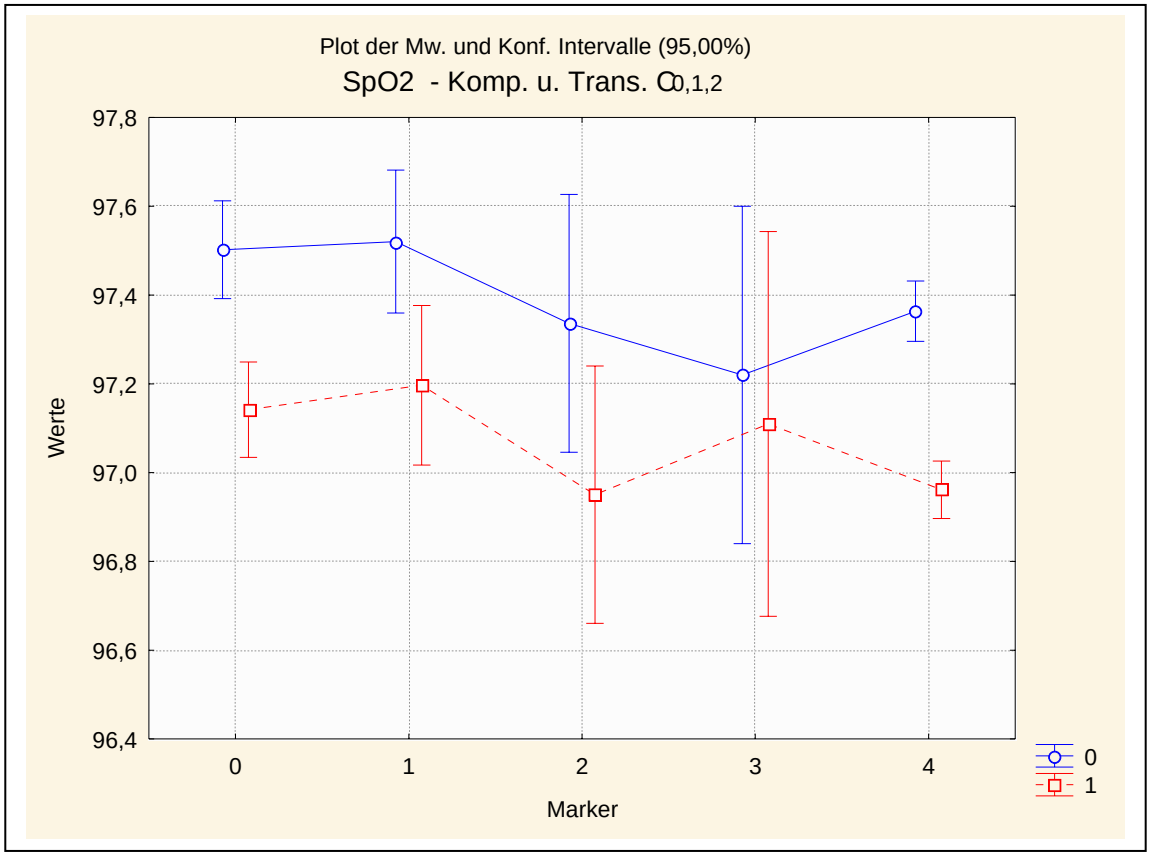


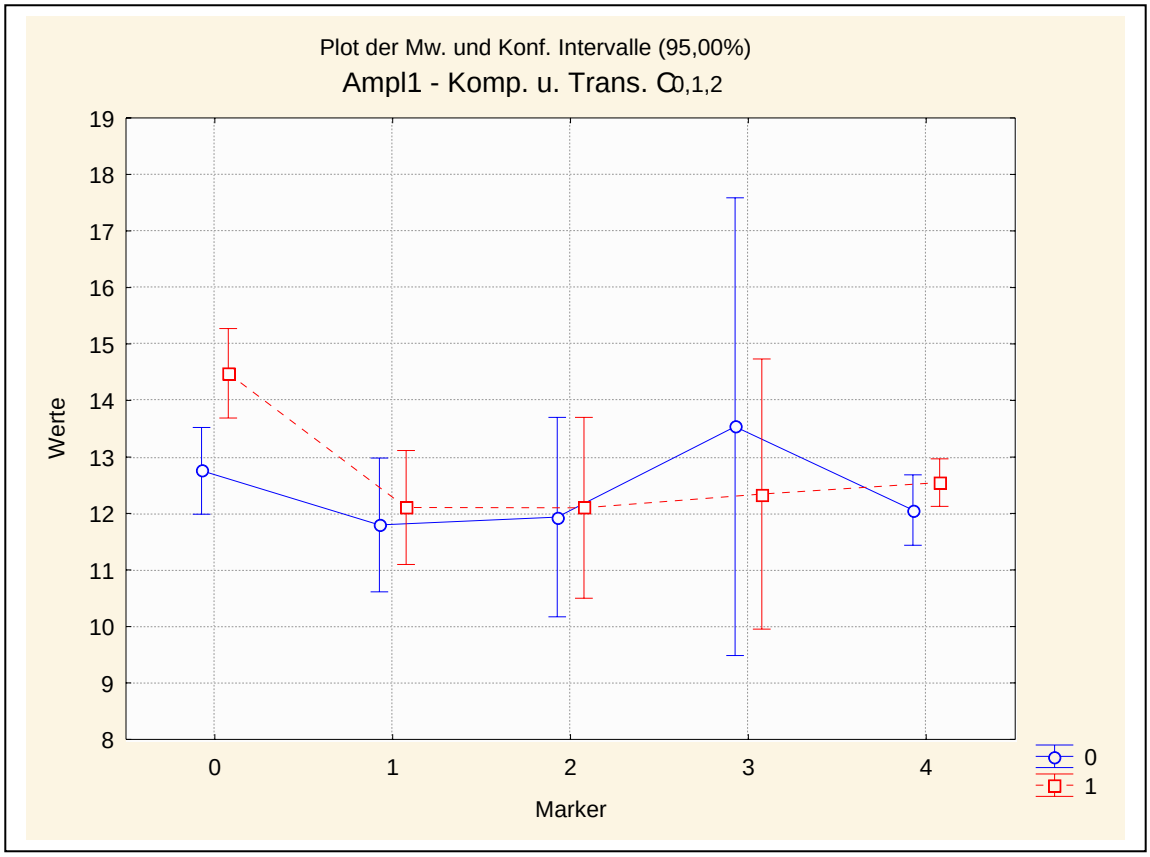
0 = test persons without comp, 1 = test persons with comp.



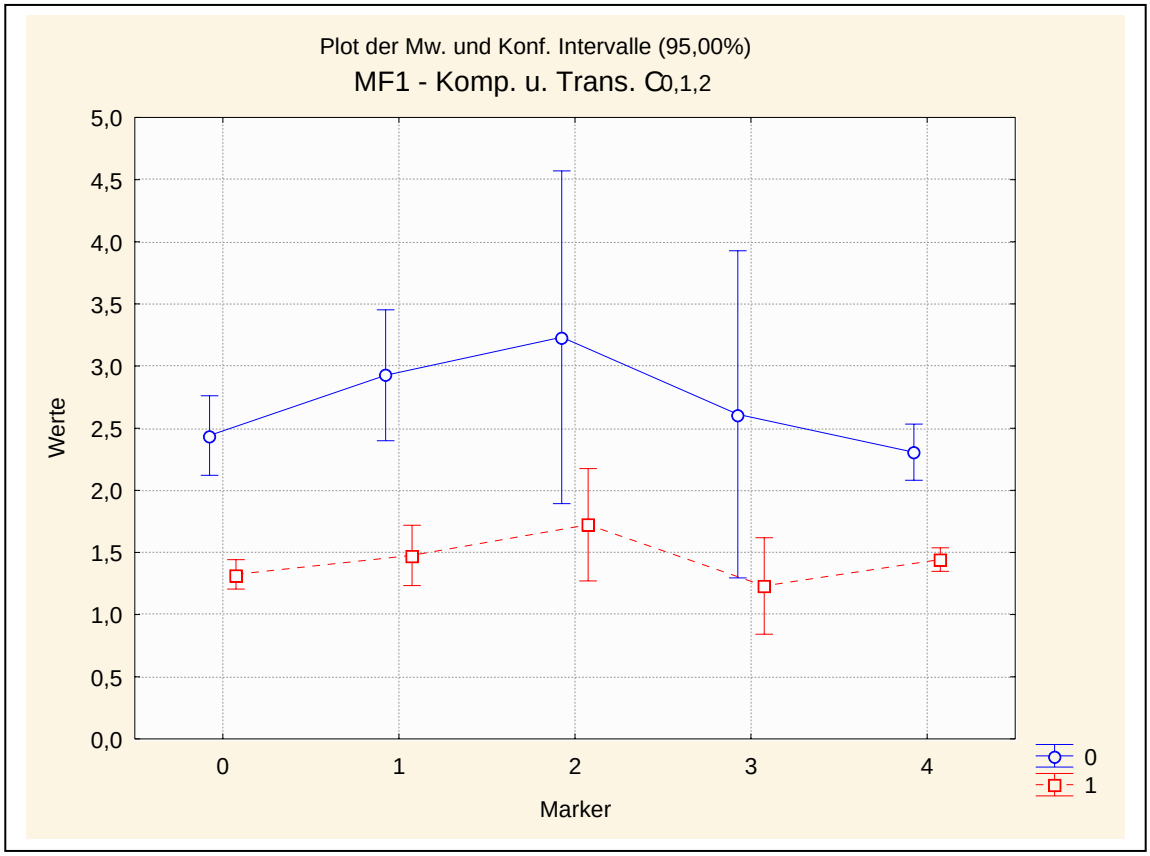


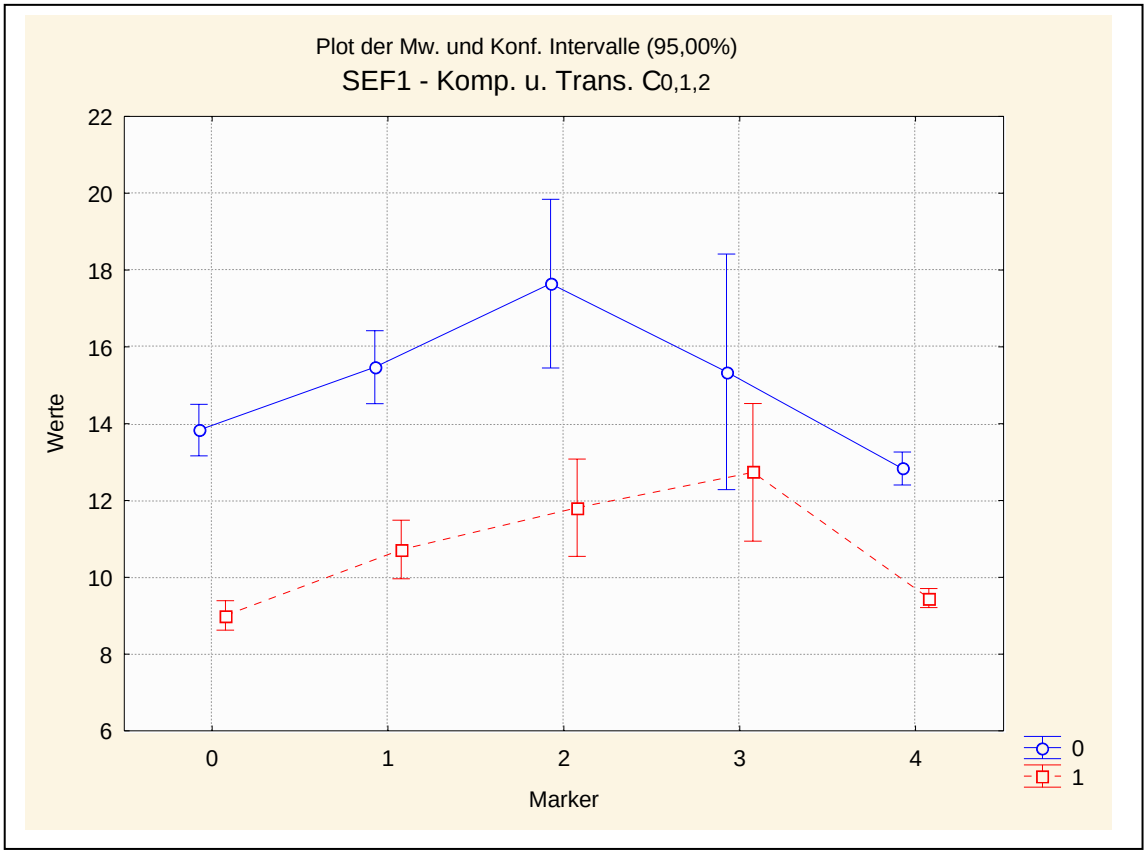
0 = test persons without comp, 1 = test persons with comp.



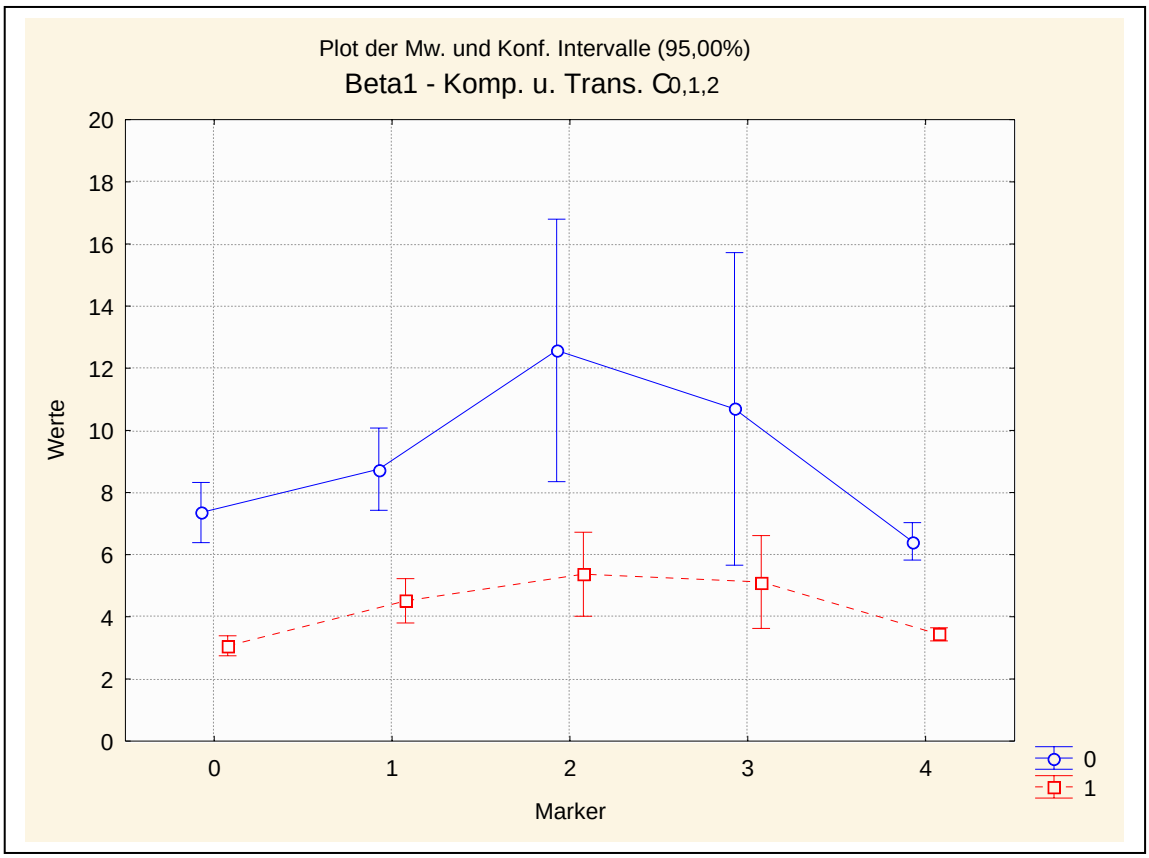


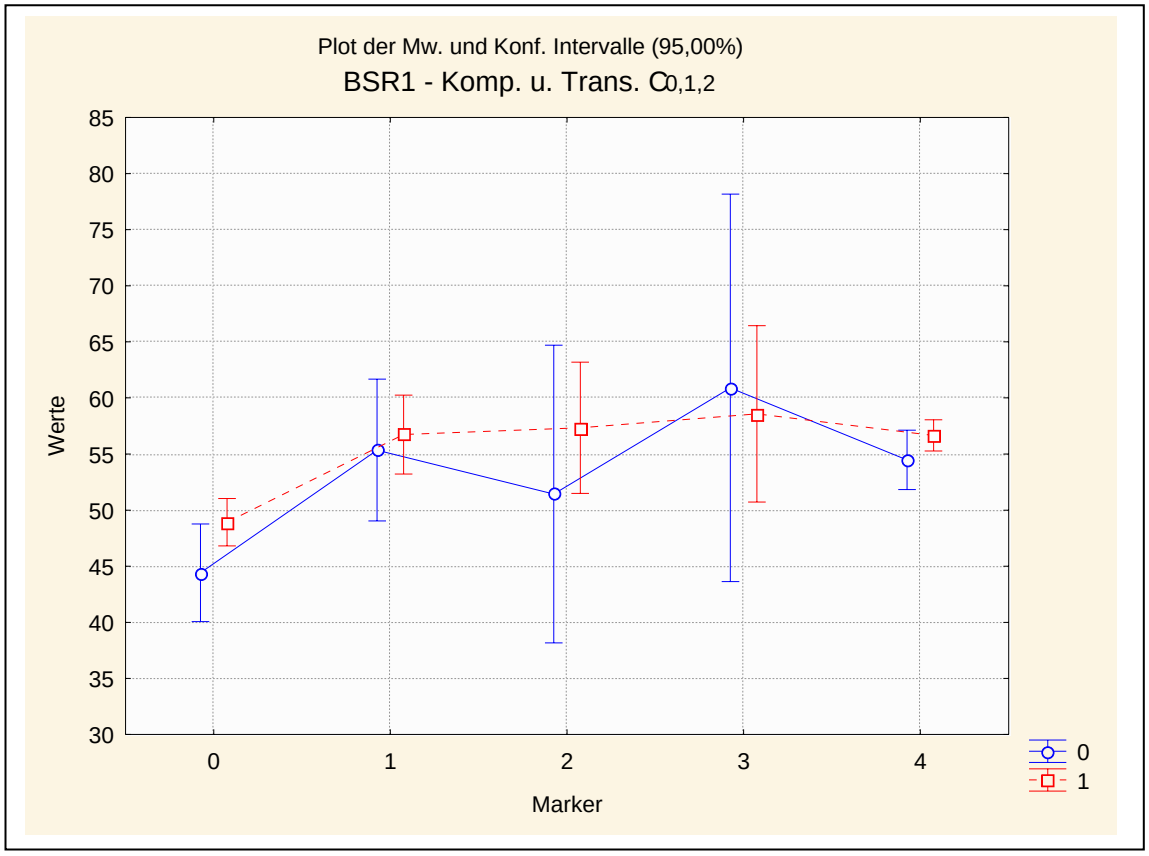
0 = test persons without comp, 1 = test persons with comp.



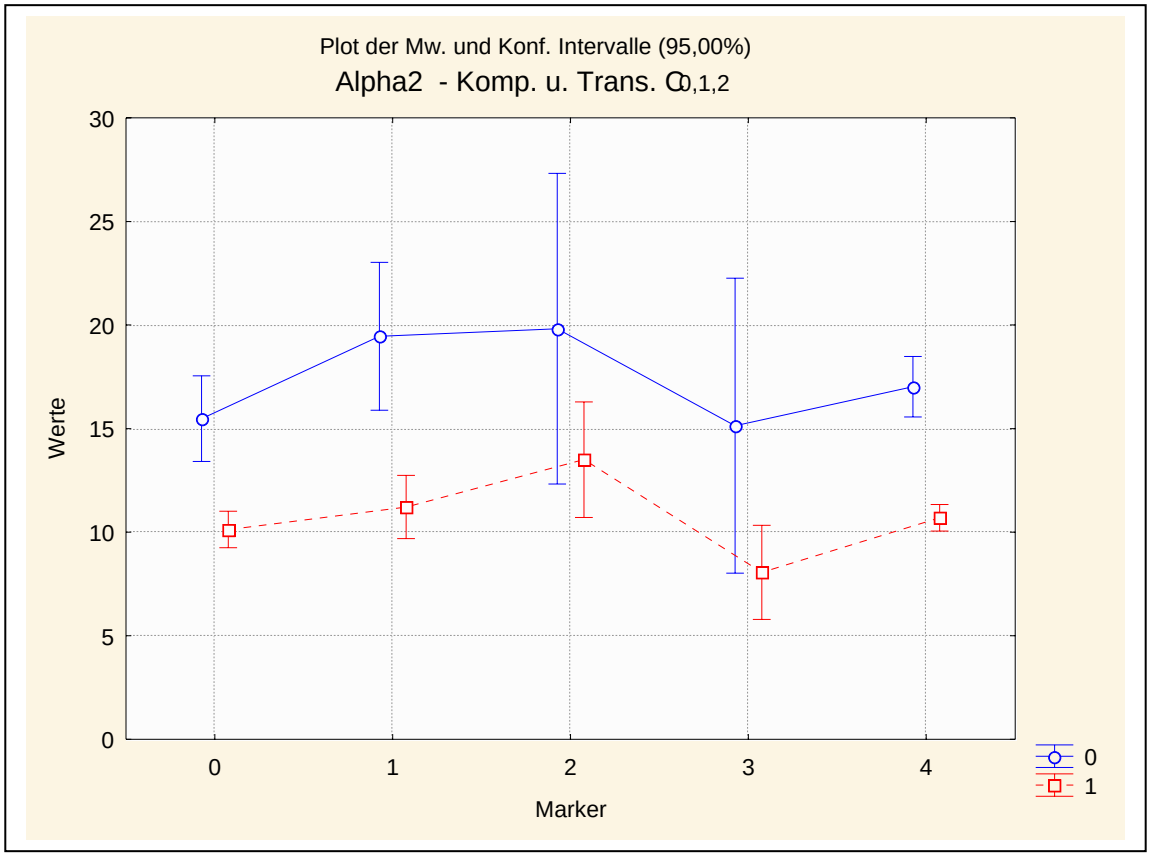


0 = test persons without comp, 1 = test persons with comp.





0 = test persons without comp, 1 = test persons with comp.



8.4.2.1. Results – comp. and tanslation. C0, C1, C2

Values	Step 0	Step 1	Step 2	Step 3	Step 4
HR - heart frequency					
Respiratory frequency					
NIBP dia – not inv. Blood pressure diastolic					
NIBP mean – not inv. Blood pressure average					
SPO2 - O2 saturation					
Ampl1 – amplitude on the left					
MF1 – middle frequency on the left					
SEF1 – spectral corner frequency on the left					
Beta1 – beta on the left					
BSR1 – Burst Suppression rate on the left					
Alpha 2 alpha on the right					

used symbols:

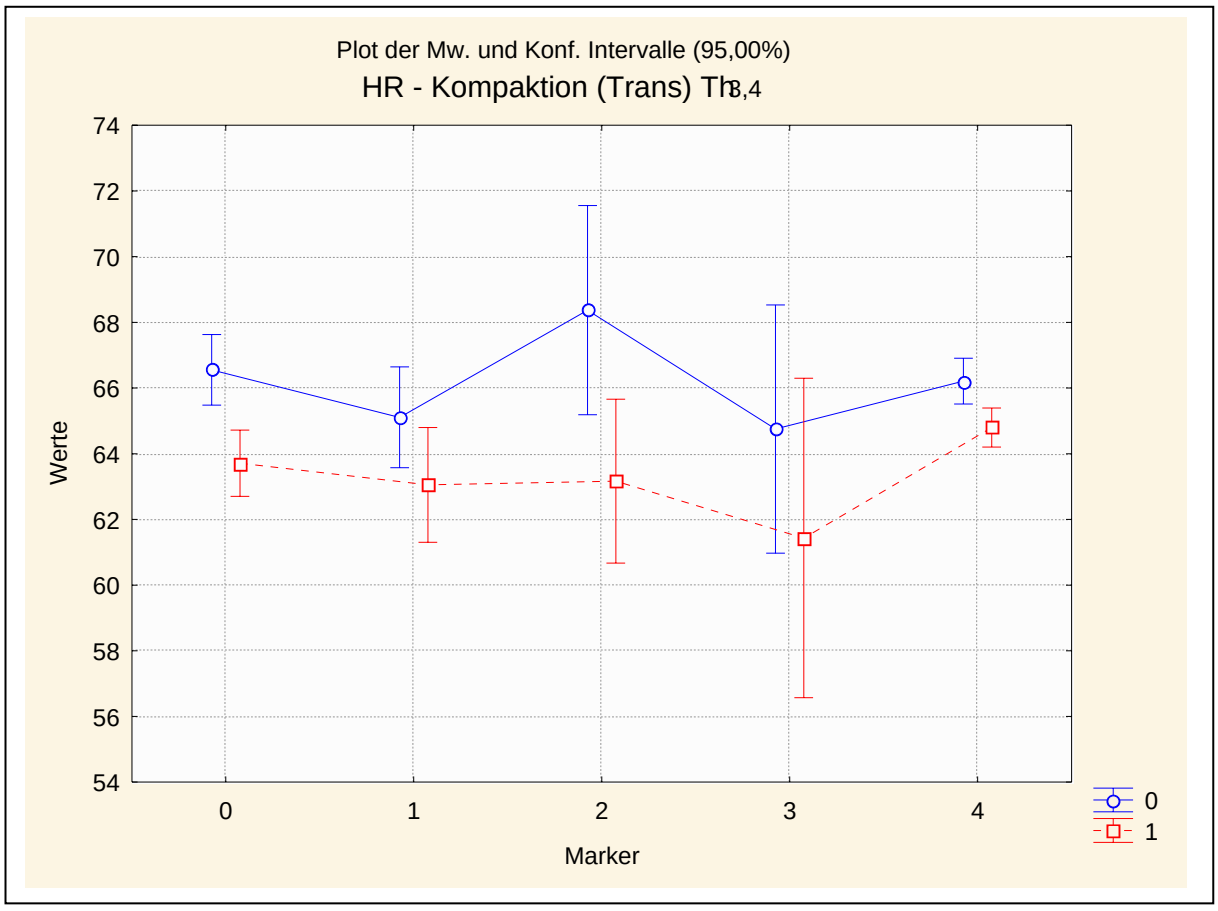
Significant difference: . grey.

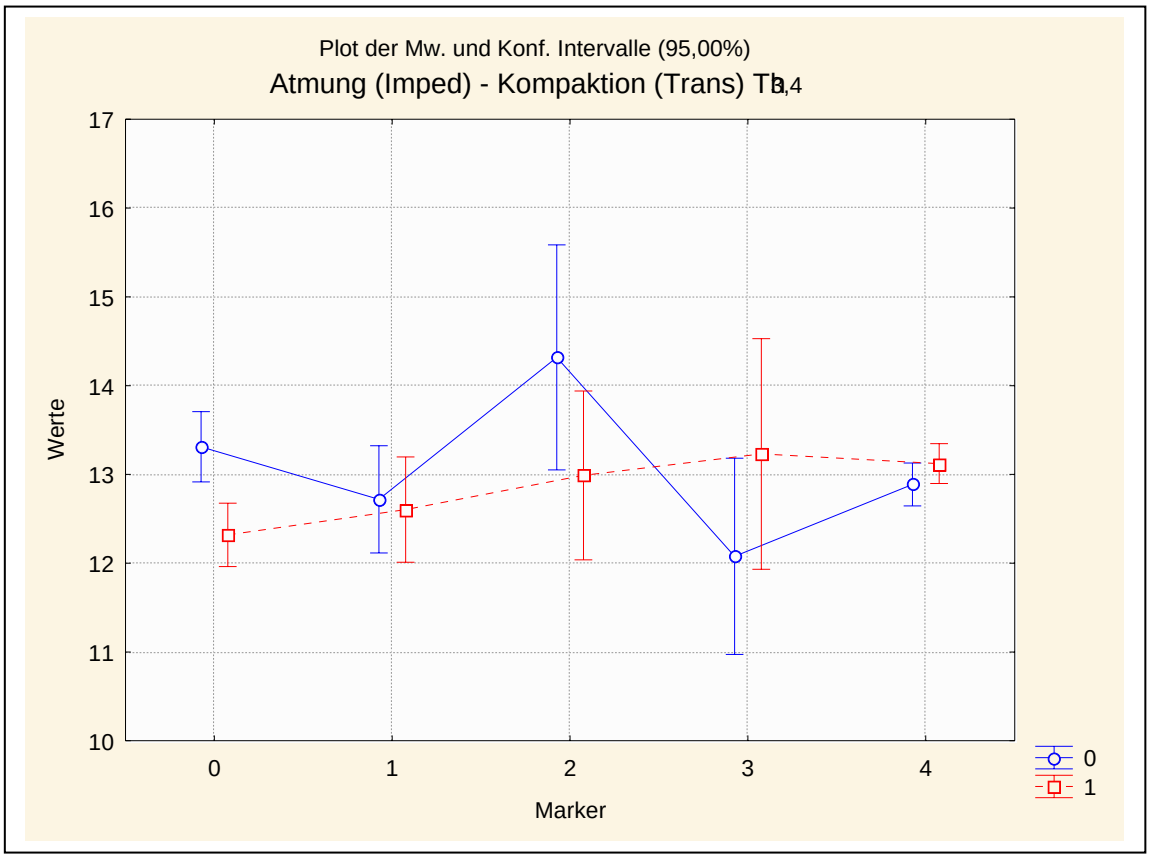
Interactions: low interaction , strong interaction

8.4.3. compaktion and translation Th3, 4

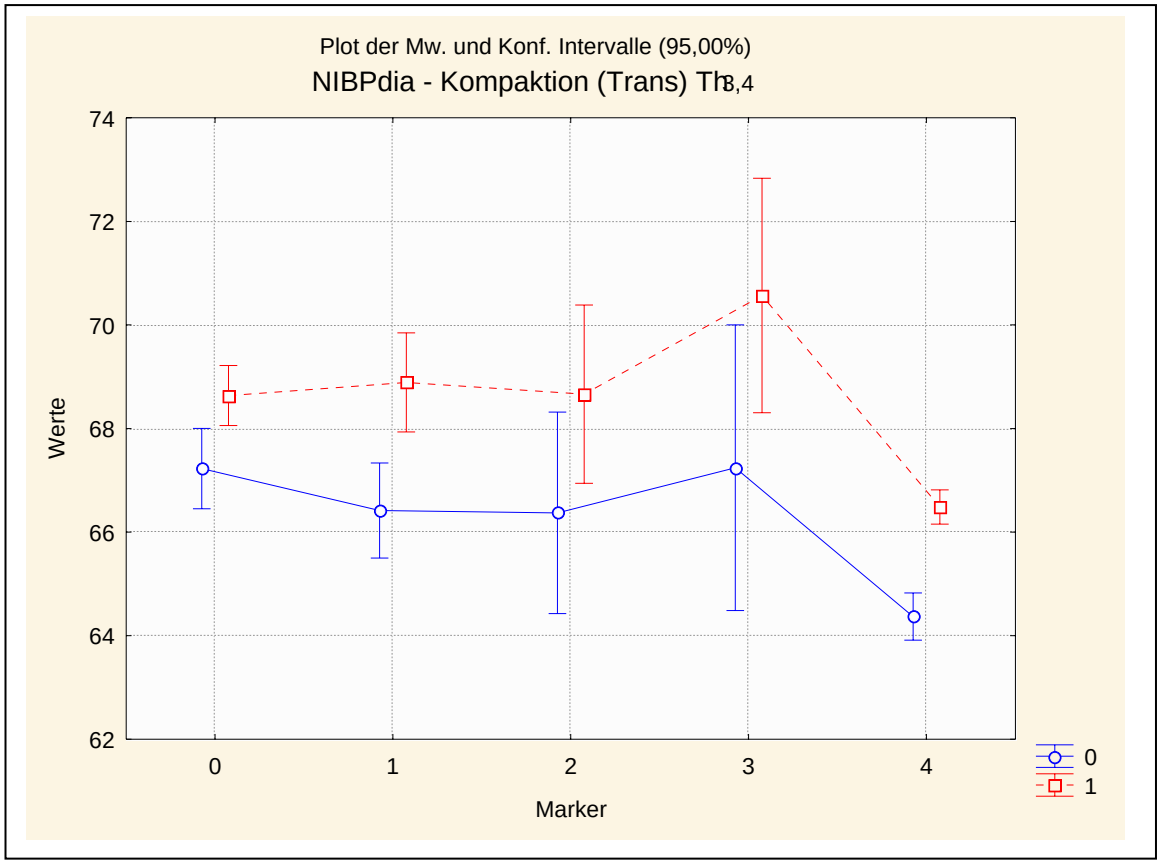
The following interaction plots show – with present compaktion or translation of Th3, 4 - in each case the reaction course from: HR (heart frequency), respiration (respiratory rate), NIBPdia (not invasive blood pressure, diastolic), NIBPmean (not invasive blood pressure, average), SpO2 (oxygen saturation), as well as the EEG parameter Ampl1, MF1, SEF1, Beta1, BSR1 and Alpha2.
On the horizontal axis five phases of the treatment (from 0 to 4) are applied, along the vertical ones the respective measuring value (HR, respiration...).

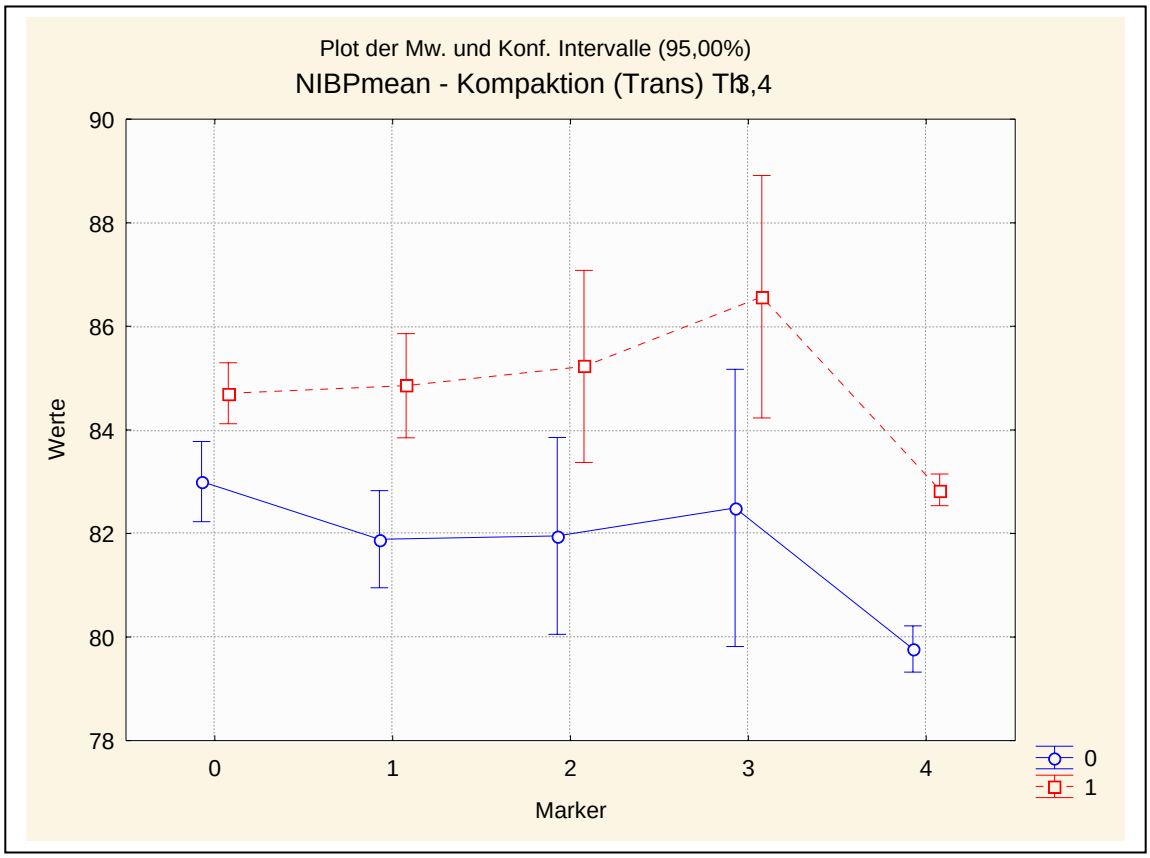
0 = test persons without comp, 1 = test persons with comp.



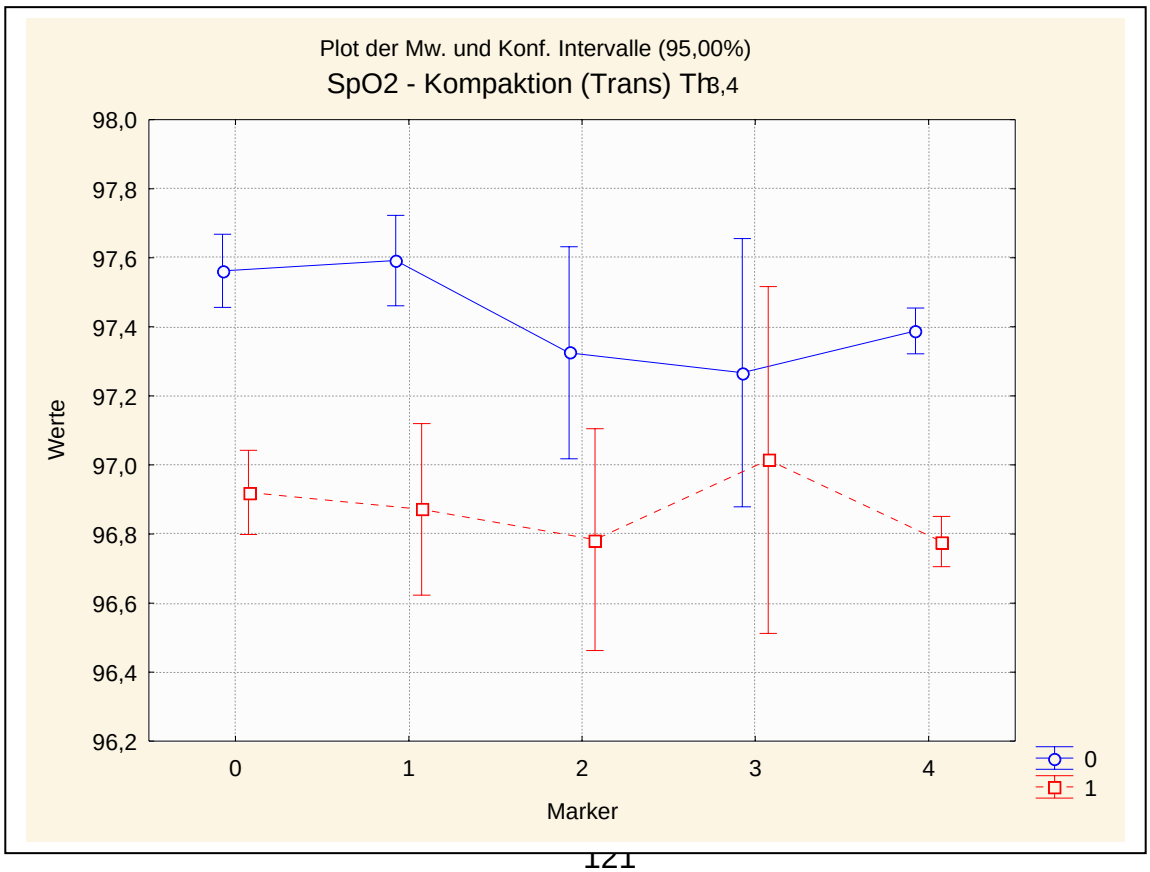


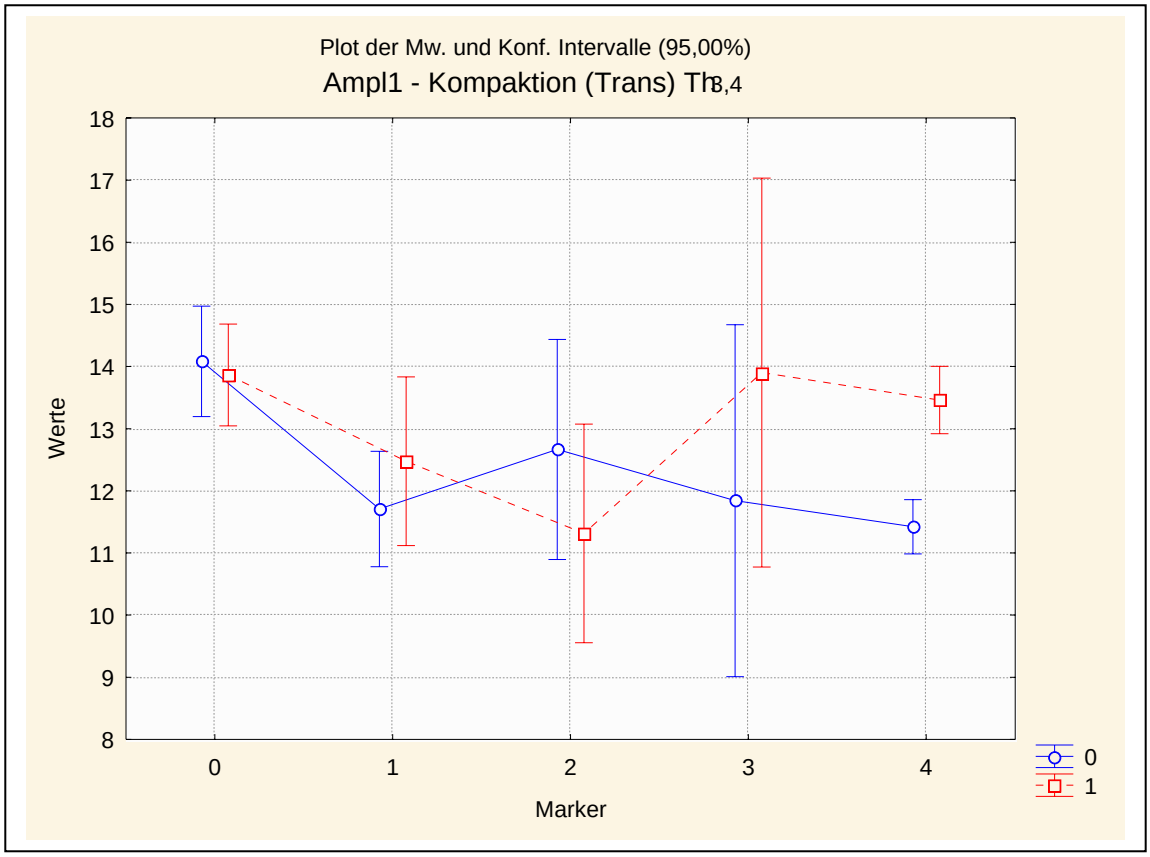
0 = test persons without comp, 1 = test persons with comp.



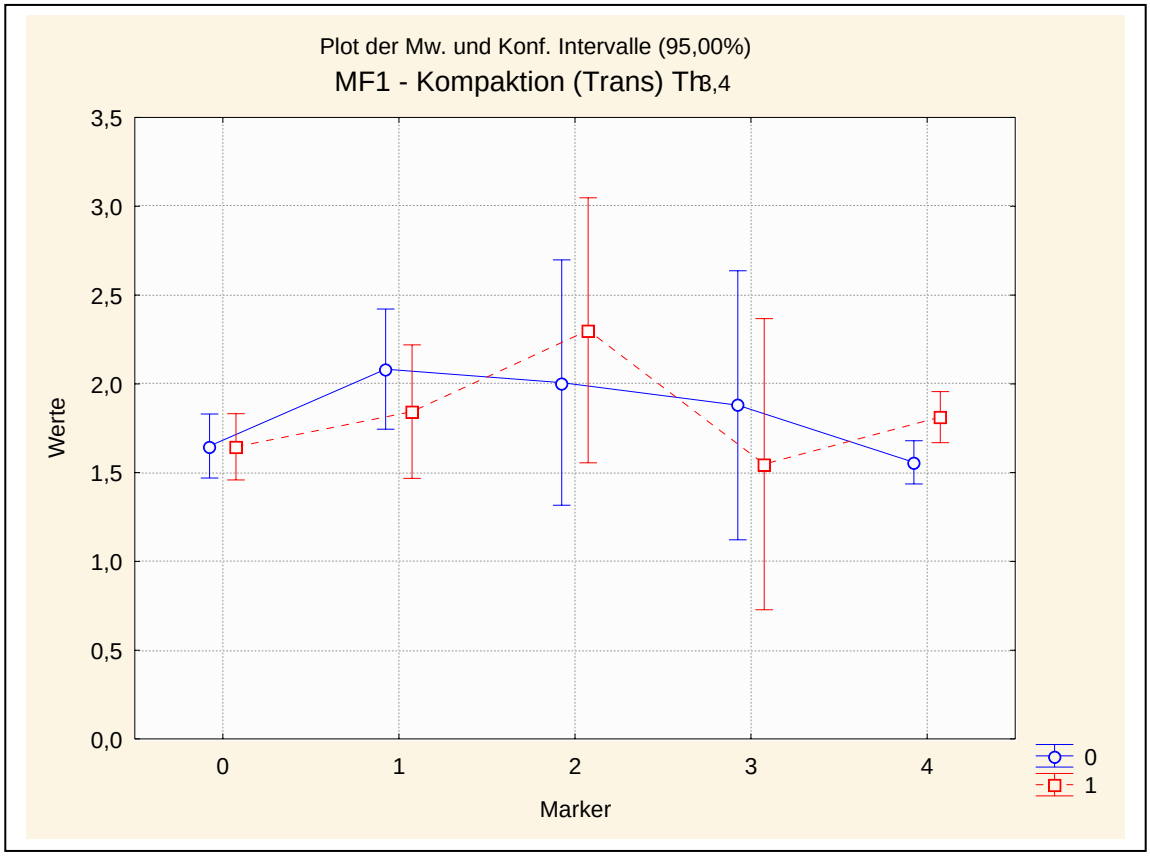


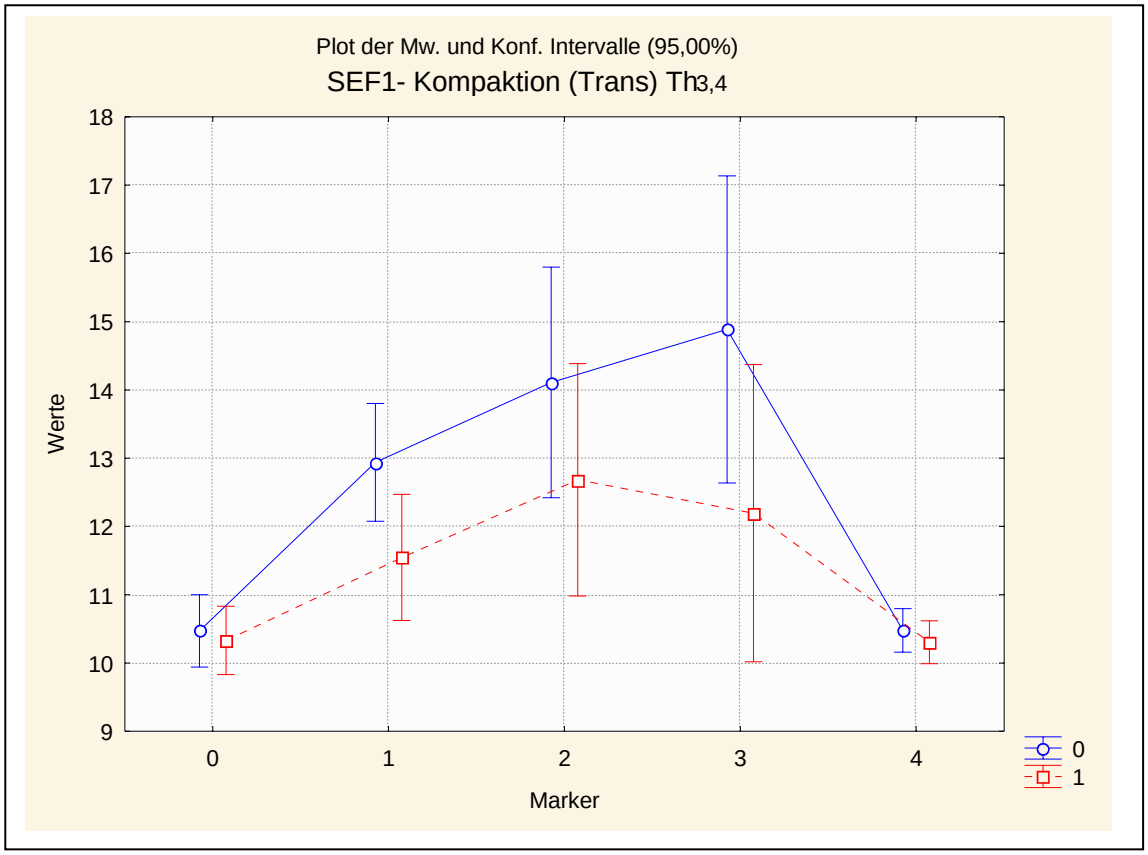
0 = test persons without comp, 1 = test persons with comp.



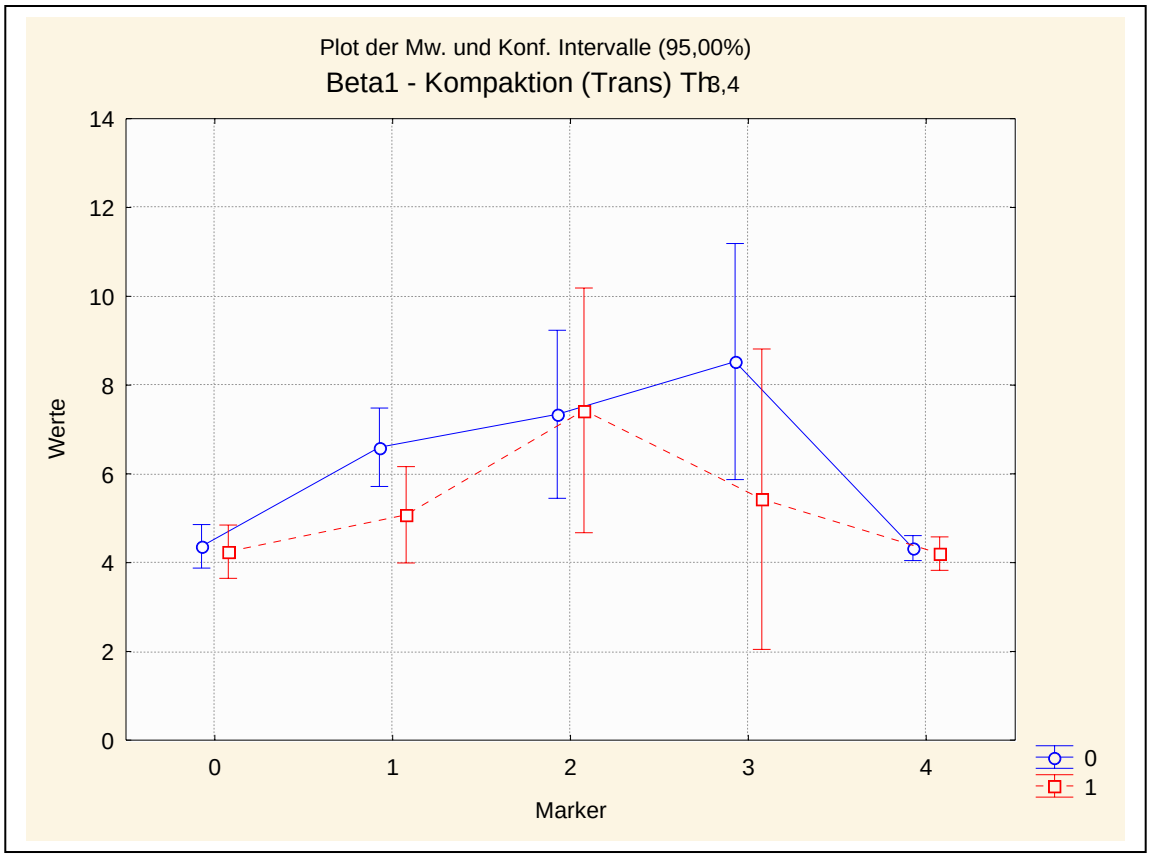


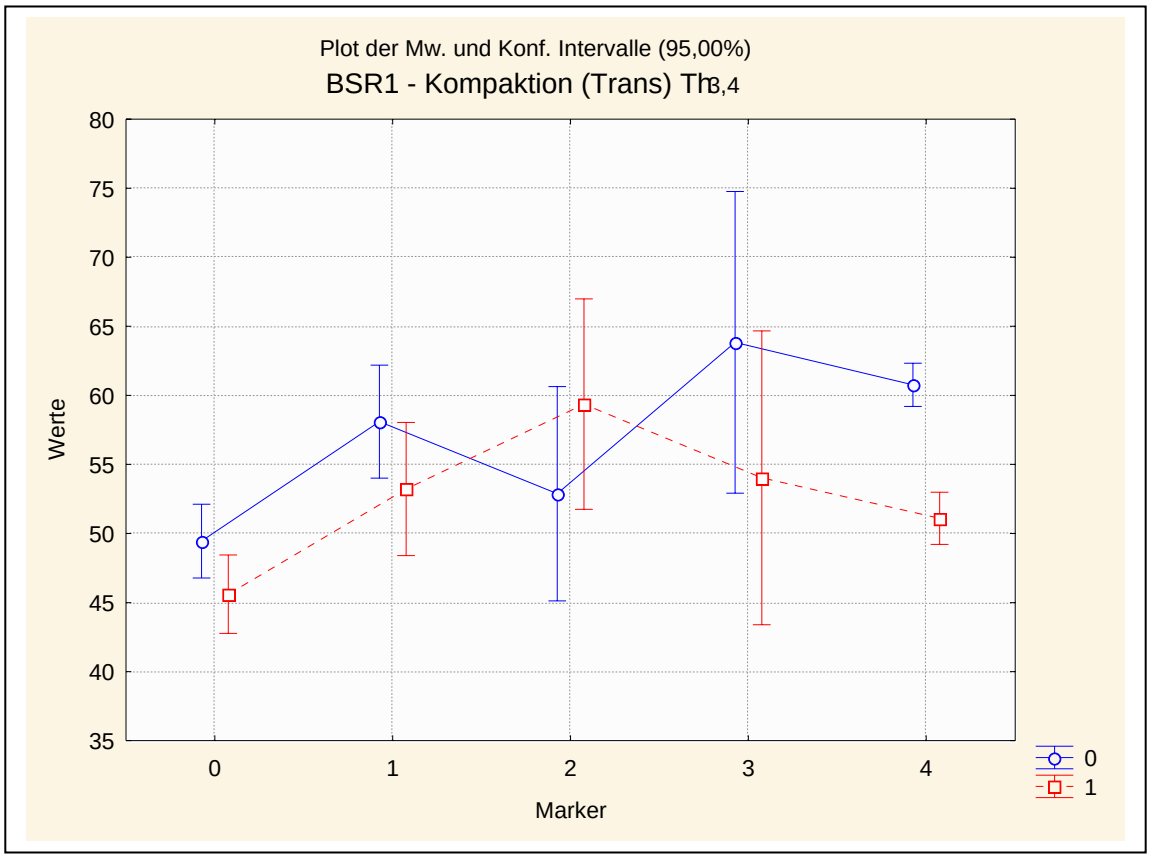
0 = test persons without comp, 1 = test persons with comp.



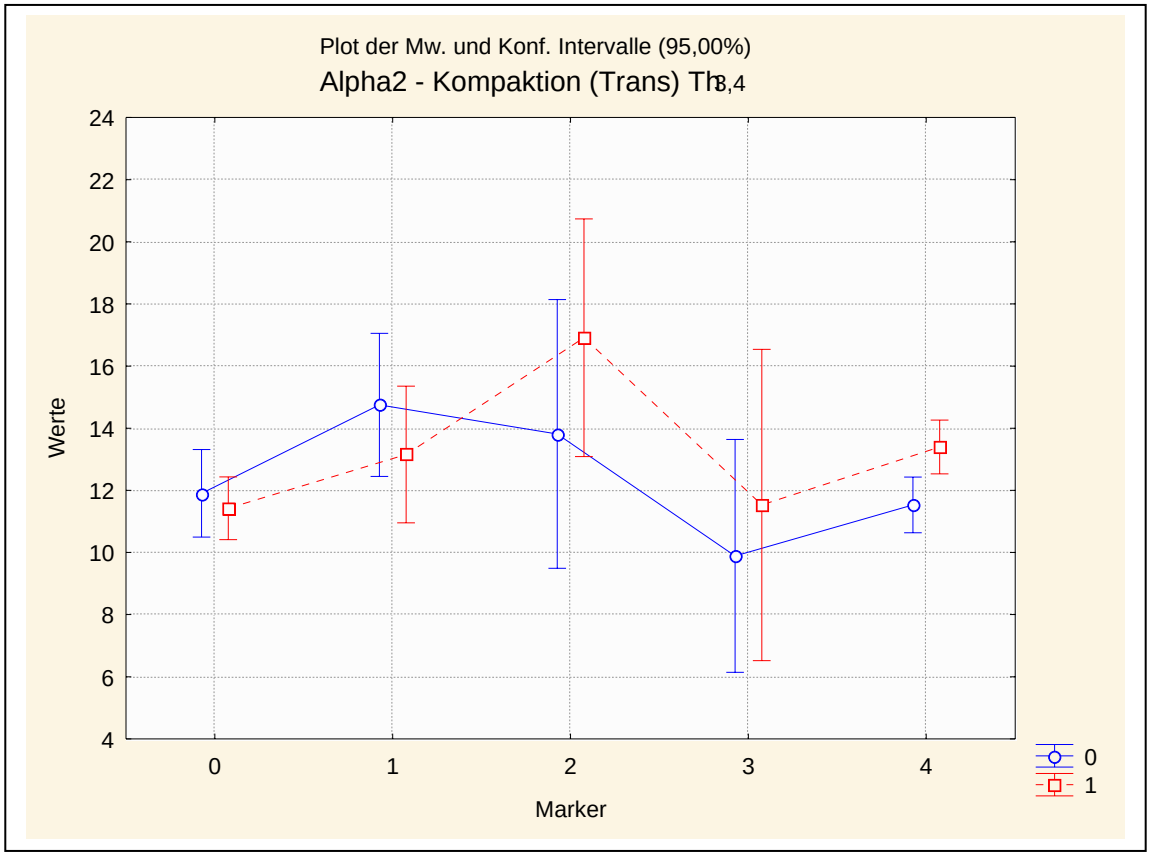


0 = test persons without comp, 1 = test persons with comp.





0 = test persons without comp, 1 = test persons with comp.



8.4.3.1. Results – comp. and trans. from Th3, 4

Values	Step 0	Step 1	Step 2	Step 3	Step 4
HR - heart frequency					
Respiratory frequency					
NIBP dia – not inv. Blood pressure diastolic					
NIBP mean – not inv. Blood pressure average					
SPO2 - O2 saturation					
Ampl1 – amplitude on the left					
MF1 – middle frequency on the left					
SEF1 – spectral ones Corner frequency on the left					
Beta1 – beta on the left					
BSR1 – Burst Suppression rate on the left					
Alpha 2 – alpha on the right					

used symbols:

Significant difference: . grey.

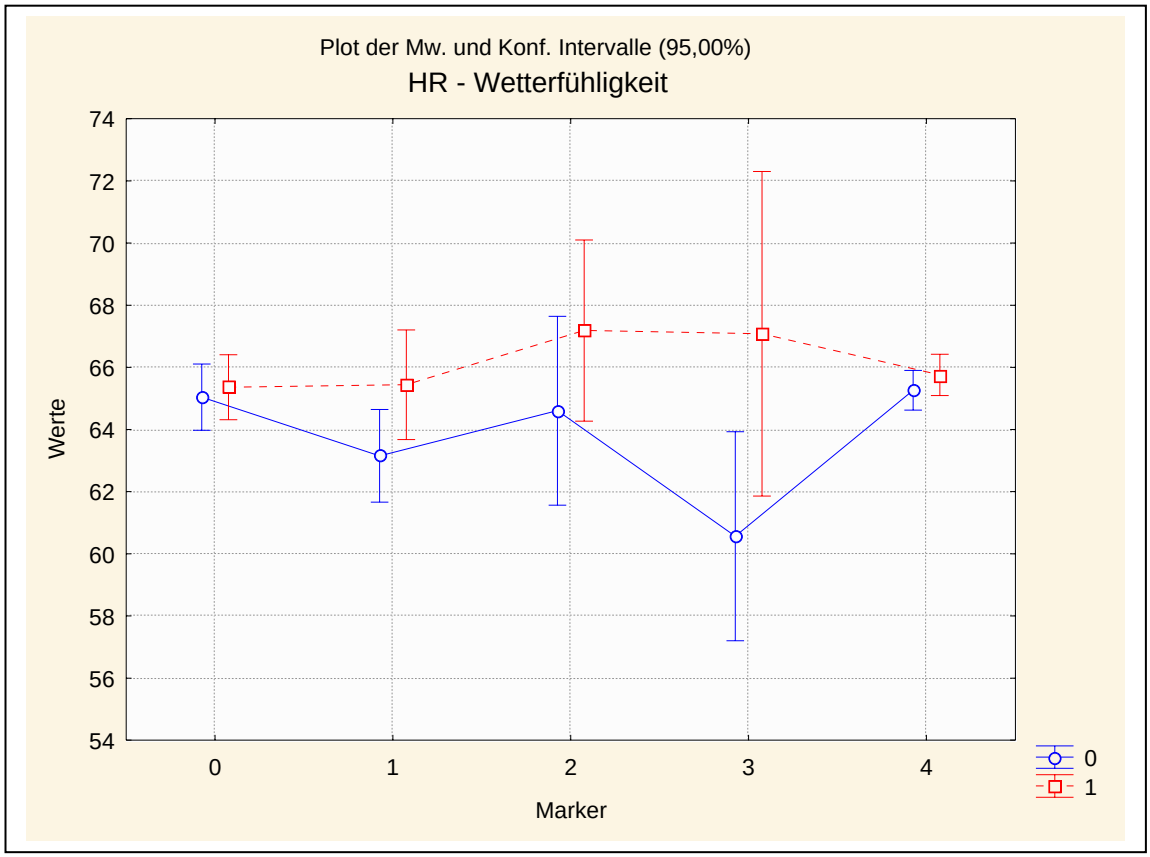
Interactions: low interaction , strong interaction

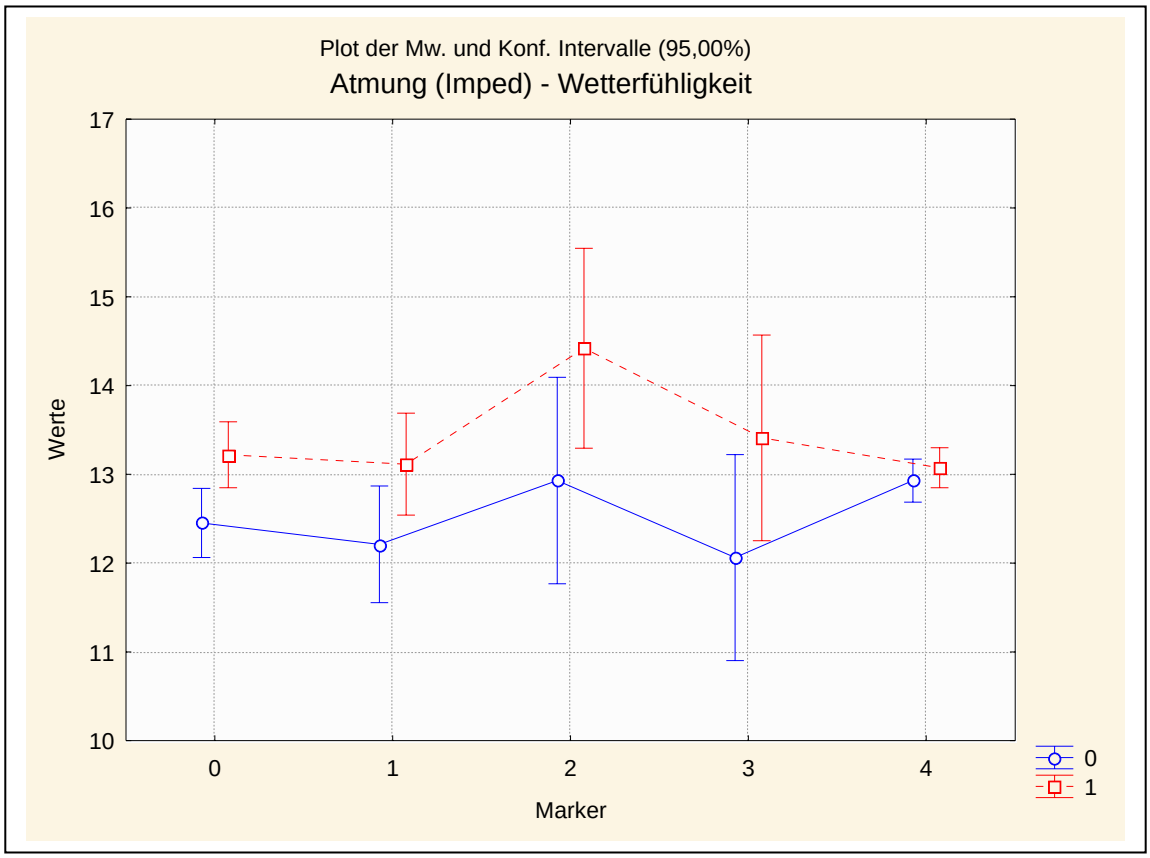
8.4.4. Weathersensitivity

The following interaction plots show – with present weathersensitivity - in each case the reaction course from: HR (heart frequency), respiration (respiratory rate), NIBPdia (not invasive blood pressure, diastolic), NIBPmean (not invasive blood pressure, average), SpO2 (oxygen saturation), as well as the EEG parameter Ampl1, MF1, SEF1, Beta1, BSR1 and Alpha2.

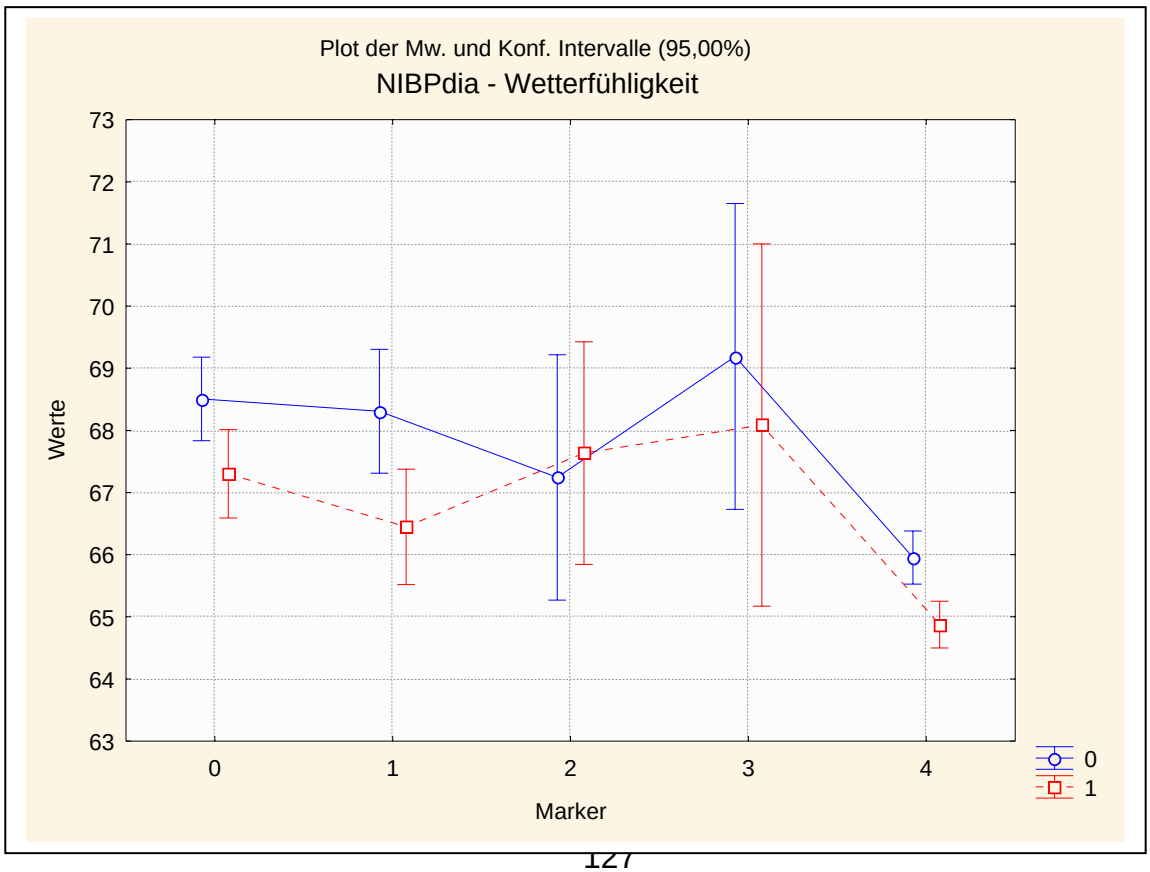
On the horizontal axis five phases of the treatment (from 0 to 4) are applied, along the vertical ones the respective measuring value (HR, respiration...).

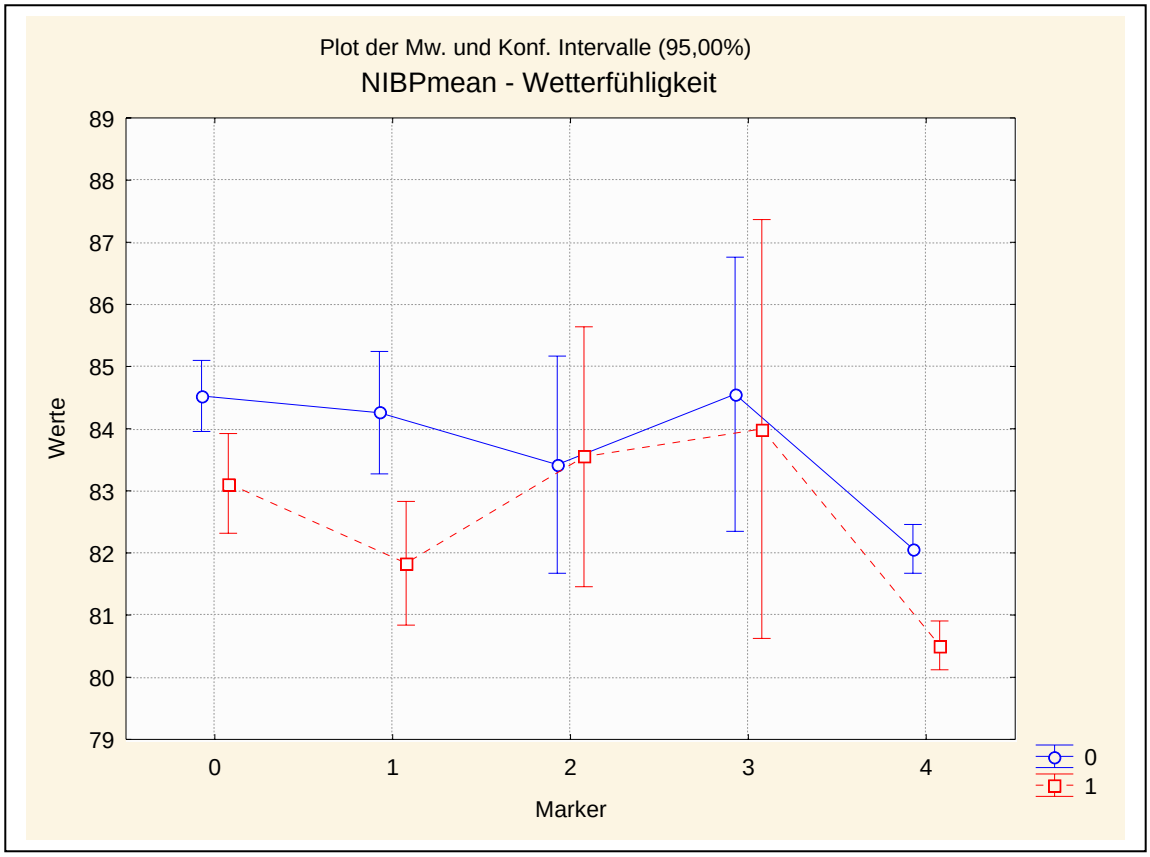
0 = test persons without weathersensitivity, 1 = test persons with weathersensitivity



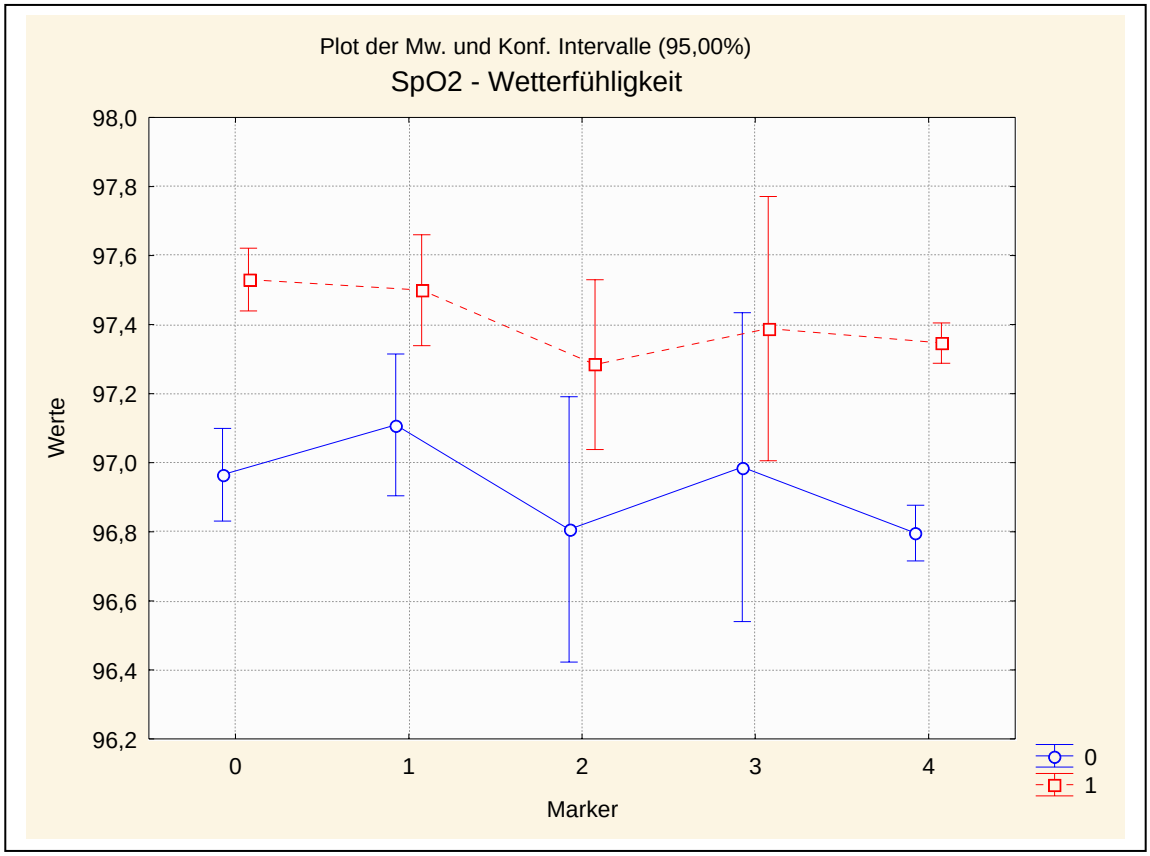


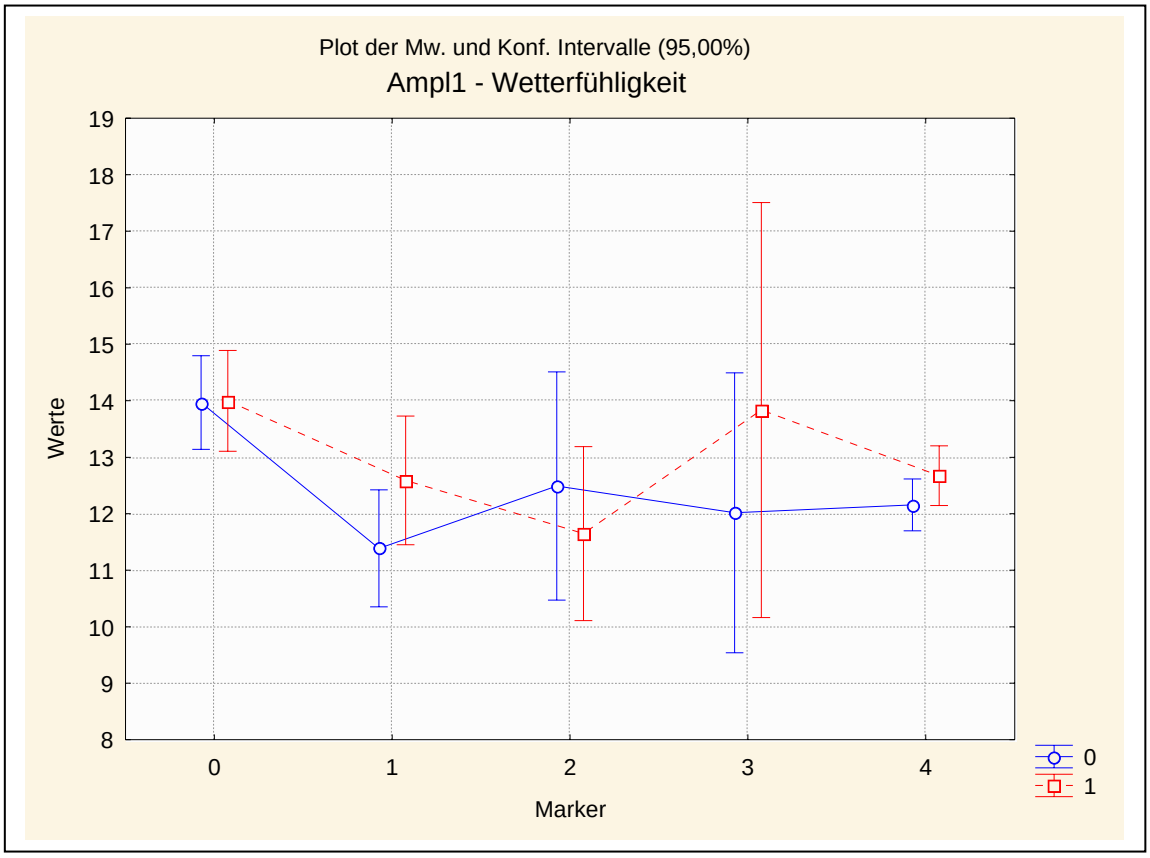
0 = test persons without weathersensitivity, 1 = test persons with weathersensitivity



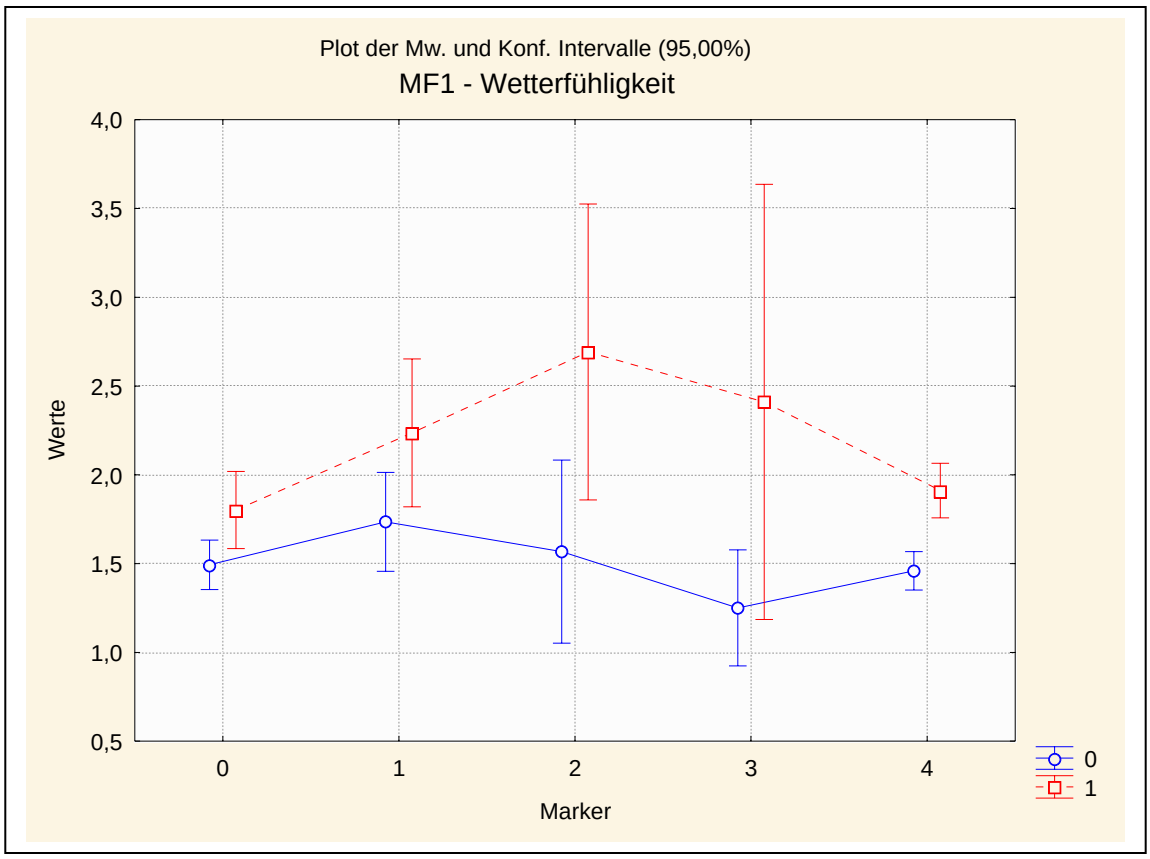


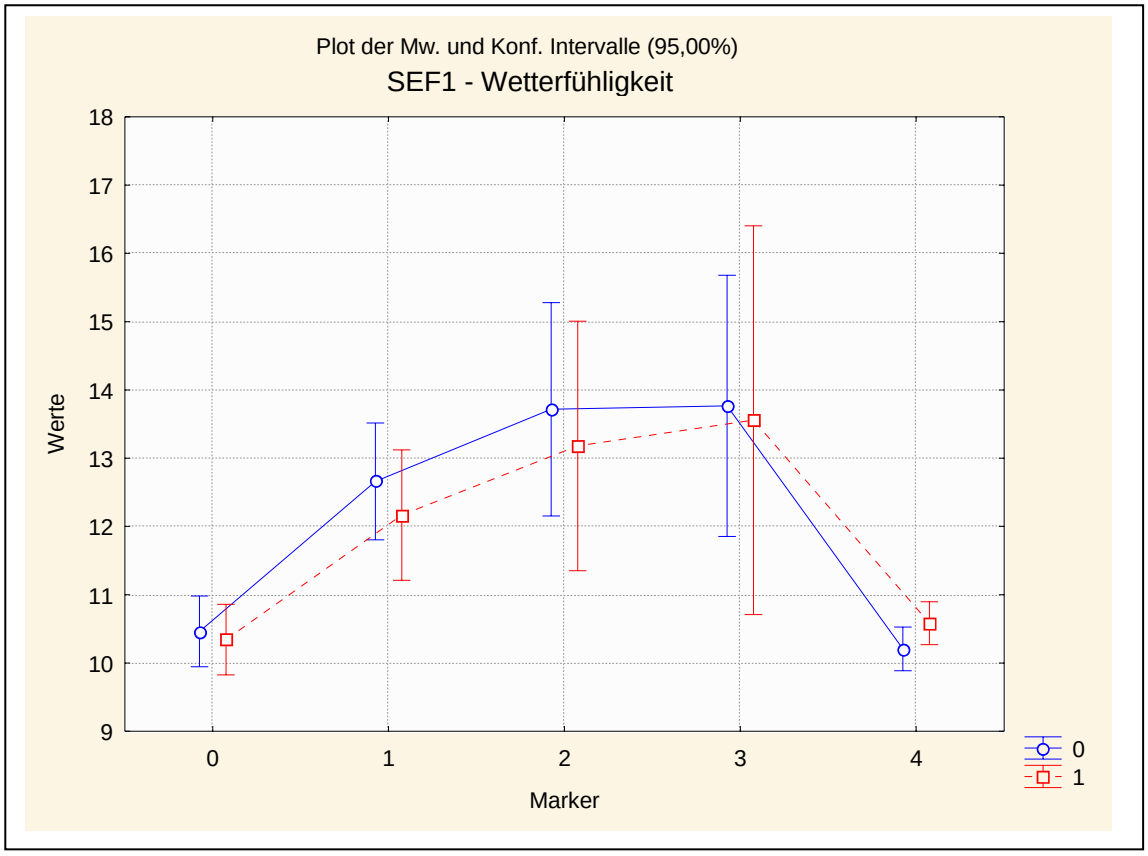
0 = test persons without weathersensitivity, 1 = test persons with weathersensitivity



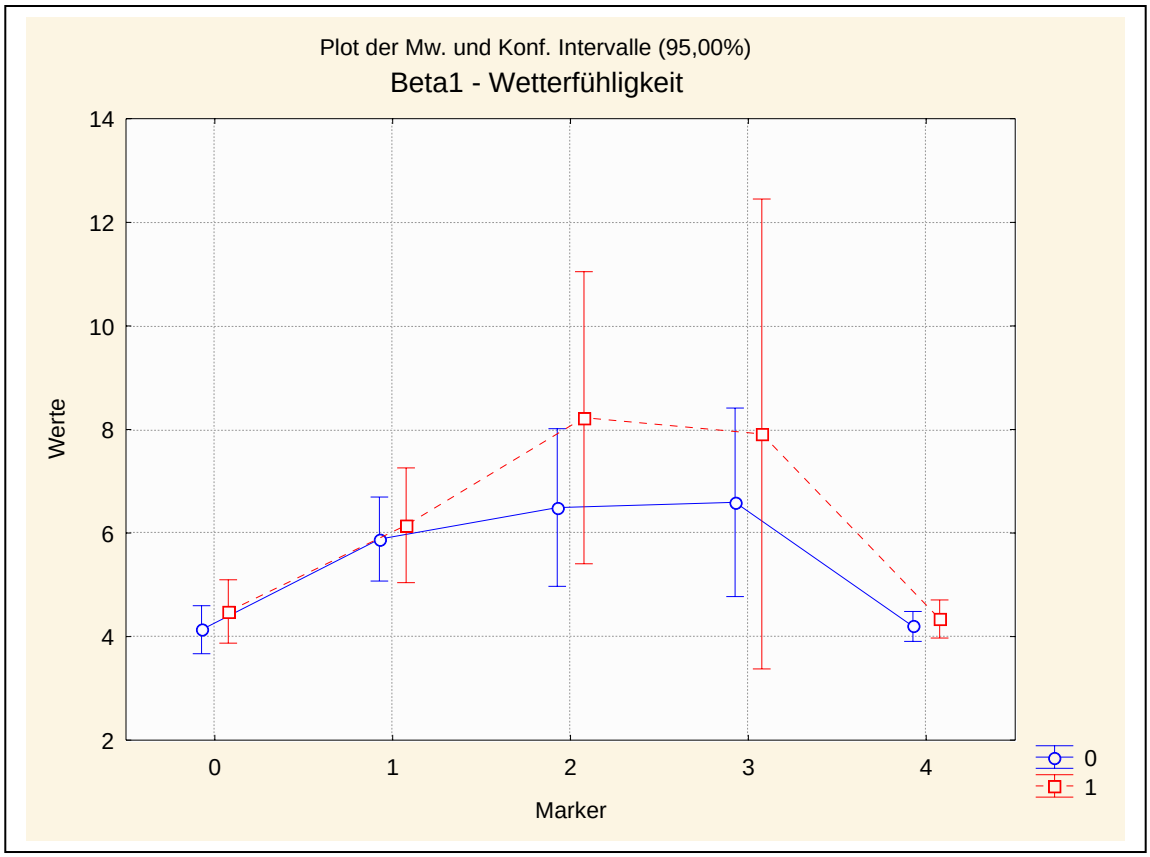


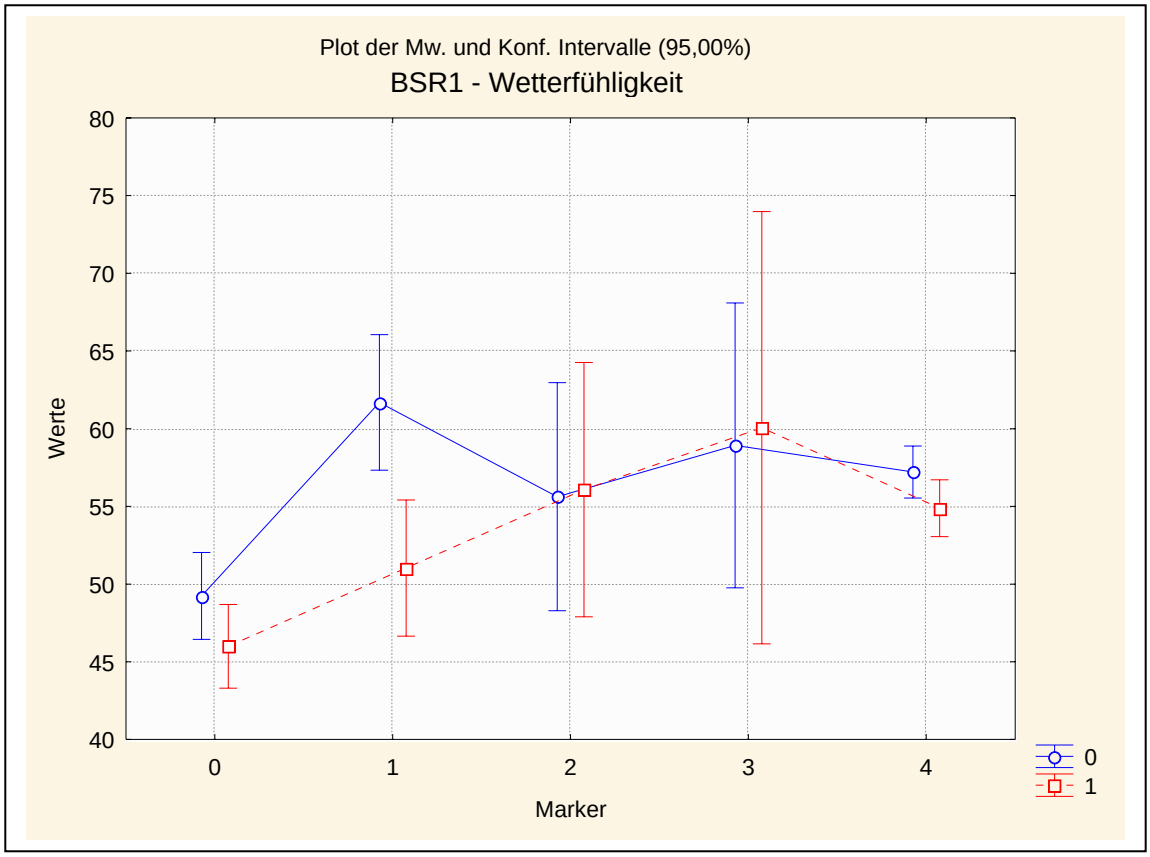
0 = test persons without weathersensitivity, 1 = test persons with weathersensitivity



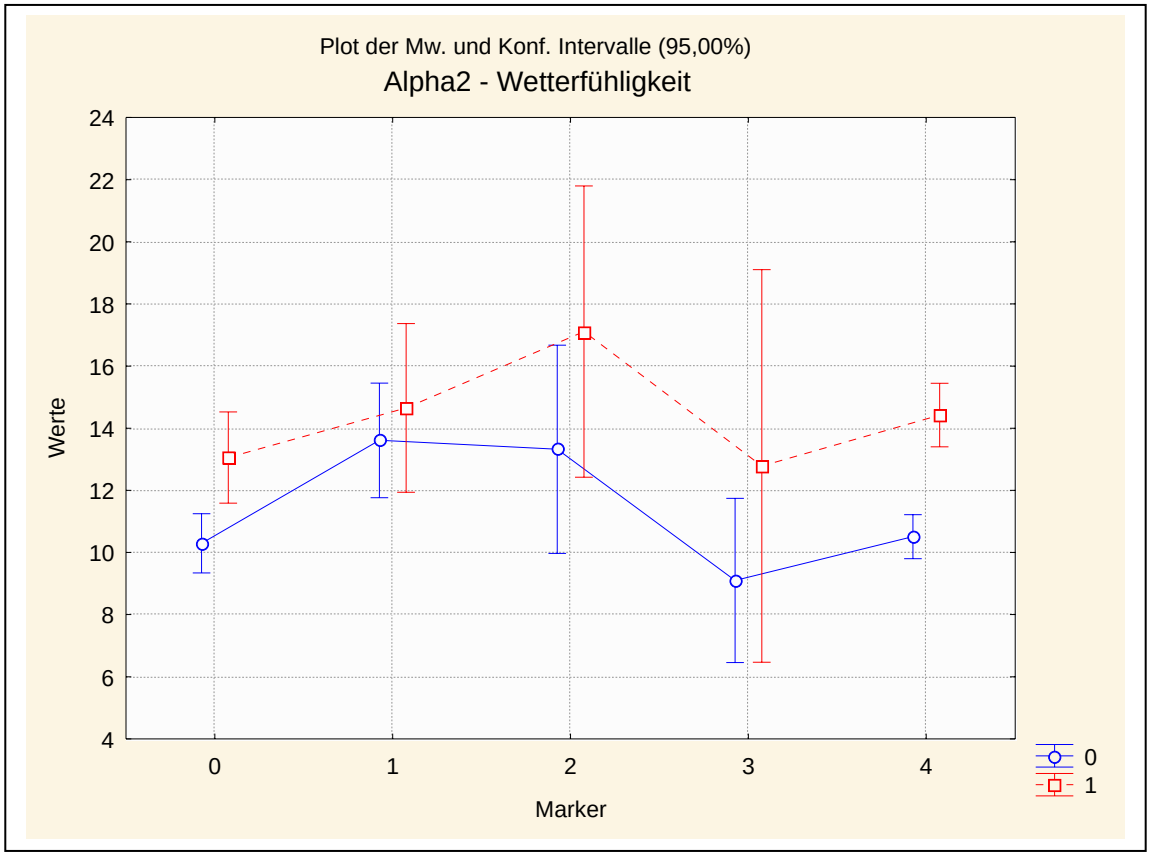


0 = test persons without weathersensitivity, 1 = test persons with weathersensitivity





0 = test persons without weathersensitivity, 1 = test persons with weathersensitivity



8.4.4.1. Results – Weather sensitivity

Values	Step 0	Step 1	Step 2	Step 3	Step 4
HR - heart frequency					
Respiratory frequency					
NIBP dia – not inv. Blood pressure diastolic					
NIBP mean – not inv. Blood pressure average					
SPO2 - O2 saturation					
Ampl1 – amplitude on the left					
MF1 – middle frequency on the left					
SEF1 – spectral ones Corner frequency on the left					
Beta1 – beta on the left					
BSR1 – Burst Suppression rate on the left					
Alpha 2 – alpha on the right					

used symbols:

Significant difference: . grey.

Interactions: low interaction , strong interaction

8.4.5. Comparison normal treatment to bluff and music

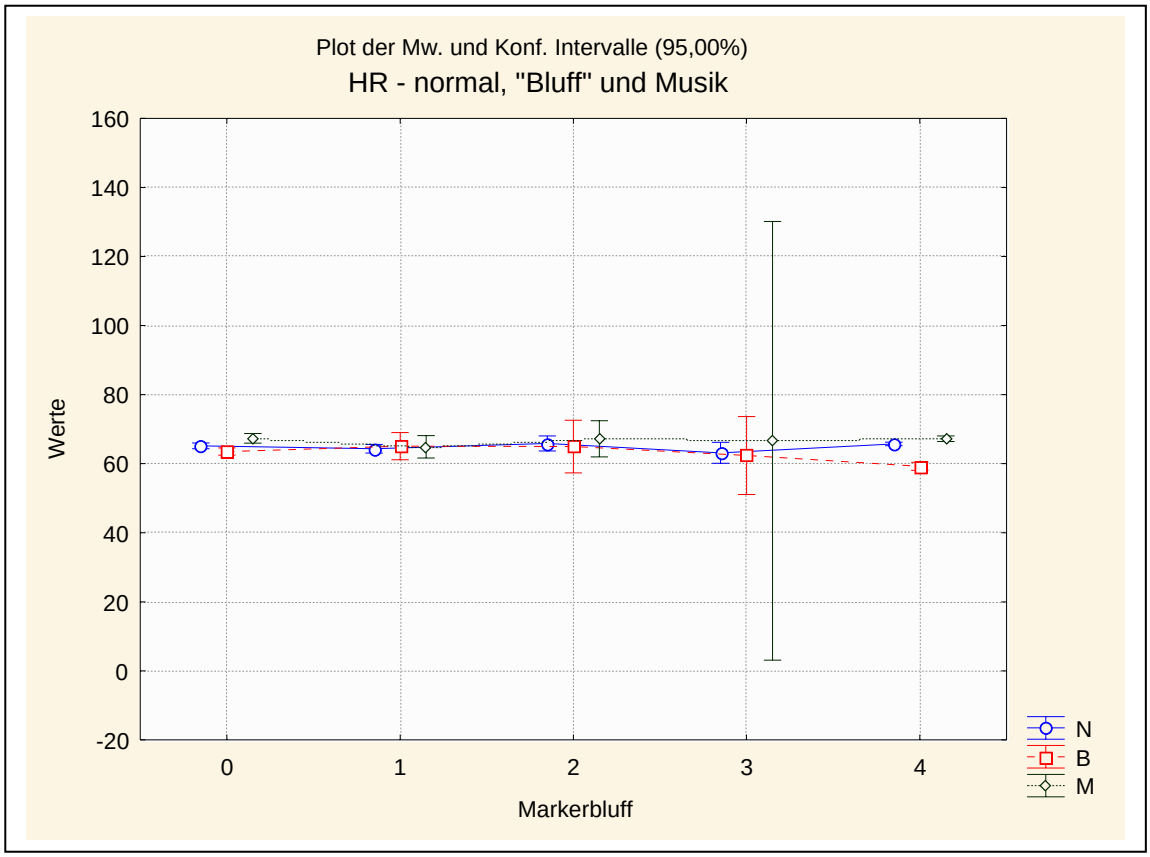
Two treatments were carried out only with putting on the hands – without compression of the ventricle. Also two other test persons heard during the whole test time "music" – besides, was chosen „ Tibetanic of sound bowls “ as a widely constant, reassuring priming coat.

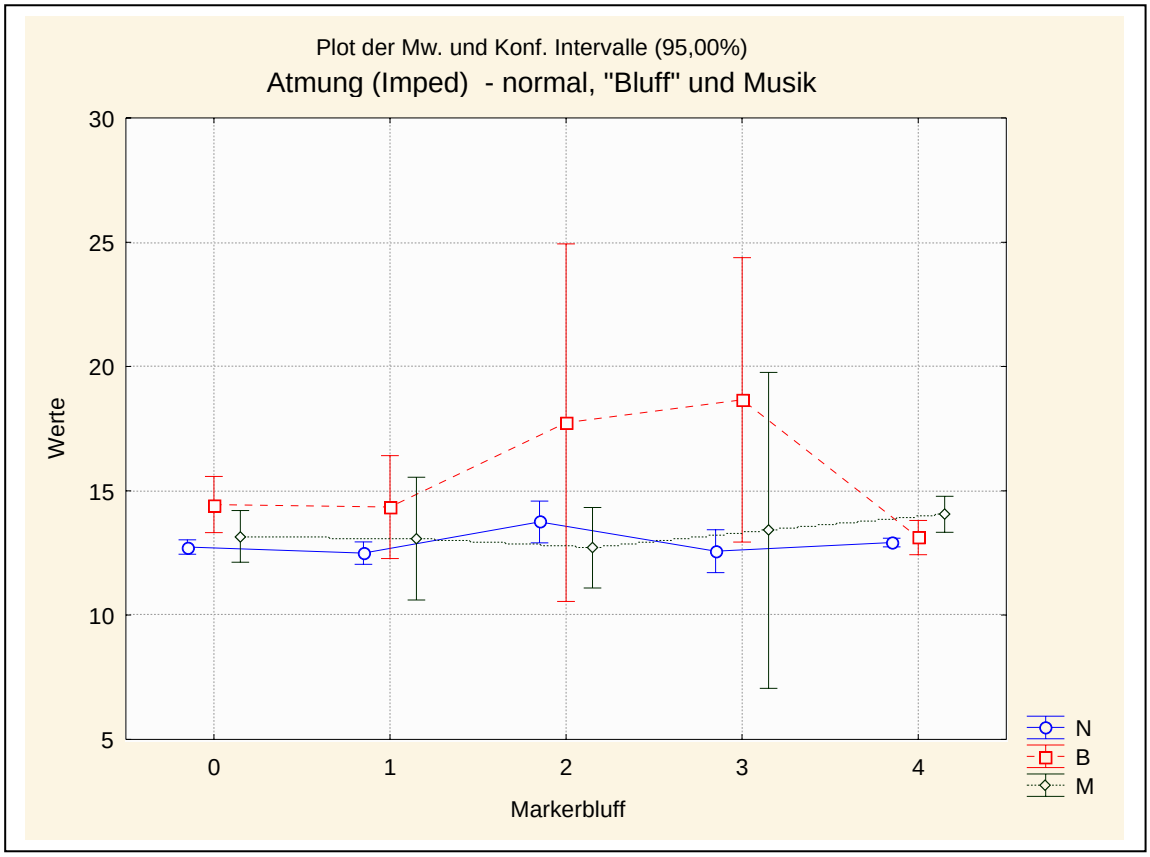
On the following sides 4 interaction analyses for the parameters HR (heart rate), respiration, amplitude are found 1 and NIBPmean (on the left) (not invasive blood pressure – average).

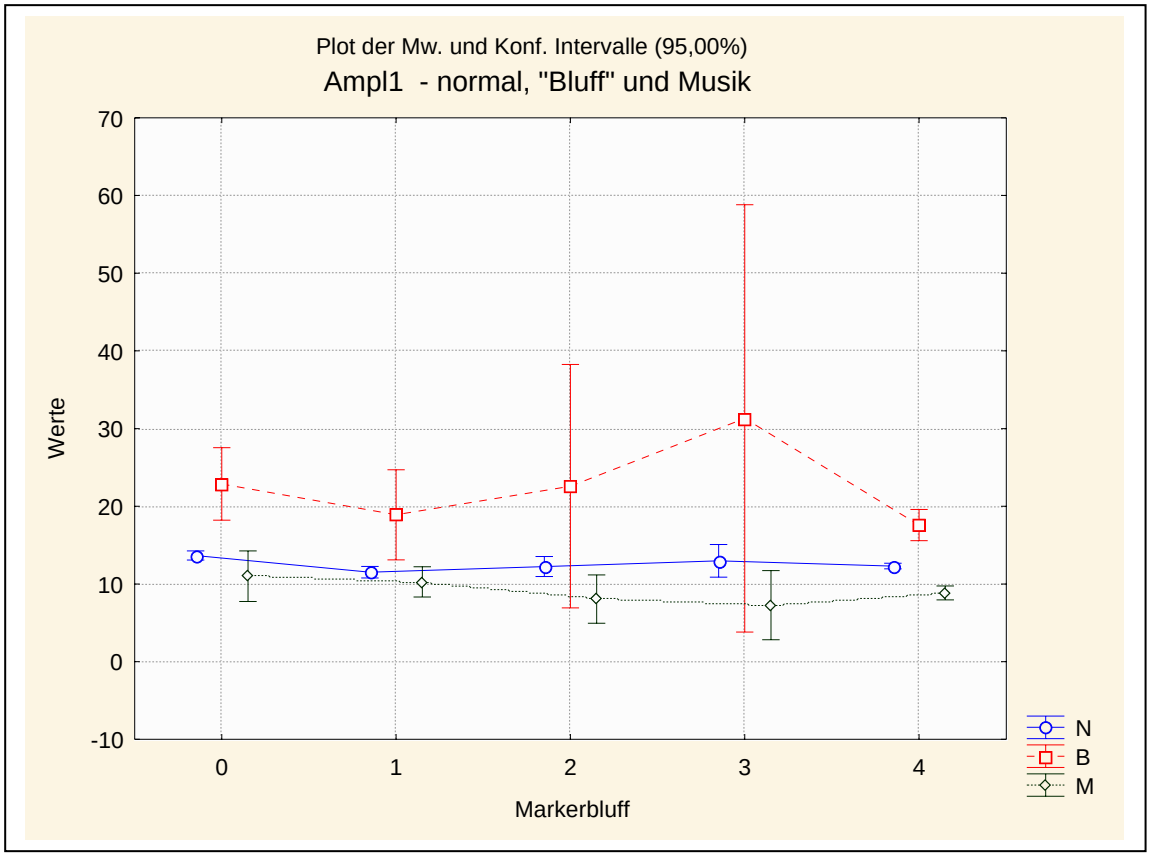
N = normal treatment

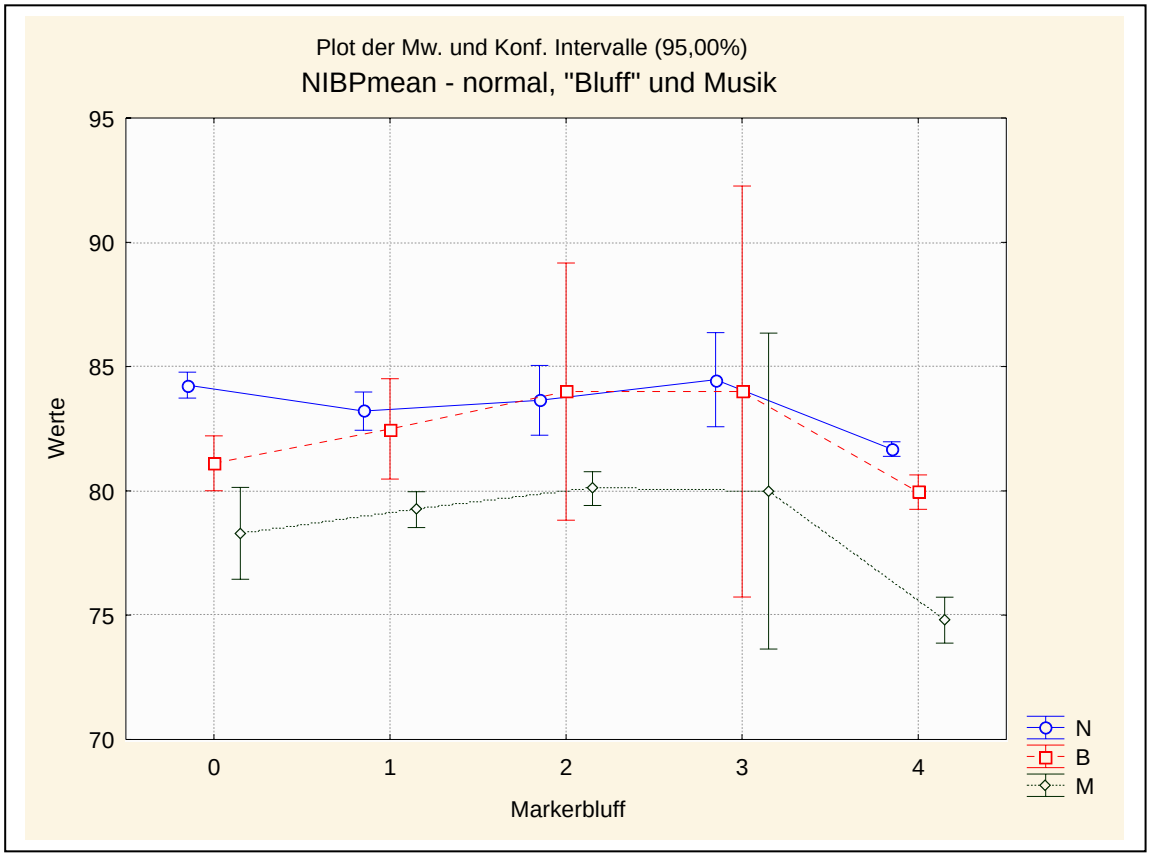
B = "bluff"

M = music




Plot der Mw. und Konf. Intervalle (95,00%)
Atmung (Imped) - normal, "Bluff" und Musik
Werte
30
25
20
15
10
5
0
1
2
3
4
Markerbluff
N
B
M


Plot der Mw. und Konf. Intervalle (95,00%)
Ampl1 - normal, "Bluff" und Musik
Werte
70
60
50
40
30
20
10
0
-10
0
1
2
3
4
Markerbluff
N
B
M

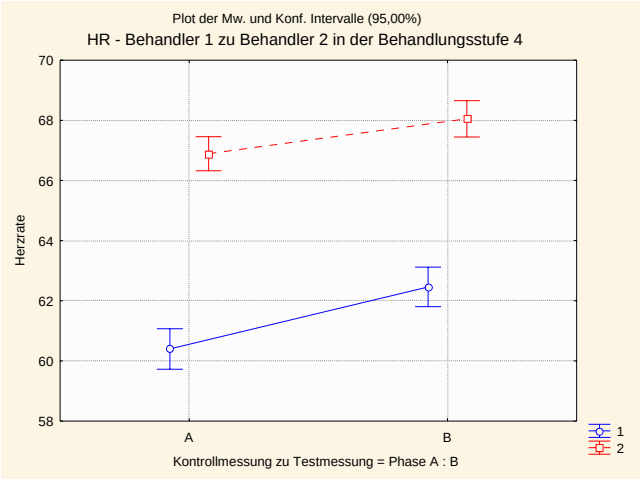


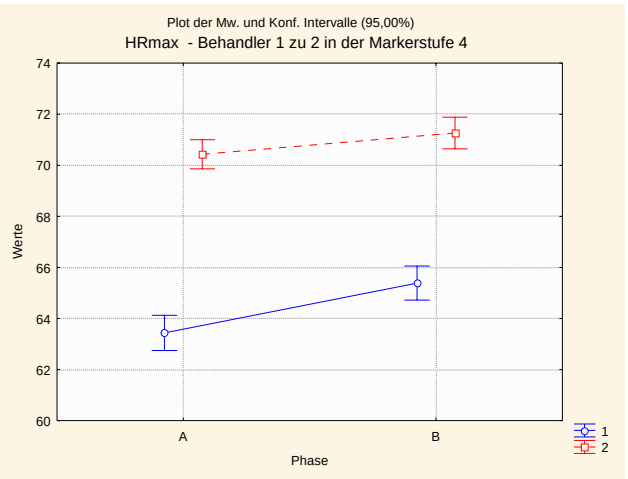
Caused by the too low random check circumference (two test persons for the bluff and the music) a very big confidenzintervall arises, hence, it is not possible to make a static statement.

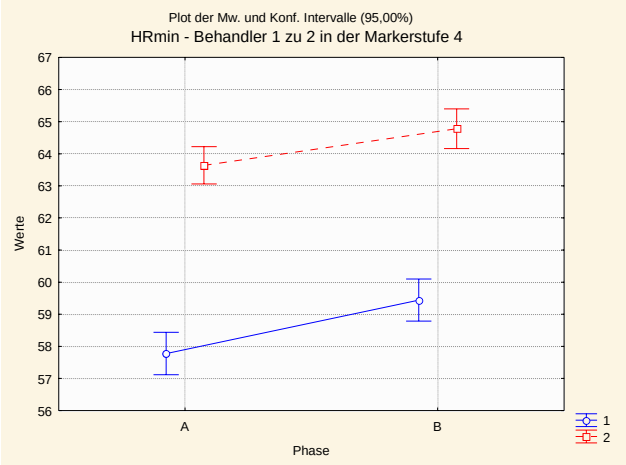
8.5. Interaction analysis comparative Osteopath 1 to 2

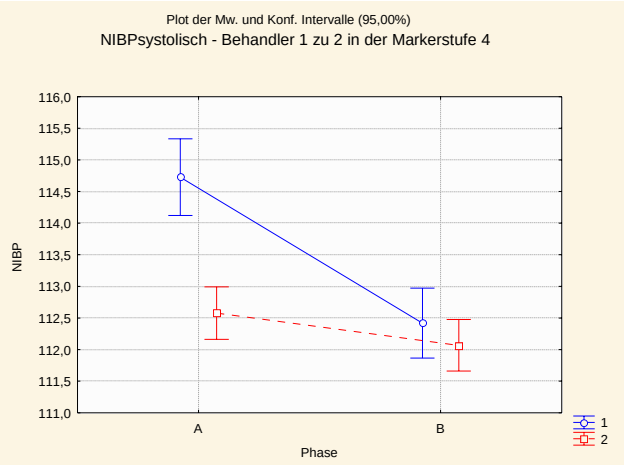
Another step of the interaction analysis was to raise whether the result changes if one compares the test groups of 2 different Osteopathen with each other.
Remark: On account of the halved patient's number per group it already comes to variations of the source averages (phase A).

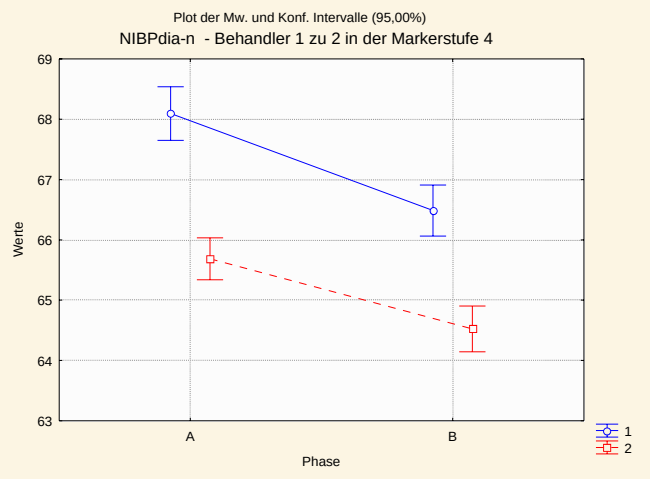
The values are to be looked about the observation and interpretation as relative values. It is just interesting how the continuous lines behave to each other. The same "therapy effect" permits the statement whether by different osteopaths the same result has been achieved.

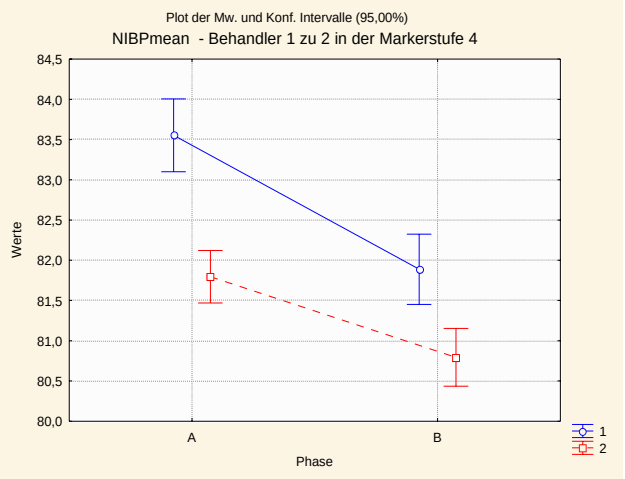


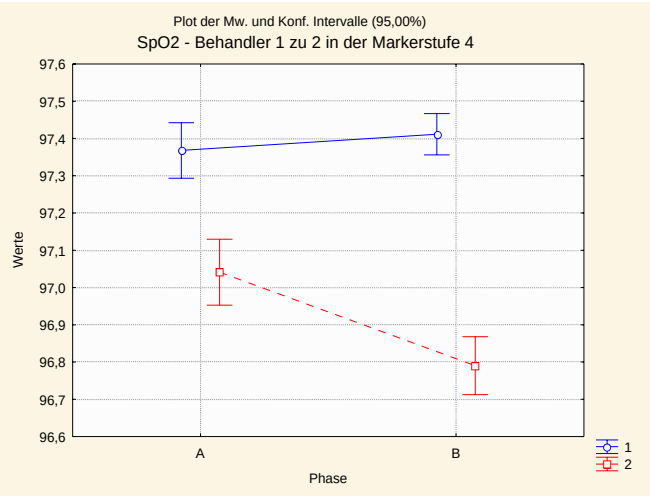


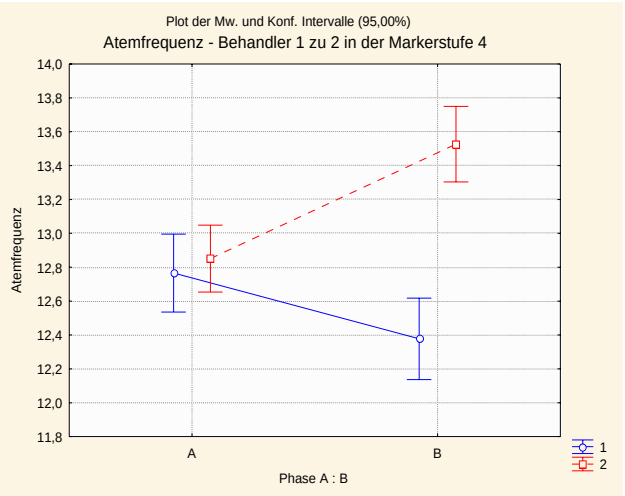












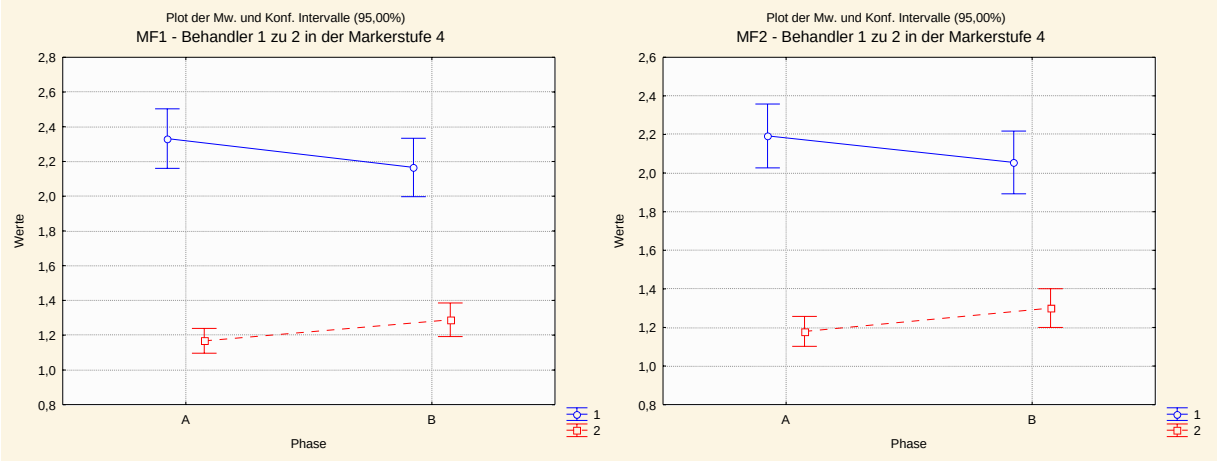
The Y axis corresponds to the measured parameter.

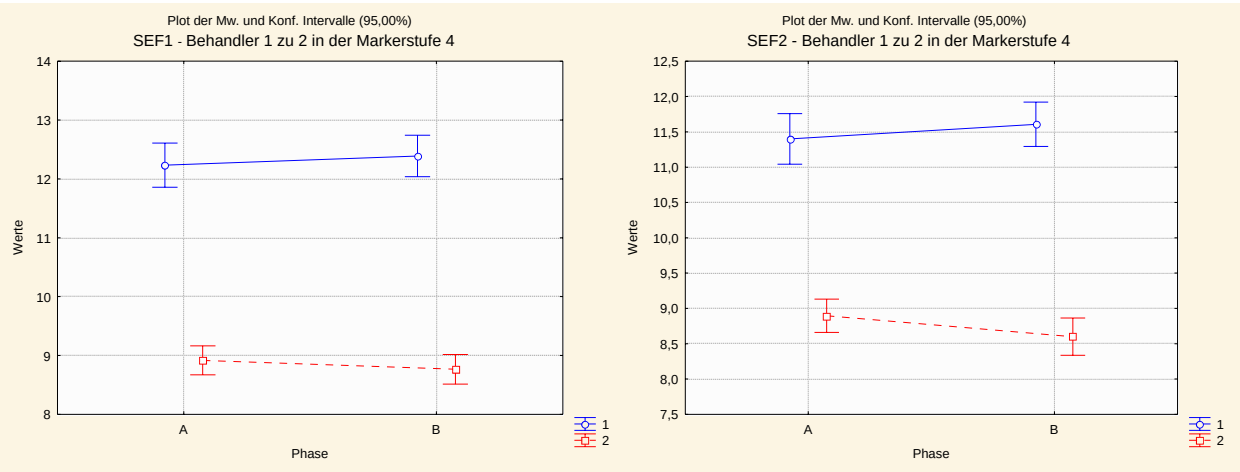
In the X axis are always the controlling measurement step 4 of treatment, so of the postquiescence comparative cited.

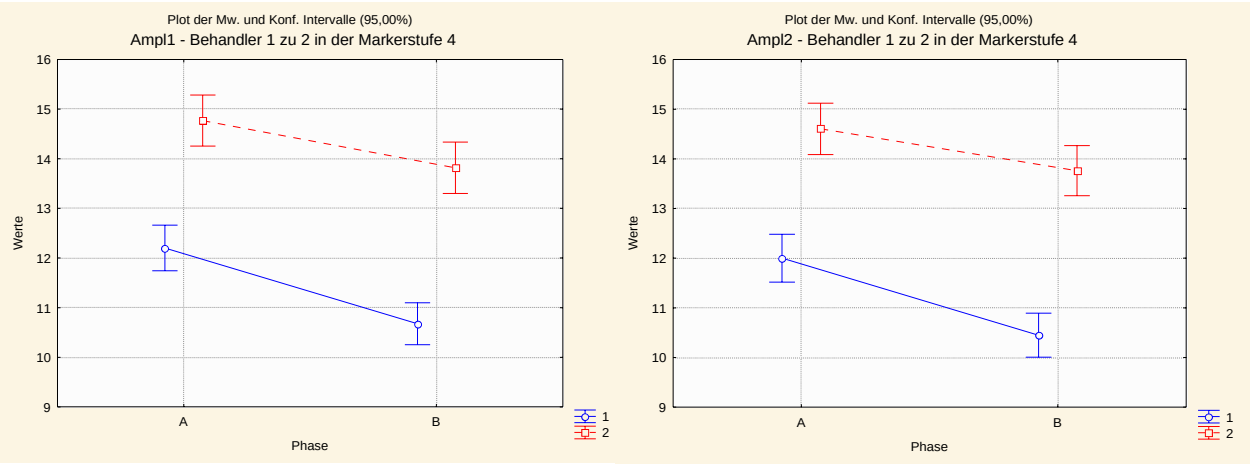
1 was Ludwig Brandstötter

2 was Wilhelm Winkler

On the following sides the interaction analysis of the EEG parameter pairs (Alpha1/Alpha2...) is shown.





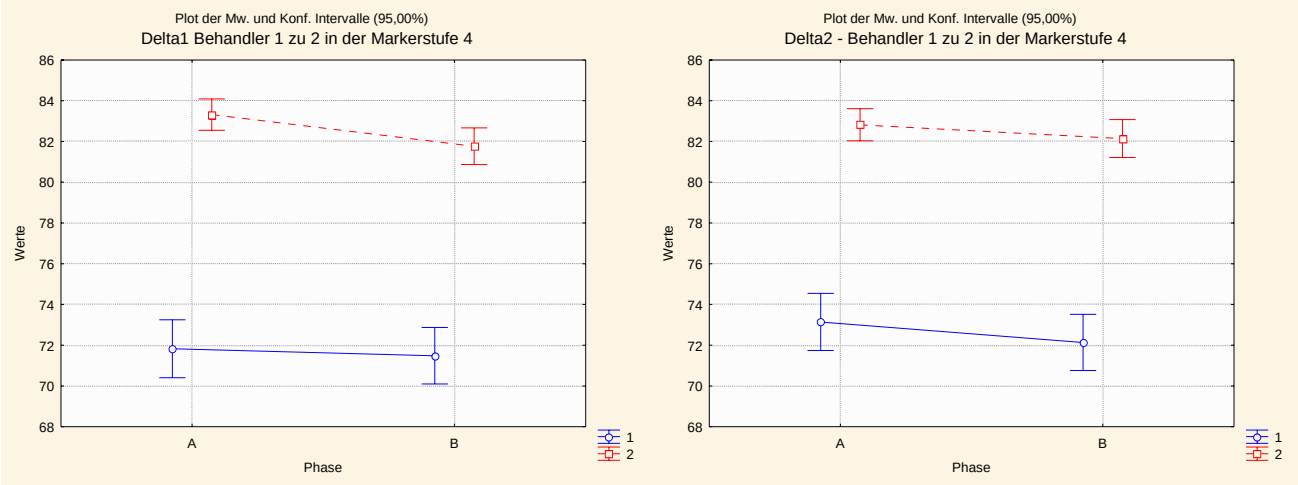


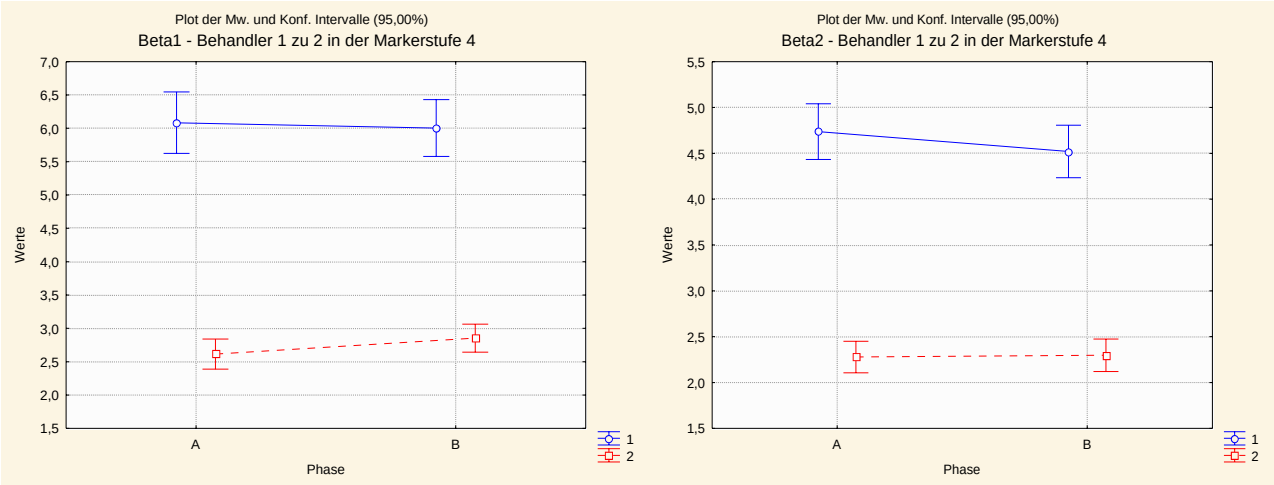
The Y axis corresponds to the measured parameter.

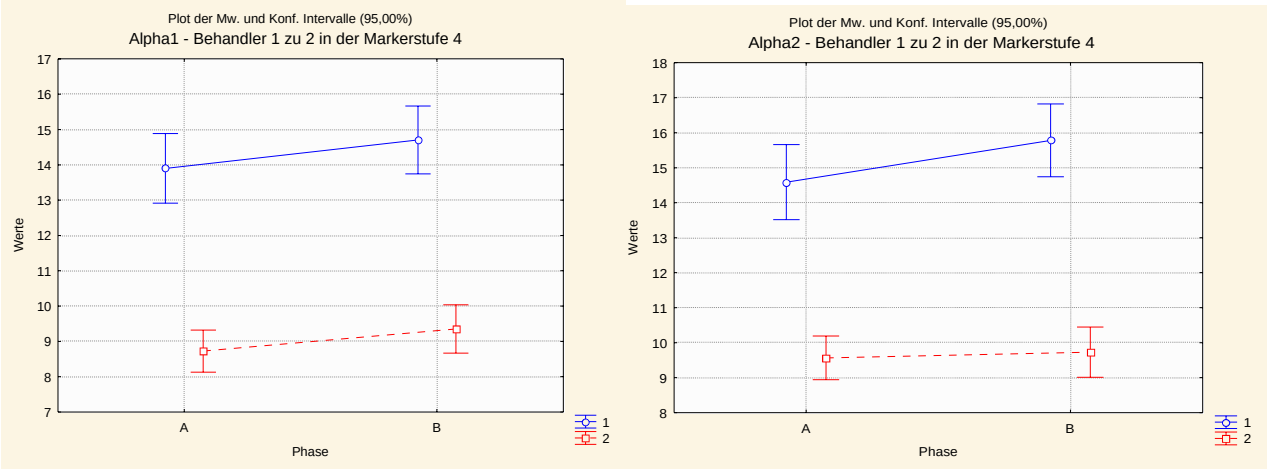
In the x axis are always the controlling measurement to the test measurement step 4 of treatment, (Step 4 =Time of rest after the CV4 technique.)

1 was Ludwig Brandstötter

2 was Wilhelm Winkler





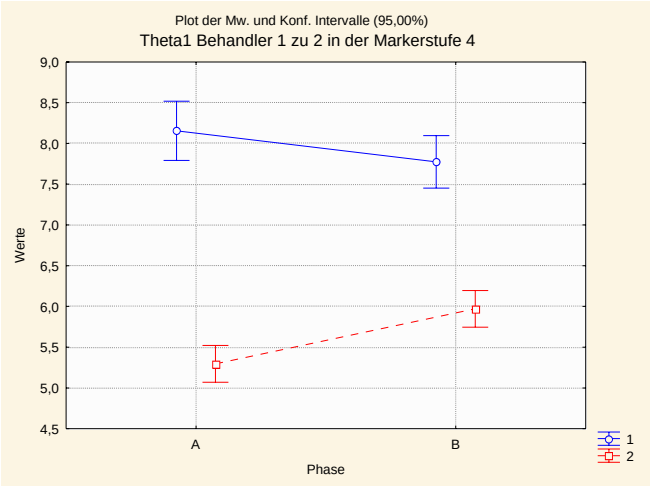


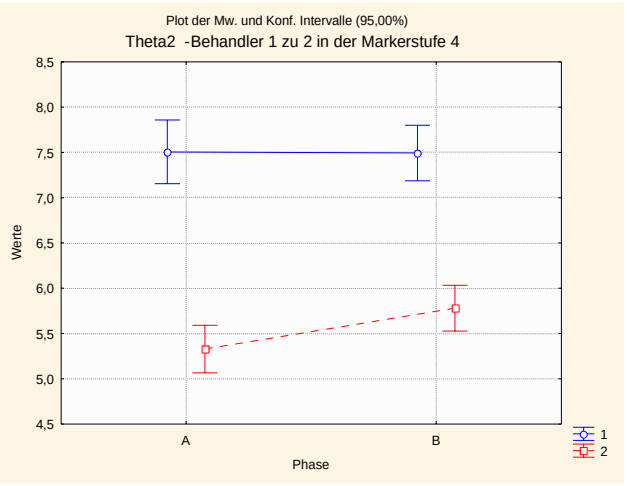
The Y axis corresponds to the measured parameter.

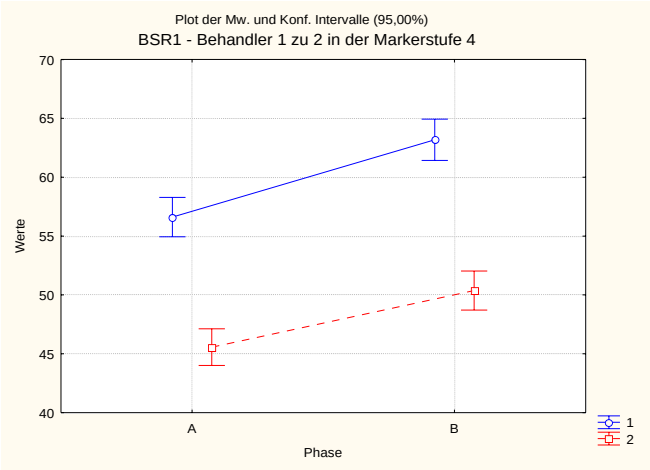
In the x axis are always the controlling measurement to the test measurement step 4 of treatment, (Step 4 =Time of rest after the CV4 technique.)

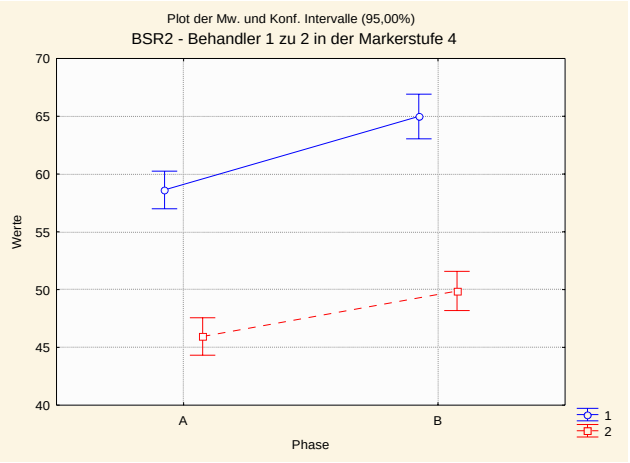
1 was Ludwig Brandstötter

2 was Wilhelm Winkler









The Y axis corresponds to the measured parameter.

In the x axis are always the controlling measurement to the test measurement step 4 of treatment, (Step 4 =Time of rest after the CV4 technique.)

1 was Ludwig Brandstötter

2 was Wilhelm Winkler

8.5.1. Interpretation of the comparision Ostepath 1 + 2

At the evaluation of the interaction analyses concerning parallel position (the same effect of treatment) it seems that a large part shows a parallel course:

	general parameters	EEG parameter	Sum
Number	8	16	24
in parallel	6	9	15
not in parallel	2*	7	9

The biggest divergence shows the interaction analysis of the respiratory rate. The cause for it: With very low respiratory rate it was not always to possible measure the breath value. Hence, these low measuring values are absent for the evaluation, because this appeared as more often with osteopath 2, the respiratory rate rises here (apparently).

Reference for " statistical evaluation “

"Electronic Statistics Texbook" under www.statsoftinc.com, Tulsa, Oklahoma 74104, the USA

E-mails, Dr. A. Ponn, dept. 07, office of the Salzburg government

Fahrmeier L. and Hamerle A. (Ed.), Multivariate statistical procedures, de Gruyter, Berlin – New York 1984

Statistics program "Statistica 5.0" – help files, manufacturers "Statsoft" Tusla, Oklahoma, the USA

www.statsoft.de, StatSoft (Europe) Ltd, high air avenue 112, D-20253 Hamburg e-mail: info@statsoft.de

www.statsoftinc.com, Headquarter: 2300 East 14th Street, Tulsa, OK 74104, the USA Phone: (918) 749-1119; fax: (918) 749-2217

9. Summary of the analysis and Interpretation

9.1. Verifying our thesis and hypothesis:

To verify our hypothesis thesis :"The influence of the osteopathic treatement on the vegetative nerval system and the hypthesis:"The technique "Compression of the 4 the ventricle" influences brain activity, blood pressure, heart rate and respiration rate." we compared a control measurement with a treatment measurement.

The treatment measurement had 5 treatmentsteps

- Step 0 Forerun
- Step 1 Beginning of the CV4 technique
- Step 2 Stillpoint
- Step 3 Restart of the Cranio Sacral Rhythm
- Step 4 Time of rest after the CV4 technique

The 5 treatmentsteps of the test measurement were compared with the corresponding periods of time in the contol measurement. In general the number of parameters, that show significant differences decreased from step 0 to step 3 and increased again in step 4:

Treatmentstep	Step 0	Step 1	Step 2	Step 3	Step 4
Significant parameters of 24	14	11	7	2	12

By means of a analysis of variance and analysis of interaction we coud find the following reaction groups:

Reaction group 1: The significant differences are before and after the treatment in treatmentstep 0 and 4. This goes for 8 parameters, ~ 33%.

- Heartrate minimal
- Heartrate maximal
- Non invasive bloodpressure systolic
- Amplitude left and right and

- Burst Suppression Rate left and right

Reaction group 2: The significant differences are after the treatment in treatmentstep 4. This goes for 2 parameters, about 8%.

- Respiratory frequency, Oxygen saturation in %

Reaction group 3: The significant differences are before the treatment in step 0. This goes for 2 parameters, about 8%.

- Theta left, Theta right

Reaction group 4: The significant differences are during the treatment in step 1 and 3. This goes for 7 parameters, about 29%.

- Spectral edgefrequency left
- Spectral edgefrequency right
- Meanfrequency left
- Meanfrequency right
- Beta left and right
- Alpha left

Reaction group 5: The significant differences are before, during and after the treatment. This goes for 2 parameters, about 8%.

- Non invasive bloodpressure - diastolic
- Non invasive bloodpressure - mean

Reaction group 6: The significant differences are before and during the treatment. This goes for 2 parameters, about 8%.

- Delta left, Delta right

Reaction group 7: Alpha right shows no significant difference, – about 4%.

9.1.1. Analysis of interaction with specific lesions and parameters

Two groups were formed and compared with each other:

- group 0 were the clients without specific lesions.
- group 1 were the clients with specific lesions.

We analyzed the following parameters:

- SSB Compaction
- Compaction and Translation von C0, C1, C2
- Compaction and Translation Th3, 4
- Sensitivity to changes in the weather
- Comparison of normal treatment with bluff- and music treatment

In the. If you are interested in the relatively complex evaluaton see chapters

9.1.2. Analysis of interaction comparing osteopath 1 and 2

In the third chapter of our statisic analysis we compared tendencially how the values of the treatmentstep 4 of control- and test measurement relate to each other when you compare the two different osteopaths. As we devided the whole client group in half we already received two different starting values.Therefore the analysis can only be seen as a relative result. Pricnipally the evaluation showed similar results concerning the gradient tendencies and “therapy effect”.

9.1.3. Analysis of subjective client impressions

The last part of this paper shows the summary of the length of the stillpoint, subjective reactions during the measurement and sujective reactions on the CV4 technique.

9.1.4. Summary and critical reflection:

After doing all the work it seems that our hypothesis is true but
as we learned a lot by doing this work we found out that a testing series with three equal client groups would make more sense to clarify our results:

- One group for control of the veg. neural system
- One group for a bluff CV4 technique and
- One group for a real CV4 technique

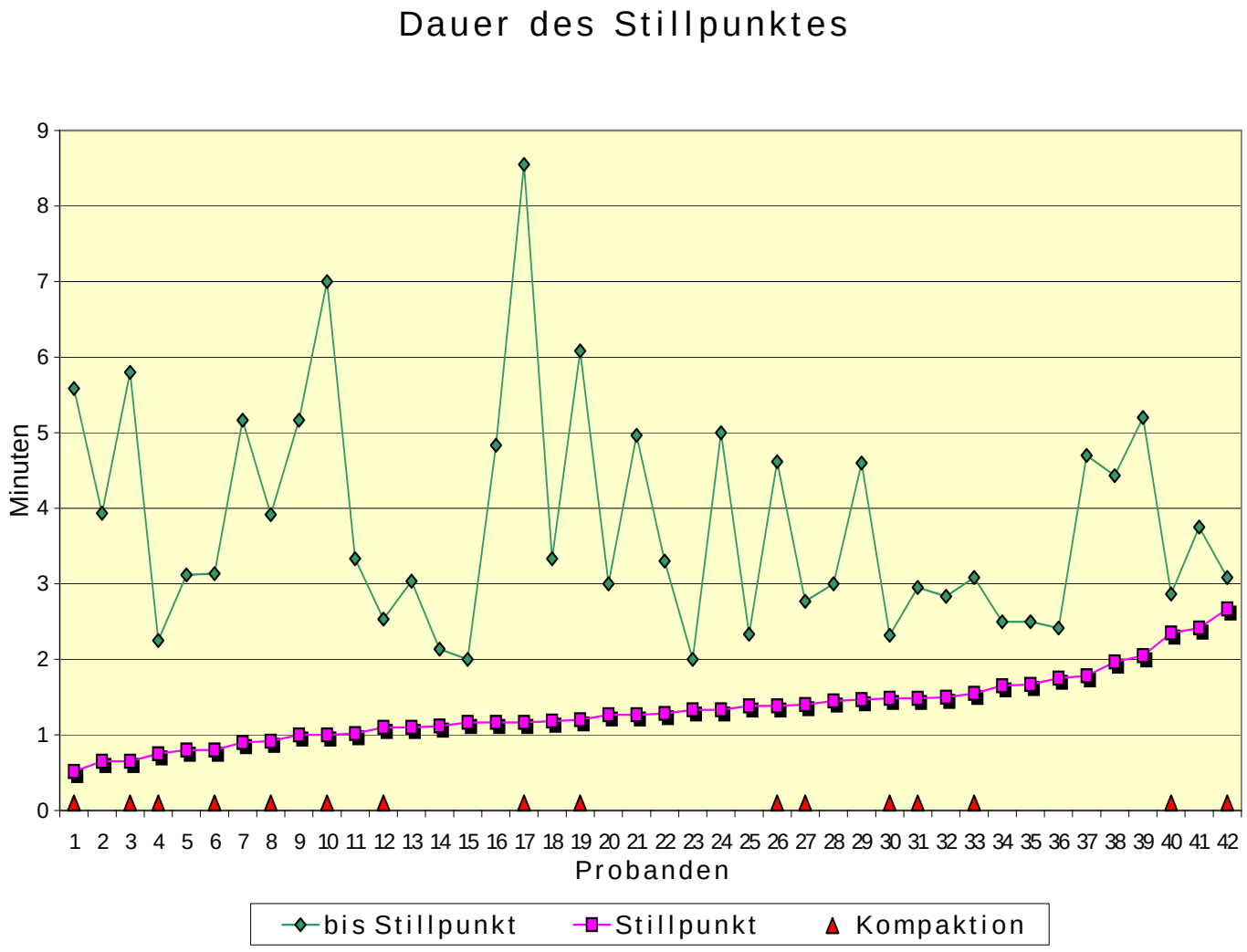
From this perspective and by including our test design with only two groups the result of all the measured parameters really seems to be difficult for us to be interpretated. Although we tried to avoid outer influence it is again difficult to differerentiate between the true influence of the CV4 technique and the influence of touch, of a more aware and observing state of the client during the CV4 technique and of reactions caused by different expectations of the client.
The value of this test for us and the osteopathic community seems to be that whenever we touch our patients we cause an effect. But we have to be honest and precise in our conclusions if the results, we have achieved in our daily practice, are truly caused by our original intention or by side effects we did not even think about.
After repeating the CV4 under same conditions with so many clients , we dare to say that in our subjective impression we could perceive a change in the organism of the clients.
As we tried to stay as objective as possible and concentrated on the facts of our measurement we have to make the scientific conclusion that we don´t know if there is an effect of the CV4 technique.
Our bluff measurement with only two clients could not show a clear result from the the statistic perspective.

Therefore we invite to do this test again with the different design of three groups.
Who ever feels called to verify the thesis with these groups is invited.

Ludwig Brandstötter

10. Appendix

10.1. Graphic description of the length of the stillpoint

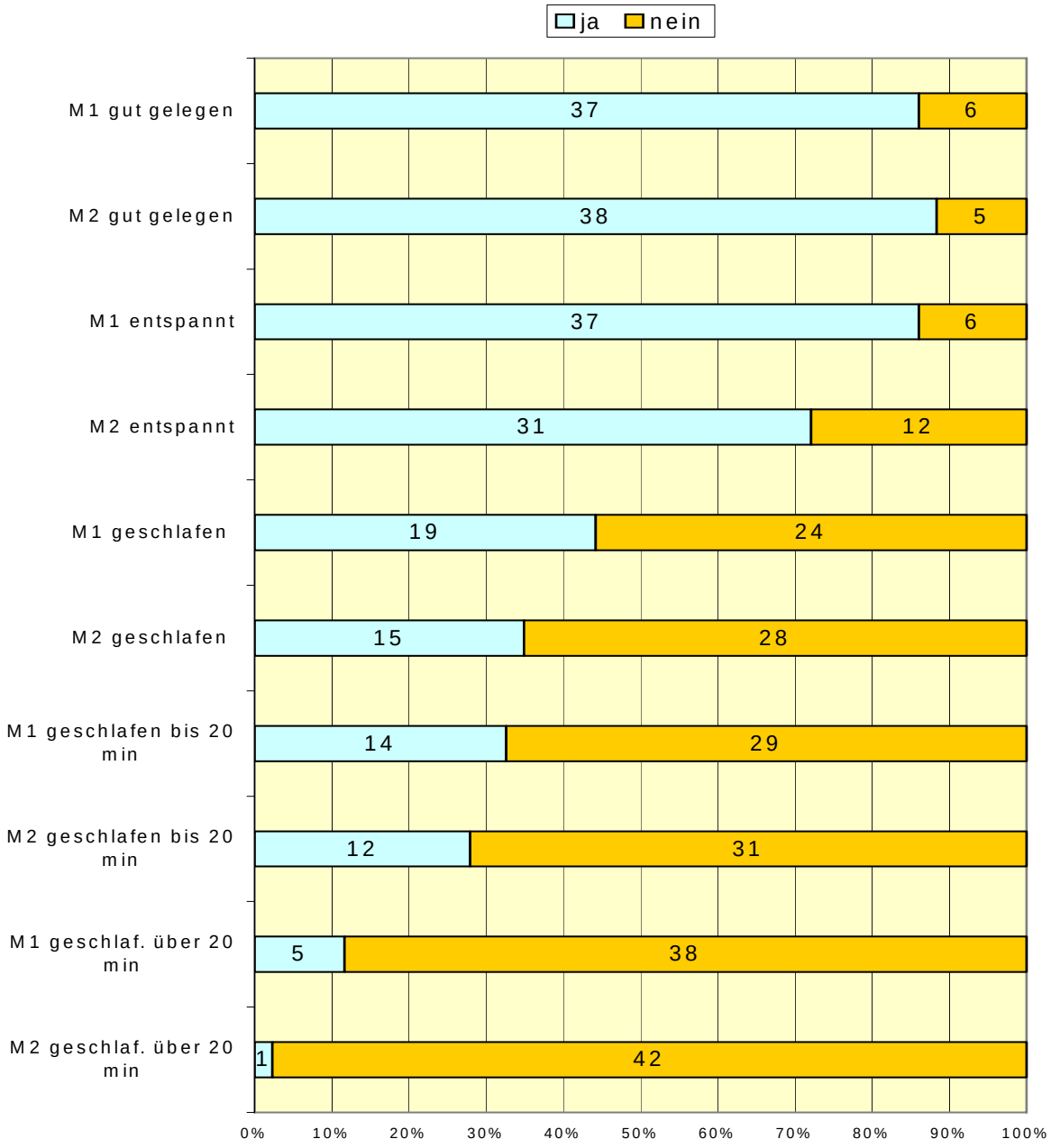


The length of the stillpoint went on between 31 and 160 seconds. (0,5-2,7 min) the period of time from the beginning of the technique to the beginning of the stillpoint lasted between 120 and 513 seconds (2 - 8,6 minutes)

About 71% of all stillpoints went on between one and two minutes.

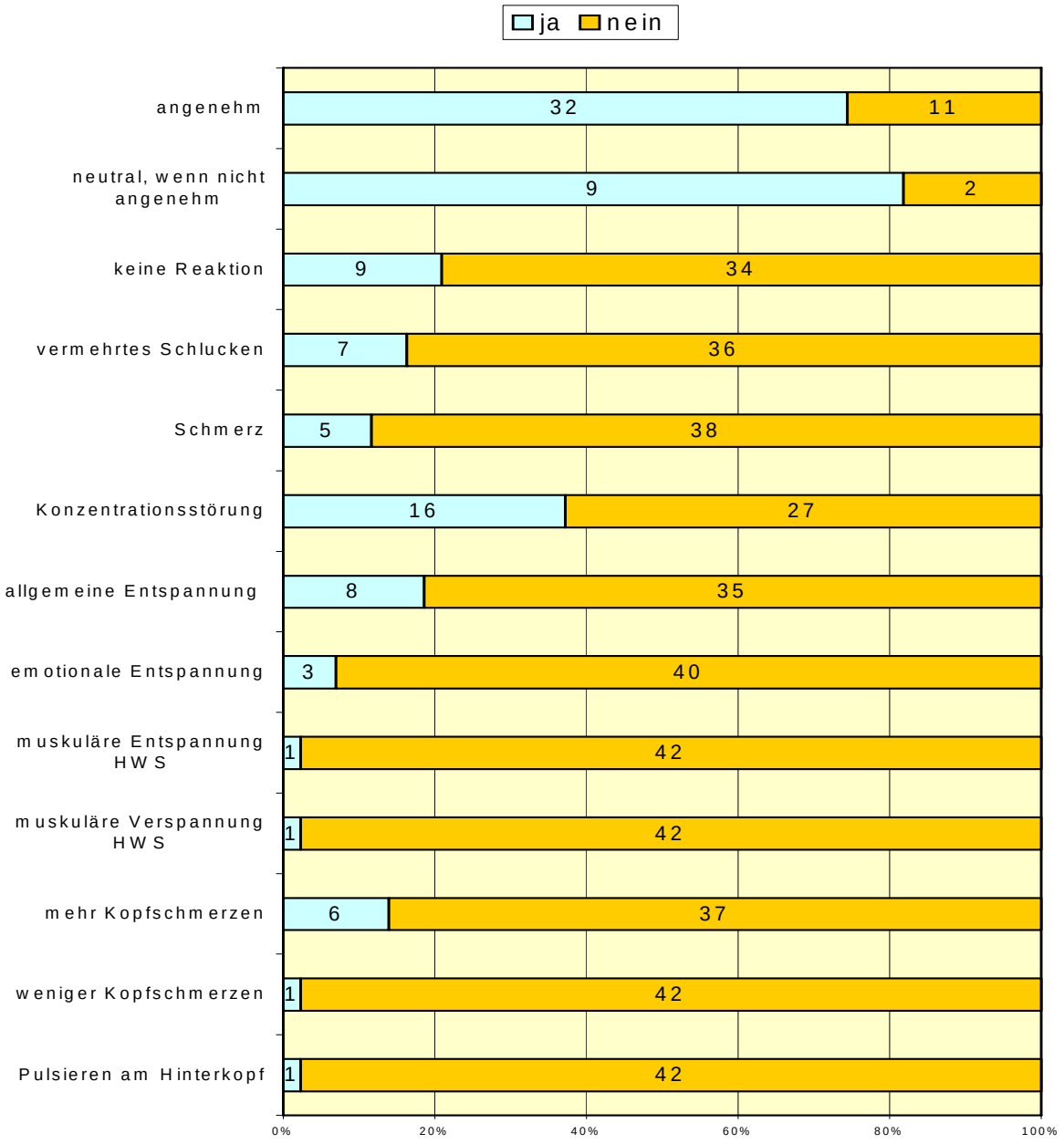
We could not find out a correlation for compacted SSBs and the lenght of the stillpoint as well as compacted SSBs and the period of time from the beginning of the technique to the stillpoint.

10.2. Subjective condition of the clients during control measurement (M 1) and treatment measurement (M 2)



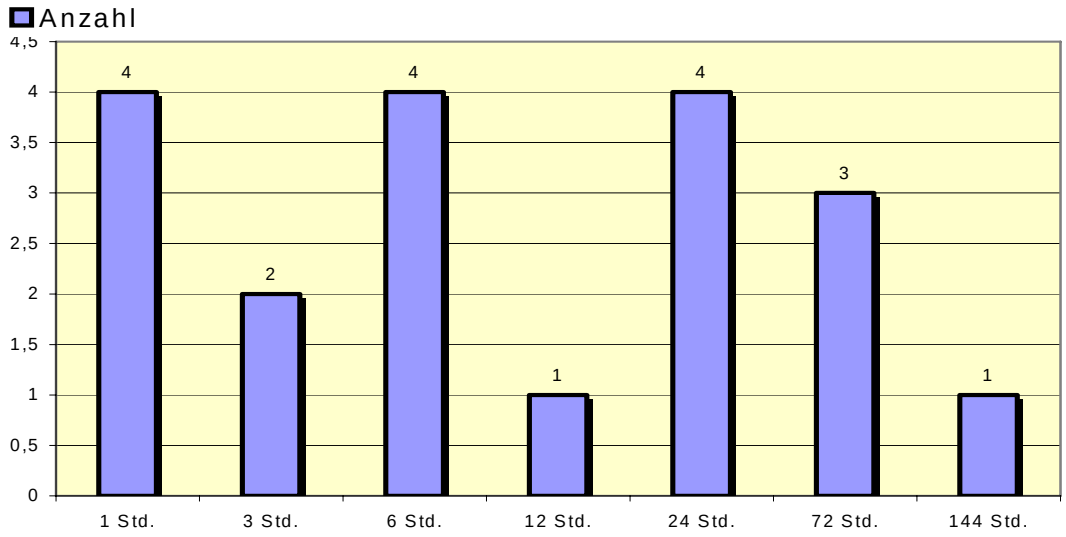
For most of the clients the positioning was agreeable and relaxing in M 1 and M 2. 87 % said to have been very relaxed in M 1. The expectation of the CV4 technique may have caused a lower relaxation rate in M 2.

10.3. Reactions during and after the CV4 technique



For 74% of the clients the CV4 technique was agreeable, for 21% neutral. Two persons described it as unpleasant. (5%). The most frequent reactions were a disturbance of concentration (37%), general and emotional relaxation (together 25%), frequent swallowing (16%), pain and more headache. (together 26%)

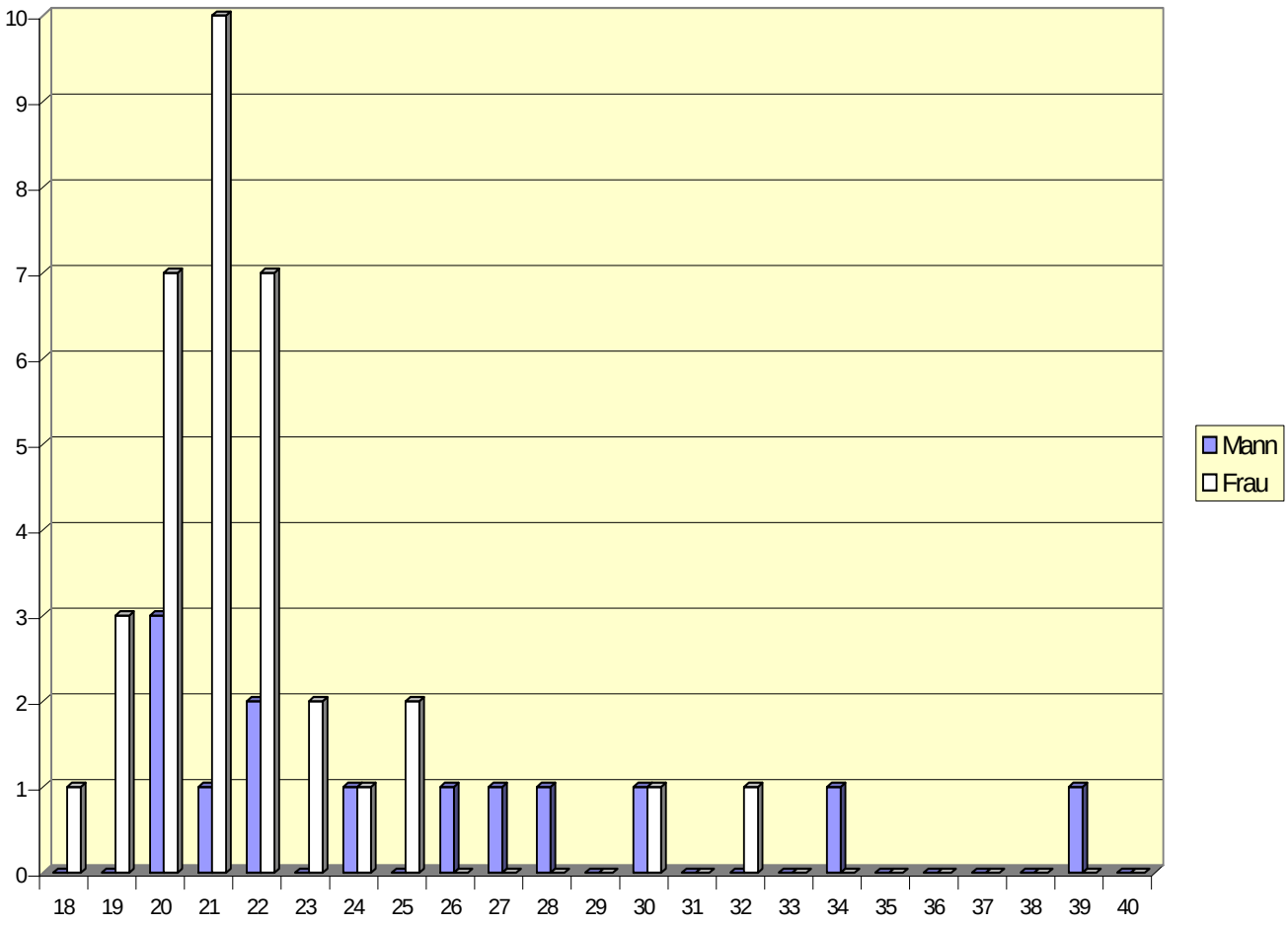
10.4. Length of reaction of the probands



44% of the clients reacted subjectivly to the CV4 technique, 79% of these clients stated the length of reaction from one hour to one day.

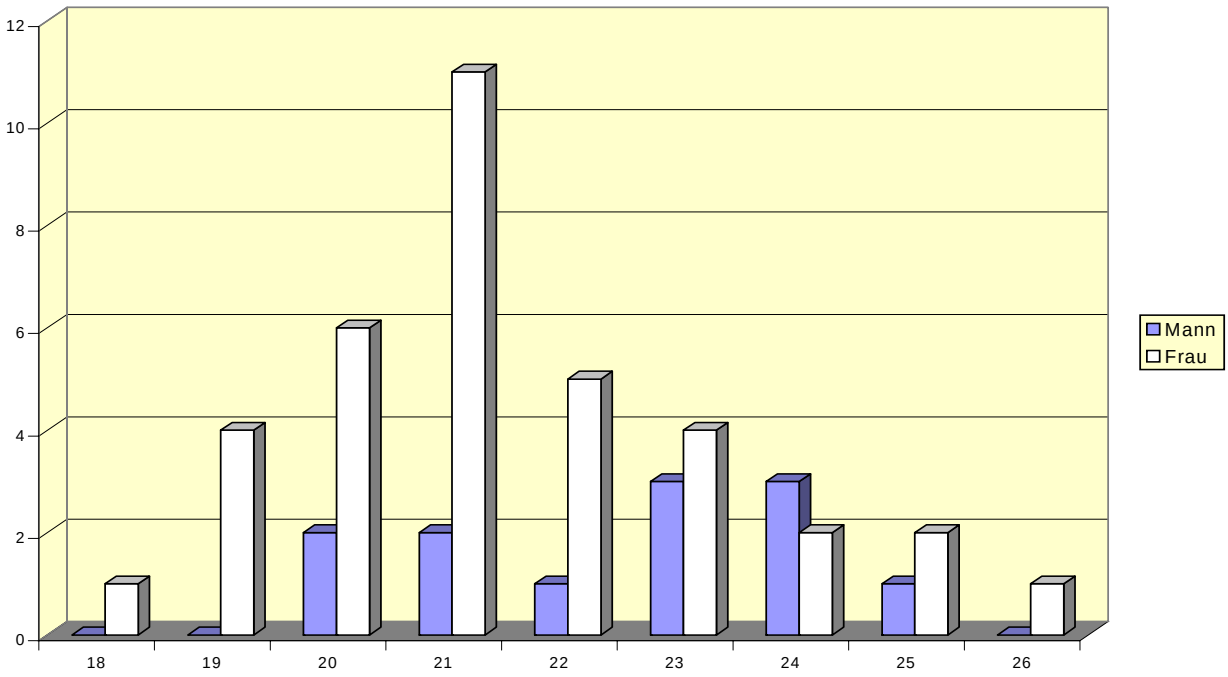
10.5. Evaluation of the anamnesis and the osteopathic findings

10.5.1. Age distribution of the test persons



The age of the test persons lay between 18 and 39 years with the maximum with 21, the cut amounted 22.8 years.

10.5.1. BMI of the test persons

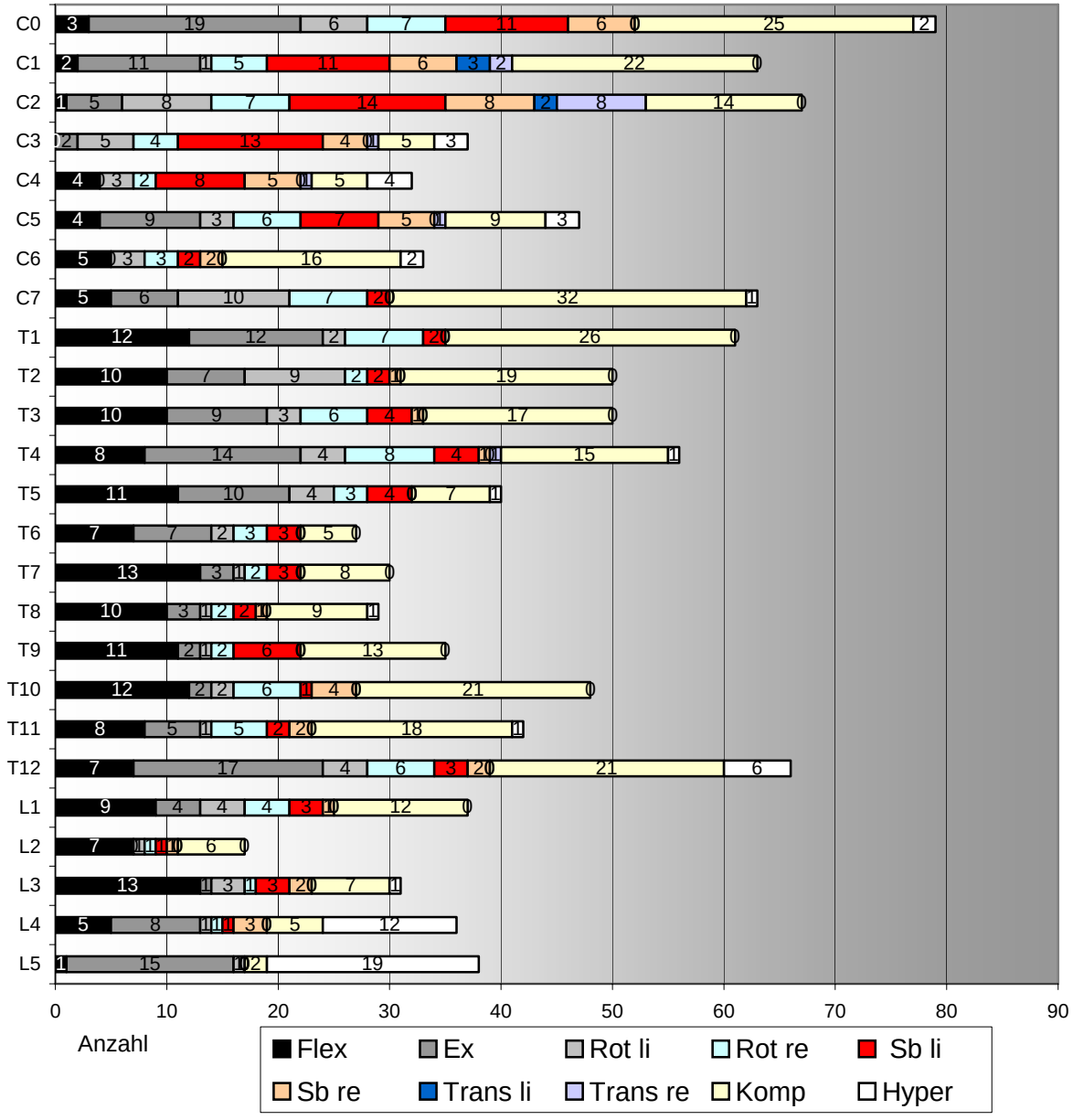


The calculation of the BMI (body measure index) shows that almost all test persons were normal-weighty:

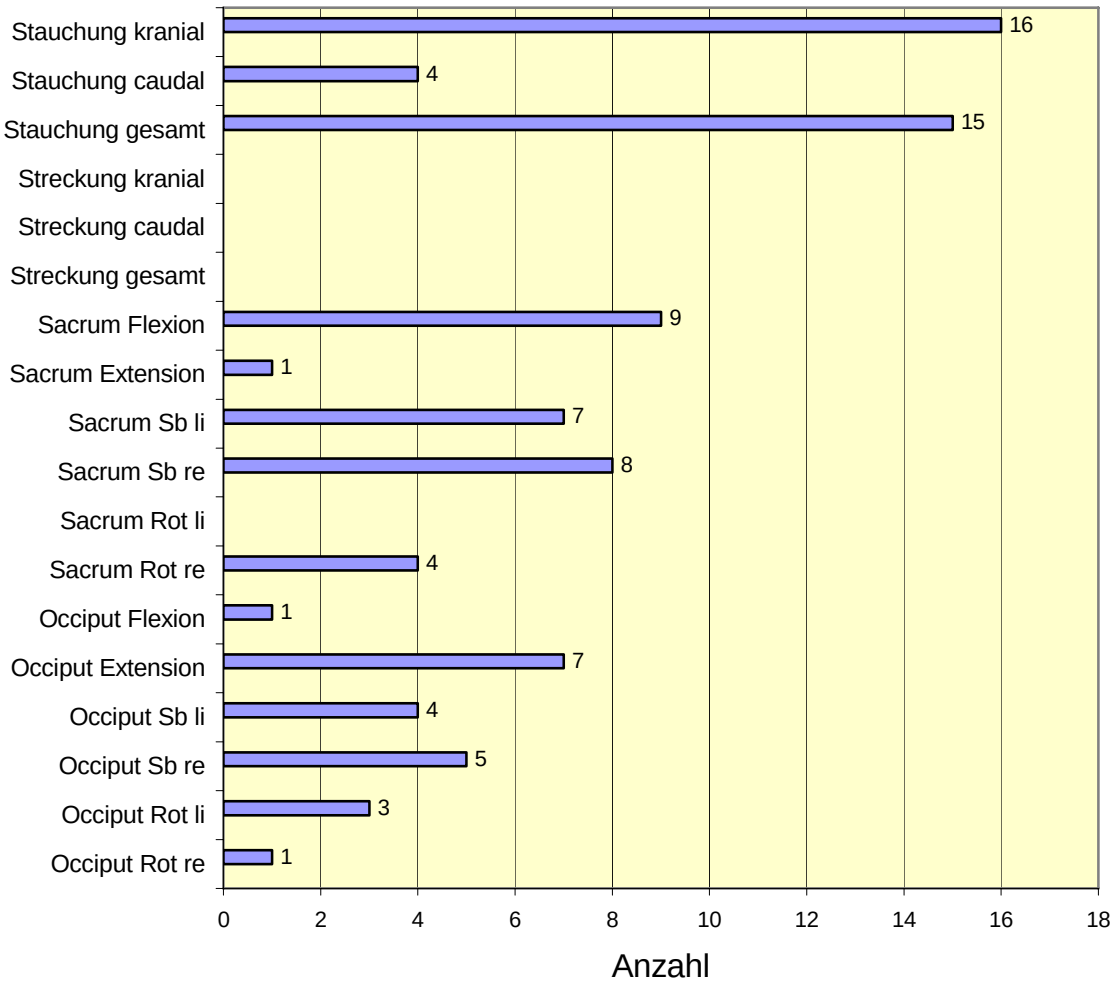
	manly	Number	female	Number
unterweighty	<20	0	<19	1
normal-weighty	20 - 25	14	19 - 24	32
overweight	25 - 30	0	24 - 30	3
very overweight	> 30	0	> 30	0

10.5.2. Vertebral blocks

The area of the upper HWS shows the highest score in lesions: C0 with 79, C2 (67) and C1 (63). Other vertebrae with a high score in interest in false positions are Th12 and the cervikothorakal junction C7 (63) and Th1 (61).



10.5.3. Cranial lesions



The compressions of the SSB was the most common with 18. Then follow membranousse lesions: SbRot (6), Torsion to the left of (5) and lat. Strain to the left of (5). A weak MRP was found, in addition, with 9 test persons.

10.5.4. Dura lesions

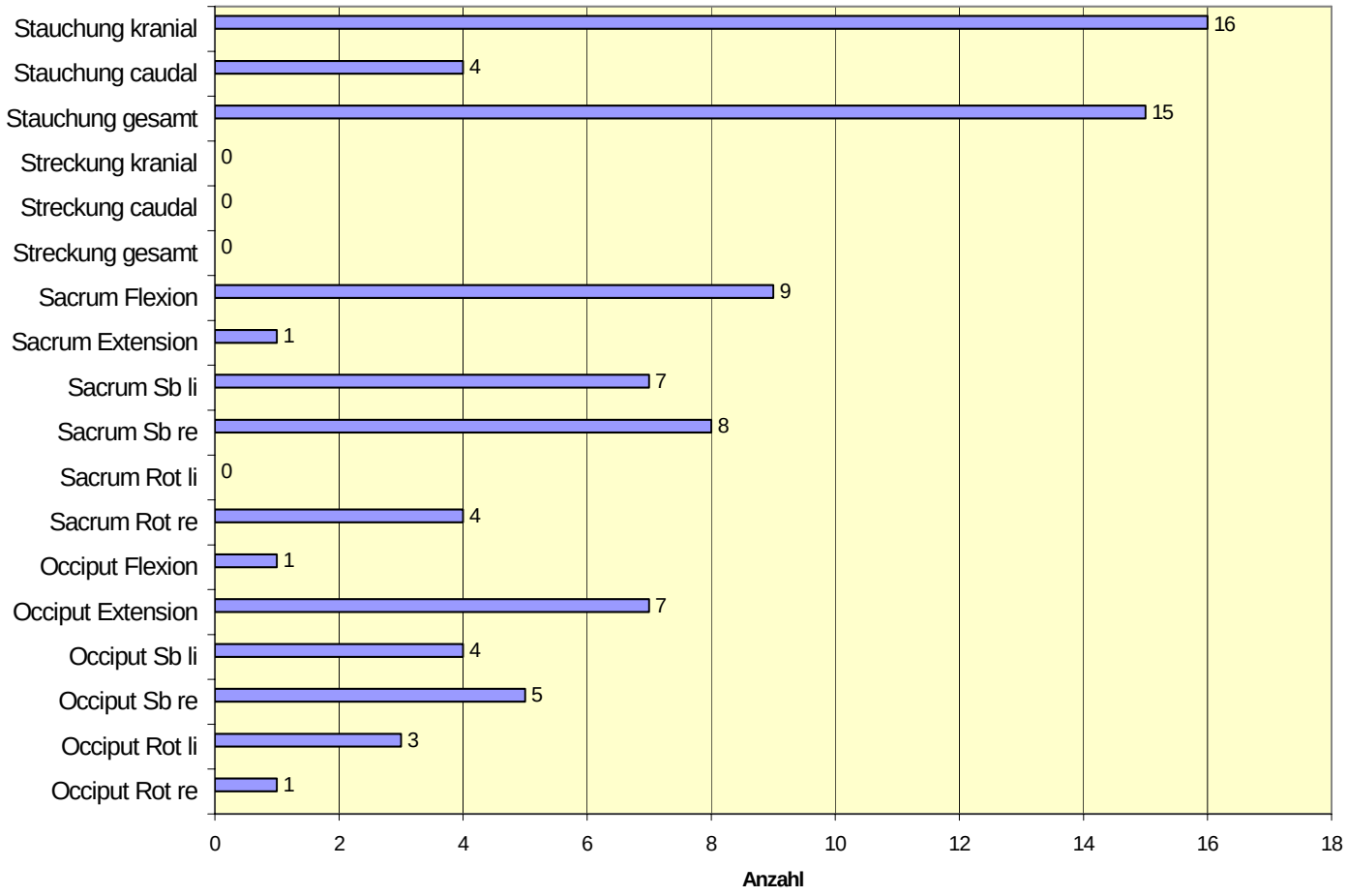
The graphic representation of the Dura lesions shows that the compression take the biggest interest - a total of 35, distributes on:

16 compression cranial

15 General compression (caudal and cranial)

04 To compression ones caudal

After the compression have the Sidebending of the Sacrums (8 to the right and 7 to the left) as well as the inflexion of the Sacrums with 9 high rate, also the extension of the Occiputs with 8.



10.5.5. Informationsheet for clients

für die Testpersonen zur Diplomarbeit Osteopathie
von Ludwig Brandstötter und Wilhelm Winkler

Herzlichen Dank, dass Sie sich für unsere Testserie zur Verfügung stellen. Wir möchten Ihnen mit diesem Infoblatt noch einige wichtige Hinweise geben, die einen reibungslosen Ablauf unserer Testserie erleichtern sollen.

Angeheftet finden Sie ein **Anamneseblatt**. Bitte bringen Sie dieses **bereits ausgefüllt** zum vereinbarten Termin mit. Ihre Daten werden selbstverständlich vertraulich behandelt. Wir brauchen Ihre Daten um aus Anamnese, Osteopathischem Befund und Testverlauf verschiedene Reaktionsgruppen herausarbeiten zu können.

Bitte beachten Sie:

Der gesamte Ablauf dauert 2 Stunden. Wir bitten Sie 5-10 Minuten vor dem vereinbarten Termin zu kommen (wenn möglich nicht gehetzt und hungrig).

Bitte suchen Sie falls notwendig vorher noch die Toilette auf.

Die Messung erfolgt in Rückenlage bei geschlossenen Augen.(2 x 40 Minuten.) Falls Sie Kontaktlinsenträger sind und damit Probleme haben, nehmen Sie bitte Ihre Kontaktlinsen vorher heraus.

Bitte verwenden Sie an diesem Tag kein Make-up und keine Hautcreme im Stirnbereich. Es verändert die Messfähigkeit der EEG Elektroden.

Wir ersuchen Sie kein Handy, Timer oder andere Elektronische Geräte mitzunehmen, da diese die EEG Messung beeinflussen.

Zum Verlauf:

Zuerst werden die Elektroden befestigt: 3 EEG-Elektroden auf der Stirn, jeweils eine am Mastoid, jeweils eine EKG-Elektrode unter linken und rechten Schlüsselbein, und die dritte EKG-Elektrode auf Nabelhöhe am Linken Unterbauch. Aufgrund der hohen Sensibilität der EEG-Elektroden ist es notwendig, dass wir Ihre Haut im Stirnbereich mit Desinfektionsmittel reinigen. Zur Blutdruckmessung wird eine Manschette an den linken Oberarm angelegt. Sie bekommen Ohrstöpsel und ein Handtuch über die Augen. **Die Augen sollten während der gesamten Messdauer geschlossen gehalten werden**, da sich sonst das EEG sofort verändert.

Es erfolgt die erste Messung. Sie liegen am Rücken, Augen geschlossen und bedeckt. Die Messung dauert 40 Minuten und wir wollen beobachten, wie lange das vegetative Nervensystem braucht, bis es sich beruhigt.

Anschließend daran erfolgt der Osteopathische Befund. Wir rechnen für diesen Teil mit ca. 20. Minuten.

Im dritten Teil erfolgt die Messung mit Durchführung der Osteopathischen Technik. (Dauer 40 Minuten) Sie liegen dabei wieder in Rückenlage, Augen geschlossen. 10 Minuten nach Beginn der Messung wird einer von uns beiden seine Hände unter Ihren Hinterkopf legen und mit leichtem Druck beginnend bis zu mittelstarkem Druck ansteigend die Technik durchführen (5-15 Minuten). Die Technik an sich ist nicht schmerzhaft. Es kann aber sein, dass Sie an sich leichte vegetative Reaktionen feststellen, z.B. veränderter Atemrhythmus, Ziehen im Nacken- oder Kreuzbeinbereich... . Nach Beendigung der Technik bleiben Sie bitte liegen, bis wir Ihnen sagen, dass 40 Minuten vorbei sind.

Im Anschluss daran haben wir noch Zeit Ihren Osteopathischen Befund und eventuell den Testverlauf zu besprechen.

Wir ersuchen Sie während der Messzeit nicht zu sprechen. Sie wissen ja: Das EEG reagiert sofort. Sie werden gut gelagert liegen und können die Zeit entspannt genießen.

Folgende Krankheitsbilder bzw. Faktoren gelten als **Kontraindikationen**:

I. Gefäßerkrankungen im Kopfbereich
II. Blutungen im Kopf- und Halsbereich
III. Herzschrittmacher
IV. Chron. Bluthochdruck: Systole>160mmHg, Diastole> 90mmHg
V. Schwangerschaft

Sollte einer der oben angeführten Punkte auf Sie zutreffen, ersuchen wir Sie uns das bitte bekannt zu geben. Wir müssen dann von einer Messung Abstand nehmen.

10.5.6. Anamnese form

ANAMNESEBLATT zur CV4-STUDIE			Studiennummer
Name	Alter		Datum
Bitte die Antwort einringeln bzw. Details ergänzen. **Danke!**			
War Ihre Geburt schwierig?	nein	ja	Saugglocke, Kaiserschnitt
Nehmen Sie Medikamente?	nein	ja	wenn ja, welche
Für Frauen: Sind Sie schwanger?	nein	ja	wenn ja: KEINE CV4 TECHNIK !!!
Hatten bzw. haben Sie (ein/e):			
schwere Krankheit(en)?	nein	ja	wenn ja, welche
Erkrankung eines Organs (Herz, Lunge, Niere, ...)?	nein	ja	wenn ja, welche
Bluthochdruck (Systole >160, Diastole >90)?	nein	ja	
Asthma?	nein	ja	
Allergie(n)?	nein	ja	wenn ja, welche
Probleme mit Ihrer Schilddrüse?	nein	ja	wenn ja, welche
Probleme mit Ihren Gefäßen?	nein	ja	wenn ja, welche

Probleme mit Ihrer Knochendichte?	nein	ja	
schwere Infektion(en)?	nein	ja	wenn ja, welche
Liquorpunktion?	nein	ja	
Operation(en)?	nein	ja	wenn ja, welche
schwere Unfälle?	nein	ja	wenn ja, welche
Autounfall mit Schleudertrauma?	nein	ja	
Knochenbrüch(e)?	nein	ja	wenn ja, welche
Sehnen/ Bandverletzung(en)?	nein	ja	wenn ja, welche
Schädel-Hirntrauma?	nein	ja	
Blutungen im Kopfbereich?	nein	ja	

Gehirnerschütterung?	nein	ja	
Bewusstlosigkeit (Amnesie)?	nein	ja	
Migräne?	nein	ja	
Epilepsie?	nein	ja	
starke Kopfschmerzen?	nein	ja	
derzeit Schmerzen?	nein	ja	wenn ja, welche
ausstrahlende Schmerzen / Gefühlsstörungen in Armen oder Beinen?	nein	ja	wenn ja, welche
schwere Zahnbehandlung?	nein	ja	
Bissprobleme?	nein	ja	
Ohrensausen (Tinnitus aurium)?	nein	ja	
psychische Schocks (z.B. plötzlicher Todesfall ...)?	nein	ja	
Schlafstörungen?	nein	ja	
heute schlecht geschlafen?	nein	ja	
Beschwerden bei bestimmten Wetterlagen (Föhn ...)?	nein	ja	wenn ja, welche
in den letzten 5 Tagen Fieber über 38 Grad?	nein	ja	
körperliche Schwachstellen, die Sie bei Stress spüren?	nein	ja	wenn ja, welche
metallische Implantate?	nein	ja	wenn ja, welche
Herzschrittmacher?	nein	ja	
Brille oder Kontaktlinsen?	nein	ja	
Hörhilfe?	nein	ja	
Wollen Sie noch etwas ergänzen ?	nein	ja	

Raum für Ergänzungen:

Name:			Nr.	
A) Stand: Typologie	anterior	posterior	normal	
B) Verticale de Barré:	Kopf li	Kopf re	Becken li	Becken re
Skoliose lumb. konvex nach	links	rechts	keine Skol.	
C) Abhören im Stand und in der Rückenlage - Zug/ Strain in Richtung:				
D) Abhören in der RL Kontakt unter den Fersen - Zug / Strain in Richtung:				
E) Abhören der Bauchorgane				
F) Abhören des Thorax über das Sternum				
G) Abtasten der Bauchorgane				

	C	D	E	F	G
Schädel					
HWS					
BWS					
LWS					
Sacrum					
Ilium					
Lunge li					
Lunge re					
Herz					
Zwerchfell					
Leber					
Magen					
Pankreas					

Milz					
12 Fingerdarm					
Dünndarm					
Caecum					
Colon aszendens					
Colon transversum					
Colon descendens					

	C	D	E	F	G
Sigmoid					
Sigmoid					
Niere li					
Niere re					
Nebenniere li					
Nebenniere re					
Uterus					
Ovar links					
Ovar rechts					
Scheide					
Prostata					
Penis					

H) Manuelle Befundung von Kopf und Wirbelsäule					
1) Kopf	Komp	Flex	Ex	Tors li	Tors re
SbRot li	SbRot re	Lat Str li	Lat Str re	Str sup	Str inf
2) HWS	C0				
Anmerkungen:	C1				
	C2				
	C3				
	C4				
	C5				
	C6				
	C7				
3) BWS	Th1				
Anmerkungen:	Th2				
	Th3				
	Th4				
	Th5				
	Th6				
	Th7				
	Th8				
	Th9				
	Th10				
	Th11				
	Th12				

4) LWS Anmerkungen:	L1				
	L2				
	L3				
	L4				
	L5				
5) Becken Ilium	ant	post	hoch	Sacr.-Flex	Sacr.-Ex
I) Befundung der Dura	Stauchung		Streckung		
Sacrum in Flex	Ex	Sb links	Sb rechts	Rot li	Rot re
Occiput in Flex	Ex	Sb links	Sb rechts	Rot li	Rot re
J) Bemerkungen:					

10.5.6. Questionaire (after Test)

Danke, dass Du bei unserer Osteopathie Studie zur CV4 Technik mitgemacht hast.

Es ist wichtig für uns zu erfahren, wie es Dir während und nach der Technik ergangen ist.

Bitte beantworte folgende Fragen:

	1. Messung		2. Messung	
Ich bin gut und angenehm gelegen	ja	nein	ja	nein
Ich war entspannt und ruhig	ja	nein	ja	nein
Ich war eher unruhig	ja	nein	ja	nein

	1. Messung		2. Messung	
Ich bin gut und angenehm gelegen	ja	nein	ja	nein
Ich war entspannt und ruhig	ja	nein	ja	nein
Ich war eher unruhig	ja	nein	ja	nein

Ich habe	1. Messung		2. Messung	
überwiegend geschlafen	ja	nein	ja	nein
teilweise geschlafen	ja	nein	ja	nein
nie geschlafen	ja	nein	ja	nein

Die CV4 -Technik während der 2. Messung war für mich

neutral	ja	nein
angenehm	ja	nein
unangenehm	ja	nein

Ich musste bei der Technik vermehrt schlucken	ja nein

Reaktionen nach der Technik

müde	ja	nein
wach	ja	nein
keine	ja	nein
Schmerzen	ja	nein
andere, wenn ja welche?	ja	nein

In welchem Zeitraum nach der Testung hattest du Reaktionen?

I had to swallow with the technique increasingly	

Reactions after the technique

tired	yes	no
awake	yes	no
none	yes	no
Hurt	yes	no
other, if so which?	yes	no

In which period after the Testung did you have reactions?

10.5.7. Example of raw data from the measurement

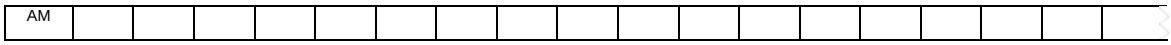
On the following sides an example of a record kontrollmessung is found after the conversion from the drc-data format of the compact monitor in the Excel format. On account of the data amount the data are distributed to 4 sides.

The first 18-th measuring dimensions and approx. the first 20 minutes.
The fissure contains completely on the left the times.

27/04/02	11:14	Trend																
Time	HR	ST1	Imped.	NIBP sys	NIBP dia	NIBP mean	PR (NIBP)	SpO2	PR (SpO2)	SpO2 _ir	RR (CO2)	Pamb	PTC	HR (ECG)	HRmax	HRmin	Marker	HR (aECG)
11:14:27 AM	66	-1,6	14	-32767	-32767	-32767	-32767	99	71	74	14	760	-291,85	66	76	65	0	66
11:14:57 AM	71	-1,6	12	132	76	94	66	98.5	69	78	12	760	-291,85	71	72	66	0	71
11:15:27 AM	70	1.2	11	132	76	94	66	97.5	70	105	11	760	-291,85	70	73	65	0	70
11:15:57 AM	80	-2,2	10	128	78	96	73	97.5	75	107	10	760	-291,85	80	81	71	0	80
11:16:27 AM	74	-1,1	12	128	78	96	73	97	72	113	12	760	-291,85	74	79	67	0	74
11:16:57 AM	81	-1,3	13	128	78	96	73	97.5	80	124	13	760	-291,85	81	85	75	0	81
11:17:27 AM	69	-0,7	13	128	78	96	73	97	68	135	13	760	-291,85	69	75	65	0	69
11:17:57 AM	74	-1,4	8	128	78	96	73	98	74	113	8	760	-291,85	74	80	67	0	74
11:18:27 AM	86	-2	13	128	78	96	73	97	80	128	13	760	-291,85	86	84	78	0	86
11:18:57 AM	75	-1,3	16	128	78	96	73	97	74	144	16	760	-291,85	75	79	68	0	75
11:19:27 AM	75	-2,5	12	128	78	96	73	97	75	126	12	760	-291,85	75	81	71	0	75
11:19:57 AM	71	-0,2	13	128	78	96	73	97	74	189	13	760	-291,85	71	78	72	0	71
11:20:27 AM	77	0.3	-32767	128	78	96	73	97.5	75	109	-32767	760	-291,85	77	80	72	0	77
11:20:57 AM	73	-2,2	-32767	124	76	94	73	98	77	94	-32767	760	-291,85	73	85	68	0	73
11:21:27 AM	69	-0,9	11	124	76	94	73	98	72	113	11	760	-291,85	69	77	66	0	69
11:21:57 AM	72	-0,2	11	124	76	94	73	98	74	129	11	760	-291,85	72	79	68	0	72
11:22:27 AM	72	-0,2	11	124	76	94	73	98	72	162	11	760	-291,85	72	74	69	0	72
11:22:57 AM	68	-1,2	-32767	124	76	94	73	97	73	126	-32767	760	-291,85	68	75	67	0	68
11:23:27 AM	76	-1,8	16	124	76	94	73	97	74	191	16	760	-291,85	76	78	69	0	76
11:23:57 AM	72	-2,1	18	124	76	94	73	97	74	175	18	760	-291,85	72	80	67	0	72

11:24:27 AM	69	-1,4	13	124	76	94	73	97	71	122	13	760	-291,85	69	74	65	0	69
11:24:57 AM	73	-1,1	11	124	76	94	73	98	73	93	11	760	-291,85	73	77	65	0	73
11:25:27 AM	66	-1,3	12	124	76	94	73	98	65	132	12	760	-291,85	66	73	62	0	66
11:25:57 AM	74	-0,5	12	124	77	91	71	97	74	155	12	760	-291,85	74	78	67	0	74
11:26:27 AM	67	-1,1	13	124	77	91	71	97	69	145	13	760	-291,85	67	72	66	0	67
11:26:57 AM	73	-1,5	13	124	77	91	71	97	72	182	13	760	-291,85	73	78	66	0	73
11:27:27 AM	70	-0,7	13	124	77	91	71	97	69	195	13	760	-291,85	70	74	66	0	70
11:27:57 AM	70	-1,3	8	124	77	91	71	96.5	72	201	8	760	-291,85	70	75	68	0	70
11:28:27 AM	76	-1,2	8	124	77	91	71	97	73	138	8	760	-291,85	76	78	67	0	76
11:28:57 AM	70	-1,8	8	124	77	91	71	97	73	166	8	760	-291,85	70	77	69	0	70
11:29:27 AM	68	-1,1	11	124	77	91	71	97.5	68	132	11	760	-291,85	68	72	65	0	68
11:29:57 AM	66	0.3	11	124	77	91	71	97	69	165	11	760	-291,85	66	69	65	0	66
11:30:27 AM	68	-0,1	13	124	77	91	71	97	70	130	13	760	-291,85	68	80	66	0	68
11:30:57 AM	67	-1,3	15	123	71	90	69	97	66	162	15	760	-291,85	67	68	64	0	67
11:31:27 AM	68	-0,8	17	123	71	90	69	97	68	196	17	760	-291,85	68	72	65	0	68
Time	HR	ST1	Imped.	NIBP sys	NIBP dia	NIBP mean	PR (NIBP)	SpO2	PR (SpO2)	SpO2 _ir	RR (CO2)	Pamb	PTC	HR (ECG)	HRmax	HRmin	Marker	HR (aECG)
11:31:57 AM	69	-0,9	11	123	71	90	69	97	68	135	11	760	-291,85	69	73	66	0	69
11:32:27 AM	64	-1,4	13	123	71	90	69	97	68	189	13	760	-291,85	64	69	64	0	64
11:32:57 AM	68	-0,8	11	123	71	90	69	97	68	190	11	760	-291,85	68	72	64	0	68
11:33:27 AM	69	-1,1	10	123	71	90	69	97	69	178	10	760	-291,85	69	73	67	0	69
11:33:57 AM	69	-1,3	8	123	71	90	69	97	70	158	8	760	-291,85	69	73	65	0	69
11:34:27 AM	68	-1,5	11	123	71	90	69	98	67	140	11	760	-291,85	68	70	64	0	68
11:34:57 AM	66	-0,4	12	123	71	90	69	98	66	136	12	760	-291,85	66	68	63	0	66
11:35:27 AM	70	-0,2	11	123	71	90	69	98	70	90	11	760	-291,85	70	73	67	0	70
11:35:57 AM	67	0.3	12	122	71	88	68	98	66	146	12	760	-291,85	67	68	64	0	67
11:36:27 AM	69	-4,2	14	122	71	88	68	97	69	139	14	760	-291,85	69	71	66	0	69
11:36:57 AM	66	-0,3	16	122	71	88	68	97	65	90	16	760	-291,85	66	66	61	0	66
11:37:27 AM	66	-0,4	20	122	71	88	68	98	67	96	20	760	-291,85	66	68	64	0	66
11:37:57 AM	66	0.8	14	122	71	88	68	98	65	68	14	760	-291,85	66	67	63	0	66
11:38:27 AM	66	1.2	14	122	71	88	68	98	64	138	14	760	-291,85	66	67	62	0	66

11:38:57 AM	66	1.6	21	122	71	88	68	97	67	103	21	760	-291,85	66	70	65	0	66
11:39:27 AM	64	-1,4	13	122	71	88	68	99	65	81	13	760	-291,85	64	67	62	0	64
11:39:57 AM	62	-1,6	12	122	71	88	68	98	66	64	12	760	-291,85	62	66	61	0	62
11:40:27 AM	64	0.9	17	122	71	88	68	98	64	63	17	760	-291,85	64	68	60	0	64
11:40:57 AM	70	-0,3	15	121	70	88	65	98	68	89	15	760	-291,85	70	70	66	0	70
11:41:27 AM	66	0.5	13	121	70	88	65	98	66	102	13	760	-291,85	66	68	63	0	66
11:41:57 AM	65	-0,7	14	121	70	88	65	98	66	63	14	760	-291,85	65	70	61	0	65
11:42:27 AM	65	-0,9	9	121	70	88	65	98	63	86	9	760	-291,85	65	66	60	0	65
11:42:57 AM	69	-1,6	8	121	70	88	65	98	68	67	8	760	-291,85	69	71	66	0	69
11:43:27 AM	61	-0,5	10	121	70	88	65	98	62	97	10	760	-291,85	61	66	60	0	61
11:43:57 AM	63	-1,2	12	121	70	88	65	99	64	66	12	760	-291,85	63	65	61	0	63
11:44:27 AM	64	-1	14	121	70	88	65	99	63	71	14	760	-291,85	64	66	60	0	64
11:44:57 AM	62	-2,3	14	121	70	88	65	99	63	55	14	760	-291,85	62	66	61	0	62
11:45:27 AM	62	0.1	13	121	70	88	65	99	62	52	13	760	-291,85	62	65	59	0	62
11:45:57 AM	68	-1,5	13	123	71	85	62	98.5	67	84	13	760	-291,85	68	70	66	0	68
11:46:27 AM	65	-1,8	15	123	71	85	62	98	66	127	15	760	-291,85	65	68	63	0	65
11:46:57 AM	64	-1,3	12	123	71	85	62	97.5	65	123	12	760	-291,85	64	66	61	0	64
11:47:27 AM	63	-1,2	15	123	71	85	62	97.5	63	133	15	760	-291,85	63	66	60	0	63
11:47:57 AM	60	-2,5	11	123	71	85	62	98	62	87	11	760	-291,85	60	64	60	0	60
11:48:27 AM	65	-0,5	15	123	71	85	62	98	65	75	15	760	-291,85	65	67	64	0	65
11:48:57 AM	64	-0,5	12	123	71	85	62	98	64	69	12	760	-291,85	64	66	62	0	64
11:49:27 AM	64	-1,4	12	123	71	85	62	98	65	56	12	760	-291,85	64	66	62	0	64
11:49:57 AM	64	0	17	123	71	85	62	99	63	62	17	760	-291,85	64	64	61	0	64
11:50:27 AM	64	0.5	15	123	71	85	62	99	61	71	15	760	-291,85	64	64	58	0	64
11:50:57 AM	64	-1,3	17	121	72	88	63	99	63	57	17	760	-291,85	64	65	61	0	64
11:51:27 AM	63	-1,6	10	121	72	88	63	99	64	91	10	760	-291,85	63	66	60	0	63
11:51:57 AM	65	-0,7	11	121	72	88	63	98	63	68	11	760	-291,85	65	65	60	0	65
11:52:27 AM	63	-0,7	10	121	72	88	63	99	66	63	10	760	-291,85	63	67	60	0	63
11:52:57 AM	60	-1,2	10	121	72	88	63	99	63	72	10	760	-291,85	60	66	61	0	60
11:53:27 AM	61	-0,9	13	121	72	88	63	98.5	61	49	13	760	-291,85	61	64	59	0	61
11:53:57	60	-1,8	11	121	72	88	63	99	60	49	11	760	-291,85	60	62	56	0	60



The first 18-th measuring dimensions and approx. the second 20 minutes.

The fissure contains completely on the left the times.

Still missing 17 measuring dimensions and approx. the first 20 minutes.

The fissure contains completely on the right to the orientation again the times.

																	27/04/02
FEMG	Ampl1	SEF1	MF1	Delta1	Theta1	Alpha1	Beta1	BSR1	Ampl2	SEF2	MF2	Delta2	Theta2	Alpha2	Beta2	BSR2	Time
2.7	8.6	7.8	1.2	87	8	4	2	10	8.7	7.4	1.2	89	7	3	1	8	11:14:27 AM
2.4	11.7	6.3	0.8	92	4	3	1	33	11.7	8.2	1.2	87	7	4	2	28	11:14:57 AM
2.1	8.9	7.4	1.2	90	5	3	2	33	11.5	9.4	0.8	84	9	5	2	30	11:15:27 AM
2.9	10.7	10.9	2	80	7	10	4	35	11.7	12.1	2	78	6	11	5	23	11:15:57 AM
1.7	9.5	13.7	2	67	11	16	6	53	9.1	15.2	2.3	64	12	18	6	28	11:16:27 AM
1.6	9.4	12.1	2	72	11	13	4	51	9.4	10.9	2	79	11	6	4	36	11:16:57 AM
2.3	9.9	15.2	2	73	11	10	6	63	9.3	13.3	2	72	14	9	5	54	11:17:27 AM
2.6	8.2	12.5	2.7	54	13	28	4	80	7.4	12.9	2	67	10	18	5	68	11:17:57 AM
2.7	10.3	11.3	1.2	77	9	11	3	88	9.9	16.4	2.3	59	11	23	7	80	11:18:27 AM
2.8	7.7	11.3	2	60	11	25	3	86	7	13.3	2	73	9	12	5	81	11:18:57 AM
2.6	9.5	12.9	3.5	54	10	31	5	90	10.4	15.6	3.9	52	13	28	7	86	11:19:27 AM
1.8	7.4	13.3	2	62	9	24	5	100	6.7	12.9	1.6	73	9	13	5	91	11:19:57 AM
2.7	8.2	11.3	2	73	7	17	3	98	11.1	10.9	2	75	13	9	3	73	11:20:27 AM
2	6.5	15.2	2	59	14	17	9	90	6.1	13.7	2.7	54	16	23	7	65	11:20:57 AM
1.6	7.1	12.1	2.3	63	12	21	4	85	15.1	12.9	1.6	76	8	11	5	60	11:21:27 AM
5.3	-32767	12.5	5.5	46	12	38	4	93	-32767	16.8	6.6	40	13	35	12	71	11:21:57 AM
1.6	6.3	15.6	2.7	58	12	22	8	96	7.1	16	2.7	65	11	16	8	89	11:22:27 AM
1.4	9.2	10.9	1.6	77	9	11	3	96	6.9	16.4	2.7	63	10	19	8	92	11:22:57 AM
1.3	8.1	12.5	1.6	67	7	22	4	95	7.6	12.9	2	71	7	17	4	96	11:23:27 AM
1.4	8.2	14.8	2.7	58	9	27	7	88	7	13.7	2	64	4	26	6	88	11:23:57 AM
1.4	8.4	16.4	2.7	57	11	24	8	90	7.2	18.8	6.3	45	9	38	8	90	11:24:27 AM
1.4	7.7	11.7	1.6	74	9	13	4	91	6.2	11.3	2	73	10	14	4	88	11:24:57 AM
1.5	8	12.9	2.7	66	10	20	5	85	7.1	11.3	1.6	78	6	14	3	81	11:25:27 AM
1.8	6.9	17.2	2.3	60	8	24	8	88	9.5	12.5	1.6	74	10	11	5	90	11:25:57 AM
1.6	8.2	12.5	1.2	68	7	20	5	90	8.6	14.1	2	67	11	17	6	86	11:26:27 AM
1.4	8.1	12.1	2	64	8	24	4	88	7.4	11.7	1.2	76	5	14	4	83	11:26:57

																	AM
5.1	-32767	12.9	0.4	78	4	13	5	91	-32767	14.1	2.3	59	8	27	6	93	11:27:27 AM
1.3	7.3	13.3	0.8	64	11	19	5	88	5.6	13.3	1.2	63	6	25	6	96	11:27:57 AM
1.2	6.2	14.1	2	55	8	30	6	86	7.3	16	3.1	55	10	29	6	96	11:28:27 AM
1.3	7.6	11.7	3.1	58	11	28	4	88	6.5	12.9	5.5	47	11	36	5	100	11:28:57 AM
1.4	9.1	10.5	1.2	82	6	10	2	90	7.8	12.1	1.6	73	4	19	4	98	11:29:27 AM
1	8.1	16	8.2	35	11	47	7	95	6.4	18.8	7.4	41	11	39	9	96	11:29:57 AM
1.5	9.7	12.1	1.6	60	6	30	4	95	6.5	18.4	7	38	13	41	8	96	11:30:27 AM
1.4	7.5	12.5	1.2	67	7	21	5	90	5.5	16	3.5	53	11	29	7	96	11:30:57 AM
1.2	9.5	10.9	0.4	87	4	7	2	88	7.9	13.3	1.6	61	10	24	5	98	11:31:27 AM
1.2	4.9	14.1	9.8	29	11	54	6	92	6.5	16.4	7.4	42	9	41	8	98	11:31:57 AM
1.6	7.5	12.9	2.7	57	11	27	4	94	7.1	13.7	6.6	39	16	39	5	96	11:32:27 AM
1.1	8.6	10.5	0.8	73	8	18	2	86	7.9	12.1	1.2	60	9	27	4	88	11:32:57 AM
1.2	8	12.5	0.8	74	6	16	4	86	6.2	18.8	3.5	53	4	33	10	88	11:33:27 AM
0.9	7.7	10.2	0.4	88	3	8	1	83	5.1	15.6	4.3	48	12	33	7	96	11:33:57 AM
0.9	11.2	5.5	0.4	94	2	3	1	76	9.6	10.5	0.4	83	3	12	2	93	11:34:27 AM
0.9	7.9	10.9	0.4	83	5	10	1	78	11.8	11.7	1.2	57	7	32	3	90	11:34:57 AM
1.2	10.1	12.5	1.6	60	8	28	4	85	9.7	12.1	2.7	59	13	24	4	91	11:35:27 AM

FEMG	Ampl1	SEF1	MF1	Delta1	Theta1	Alpha1	Beta1	BSR1	Ampl2	SEF2	MF2	Delta2	Theta2	Alpha2	Beta2	BSR2	Time
1.1	10.9	9.8	0.4	91	3	5	1	83	7.1	16	2.7	53	8	31	7	93	11:35:57 AM
1.5	6.5	11.3	0.8	75	6	17	3	66	5.5	12.1	1.2	60	9	28	4	90	11:36:27 AM
0.9	7.9	11.7	0.8	79	4	14	3	73	8	14.1	4.7	48	9	38	5	91	11:36:57 AM
1	7.6	11.3	1.2	66	8	23	3	86	7.9	11.3	0.4	76	3	18	3	90	11:37:27 AM
1.6	7.6	12.9	1.2	61	8	27	5	91	6.4	17.2	2	59	7	26	8	91	11:37:57 AM
0.9	13.3	10.9	0.4	84	4	11	2	86	7.1	13.7	6.6	42	9	43	5	96	11:38:27 AM
1.4	8	11.3	0.4	78	5	14	3	76	7.7	18.4	1.6	63	10	19	8	91	11:38:57 AM
1	11.6	10.9	0.4	69	5	23	3	86	8.3	12.9	3.1	51	6	37	5	91	11:39:27 AM
1.6	4.9	10.2	0.4	90	3	6	2	73	6.2	10.9	0.4	83	4	11	3	83	11:39:57 AM
1.3	8.2	12.1	1.2	65	6	25	4	68	6.4	21.1	5.9	44	10	36	10	86	11:40:27 AM
1.2	11.5	10.5	0.4	78	5	14	2	76	8.6	12.5	2.3	57	10	28	5	95	11:40:57 AM
1	11.7	13.7	1.2	64	6	24	6	73	7.2	14.5	0.4	67	7	21	6	81	11:41:27

																	AM
1.2	11.9	11.3	0.4	76	4	17	2	73	6.3	12.1	0.8	66	7	24	3	85	11:41:57 AM
1.1	11.6	8.6	0.4	93	2	4	1	60	7.1	12.9	3.9	50	11	34	5	95	11:42:27 AM
1.2	9.1	12.9	4.7	49	12	35	5	63	11.7	11.3	0.4	75	5	17	4	90	11:42:57 AM
0.9	14.8	10.9	0.4	88	3	7	2	73	7.9	10.9	0.8	85	4	8	3	83	11:43:27 AM
0.8	7.2	10.9	0.4	83	3	12	2	66	9.2	10.9	0.4	84	3	12	1	80	11:43:57 AM
0.8	14.6	9.4	0.4	91	3	5	1	70	8.2	11.3	0.8	74	3	20	3	71	11:44:27 AM
1.2	7.7	7.4	0.4	91	4	3	1	56	11.9	10.9	0.4	88	3	7	2	73	11:44:57 AM
1.2	7.3	13.7	1.6	65	7	22	6	55	8.3	13.3	2.7	54	8	32	5	80	11:45:27 AM
1.1	8.8	10.5	0.4	86	5	8	2	80	6.4	17.2	2	65	7	21	7	86	11:45:57 AM
0.9	6.8	10.5	0.4	80	4	14	2	78	6.9	14.1	9.4	38	8	49	6	95	11:46:27 AM
0.9	8.1	12.5	0.8	69	4	22	5	68	7.2	14.5	1.6	55	5	34	6	86	11:46:57 AM
0.9	8.2	11.7	1.2	70	7	19	3	83	9.1	10.5	0.4	80	4	14	3	86	11:47:27 AM
0.7	9.4	10.5	0.4	87	3	10	1	75	9.6	10.2	0	91	2	7	1	80	11:47:57 AM
0.7	10.8	10.9	0.4	82	6	10	2	61	7.8	10.5	0.4	89	3	7	1	68	11:48:27 AM
0.6	10.9	14.8	0.8	68	6	19	7	75	6.4	12.5	1.2	67	5	23	4	70	11:48:57 AM
0.7	7.7	14.8	1.2	64	6	24	6	85	8.8	13.3	0.8	65	6	24	5	80	11:49:27 AM
1.4	9.6	11.3	0.4	78	6	13	3	81	11.8	9.8	0.4	88	3	8	1	78	11:49:57 AM
0.9	7.7	12.5	2.7	56	15	24	5	76	8.7	11.3	0.8	75	4	19	2	71	11:50:27 AM
0.9	5.7	16.8	0.8	69	5	18	7	80	6.1	23.4	7.8	43	6	32	20	88	11:50:57 AM
1.5	10.7	10.5	0.4	87	4	8	1	76	7.4	10.9	0.8	73	8	17	2	93	11:51:27 AM
0.7	9.1	11.7	0.8	68	10	18	4	71	7.4	11.7	1.2	68	8	22	3	82	11:51:57 AM
0.6	10.8	10.5	0.8	90	3	7	1	64	9.1	9	0.4	92	2	4	2	76	11:52:27 AM
0.6	9.8	8.6	0.4	92	3	5	1	66	7.9	11.3	0.4	89	2	6	2	78	11:52:57 AM
0.6	6.3	10.2	0.4	82	6	10	2	68	5.8	11.3	2	69	12	16	3	88	11:53:27 AM
0.6	9	11.7	1.6	73	12	12	3	80	6.7	10.5	0.8	85	7	6	2	91	11:53:57 AM

Still missing 17 measuring dimensions and approx. the second 20 minutes.

The fissure contains completely on the right to the orientation again the times.

10.5.8. Evaluation table

The following table served for the static evaluation of the findings.

Number	Age	Size	kg	Man's woman	to quietly	Quiet	End	Birth	Med	pregnant	now rule	s-krank1	s-krank2	s-krank3	Organ krank1	Organ krank2	Organ krank3
1	34	183	80	1				2	2	2	2	35			2		
2	32	164	57	2				2	2	2	2	2			45		
3	23	170	75	2				2	82	2	2	2			2		
4	24	170	70	1	420	60	20	2	2	2	2	2			2		
5	22	172	70	1	300	80	90	2	2	2	2	2			2		
6	18	164	56	2	513	70	59	2	2	2	2	45			18		
7	30	160	58	2	170	90	70	2	2	2	1	2			2		
8	24	169	52	2	266	118	29	2	1	2	2	2			7	9	
11	21	168	60	2	182	66	68	2	1	2	2	2			2		
12	28	184	77	1	365	72	80	2	1	2	2	2			2		
13	27	178	69	1	276	88	46	2	2	2	2	2	2	2	2	2	2
14	19	164	52	2	298	76	47	2	2	2	2	2	2	2	2	2	2
15	20	172	63	2	225	145	60	2	2	2	2	2			2		
16	21	186	80	1	140	83	29	2	2	2	2	37	21		2		
21	39	171	65	2	310	54	36	2	2	2	2	2			2		
22	20	173	69	2	200	71	59	2	82	2	2	2			2		
23	22	170	58	2	335	31	34	2	82	2	2	2			2		
24	19	166	51	2	236	39	15	2	2	2	1	2			2		
25	22	173	68	2	282	107	77	2	82	2	2	2			2		
26	21	173	59	2	277	83	46	2	2	2	2	2			2		
27	20	176	78	1	290	70	56	2	1	2	2	2			2		
31	20	178	75	2				1	2	2	2	2			2		
32	20	160	60	2	348	39	26	2	82	2	2	2			2		
33	22	178	63	2	180	76	55	2	2	2	2	2			2		
34	20	170	64	2	120	70	36	2	82	2	2	2			2		
35	21	165	58	2	235	55	60	2	82	2	2	2			2		
36	20	183	67	1	180	87	42	2	2	2	2	21			2		
41	21	173	63	2				2	2	2	2	2			2		
42	21	173	63	2	198	77	48	1	2	2	2	18			2		
43	22	171	63	2	200	61	44	2	82	2	2	2			2		
44	19	170	55	2	310	60	35	2	2	2	2	2			2		
45	20	189	76	1	150	99	34	2	2	2	2	2			2		
46	21	160	50	2	185	93	36	2	2	2	2	2			2		
47	21	169	59	2				1	2	2	2	2			2		
51	25	165	53	2	150	100	50	2	82	2	1	2			58	59	
52	21	161	58	2	188	48	48	2	1	2	2	2			45		
53	23	161	52	2	120	80	45	2	82	2	2	2			2		
54	26	183	67	1	187	48	25	2	2	2	2	2			2		
55	30	184	78	1	135	45	56	2	2	2	2	2			2		
56	22	161	65	2	166	84	60	2	82	2	2	2			2		
57	20	168	70	2	152	66	30	2	2	2	2	2			2		
61	22	187	72	1	128	67	39	2	2	2	2	2			2		
62	22	169	56	2	312	123	75	2	2	2	2	2			2		
63	21	175	64	2	172	141	30	2	2	2	2	2			21	43	
64	25	169	61	2	177	89	30	2	82	2	2	2			2		
65	21	170	62	2	185	160	25	2	82	2	2	2			2		
66	22	160	62	2	139	89	25	2	1	2	2	65			65		
67	20	160	56	2	145	105	40	2	82	2	2	2			2		

Vol.-high	Asthma	Allergy	Sign gland	Vessels	Kno-thick	Infection	Liquor sharp.	Op1	Op2	Op3	Accident 1	Accident 2	Accident 3	Accident 4	Schleud-trauma	Fraktur1
2	2	2	2	2	2	37	2	2			22	25	27	0	0	22
2	1	1	2	2	2	2	2	2			2				2	2
2	2	20	1	2	2	2	2	6	36		2				2	36
2	2	2	2	2	2	2	2	2			2				2	2
2	2	2	2	2	2	2	2	2			2				2	2
2	2	20	2	2	2	1	2	2			2				2	22
2	2	20	1	2	2	2	2	2			2				2	2
2	2	1	2	2	2	2	2	2			2				2	2
2	2	20	2	2	2	2	2	2			2				2	2
2	2	1	2	2	2	2	2	2			2				1	2
2	2	2	2	2	2	2	2	16	44	0	2				2	2
2	2	1	2	2	2	2	2	49			2				2	2
2	2	2	2	2	2	2	2	2			2				2	2
2	2	20	2	2	2	2	2	2			2				2	24
2	2	2	2	2	2	2	2	12			2				1	22
2	2	1	2	2	2	2	2	2			14				2	26
2	2	1	2	2	2	2	2	36	40		2				2	25
2	2	2	2	2	2	2	2	2			2				2	2
2	2	2	2	2	2	2	2	2			2				2	31
2	2	2	2	2	2	2	2	2			2				2	2
2	1	20	2	2	2	2	2	88			2				2	2
2	2	2	2	2	2	2	2	2			2				2	2
2	2	2	2	2	2	2	2	2			2				2	2
2	2	2	2	2	2	2	2	2			2				2	2
2	2	2	2	2	2	2	2	49			1				2	22
2	2	20	2	2	2	2	2	134			2				2	2
2	2	2	2	2	2	2	2	6			2				2	2
2	2	2	2	2	2	2	2	2			2				2	
2	2	20	2	2	2	2	2	6			2				1	2
2	1	1	2	1	2	2	2	15			2				2	2
2	2	2	2	2	2	2	2	2			2				2	2
2	2	20	2	2	2	2	2	2			2				2	2
2	2	2	2	2	2	2	2	2			2				2	2
2	2	2	2	2	2	2	2	2			2				2	2
2	2	2	2	2	2	2	2	2			2				2	24
2	1	21	2	2	2	2	2	2			2				2	2
2	2	1	0	2	2	2	2	49			1				2	2
2	2	20	2	2	2	2	2	36			2				1	2
2	2	20	2	2	2	2	2	2			2				2	2
2	2	2	1	2	2	2	2	49	31	18	2				2	2
2	2	1	2	2	2	2	2	2			2				2	11
2	2	2	2	2	2	2	2	12			2				2	12
2	1	2	2	2	2	2	2	49			2				1	2
2	2	1	2	2	2	1	2	1			2				1	2
2	2	2	2	2	2	2	2	49			2				2	2
2	2	2	2	2	2	2	2	36			2				2	25
2	2	2	2	2	2	2	2	15	49		2				2	2
2	2	2	2	2	2	2	2	34			2				2	2

Fraktur2	Fraktur3	Sehnen-Bdverl 1	Sehnen-Bdverl 2	Sehnen-Bdverl 3	SHT	Head blood.	Gehirners.	Amnesie	Migraine	Epilepsy	Head pain	now pain	ausstr. Schm.	Zahn-bhdlg	Bite-rehearses.	Tinnitus	psychic ones. Shock
25	27	2	0	0	2	2	2	2	2	2	2	2	2	1	2	2	2
		2			2	2	2	2	2	2	2	2	2	2	2	2	1
25	22	2			2	2	2	2	2	2	2	2	2	2	0	2	2
		12			2	2	2	2	2	2	2	2	2	2	2	2	1
		12			2	2	2	2	2	2	2	2	2	2	2	2	2
		2			2	2	2	2	2	2	2	87	2	2	2	2	2
		2			2	2	2	2	2	2	2	81	2	2	2	2	2
		2			2	2	2	2	2	2	2	2	2	2	2	2	2
		2			2	2	2	2	2	2	2	2	2	2	2	2	2
		2			2	2	2	2	2	2	1	73	2	2	2	2	2
0	0	12			2	2	2	2	2	2	2	24	2	2	2	2	2
2	2	2			2	2	2	2	2	2	2	2	2	2	2	2	2
		2			2	2	2	2	2	2	2	2	2	2	2	2	2
		22			2	2	2	2	2	2	1	87	2	2	2	2	2
		12			2	2	1	2	2	2	2	2	2	2	2	1	2
		2			2	2	2	2	2	2	2	2	2	1	2	2	1
		2			2	2	1	2	1	2	2	2	2	1	2	1	2
		2			2	2	2	2	2	2	2	2	2	2	2	1	2
		2			2	2	2	2	2	2	2	2	2	2	2	2	2
		2			2	2	2	2	2	2	2	2	2	2	1	2	2
		2			2	2	2	2	2	2	2	2	2	2	2	2	2
		2			2	2	2	2	2	2	2	2	2	2	2	2	2
		2			2	2	2	2	2	2	2	2	2	2	2	2	2
		13			2	2	1	2	2	2	2	2	2	2	2	2	2
12		2			2	2	1	1	2	2	2	2	2	2	2	2	2
		24			2	2	2	1	2	2	2	2	2	2	2	2	2
		2			2	2	2	2	2	2	2	2	14	2	2	2	2
		53			2	2	2	2	2	2	1	2	2	2	2	2	2
		2			2	2	1	2	2	2	2	87	2	2	2	2	2
		15			2	2	2	2	2	2	2	2	2	1	2	2	2
		2			2	2	2	2	2	2	2	2	2	1	2	2	2
		2			2	2	2	2	2	2	2	2	2	2	2	2	2
		2			2	2	2	2	2	2	2	2	2	2	2	2	2
		2			2	2	2	2	2	2	2	2	2	1	2	2	2
25		2			2	2	1	2	2	2	2	2	2	2	2	2	2
		2			2	2	1	2	1	2	1	2	2	2	2	2	2
		24			2	2	2	2	2	2	2	2	2	2	2	2	2
		2			2	2	2	2	2	2	2	2	2	2	2	2	2
		2			2	2	2	2	2	2	2	2	2	2	2	2	2
		2			2	2	2	2	2	2	2	2	2	1	2	2	2
		2			2	2	2	2	2	2	2	2	2	2	2	2	2
		2			2	2	1	1	2	2	2	2	2	2	2	2	2
		2			2	2	1	2	1	2	1	2	2	2	2	2	1
		12			2	2	1	2	2	2	1	2	2	2	2	2	1
		2			2	2	2	2	2	2	2	2	2	2	2	2	2
		2			2	2	2	2	2	2	1	2	2	1	2	2	2
		15			2	2	2	2	2	2	2	2	2	1	2	2	2
		2			2	2	1	2	2	2	1	2	2	2	2	2	2

beginning: osteopathiic findings ⇓

Sleep	today sleep	Weather	Fever	Weak place 1	Weak place 2	Impl.	Heart pacemaker	Glasses lens	Hearing help	B - Typo-logie	B-Barré	B-Abh-C1	B-Abh-C2	B-Abh-C3	B-Abh-C4	B-Abh-D1	B-Abh-D2
2	2	2	2	40	0	2	2	2	2	3	2	84	85			85	
2	2	71	2	2		2	2	2	2	1	2	83	84	43		43	
2	2	2	2	54	0	2	2	1	2	1	7	92	83	84		84	60
2	2	71	2	2		2	2	2	2	1	1	86				86	85
2	2	2	2	48		2	2	1	2	3	2	92	83	84	86	86	5
2	2	71	2	2		2	2	2	2	3	6	92	86			86	
2	1	71	2	48		2	2	1	2	1	3	83	87			91	60
2	2	41	2	2		2	2	1	2	2	7	83				5	78
2	2	71	2	54	77	2	2	2	2	3	1	43				43	90
2	2	2	2	2		2	2	2	2	1	7	92	84	85		84	85
2	2	2	2	2		2	2	2	2	1	2	92	86			86	93
2	2	2	2	2		2	2	1	2	1	1	92	88	85	86	85	86
2	1	2	2	2		2	2	2	2	3	2	85				85	
2	2	71	2	48	87	2	2	1	2	3	2	92	84			86	
1	2	2	2	10		2	2	1	2	3	2	92	84			43	
1	1	71	2	2		2	2	2	2	3	7	92	84	88	85	14	
2	2	71	2	73		2	2	2	2	3	7	87	88			88	85
2	2	2	2	49		2	2	1	2	3	7	84	88	85	86	88	85
2	2	2	2	54		2	2	1	2	3	7	88	85			88	85
2	2	2	2	54		2	2	2	2	2	1	84	88	86		85	78
2	2	2	2	2		2	2	2	2	2	1	86	43			86	43
2	2	2	2	2		2	2	2	2	1	3	5				5	7
2	2	71	2	88	54	2	2	2	2	3	7	92	85			85	
2	2	71	2	87		2	2	1	2	3	7	85				85	
2	2	2	2	2		2	2	1	2	3	1	85				85	81
2	2	2	2	87		2	2	1	2	3	7	84				50	
2	2	2	2	2		2	2	1	2	3	7	14	3			14	
2	2	71	2	2		2	2	2	2	3	2	92	84			8	
1	2	71	2	18		2	2	2	2	3	7	92	84	86		86	
2	2	71	2	2		2	2	2	2	3	7	92	84	46		46	
2	2	1	2	48		2	2	1	2	3	7	92	84	83	88	88	85
2	2	2	2	2		2	2	2	2	3	7	83	84	87	88	88	85
2	2	41	2	10		2	2	1	2	3	7	92	83	87		88	85
2	2	2	2	2		2	2	1	2	3	7	59	58	88	43	58	59
2	2	2	2	54		2	2	2	2	3	7	92	84			86	7
2	2	71	2	41	73	2	2	2	2	1	7	92	84	83		10	91
2	2	2	2	2		2	2	2	2	3	7	46	50			50	8
2	2	2	2	54		2	2	1	2	3	1	92	84			45	89
2	2	2	2	2		2	2	2	2	1	2	88	86			88	86
2	2	2	2	2		2	2	1	2	3	7	81				86	78
2	2	71	2	1		2	2	1	2	3	7	83	87	58	59	87	86
2	2	2	2	2		2	2	1	2	3	7	92	84	46	90	90	50
2	2	71	2	54		2	2	2	2	3	7	92	84	43	65	90	89
2	2	71	2	84	43	2	2	2	2	3	7	92	84	86	43	86	43
2	2	71	2	48		2	2	2	2	3	7	92	84			89	48
2	2	71	2	2		2	2	2	2	3	7	0				89	90
2	2	71	2	2		2	2	2	2	1	7	65				3	
1	2	2	2	73	21	2	2	1	2	3	7	86	88			86	88

⇓ Beginning WS - Befundung...

B-Abh-D3	B-Abh-D4	B-Abh-E1	B-Abh-E2	B-Abh-E3	B-Abh-E4	B-Abh-F1	B-Abh-F2	B-Abh-F3	B-Abh-F4	B-Abh-G1	B-Abh-G2	B-Abh-G3	B-Abh-G4	Head 1	Head 2	Head 3	C0 ex / Flex	Red	Sb	Of fish oil	comp	C1 ex / Flex
		43	91			79				43	91			2	5							
		43	89			26				90	89			10	4							
61		50	86			45	27			90	89	6		1	16	25						
		7	8	58	59	58				0				1	3	18						
		5	7			0				7				0								
		65	50	91						89	43	7	81	1								
61		91				0				65	91	59		4	24							
3		50				50	8			19	7	8	9	3	4							
		43	90	50		0				43	91	7		10			2					2
		5	78							89	43	78		1	10		2	2			1	
79	80	93	85			93	4			93				8								2
						79				43	81			26			2	2				
		85	90	78		89	90			89	90	78		16			2	1				
		78				79				43	79						2		1		1	
		43	5			0				89	90	7	8	14					1		1	
		85	86			79								23				2			1	
86		78								89	90	65	78	1	14	25	2				1	
86		58	81							43	10	89		24					2			
		86	78			90								16							1	
81										5				1	25			2			1	
		86	43			43				43	5	8	4	26			2				1	2
59		7	59							89	90	43	48	14			2	1				2
		78				50				90	89	59		1	25				1		1	
		78				90				91	78			4	14		2	1	1			
		89	90			89				81				26								
		58				50				50	7	8	78	1	25							
										43	48	65	7	14	22		2				1	
		90	89							8	78			10							1	
		6	81							81				0			2	2	1		1	2
		10				46	47			50	7	8	9	0			2	2			1	
86		5				43				43	5	4		12				1			1	
86		10	91			79	80			5				8	26		2					2
86	81	4				89	90			0				25	1		2				1	
60	61	58	59			79								1	19						2	
59		7	59			22				89	10	5	59	6							2	1
7		10	91	7	16					89	90	7		1	18		1		1			1
		50	8							90	89	58	79	10	26		1				1	
90	50	5				54				78	61			26				1			1	
		5				80	79			43	78			1	23	13	1				1	
81		43	85	86		43	85	86		0				1	10		2				1	2
		0				43	89	90		5	7			1	13						1	2
58		90	89	50		90	50			90	50	3		3	20		2	2	2		1	2
65	60	61	65			19				0				0			0					0
		0				0				43	91	7		1	25			1			1	
78		0				0				0				1	4	18	2				1	
43	78	58	59	60	61	89	90			0				1	25						1	
		65	3			65				85	89	90		1	25	12	2		2			2
										5	7			26			2				1	2

end WS Befundung ⇓ ⇓Beginning postquestioning

L4 comp	L5 ex / Flex	Red	Sb	Of fish oil	comp	WS Ilium	WS Dura 1	WS Dura 2	WS Dura 3	WS Dura 4	WS Dura 5	N M1 well gel	N M² well gel	N M1 entsp	N M² entsp	N M1 worriedly	N M² worriedly	N M1 ü geschl	N M² ü geschl	N M1 t geschl
						1	7	9	14	0	0	1	1	1	2	2	1	2	2	2
						0	3	8	16			1	1	1	1	2	2	2	2	2
						0	1	9	13	7		1	1	1	1	2	2	1	2	2
						0	9	15				1	1	1	1	1	2	2	2	2
						0	3	7				1	1	1	1	2	2	2	2	2
		1				0	3	17				1	1	2	1	1	2	2	2	2
	2				2	0	1	7	9			1	1	1	2	0	1	2	2	0
						5	1	7				2	1	2	1	1	1	2	2	2
						0	1	10	15			2	1	1	1	2	2	2	2	2
2						0	9	12				2	1	1	1	2	2	2	2	1
							2	10	15			0	0	0	0	0	0	0	0	0
					2		14					1	1	1	1	2	2	2	2	1
							12					1	1	1	1	2	2	1	0	0
2	2				2		12					1	2	1	2	2	1	0	0	1
						0	3	7	17			1	1	1	1	2	2	2	2	2
					2		3	16				1	1	1	1	2	2	2	2	1
	1				2		3					1	1	1	2	2	1	2	2	1
							1	10				1	1	1	1	2	2	0	0	0
	2				2		2					1	1	1	1	1	2	2	2	2
	2						18					1	1	1	2	2	1	0	0	1
	2				2		1	10				2	1	1	1	2	2	2	2	1
1					1		14					1	1	1	1	0	0	0	0	1
						0	3	9				1	1	1	2	2	1	1	2	2
						0	3	7	14			1	1	1	2	2	1	2	2	1
	2				2	0	1					1	1	1	1	2	2	2	2	2
2					2	0	3					1	1	1	2	0	0	1	0	0
	2				2	0	0					1	2	2	0	0	1	0	0	1
2	2				2	0	1	7				1	1	1	1	2	2	2	2	1
					2	0	2	14				1	2	1	2	2	1	2	2	2
						0	10					1	1	1	1	2	2	2	2	2
2	2					0	3					1	1	1	1	2	2	0	1	1
2	2				2	0	10	12	14			2	1	2	1	2	2	2	2	2
	2				2	0	3					1	2	1	1	2	2	0	0	0
2	2				2	0	0					0	0	0	0	0	0	0	0	0
2	2				2	0	1	10				1	1	1	1	2	2	2	2	2
2					2	0	3	16				1	0	1	0	2	1	2	2	2
						0	3	16				1	1	1	1	2	1	2	2	1
					2	0	1	7	9	14		1	1	1	1	2	2	2	2	1
2					1	0	2					0	0	0	0	0	0	0	0	0
2						0	1					1	1	2	2	1	1	2	2	1
						0	9	15				1	1	1	1	2	2	2	2	1
2						0	1					0	0	0	0	0	0	0	0	0
												1	1	1	1	0	0	0	0	1
						0	1	10	3			0	0	0	0	0	0	0	0	0
2						5	0					1	1	1	1	2	2	2	2	2
2					2	0	1					2	1	2	1	1	2	2	2	2
						0	1	3				1	1	1	1	2	2	1	2	2
	2				2	0	1	16	17			1	1	1	1	2	2	2	2	1

N M² of t geschl	N M1 n geschl	N M² n geschl	N CV4 neutrally	N CV4 angen	N CV4 unangen	N + swallow	N Rea tiredly	N Rea awake	N Rea none	N Rea pains	N Rea other 1	N Rea other 2	N Rea other 3	N Rea time	Be-handler
2	1	1	2	1	2	2	2	2	0	2	3	5	0	5	1
2	1	1	2	1	2	1	1	2	0	2	4			7	1
1	2	2	1	0	0	2	1	1	1	1	8			3	1
2	1	1	2	1	2	2	0	1	0	0	9			1	1
2	1	1	2	1	2	2			0		3			0	1
2	1	1	1	2	2	1		2	2	1	7	0		3	1
0	1	1	1	1	2	2	1	2	2	2	2	0	0	0	1
2	2	2	2	1	2	2	2	1	2	2	3			4	1
1	2	2	2	1	2	2	2	1	1	2	2	0		1	1
2	2	1	2	1	2	2	2	1	0	2	8			5	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1	2	2	1	1	2	2	2	2	0	0	3	0	0	2	1
1	0	0	0	1	0	2	2	1	1	2	2	0		0	1
1	0	0	2	1	2	0	0	0	0	1	6			6	1
2	1	1	0	1	0	0	2	1	0	2	0			0	1
2	2	1	2	1	2	2	2	1	2	2	8			6	1
2	2	1	2	1	2	2	1	2	2	2	2			1	1
0	1	1	1	0	0	2	1	0	0	0	0	0	0	0	1
2	1	1	2	1	2	2	1	1	2	2	5	0	0	0	1
0	0	1	0	1	2	0	0	1	0	2	0	0	0	0	1
2	2	1	1	1	2	2	2	2	2	2	2			0	1
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
1	2	2	0	1	0	1	1	2	2	2	3			0	1
2	2	1	1	1	2	1	2	1	1	2	2			0	2
2	1	1	2	1	2	0	1	2	2	2	2			1	2
1	0	0	0	1	0	1	1	0	0	0	8			6	2
0	0	1	0	0	1	0	0	1	0	2	0			0	2
1	2	2	1	2	2	2	2	2	0	2	0			0	2
2	1	1	2	1	2	2	1	2	2	2	0			0	2
2	1	1	2	2	1	2	2	2	1	2	2			0	2
0	0	0	1	0	0	2	1	0	0	1	8			2	2
1	1	2	1	1	2	2	1	2	1	2	2			0	2
0	1	1	0	1	0	2	0	0	0	0	1			0	2
0	0	0	0	0	0	0	0	0	0	0	0			0	0
2	1	1	2	1	2	2	2	2	1	2	2	0		0	2
2	1	1	0	1	0	1	1	2	0	2	2			5	2
1	2	2	2	1	2	2	1	2	2	1	3			3	2
1	1	2	1	1	2	2	1	2	2	2	2			0	2
0	0	0	0	0	0	0	0	0	0	0	0			0	2
1	2	2	2	1	2	2	2	2	1	2	2			0	2
1	2	2	1	2	2	2	1	2	0	2	2			0	2
0	0	0	0	0	0	0	0	0	0	0	0			0	2
0	0	2	1	2	2	1	2	1	2	2	4	3		0	2
0	0	0	0	0	0	0	0	0	0	0	0			0	2
2	1	1	1	2	2	2	2	1	0	2	8			3	2
2	1	1	1	1	2	2	2	2	1	2	2			0	2
1	2	2	2	1	2	2	1	1	2	2	3	4		5	2
1	2	2	2	1	2	2	2	1	2	2	2			0	2

10.5.9. Numeric codes to allgem. Befundung

Number	Meaning	Gender
2	no	1 = man
1	yes	2 = woman

B typology	ant	1
	post	2
	normally	3
B bar	Head li	1
	Head re	2
	Washbasins li	3
	Washbasins re	4
	Skoliose li	5
	Skoliose re	6
	normally	7

WS Head	compaktion	1
	Inflexion	2
	Extension	3
	Torsion li memb	4
	Torsion li traum	5
	Torsion re memb	6
	Torsion re traum	7
	SbRot li memb	8
	SbRot li traum	9
	SbRot re memb	10
	SbRot re traum	11
	Sb li	12
	Sb re	13
	LatStrain li memb	14
	LatStrain li traum	15
	LatStrain re memb	16
	LatStrain re traum	17
	Street sup memb	18
	Street sup traum	19
	Street inf memb	20
	Street inf traum	21
	Temp li blocks	22
	Temp re blocks	23
	Sutur blocks	24
	MRP weakly	25
	other one	26

WS Whirl	no findings		0
	Inflexion		1
	Extension		2
	Red li		1
	Red re		2
	Sb li		1
	Sb re		2
	Of fish oil li		1
	Of fish oil re		2
		yes	no
	compaktion	1	0
	Hypermobility	1	0

Washbasi	no findings	0
	Ilium ant li	1
	Ilium ant re	2
	Ilium post li	3
	Ilium post re	4
	Ilium high li	5
	Ilium high re	6

Dura	Stauchung cranial	1
	Stauchung caudal	2
	Stauchung whole	3
	Stretching cranial	4
	Stretching caudal	5
	Stretching whole	6
	Sacrum inflexion	7
	Sacrum extension	8
	Sacrum Sb li	9
	Sacrum Sb re	10
	Sacrum Red li	11
	Sacrum Red re	12
	Occiput inflexion	13
	Occiput extension	14
	Occiput Sb li	15
	Occiput Sb re	16
	Occiput Red li	17
	Occiput Red re	18

N Rea	lumbale pains	1
	Concentration disturbance	2
	general relaxation	3
	emotional relaxation	4
	muskulare relaxation HWS	5
	muskulare spanning HWS	6
	Headaches-	7
	Headaches +	8
	Pulsate in the back of the head	9

N Rea	to 1 hour	1
	to 3 hours	2
	to 6 hours	3
	to 12 hours	4
	to 24 hours	5
	to 3 days	6
	to 7 days	7

CV4	without contact	0
CV4	Contact till the beginning Stillpoint	1
CV4	Stillpoint	2
CV4	Return MRP till the end contact	3
CV4	without contact after technique	4

	Handler Ludwig Brandstötter	1
	Handler Wilhelm Winkler	2

	normal treatment	N
	Bluff treatment	B

10.5.10. Numeric codes to the Organ-Befundung

Ill from Org	
no information	0
yes	1
no	2
Pelvic ground	3
Bubble	4
Caecum	5
Caecum blind arm	6
Col asz	7
Col desz	8
Col trans	9
Small intestine	10
Gel elbow	11
Gel foot	12
Gel hand	13
Gel hip	14
Gel knee	15
Gel shoulder	16
Joints	17
Skin	18
Heart	19
Hay fever	20
Immune system	21
Kno Clavicula	22
Kno Femur	23
Kno foot	24
Kno hand	25
Kno Humerus	26
Kno Thorax ribs	27
Kno Thorax ribs li	28
Kno Thorax ribs re	29
Kno UA	30
Kno the US	31
Kno WS (Scheuermann)	32
Bones	33
Head eyes	34
Head meningitis...	35
Head nose	36
Head sinuses	37
Head ears	38
Head dizziness	39
Head teeth	40
Circulation	41
Larynx (larynx)	42
Liver	43
Strip (Hernie)	44
Lung allgmein	45
Lung li	46

Ill from Org	
Lung re	47
Stomachs	48
Almonds	49
Spleen	50
Mush arms	51
Mush belly	52
Mush legs	53
Mush cervical shoulder	54
Mush back	55
Musculature	56
Tiredness	57
Kidney li	58
Kidney re	59
NN li	60
NN re	61
Ösophagus	62
Ovar li	63
Ovar re	64
Pancreas	65
Pharynx (pharynx)	66
Prostate gland	67
Psyche	68
Rectum	69
Scabbard	70
Pain head hairdrier	71
Pain head performs statute labour	72
Pain head worldwide	73
Pain head li	74
Pain head post	75
Pain head re	76
Pain rule	77
Sigmoid	78
Sternum	79
Thorax	80
uterus	81
Prevention (the pill ...)	82
WS BWS	83
WS HWS	84
WS Ilium li	85
WS Ilium re	86
WS LWS	87
WS Sacrum	88
Diaphragm re	89
Diaphragm li	90
Duodenum	91
WS Skull	92

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13. Abstract

Authors: Ludwig Brandstoetter (brandstoetter@tele2.at), Wilhelm Winkler (Le-i-Lo@nusurf.at)

Institution: Internationale Schule für Osteopathie Wien

Title: The influence of the osteopathic treatment on the vegetative neural system.

Date of publication: September 2007

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Language: German, English

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Keywords: CV4, Compression 4th ventricle, influence vegetative neural system, blood pressure, respiration

Design: Quasi experimental study design, comparison of a control group with a treatment group, both groups 50 clients, age of clients between 18 and 40 years.

Objective: It was the objective of the study to observe how the technique “Compression of the 4 th ventricle“ influences brain activity, blood pressure, heart rate and respiration rate.

Hypothesis: The technique “Compression of the 4th ventricle“ influences brain activity, bloodpressure, heart rate and respiration rate.

Relevance for clients: For clients with vegetative symptoms in the field of bloodpressure and breath,

Relavance for Osteopathy: Basic testing with the intention to evaluate objectively the vegetative changes during a CV4 technique and therefore give a measured feedback to what the osteopathic therapist may feel subjectively. As osteopathic medicine in Austria still is trying to find it´s place in the health care system objective measurements of treatment effects, like we tried in this study, could be essential in the accreditation process.

Method: We measured continuously 24 different vegetative parameters with an intensive care monitor to be able to observe vegetative changes during and after the CV4 technique.

We measured the following parameters:

- Heartrate minimal
- Heartrate maximal
- Non invasive bloodpressure systolic
- Non invasive bloodpressure - diastolic
- Non invasive bloodpressure - mean
- Respiratory frequency,
- Oxygen saturation in %
- Amplitude left and right
- Alpha left and right
- Beta left and right
- Delta left and right
- Theta left and right
- Spectral edgefrequency left and right
- Meanfrequency left and right
- Burst Suppression Rate left and right

The treatment measurement had 5 treatmentsteps

- Step 0 Forerun
- Step 1 Beginning of the CV4 technique
- Step 2 Stillpoint
- Step 3 Restart of the Cranio Sacral Rhythm
- Step 4 Time of rest after the CV4 technique

Results in analysis of variance and analysis of interaction

In general the number of parameters, that show significant differences decreased from step 0 to step 3 and increased again in step 4:

Treatmentstep	Step 0	Step 1	Step 2	Step 3	Step 4
Significant parameters of 24	14	11	7	2	12

We could split up the 24 parameters in 7 different reaction groups.

Results in analysis of interaction with specific lesions and parameters:

We compared the vegetative reactions of clients with and without specific lesions with each other. We analyzed the following lesions and parameters:

- SSB Compaction
- Compaction and Translation of C0, C1, C2
- Compaction and Translation Th3, 4
- Sensitivity to changes in the weather
- Comparison of normal treatment with bluff- and music treatment

When we analysed clients with and without SSB Compaction and Compaction and Translation of C0, C1, C2 there were more significant differences compared to the other analysed lesions and parameters.

Results in analysis of interaction comparing osteopath 1 and 2:

Here we analysed how the values of the treatmentstep 4 of control- and test measurement relate to each other by comparing two different osteopaths.

As we devided the whole client group in half we already received two different starting values. Therefore the analysis can only be seen as a relative result. Principally the evaluation showed similar results concerning the gradient tendencies and “therapy effect”.

Critical reflection, perspective, conclusion:

By including the test design with only two groups the result of all the measured parameters really seems to be difficult for our interpretation. Although we tried to avoid outer influence it is again difficult to differentiate between the true influence of the CV4 technique and the influence of touch, of a more aware and observing state of the client during the CV4 technique and of reactions caused by different expectations of the client. To get an objective result there would have been the necessity of a different design with three groups:

- One group for control of the veg. neural system
- One group for a bluff CV4 technique and
- One group for a real CV4 technique

The idea of continuously measuring the changes in the organism during an osteopathic treatment still seems very fascinating. Therefore this paper can be seen as a fertile basis for other future tests in a more clear design. In addition a long term study of the effect would make sense as the clients of our practices should be seen in that perspective.