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Introduction and a Review of
Nerve Entrapment Course by CL Jones

Upcoming Seminars

Muscle of the Month: Quadriceps
by Jeffrey S. Kurtz, DC, CCSP, DIBAK

The Neurology of Spinal Manipulations, Clinical Implications
by Hans Garten, DIBAK, DACNB, DAAO

Introduction and Course Review

Dear Colleague,

Welcome to the third edition of the ICAK UK Newsletter. As the autumn season is upon us, so is the beginning of a great seminar season. There are many great courses coming up this year and this year kicked off with Clive Lindley-Jones's Nerve Entrapment and Hidden Problems Course.

Clive L-Jones is an Osteopath and AK Diplomate who practices in Oxford, England. He has been teaching for many years and has conducted the basic 100 hours course as well as many others.

The nerve entrapment course was a 3 day affair that had an abundance of great information. I must admit when I was considering the course, I thought it would be everything I already learned in school and previous courses. I was greatly humbled as I was impressed with the presentation and AK applications to some of the common problems that are resistant to treatment.

Introduction and Course Review (cont)

One important aspect covered was muscle testing distinction with specific divisions of muscles. Subscapularis and especially the Abdominals were covered in great detail and practiced regularly. Another example was isolating extensor carpi radialis longus and brevis and their relationship to tennis elbow.

Overall the course was excellent. One thing to note is that some AK knowledge was required to make the most of the course and I highly recommend taking the Fundamentals of AK course.

The next Fundamentals course starts in January and will be taught by Tracy Gates in Southwater, England. It will be the first 4 sessions of the course and will surely be informative.

If you have any questions or comments or would like to be added to the email list, please email: icak-uk@hotmail.co.uk

Regards,

Jeffrey S. Kurtz, DC, CCSP, DIBAK

Advanced AK 3 day course in peripheral nerve entrapment with Clive Lindley-Jones DO MRO Diplomate ICAK , October 2011 Oxford UK.

How does the artist allow the statue to escape from the stone? By chipping away at the block. By uncovering layer after layer until the full beauty is revealed.

It would not be an exaggeration to say that those of us who have completed the 100 hours basic AK course stand a better chance of fixing a patient with peripheral nerve entrapment than our colleagues who have not. This advanced course took things to a higher level and began by saying what do you do when you have done all that, all muscles are good in the clear, but the patient is still in pain? Clive gave us some advanced analysis methods to take the patient and our own understanding to a new level. When my wife asked me what I had done on day 3, I said the leg, she said how can you spend a whole day on the leg. I began to tell her but she lost interest quickly so I ended with I would have liked a week not a day.

Clive talked about the treatment journey, our intention and the cascade of error. From such Zen like thoughts his insight takes us from muscles that are strong in the clear, but when tested immediately after another become weak (Reactive) then how that same muscles co-workers (Synergists) are in turn burdened by the first muscles weakness and so weaken themselves on repeated testing and its opposites (the Antagonists) who take up the slack from the weak muscle and develop fascial problems, plus the role in co-ordination (Gait) as our diagnostic insights are encouraged to move from general to distinctive.

Specifically the 3 days were packed with muscle testing protocols and procedures for finding hidden causes of problems in the arms and legs moving beyond finding and correcting single muscle weaknesses onto to comprehending the multi-level nature of some stubborn injuries which will not easily go away.

Some of the things we studied in the lower limb were the lumbosacral-iliolumbar syndrome, iliopsoas-inguinal syndrome, entrapments of the pelvis, femoral nerve entrapment, the obturator tunnel, piriformis syndrome, patellofemoral stress syndrome, popliteal syndromes, peroneal tunnel syndrome and nerve entrapments of the foot including tarsal tunnel syndrome.

In the upper limb we looked at multiple causes of thoracic outlet syndrome, frozen shoulder, biceps tendon slippage, elbow wrist and hand problems.

Muscle tests were demonstrated in more precise ways that isolated different portions of the muscle. The abdominal muscle test (which I seldom did anyway) was isolated into 9 individual tests on each side. Clive made us think more about what the position for testing is seeking to achieve and how varying positions isolates different aspects of the muscle.

So these few days will be good for our patients and good for us as we get a better understanding of the art and science of what we do daily and move from good to excellence in everything we do releasing the statue from the stone for the patient and ourselves in our journey as healers.

Roll on Monday morning I truly can't wait.

Steve Rudd ND MRN Cert. AK Cert SOT Cert Cranial Osteopathy DC CCEP
FCC(cranio)

Upcoming Seminars

2011-2012

If you would like to be added to our email list or you would like more information regarding seminars, please email the ICAK-UK at: ica k-u k@hotmail.co.uk.

January 2012- April 2012 - The first four weekends of the basic 100 hours. TracyS Gates, DO, DIBAK with contributions from Jeffrey Kurtz, DC,CCSP,DIBAK and Diplomate Candidate James Townhill, DC

--A 4 weekend course teaching doctors the basic procedures of Applied Kinesiology. It includes structural, chemical, and emotional approaches to treating the triad of health for which AK is based. The course integrates neurology, biochemistry, acupuncture, craniosacral therapy, chiropractic/osteopathy, and several other disciplines.

Please click [here](#) to visit the ICAK UK Facebook page for more information.

April 21-22, 2012 - Orthomolecular Seminar with Dr. Harald Stossier, M.D., DIBAK and Tracy Gates DO, DIBAK

-Orthomolecular medicine, as conceptualised by double-Nobel laureate Linus Pauling, aims to restore the optimal environment of the body by correcting imbalances or deficiencies based on an individual's biochemistry, using substances natural to the body such as vitamins, minerals, amino acids, trace elements and fatty acids.

Please see the Pure Bio website for more information

May 2012 - AGM TBA

Muscle of the Month:

Quadriceps

Written By:

Jeffrey Kurtz, DC, CCSP, DIBAK



Vastus Lateralis



Rectus Femoris



Vastus Medialis



Vastus Intermedius

The quadriceps muscle is named after its four different muscles where the primary movement is knee extension. The rectus femoris has its origin at the AIIIS and the reflected head attaches to the acetabulum at the ilium. The muscle crosses the hip joint making it also a hip flexor.

Posturally you will see knee hyperextension in the standing position as the quads fail to keep the tibia forward. Also present with rectus femoris weakness is posterior ileum as anterior support of the pelvis is lost. During gait the weak quad will fail to assist the psoas in bringing the femur forward which creates a short stride on that side. The opposite arm will have reduced swing movement as a result and it is important to check the biceps as it is related to the opposite quadriceps in gait. The quads and especially the rectus femoris can be weak from tibia that has subluxed posteriorly on the femur. They can also be weak in an inguinal entrapment syndrome. In cases of knee instability, the quads should always be investigated carefully.

The quadriceps are a complex group of muscles that can be involved with a lot of hidden problems. In one patient who clenched her jaw at night, I found a correlation between her tmj and her small intestine when tested with her eyes closed. The treatment was rather involved, but her jaw problem of 15 years was resolved and stayed that way even months later. That is the importance of testing this muscle on patients who have problems at night and the effectiveness of Applied Kinesiology diagnosis and treatment. For more information on the quadriceps and other muscles, I recommend the following references as they were referenced in the writing of this article:

Applied Kinesiology Synopsis, 2nd edition
by David Walther

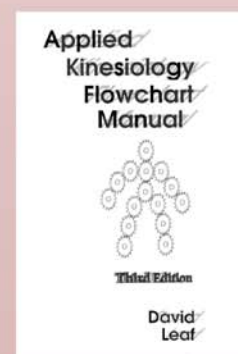


AK Muscle Tests at a Glance
by Ivan Ramsak and Wolfgang Gertz
-Translated to English by Tracy S. Gates



AK Flow Chart Manual
by David Leaf

This must be ordered from the USA and can be found on the ICAK-USA website:
www.icakusa.com



Quickfacts about the Quadriceps

- it is associated with the small intestine along with abdominals
- It is on the Small Intestine meridian
- It is important to test the muscle in different degrees of knee flexion to uncover hidden weakness in knee problems
- It is important to test the quads with eyes open and eyes closed to reveal hidden problems during sleep
 - Goodheart described this as "small intest. awake, small intest. asleep"

Muscle testing is a science and an art.

In my experience, muscle testing can be affected by electromagnetic interference (batteries on the body from watches and cell phones), so it is best to have these removed before testing.

Some tips when testing the Quadriceps muscle:

Testing this muscle can be difficult at times as it is one of the strongest muscles of the body. It especially requires geometric testing to gain accurate information about the muscle. General testing of the muscle can be found in several AK texts. However, if you want to isolate the vastus lateralis and medialis, the doctor can perform the same test with 25 degrees of external rotation (medialis) and internal rotation (lateralis) of the hip. This can uncover hidden weakness not found with the general test and is especially important in patients with knee problems. The doctor needs to watch for recruitment of the anterior tibialis as it can facilitate the quads and give a false negative.

--Part of the art of the test is to gradually apply pressure to the arm and feel the muscle activate or fail to hold. Applying pressure too rapidly and forcefully will give a false positive.

The Neurology of Spinal Manipulations, Clinical Implications

Hans Garten;

Translation from German: Tracy S Gates

Abstract

Spinal manipulations, as well as having segmental effects, also have consequences on the central nervous system.

With the exception of Atlas impulse therapy according to Arlen, these are considered more as undesired collateral effects rather than being used constructively as neurological rehabilitative therapeutic measures.

Segmental vertebral dysfunctions have respective central nervous system effects. These are best seen in infants and small children.

Symmetry imbalances in infants and small children are consequences of both nociceptive reactions from spinal segments and also functional disorders of the neuraxis caused by hypo-afferentation, especially of the cerebellum and cerebrum. They have to be distinguished from movement disorders associated to cerebral palsy.

In this article a neurological model of the effects of atlas impulse therapy and other manipulative techniques on the upper cervical spine is proposed. Functional neurological diagnosis should prevail over radiological diagnosis. A few possible side effects of spinal manipulations are explained in their nature and the necessary cautions are described.

Keywords

Proprioception, spindle cells, Golgi tendon organ, hemisphericity, atlas therapy, Kiss-syndrome, symmetry imbalance, radiological positional diagnosis, manual muscle testing

Introduction

All manual medicine impulse techniques on the spine have primary effects on the proprioceptors of the autochthonic spinal musculature and joint receptors of the spinal joints. The afference of these proprioceptors has both segmental and central effects with skeletomotor and visceromotor consequences, which can lead to a change in tone of both striated and smooth musculature.

Experience indicates that the further cephalad the spinal dysfunction and spinal manipulation occurs, the greater are these central nervous system effects.

Tonus imbalances in babies and infants can on the one hand be the result of nociceptive reactions from spinal segments, especially the upper cervicals, whilst on the other hand can be due to functional disturbances of the neuraxis through hypo-afferentation, in particular of the cerebellum and the cerebrum. To what extent disorders of the neuraxis

(including movement disorders associated with cerebral palsy) are functional in nature, can only be determined with appropriate therapeutic trials.

Atlas impulse therapy according to Arlen [1-3] is used (other than in the therapy of cerebral dysfunction) primarily for the treatment of muscle tone imbalances on babies, infants and adults. Atlas therapy will explicitly not be expected to create a change of a possible malposition of the Atlas, in contrast to methods such as HIO (Hole in One) from Chiropractic [4] or methods of Chirotherapy [5, 6].

Despite this fact, a radiological positional diagnostic of the Atlas in neutral position in the A.P. plane is advocated [7], to determine the appropriate impulse direction.

Diagnosis of disturbances of vertebral function using X-rays in the neutral position is valid only in exceptional cases [8-11]. Rather more so, to determine the position of the atlas with x-ray in order to specify the direction of treatment seems controversial, especially since this position is not to be changed by the treatment and is basically genetically determined. The tenuous link between Atlas position and neurological conditions was also observed by Coenen [9].

Instead of a radiological positional diagnosis it seems rather more appropriate to use functional neurological diagnosis to determine the direction of impulse.

This is shown in the following as well as the therapeutic consequences.

A.P. X-rays of the upper cervical vertebrae remain important in order to exclude structural deformation and traumatic damage and/or genuine subluxations in this area.

Manual medicine will also have an effect on central movement disorders in general (e.g. cervical Dystonia, Parkinson's syndrome, Tremor), regardless of aetiology, since proprioceptive afferences may rehabilitate structures of the central nervous system [12] [13].

Theoretical Foundations

Hemispheric dysfunction: Pseudo-pyramidal inhibition pattern

Background

The functional inhibition of the cerebral cortices can present a picture of a non-spastic pseudo pyramidal inhibition (stroke antalgia-like pattern of inhibition). In reality, this should be termed "extrapyramidal inhibition pattern", since it affects the extrapyramidal motor system. This name is justified by the similar distribution of muscle tone in these functional disturbances as would be found in pathological destruction of the brain (S. fig. 1). This has the following neurophysiologic background: Hypo-afferentation of the cerebral cortex can lead to decreased activation of the pontobulbar reticular formation (PBRF) ipsilaterally. This has at least four consequences [12-15]

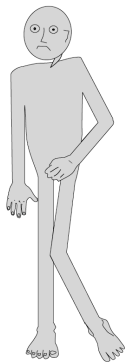
1.) Inhibition of the ipsilateral α - and γ - motor neurones globally.

2) Ipsilateral increased tone of the phylogenetic flexors, i.e. ventral muscles above T6 and dorsal muscles below T6 compared to their antagonists.

3) Hypersympathetic tone ipsilaterally: pupil dilatation, increased perspiration, raised blood pressure, increased blood supply.

4) Reduced inhibition of pain ipsilaterally.

Abb. 1: Pseudopyramidal pattern of inhibition (stroke antalgia like pattern of inhibition): muscle tone pattern (from [15]).



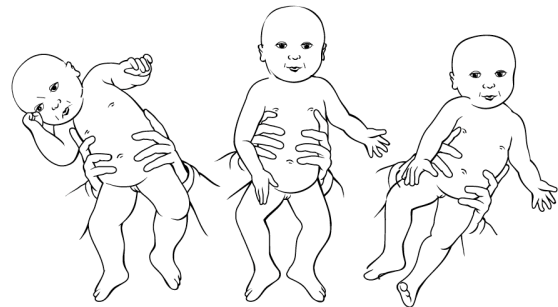
Diagnostic findings

The following simple clinical investigations can therefore be used to establish a hemispheric hypofunction:

- Hypotonicity and/or hyporeaction in the manual muscle test of Professional Applied Kinesiology and weakened myotonic reflexes (MTR) of the dorsal muscles above T6 and ventral muscles below T6 on the side of the hemispheric hypofunction.
- In general all MTR on the side of the hemispheric weakness will be weaker relative to the contralateral side (general hypotonus). In babies and toddlers, this would be displayed as a hypotonic righting reaction on the side of the weak cerebrum in Romberg's test. In the tilt-test for babies and toddlers there would be a hypotonic reaction tilting away from the side of the hypo-functioning cerebrum [16] (fig. 2).
- Hypotonicity of the soft palate ipsilaterally (inhibition of Cranial N. IX and X).
- Increased blood pressure on the side of the hemispheric weakness.
- Increased AV-ratio at the fundus of the eye (the ratio of the diameters of arteries and veins in this area in these cases is greater than 1:1.5), particularly in comparison to the intact side, due to the disinhibition of the sympathetic nervous system (hypersympathetic tone) on the side of the hemispheric hypofunction.
- Pain sensitization on the side of the hemispheric weakness, when examined with a neurological needle wheel or similar.

- Increased physiological blind spot on the opposite side of the hemisphere lesion (see below).
- Latent exophoria of the ipsilateral eye (convergence weakness with repetitive examination)

Fig. 2: Pseudopyramidal pattern of inhibition in a baby expresses itself as a one-sided hypotonic reaction with lateral tilt (from [15], after [16])



Integration of visual and proprioceptive afferences; the physiological blind spot

50% of the visual afference of the eye is from the temporal visual field (nasal retina, which contains the optic disc) and all proprioceptive afferences cross to the contralateral thalamus.

Hypo-afferentation from proprioceptors can lead to hyperpolarisation (inhibition) of the contralateral thalamus and in turn lead to decreased cortical (perceptive) activity. This leads to the enlargement of the blind spot on the side of the hypo-afferentation [14, 17]. Both fig. 3 and 4 illustrate a hypo-afferentation from the right side.

Relevance

The blind spot becomes smaller on improvement of neurological organization [14, 17].

In the case of a larger blind spot on the left, the afferentation from the left must be improved, and vice versa with a larger right blind spot. The lower section of the blind spot relates to the function of the parietal lobe, whilst the upper section relates to the function of the temporal lobe.

Fig. 3 represents a model for an increased blind spot on the right by decreased afference from the muscle spindles of the right-sided autochthonic spinal muscles.

Any source of sensory hypo-afferentation is possible as a cause. Carrick [17] suggested using the investigation of the blind spot as an indicator for optimal learning techniques for schoolchildren.

Fig. 3: The physiological blind spot is larger on the opposite side to that of the cortical hemisphere that has decreased afferentation (from [15]).

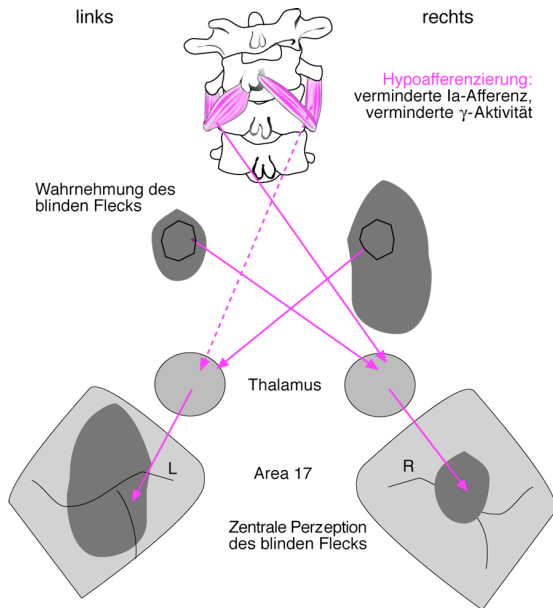
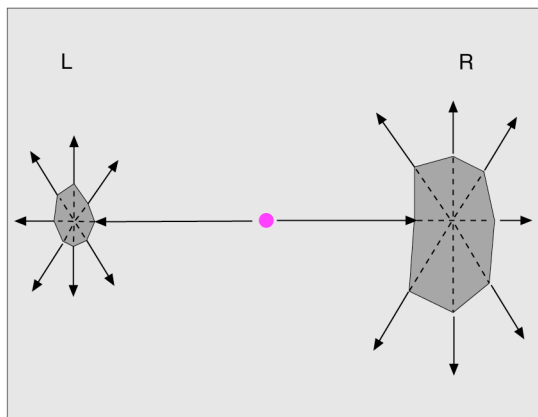


Fig. 4: Determination of the physiological blind spot: A fixation point is marked on the centre of an A4 sheet of paper. The patient stands at a distance of 30 cm from the wall. One eye is covered with one hand, whilst the free hand is used as a support against the wall. (A more comfortable alternative is to use a forehead support and an eye patch). The patient fixes his gaze on the central point with the free eye. The examiner drags a pin or a laser pointer from the central point outwards directly lateral, and the patient indicates firstly when the pin disappears and then when it emerges again. The same procedure is repeated in a vertical and then diagonal directions. The whole process is then repeated with the other eye (from [15]).



Efferent autonomic nervous system: the Intermediolateral Cell Column (IML, Columna intermediolateralis)

There are no „sympathetic or parasympathetic afferences“, but merely somatosensory and viscerosensory afferences (particularly to the ncl. of the tractus solitarius, the reticular formation, and the thalamus), which influence the thalamo-

hypothalamo-cortical feedback loops, which in turn affect visceromotor efferences [15, 18].

The visceromotor neurones are located in the homologous nuclei of the intermediolateral cell column. These reach from the mesencephalon to the sacral medulla.

The most rostral structure of the autonomic nervous system is the hypothalamus, which regulates the homeostasis of (amongst other things) blood pressure, electrolyte balance, temperature and hormonal feedback mechanisms.

The substantia grisea centralis (periaqueductal grey matter) in the mesencephalon has a stimulatory effect bilaterally on the IML (estimated as 10% of the total influence on the IML).

The pontobulbar reticular formation has a stimulatory effect on the parasympathetic nuclei of Cranial N.III (to the Gl. ciliare -> pupilloconstriction), Cranial N.VII (to the Gl. pterygopalatinum -> lacrimation, salivation), Cranial N. IX (to the Gl. oticum -> salivation) and ncl. ambiguus and ncl. dorsalis n. vagi (thoracic and abdominal parasympathetic activity) in the brain stem.

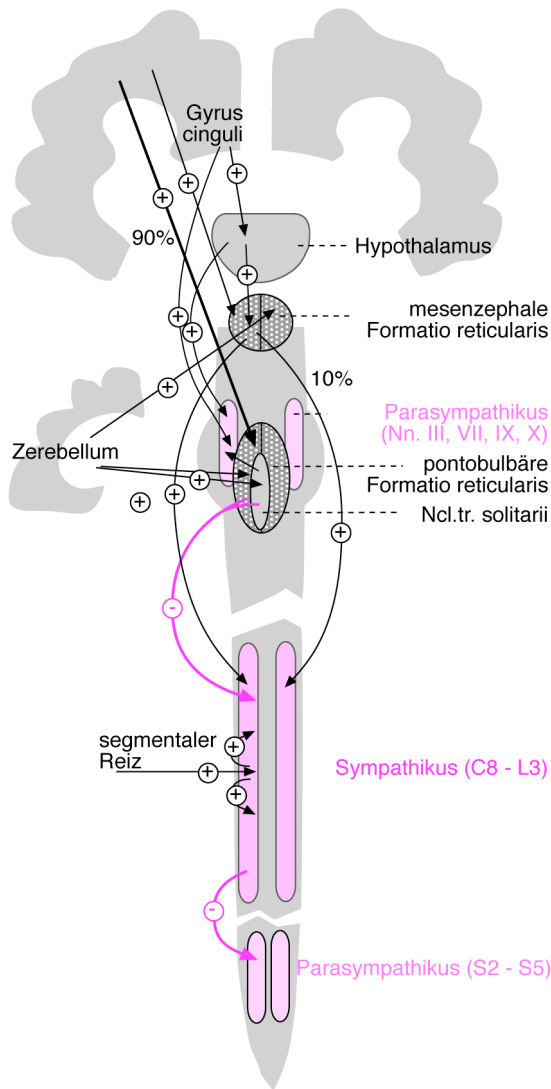
However, most importantly, the pontobulbar reticular formation inhibits the ipsilateral intermediolateral cell column (IML) of the thoracic medulla (sympathetic). 90% of the impulses to the IML are of an inhibitory nature.

Within the intermediolateral cell column (IML) the more cranial structures always inhibit the more caudal ones, the thoracic IML (sympathetic) inhibits the sacral IML (parasympathetic).

Outside of the central nervous system, the quality of the neurones is determined by the respective neurotransmitters: acetylcholine at the parasympathetic nervous system, norepinephrine and epinephrine at the sympathetic nervous system.

Fig. 5: Homologous columns of the IML and control mechanisms (from [15]).

The cerebrum stimulates the mesencephalon and the pontobulbar reticular formation as well as the hypothalamus. The cerebellum stimulates the ncl. tractus solitarius, which has a strong inhibitory effect on the IML, and the mesencephalic reticular formation. Approx. 10% of the total activity is possibly attributed to the mesencephalic reticular formation, which stimulates the ipsilateral and contralateral IML. The physiologically crucial factor is the inhibitory control of the pontobulbar reticular formation on the ipsilateral IML (thus 90% of the total activity). Within the intermediolateral cell column (IML) the cranial structures inhibit the more caudal ones. In addition, segmental activity spreads cranially and caudally.



Sympathetic nervous system

From C8 to L3 the preganglionic neurones of the sympathetic efferences lie in the lateral horn of the spinal medulla. The preganglionic fibres leave the spinal medulla with the anterior root of the spinal nerve and project to the paravertebral ganglia of the sympathetic chain or the prevertebral ganglia via the ramus communicans. Within the sympathetic chain lie the ganglionic neurones, whose fibres travel to the viscera via the ramus communicans griseus and the spinal nerve.

Parasympathetic nervous system

The nuclei of the parasympathetic efference lie in the brain stem and in the sacral medulla. The preganglionic parasympathetic fibres are very long, since the parasympathetic ganglia lie in the wall or in the proximity of the effector organs.

The parasympathetic axons from the brain stem run in the N. vagus to the organs of the chest and abdominal cavity, whilst cranial nerves III, VII and IX run to the organs within the head. The fibres from the sacral medulla run together with the pelvic nerves to the pelvic organs. The vegetative ganglia, in which the transmission to the ganglionic parasympathetic fibres occur, lie scattered in the walls of the effector organs or in the proximity of the effector organs. Their fibres are very short.

The right vagus nerve controls the frequency (SA node), whilst the left controls the rhythm (AV-transition), a disturbance of which may cause ventricular arrhythmia [19].

Segmental stimuli into the autonomic nervous system

Both a segmental proprioceptive and nociceptive stimulus in the upper cervical joints - as in the entire spinal column - can spread cranially and caudally (fig. 5). The physiological background is that a motor activity (e.g. of the arm), which is accompanied by increased proprioceptive afferentation, requires an increased blood supply to the involved motor segments. This increased perfusion is facilitated by segmental hypersympathetic tone.

The excitatory spread beyond the segmental boundaries is however inhibited, if the IML is working normally. In the event of lack of inhibition of the IML due to reduced cortical function there is a dissemination of segmental impulses: A spinal manipulation will then lead to strong autonomic reactions, such as cold sweat and tachycardia, the sensory input leads to a response [20] going beyond the segment.

Central effects through Atlas impulse therapy and manipulation of the upper cervicals and TMJ

The central vasodilatory effect of these manipulative inputs is the result of a stimulation of the ncl. salivatorius sup. through segmental stimuli in the area of the upper cervical joints, which diverge cranially. This could, for example, be of advantage in the treatment of migraine; however, one must be sure to choose the correct moment at which vasodilatation is desirable. An explanation of migraine is that the stimulation of the ncl. salivatorius sup. during cortical depression is insufficient, resulting in a lack of inhibition of the caudal IML and, thus, vasoconstriction (see fig. 5).

Similarly, afferences from the mechanoreceptors of the TMJ can have an effect of parasympathetic stimulation, since they represent pontobulbar afferences.

De-Kleyn test, provocation tests in the sitting position

Provocation tests [21, 22] for the vertebral arteries need to be considered in the context of the neurology of the upper cervical joints.

Left rotation (the equivalent applies for right rotation), combined with extension of the head and neck, have at least two effects:

It leads to a relative narrowing of the contralateral right vertebral artery, which supplies the brain stem including the labyrinthine and cerebellar arteries. This arterial narrowing can cause hypoxic loss of Purkinje cell inhibition. This may also lead to hypoxia of the neurones of the vestibular organ and their secondary neurones in the ncc. vestibulares on the narrowed side, and to dizziness and left-beating

nystagmus, which cannot be suppressed, as it is primarily central in nature (2nd neuron) [23].

Furthermore reclining the head towards the left will cause a stimulation of the left posterior canal, which can result in a benign left torsional positioning nystagmus [23].

Differential diagnosis between a narrowing in the arterial supply and hyper-stimulation of the posterior semicircular canal can be achieved by examining the patient with the upper body flexed 45° ventrally. If left rotation and extension of the head results in dizziness then this is an indication of arterial narrowing, since this movement is not an adequate stimulation of the posterior semicircular canal.

Negative reactions to manipulation of the upper cervical joints and to Atlas Therapy

Direct effects on the parasympathetic nervous system in case of cortical hypoactivity

Cortical weakness can lead to a lack of inhibition of the IML, i.e. to a state of hypersympathetic tone (see above).

The segmental stimulus of a manipulation of the upper cervical joints can spread to the pontobulbar region (segmental, diverging stimulus), where the ncl. salivatorius sup., inf., and ncl. motoricus dorsalis n. X are located. As a result of the manipulation, these nuclei can mediate a parasympathetic effect: tears, salivation, nausea and vasovagal reactions.

These high cervical manipulations are unlikely to have hypersympathetic tonic effects in the periphery via caudal spread - which could in principle maintain the vasotone - since the segments from C8/Th1 (first sympathetic motor neurone) are basically not affected.

Effects on the Ncl. tractus solitarii in the case of cerebellar weakness

Spinal manipulations stimulate the ncc. fastigii and interpositus of the cerebellum directly, whilst simultaneously stimulating the Purkinje cell system via provocation of the muscle spindles and joint receptors. Spinal manipulations might therefore lead to better cerebellar mossy fibre activity, which in turn leads to improved inhibitory activity of the Purkinje cells of the cerebellum on the ncc. fastigii and interpositus. This leads to decreased output of these nuclei to the ncl. tractus solitarii.

If the Purkinje cells are either at their maximum activity and a further increase is not possible or an inhibition (toxic or hypoxic) is present, spinal adjustment could cause increased net output of the cerebellar nuclei into the ncl. tractus solitarii with consequential nausea and vegetative reactions, since the direct stimulation of the output nuclei might be greater than the stimulation of the inhibitory Purkinje cells.

Consequences for Manual Therapy

Asymmetry as a result of hemisphere imbalances

This was already outlined above. A traumatic torticollis in adults can also be a disease state in infants and young children: Muscular hypertonicity results - among other things - from nociceptive activity [24], in this case from the spinal segments. This becomes particularly noticeable with the examination of global reactions caused by head rotation (rotation en bloque in the case of the baby) and side-bending (abolition of the side-bending curve in the case of the baby [2]).

The illustrated lateral tilt reaction according to Coenen [2], represented in fig. 2, which shows a global hemi-body hypotonicity, cannot be explained by nociceptive activity, nor may the immediate normalizing of this reaction by Atlas impulse therapy be explained by elimination of this nociactivity. Moreover the latter is explicitly not supposed to correct a vertebral "subluxation".

The proposed theory that a symmetry imbalance in infancy, left untreated, may lead to attention deficit disorder on reaching school age [3], is further supported by the fact that ADD and ADHD are very frequently associated with hemisphere asymmetry [25, 26]. One-sided hypotonicity or hypertonicity maintains a left-right imbalance of the proprioceptive afferences and thus a hemisphere asymmetry. Tonic disturbances must therefore be removed as a priority.

Manipulative techniques if appropriately applied according to the neurological imbalance, can be an efficient method to eliminate tonus imbalances.

Impulse vector should be determined through hemispheric asymmetry

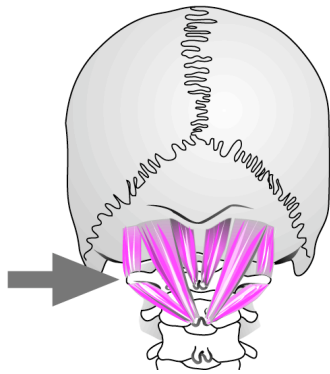
A basic rule for high velocity adjustments is that the impulse must be administered on the opposite side of the hemispheric weakness, since all sensory afferences cross. This means, on the opposite side to the hypotonicity, which is the side of the weaker response in tilt reaction in babies; the raised blood pressure in adults; the larger AV-ratio at the fundus of the eye; but on the same side as the increased blind spot.

In a study of 30 adult patients in the practice of the author, the examination of the blind spot before and after Atlas therapy as well as the blood pressure and the AV-ratio, consistent with previously established muscular hyporeaction in the manual muscle test of Applied Kinesiology [15] confirmed that the impulse on the transverse process of the Atlas in Atlas therapy must be applied on the opposite side of the increased blind spot i.e. on the side of the hemispheric weakness and thus the side of the hypotonicity, in order to establish correction. Therefore, the impulse on the Atlas should be applied on the exact opposite side to that of more caudal spinal manipulation (from C2 downward).

This practice has also been effective in babies and young children, where more sophisticated topographical neurological indicators cannot, in most cases, be established.

The apparent contradiction that the impulse of spinal adjustments should be applied on the opposite side of the hypotonicity, whilst the Atlas impulse therapy it is on the side of the hypotonicity, can possibly be explained through the biomechanics of the suboccipital musculature, where the stimulus which is contrary to the direction on the rest of the spine, provides an adequate proprioceptive input. (fig. 6).

Fig. 6: Suboccipital musculature and Atlas Impulse Therapy



With toddlers and school children myotatic reflexes (stretch reflexes) and the single leg hop, where a more pronounced pounding can be noticed on the hypotonic side, can be used as additional parameters for left-right cerebral asymmetry. In addition the manual muscle test of Applied Kinesiology can be used from approx. 5 years upwards.

For the treatment of cerebellar asymmetry, differentiation between lateral (cerebrocerebellum) and medial (spinocerebellum) dysfunction should be established, since this modifies somewhat the necessary therapeutic input. In general, proprioceptive afferences activate the ipsilateral cerebellum, whereas the Atlas therapy impulse will have to be on the opposite side of the cerebellar disturbance (see above.).

Finger-nose Test, Heel-shin Test, and Single leg stance can also be used for children as indicators of cerebellar function.

Radiological positional diagnostics of the Atlas would certainly not contribute to these findings; the X-ray is used exclusively to establish contra-indications for impulse therapy.

The integrity of the neuraxis must be ascertained before high velocity adjustments

Since the manipulation of the upper cervical joints, including Atlas therapy according to Arlen, leads to the quantitatively greatest proprioceptive input, it is

particularly important to examine the integrity of the neuraxis before these manipulations:

The metabolic capacity of the stimulated structures (cerebellum, cerebrum, brain stem) should not be exceeded. This means that if there is a high exhaustion coefficient (severe fatigability) - indicated by excessive acceleration of heart frequency (right-sided IML), ventricular arrhythmia (left-sided IML), non-durable pupillary light reflex etc. - the stimulus intensity must be reduced: i.e. Atlas impulses with low intensity, and avoidance of high velocity adjustments at the upper cervical joints. This means that before an Atlas therapy and before manipulation of the upper cervical joints is applied, a minimum program (see Tab. 1) of neurological diagnosis should be completed.

Tab. 1 Minimum program of neurological examination and topical significance

Technique	Interpretation
1. Romberg Test	proprioception, large-fibre afferents, cerebellum, cerebrum
2. Romberg Test on a soft surface (rubber foam mattress or similar)	vestibulum, cerebellum, cerebrum, less proprioception
3. Single leg stance L/R	proprioception, vestibulum, cerebellum, cerebrum
4. Single leg hop L/R	cerebellum, cerebrum,
5. Single leg hop L/R with catching a ball	cerebellum, cerebrum
6. Rotating L/R at a frequency of 1 Hz Assess for nystagmus (Frenzel glasses)	vestibular system
7. Spine-Test	medial cerebellum (spinocerebellum)
8. Finger-nose test	lateral cerebellum (cerebrocerebellum)
9. Heel-shin test	Intermedial cerebellum
10. Myotatic reflexes on the upper and lower extremities	cortex, cerebellum, segmental roots
11. Manual muscle test on typical flexors and extensors of the upper and lower extremities bilaterally	cortex, pontobulbar reticular formation, segmental roots
12. Babinsky	upper motor neurone
13. Abdominal reflex	
14. Diadochokinesis	intermedial and lateral cerebellum
15. Convergence test	mesencephalon
16. Pupillary reaction	mesencephalon
17. AV ratio at the fundus	cortex, pontobulbar

of the eye	reticular formation, IML
18. Blood pressure bilaterally	cortex, pontobulbar reticular formation, IML
19. Optokinetic test	frontal lobe, parietal lobe, cerebellum
20. Pursuit (eye tracking)	parietal lobe, cerebellum
21. Saccades	frontal lobe, cerebellum
22. Blind spot	thalamus, parietal lobe, temporal lobe, frontal lobe

Conclusion and Discussion

High velocity adjustment of the upper cervical joints and Atlas impulse therapy work just like all other manual medicine interventions via proprioceptive (and, possibly, also nociceptive) afferences, not only segmentally but also centrally. A neurological diagnosis should be used to establish the highest possible specificity of the chosen application. The involvement of the neuraxis and thus the individual stimulus tolerance threshold needs to be understood in order to avoid negative neurological effects. The laterality of the manual application should be according to the laterality of the disturbance of the neuraxis, not X-ray diagnosis.

This requires a minimum program of neurological diagnosis, which should be an inclusive part of manual medical practice and training.

References

- Arlen, A., *Leitfaden zur Atlasterapie*. 1985, Munster: Ass rech méd prév santé.
- Coenen, W., *Manualmedizinische Diagnostik und Therapie bei Säuglingen*, in *Manuelle Medizin, Behandlungskonzepte bei Kindern*, H. Lohse-Busch and T. Graf-Baumann, Editors. 1997, Springer: Heidelberg.
- Lohse-Busch, H. and M. Krämer, *Atlasterapie nach Arlen - heutiger Stand*. *Manuelle Med*, 1994. **32**: p. 153 -161.
- Nash, J., C.D. Johnson, and B.N. Green, *Hole in one: a history of its founding*. *Chiropr Hist*, 1996. **16**(2): p. 76-80.
- Biedermann, H., *KISS-Kinder*. 1996, Enke: Stuttgart.
- Biedermann, H., *Manualtherapie bei Kindern, Indikationen und Erfahrungen: ein Querschnitt*. 1999, Stuttgart: Enke.
- Coenen, w., *Röntgenologische Stellungen-diagnostik des atlanto-okzipitalen Übergans bei Säugling*. *Manuelle Med*, 1998. **36**(3): p. 116 - 120.
- Lewit, K., *Manuelle Medizin*. 6 ed. 1992, Leipzig: Johann Ambrosius Barth.
- Coenen, W., *Kommentar zu "Kopfgelenk-induzierte Symmetriestörungen und deren Folgepathologien, Pilotstudie*. *Manuelle Medizin*, 1999. **37**(2): p. 77-78.
- Gutmann, G., *Die funktionsanalytische Röntgenuntersuchung der Wirbelsäule und ihre tatsächliche klinische Bedeutung*, in *Manuelle Medizin heute*, H. Frisch, Editor. 1985, Springer: Berlin. p. 61 - 89.
- Jirout, J., *Das Röntgenverfahren bei der Erforschung von Dynamik und Gelenkspiel der Halswirbelsäule und der Kopfgelenke*, in *Manuelle Medizin heute*, H. Frisch, Editor. 1985, Springer: Berlin. p. 90 -94.
- Carrick, F.R., *The treatment of cervical dystonia by manipulation of the cervical spine*. *Int J Applied Kinesiology and Kinesiological Medicine*, 2001. **10**: p. 20-36.
- Garten, H., *Manuelle Therapie bei zervikaler Dystonie*. *Man M*, 2008. **46**(4): p. 238-244.
- Carrick, F.R., *Changes in brain function after manipulation of the cervical spine*. *J Manipulative Physiol Ther*, 1997. **20**: p. 529-545.
- Garten, H., *Applied Kinesiology: Muskelfunktion, Dysfunktion, Therapie*. 2004, Urban und Fischer: München.
- Coenen, W., *Neurologische und manuelle Standarduntersuchungen bei Säuglingen mit Bewegungsstörungen*. *Manuelle Medizin*, 2004. **42**(4): p. 293-303.
- Carrick, F.R., *Neurophysiological Implications in Learning*. 1996, Privately published: www.carrickinstitute.org.
- Kandel, E.R., J.H. Schwartz, and T.M. Jessell, *Principles of Neural Science*. 2000, McGraw-Hill: New York.
- Lown, B., R.L. Verrier, and S.H. Rabinowitz, *Neural and psychologic mechanisms and the problem of sudden cardiac death*. *Am J Cardiol*, 1977. **39**(6): p. 890-902.
- Ammenwerth, R., A. Götte, and A. Janitzki, *Wirkung manueller Therapien auf das sympathische Nervensystem*. *Manuelle Medizin*, 1999. **37**(4): p. 171-185.
- Frisch, H., *Programmierte Untersuchung des Bewegungsapparates*. 2 ed. 1987, Berlin: Springer.
- Dvorák, J. and V. Dvorák, *Manuelle Medizin, Diagnostik*. 4 ed. 1991, Stuttgart: Thieme.
- Brandt, T., *Vertigo, its Multisensory Syndromes*. 2000, Springer: London.

24. Mense, S., *Peripheral Mechanisms of Muscle Nociception and Local Muscle Pain*. J Musc Pain, 1993. 1: p. 133-170.
25. Melillo, R. and G. Leisman, *Neurobehavioral Disorders in Childhood*. 2004, Kluwer Academic/Plenum Publishers: New York.
26. Devinsky, O. and M. D'Esposito, *Neurology of Cognitive and Behavioral Disorders*. 2004, Oxford: University Press.

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