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MASTER THESIS IN OSTEOPATHY

ALONG THE DURA MATER IN PATIENTS WITH MULTIPLE SCLEROSIS

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1 PREFACE

Once I found myself listening to a man with great enthusiasm, realizing that my career would take a new course.

The name of this man is Raphael van Assche. He and two others, Dr. Margot Seitschek and Bernard Ligner D.O. founded the “Vienna School of Osteopathy” in Austria.

I want to thank all three of them most sincerely for enabling me to study this wonderful art of manual therapy here in Vienna. Their endeavours to achieve a high international standard ensured that the best lecturers in the field of osteopathy in Europe and in the USA now teach in our school.

Many thanks to Bernard Ligner D.O. for teaching us all six years.

Step by step he has patiently guided us on our way to becoming graduate osteopaths.

Many thanks to Jean Arlot D.O. for his exceptional thoroughness and patience in familiarizing our hands with the cranial-sacral system.

Thanks to Barrie C Savorie D.O. for having taught us virtuosity in applying the techniques along the spinal column.

Thanks to Louis Rommeveaux D.O. for his profound and animating teaching of the principles of biomechanics of the human body.

Thanks to Andre Ratio D.O. for many enlightening explanations of biomechanical correlations in the cranial-sacral system.

Thank you to Dennis Kelly D.O., who made a particular impression on me through his vitality.

Thanks to Van der Heede D.O. for his ingenuity in introducing clinical osteopathy and the autonomic nervous system.

Special thanks to Tom Shaver D.O. for his creativity and the inspiration I got through meeting him. On three afternoons at small and informal meetings, he familiarized me with the original spirit of osteopathy. Thanks to Tom Shaver I decided to make this pilot study as subject of my diploma thesis.

Very special thanks to James S Jealous D.O. conveying tranquillity and love expressed by the intrinsic rhythms of the organism. Through him, we gained deep insight into the body’s wisdom and self-healing powers that go far beyond tissue structures.

Further, thanks to Jean-Pierre Barral D.O., Susan Turner D.O., Serge Paoletti D.O., and Dr. Alfred Windisch anatomist and to Stuart Korth D.O. for the love and understanding he gave us for the treatment of the children.

I especially want to thank Prof. Dr. Eva Maida and Dr. Ingrid Fuchs for their support and their interest in osteopathy. Thanks to all my MS Patients who have confidently submitted themselves to osteopathic examination and treatment.
Thanks to all these people, I have been able to undertake the study at hand.

2 INTRODUCTION

I came to know osteopathy as a method of medicine, which the osteopath practices by using only his hands to diagnose a lesion and carry out the treatment.

Later on, osteopathy became a great art to me, the practice of which equally includes the hands, the mind and the heart.

Osteopathy is based on a very profound knowledge of anatomy, physiology, path physiology and biomechanics.

The great variety of very subtle and precise techniques demands a high level of professional skill. A sense of responsibility and sensitivity are also essential to fit the requirements. These qualifications are acquired in the course of six years' training. It is the aim of the osteopathy to restore the integrity and order of the whole organism and its self-regulation and healing powers.

From the philosophical point of view, the most important thing in osteopathy is to wait, gentle attentiveness until the tissue tells its story, to listen, to let things happen, simply to be there.

The point is not to do something of the contrary, the point is to attune oneself to the tissue and the patient, and learn to understand his very one story.

More than a century ago, Dr. Tailor Andrew Still MD (1828-1917), the founder of osteopathy, Dr. William Garner Sutherland, the founder and discoverer of cranial osteopathy, looked for a holistic way of treatment.

The philosophy of osteopathy and its five fundamental principles, established by the founder Dr. T.A. Still, are actually the basic laws of holistic medicine in general:

1) "Life is motion" the prime criterion for osteopathic diagnosis is to assess mobility, the restriction of which is an osteopathic lesion.

2) "The structure rules the function and the function forms the structure" when the ideal state of harmony in our body is disturbed there will not be optimum function either.

3)"The body functions as a unity" even smallest disturbances of one part unbalance the equilibrium of the whole body.

4)"The rule of the arteries is supreme" life must be nourished, so good circulation is the key factor. "The stagnation of toxic fluids causes irritations of musculature and nerves" (Fryette)

5)"Self healing mechanisms" health is the result of numerous auto regulatory processes of the immune system, the endocrine system, the autonomic nervous system, and the other regulatory systems.

It is important to stress that the osteopath does not heal disease of functional disturbances, but removes barriers that prevent the body from healing and regulating itself. The osteopath will continuously work with the homeostatic regulatory processes of the body.

In other words, one can say that he works at the triad of health. It has been mentioned before that our body incessantly tries to maintain our health by means of regulation, adaptation and compensation.

The triad of health consists of the physical component, the chemical component and the emotional component. When all three components are integrated sufficiently and effectively, a person will be healthy and happy.

The osteopath uses his two hands to examine the body of the patient. The art of palpation meant so called “sensing” and attuning oneself with what Dr. W Sutherland called ”the breath of life”.

Feeling the sensation of biodynamic motion impulses has opened a view beyond the structures for me. I have become aware of the patient’s heart, of his point of balance.

I have learnt to sense his individual potential source of health. This is a very conscious, gentle and respectful way of coming closer to the patient’s entire self.

The art of palpating must not be restricted to the hands. The physician must open all his senses in order to perceive the breath of the whole universe. Therefore, he can express himself individually in the patient and in every form of existence.

The physician should listen to the unique stories of the tissues to sense their slightest movements, the intrinsic rhythms of the body and the tensions within.

The therapeutic impulse lies in attuning oneself to these rhythms and energies, which reveal in the anatomical structures and by other ways of expression.

In coming closer to the patient, the physician has to step back and become so receptive that he can follow the potency and the senses beyond all anatomical structures. Therefore, the patient’s organism can reorientate itself and pass from the fulcrum of illness to the fulcrum of health.

We study anatomy in order to understand how the body works and to analyze the problem that leads the patient to us.

In my study, I intend to demonstrate the necessary embryological and anatomical basis as well as the pathological principles of multiple sclerosis. As the osteopath supports the patient’s self-healing process, the healthy human being and the healthy living tissue are indispensable guides. The human body is a part of the universe. So if we are looking for the universe we should be able to find it in the human body too.

I have tried to implement the known results of scientific research in the field of cranial sacral osteopathy in order to help MS patients who suffer gravely from their disease.

I hope that this study will give new ideas and perhaps contribute to find answers to some of the many open questions.

3 SUBJECT

Along the Dura Mater in Patients with Multiple Sclerosis

I have chosen this subject after many years' work in hospital, observing and treating MS patients. This subject ought to bring more light and hope to both, MS patients and all those treating and nursing them, and helps in dealing with the disease.
The rehabilitation and reintegration of those patients might be given a new impetus. I would be glad if I were able to fill in a gap in the field of osteopathic studies with new knowledge.
Through numerous conversations with specialists and experienced osteopaths from Europe and USA, as well as intensive enquiries into specialist literature and studies, I have found out that:
specialists, as well as osteopaths and MDs have been showing great interest in the subject;
no studies on such a large scale (30 MS patients) have ever been carried out;
Osteopaths in their offices have only treated and evaluated occasional cases up to that point.

The fundamental questions on the subject were:
In which way can osteopathy achieve a positive outcome in a severe disease at all?
Which structures play the most important role from an osteopathic point of view?

These two questions have generated the HYPOTHESIS.

4 HYPOTHESIS

In my hypothetical exposition, I started with the assumption that plaques develop at the onset of the disease and immediately after each relapse.
Later those plaques turn into scar tissue. The resulting scars in the central nervous system affect the circulation and fluctuation of the CSF the way genuine obstacles do. They are a great disruptive factor in the reciprocal membrane tension system.
The thereby arising overlapping functional disturbances can aggravate the neurological status of the MS patient.
The fluctuation of the CSF forms an enormous healing power inherent in the body.
Any reduction or obstruction of the CSF's fluctuation and circulation could impair the self-healing mechanism.

Four more questions:
What happens at the mechanical level in the CSF the dura mater cerebralis and spinalis?
What is the role the liquor cerebrospinalis (CSF) plays here?
How long is it possible to maintain the patient's well being by reducing functional disorders?
Does it make sense to continue the study?

5 ANATOMICAL AND PHYSIOLOGICAL BASIS

“In early life I began the study of anatomy, believing it to be the alpha and omega, the beginning and the end, of all forms and the laws that give forms, by selections and the associations of the elements, kinds and quantities, to the human body.(A.T. Still ,,The Philosophy and Mechanical Principles of Osteopathy” 1986 page 27)

“I view the cranial articulate structure as a primary respiratory mechanism, and it functions in conjunction with the brain, the ventricles, and the intracranial membranes; the diaphragmatic respiratory mechanism being secondary thereto.”

(W. G. Sutherland ,,The Cranial Bowl” 1994 page 24)

5.1 The Skull

“The skull, the skeleton of the head, is the most complex bony structure in the body because it encloses the brain, is irregular in shape; houses the organs of special senses for seeing, hearing, tasting and smelling; and surrounds the openings into the digestive and the respiratory tracts.

In the anatomical position, the scull is oriented so that the inferior margin of the orbit and the superior margin of the external acoustic meatus (auditory canal) are horizontal. This is called the orbitomenial plane.

The term cranium is sometimes used when referring to the scull without the mandible, but the cranium is often used when referring to the part of the scull containing the brain. Its superior part is a boxlike structure called calvaria; the remainder of the cranium, including the maxilla, orbits and the nasal cavities, forms the facial skeleton.

5.1.1 Internal Aspect of the Skull

The bones that can bee seen in the internal aspect of the base of the skull are the frontal, ethmoid, sphenoid, temporal, and occipital bones. Calvaria was removed. The striking features of the internal aspect of the calvaria are the grooves in the parietal bones made by the anterior branches of the middle meningeal artery and its accompanying vein.

Arachnoid granulations project into venous sinuses, particularly into the lacunae at the side of the superior sagittal sinus. The internal aspect of the cranial base presents three distinct tiered areas: the anterior, middle, and posterior cranial fossae. I found this short anatomical

text, while describing some bones with internal and external surfaces, points, and areas that have to be used as a part of the palpation skills in the osteopathy.

5.1.2 The Anterior Cranial Fossa

The inferior part and the anterior extremities of the frontal lobes of the cerebral hemispheres, known as the frontal poles, occupy the anterior cranial fossa, the shallowest of the three fossae. The anterior cranial fossa is mainly formed by the frontal bone. Most of its floor is composed of the convex orbital parts of this bone, which constitute the bonny roofs of the orbits. The orbital parts of the frontal bone show sinuous, shallow depressions called convolutional impressions, or brain markings. They are formed by the frontal gyri of the frontal lobes of the brain. The crista galli is a median process or crest resembling a cock's comb that projects superiorly form the ethmoid bone.

The crista galli and the frontal crest give attachment to a median septum or fold of dura mater, called the falx cerebri. It is located in the longitudinal cerebral fissure between the cerebral hemispheres of the brain. The lesser wings of the sphenoid bone and the part of this bone that joints them called the jugum, from the posterior part of the floor of the anterior cranial fossa. Each lesser wing ends medially in an anterior clinoid process, which gives attachments to a dural septum called the tentorium cerebelli.

5.1.3 The Middle Cranial Fossa

The rounded anterior extremities of the temporal lobes of the cerebral hemispheres, known as the temporal poles and about half of the inferior surface of the temporal lobe, fit into the middle cranial fossa. This fossa is located posterior and inferior to the anterior cranial fossa and is marked off from the posterior cranial fossa by a median rectangular bony projection called the dorsum sellae. More laterally, the middle cranial fossa is separated from the posterior by crests or prominences formed by the superior borders of the petrous parts of the temporal bones. The saddle like part of sphenoid bone, between the anterior and posterior clinoid processes, is known as the sella turcica. It is composed of three parts: tuberculum sellae, dorsum sellae, and hypophyseal fossa, for the hypophysis cerebri or pituitary gland.

5.1.4 The Posterior Cranial Fossa

This is the largest and deepest of the three cranial fossae. It lodges the cerebellum, pons, and medulla. It is formed by the inferior and anterior parts of the occipital bone, but the body of the sphenoid and the petrous and mastoid parts of the temporal bones also contribute to its formation. The occipital lobes of the cerebral hemispheres lie on the tentorium cerebelli, superior to the posterior cranial fossa. The sinuses lie between diverging folds of the

peripheral attachments of the tentorium cerebelli. The groove for the right sinus is usually larger because the superior sagittal commonly enters the transvers sinus on this side. At the centre of the posterior cranial fossa is the foramen magnum.

The tentorium of the cerebellum is a tent-shaped dural septum that roofs over most of the posterior cranial fossa, intervening between the occipital lobes of the cerebral hemispheres and the cerebellum. Between the anteromedial parts of the right and left leaves of the tentorium is an oval opening, called the tentorial incisure, for the brain stem to pass from the middle to the posterior cranial fossa. In the median plane, superior and posterior to the edge of the foramen magnum, there is a prominent bony ridge called the internal occipital crest. It partly divides the posterior cranial fossa into two cerebellar fossae. There lodge the cerebellar hemispheres. This crest ends superiorly and posteriorly in an irregular elevation called the internal occipital protuberance, which more or less matches the external occipital protuberance. Rostral to the foramen magnum, the basilar part of the occipital bone rises to meet the body of the sphenoid bone, basisphenoid. This inclined bony surface, called the clivus, is located anterior to the pons and medulla of the brain stem. (Illustration 1)

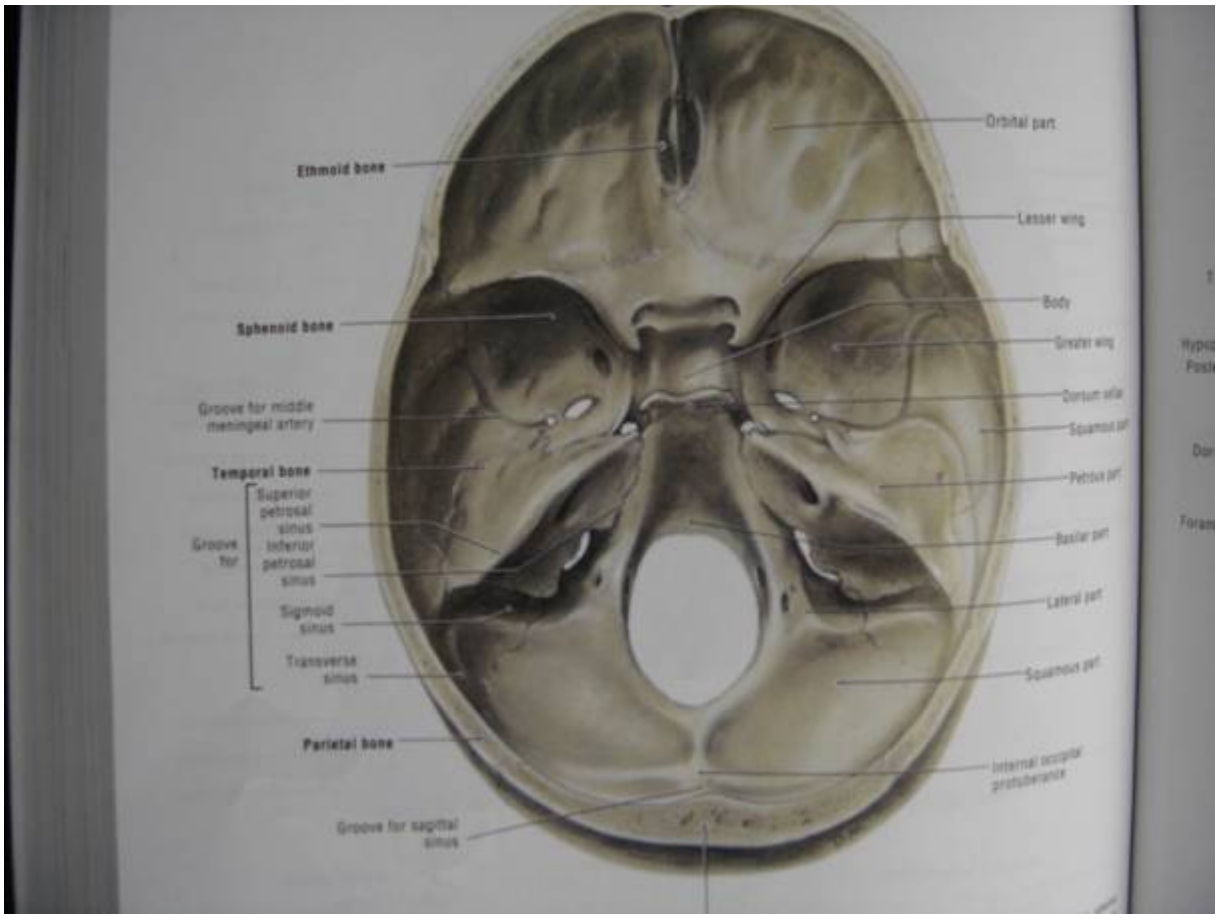

Illustration 1. Interior of the base of an adult skul.Keith L.Moore 1992. Page 648

5.2 Cranial Meninges and Cerebrospinal Fluid

A clear understanding of the membranes covering the brain and their relationship to the cerebrospinal fluid (CSF) is an essential basis for understanding intracranial disease and head injuries. In the living body, this vital organ is enveloped by three membranes an external, thick, tough dura mater, an intermediate, thin cobweb like arachnoid mater, an internal, delicate, vascular pia mater. These three membranes covering the brain, known collectively as the cranial meninges, are continuous with the spinal meninges covering the spinal cord. The cranial meninges and CSF provide support and protection for the brain, in addition to that afforded by the calvaria and scalp.

5.3 The Dura Mater

This is the outermost and toughest of the membranes covering the CNS. It consists of collagenous connective tissue. The cranial dura mater consists of one layer, similar to the spinal dura, it is described as a two layered membrane because the dura adheres so closely to the internal periosteum of endocranium, except where are dural venous sinuses and venous lacunae. The dura also extends medially to form dural folds or septa, the falx cerebri. It is important to understand that the external layer of the dura is really the internal periosteum or endocranium of the calvaria. It is attached to the bones of the calvaria by Sharpey's fibres, which penetrate and attach it to the cranial bones. This periosteal layer is also continuous with the external periosteum or pericranium of the cranial bones at the margins of the foramen magnum and at the smaller foramina for nerves and vessels.

The internal meningeal layer of cranial dura is continuous with the spinal dura at the foramen magnum. It also provides tubular sheaths for the cranial nerves as they pass through the foramina in the floors of the cranial fossae. Outside the skull, the dural sheaths fuse with the epineurium of the cranial nerves. The dural sheaths of the cranial nerves extended approximately to the cranial ganglia. The trigeminal ganglion of the fifth cranial nerve is surrounded by an extension of the cranial meninges. The trigeminal ganglion occupies the dura-enclosed space at the trigeminal impression in the petrous part of the temporal bone, called the trigeminal cave. The dural sheath of the optic nerve is also continuous with the internal meningeal layer of the cranial dura and the sclera of the eye. These relationships are clinically important.

5.4 Dural septa

During development of the brain, the dura is duplicated or reflected to form four inwardly projecting dural septa (folds).

These septa divide the cranial cavity into three intercommunicating compartments, one subtentorial and two supratentorial. The dural septa provide support parts of the brain, particularly the cerebral hemispheres.

The Falx Cerebri. This is large, sickle shaped, vertical partition in the longitudinal fissure between the two cerebral hemispheres. This thick tough dural fold is attached in the median plane to the internal surface of the calvaria from the frontal crest of the frontal bone and the crista galli of the ethmoid bone anteriorly to the internal occipital protuberance posteriorly. The falx cerebri is also attached to the midline of the tentorium cerebelli, another dural fold that lies between the occipital lobes of the cerebral hemispheres and the cerebellum. At the superior convex border of the falx cerebri, its two layers separate to enclose the superior sagittal sinus. The inferior sagittal sinus is enclosed within the free inferior edge of the falx cerebri.

The Tentorium Cerbelli. This is a wide crescentic, arced fold of dura, that separates the occipital lobes of the cerebral hemispheres from the cerebellum.

The attachment of the falx cerebri to the median portion of the tentorium cerebelli holds the latter fold up, similar to the ridgepole of the tent.

The tentorium cerbelli is attached anterolaterally to the superior edges of the petromastoid parts of the temporal bones and to the anterior and posterior clinoid processes.

Posteriorly, the tentorium is attached to the occipital bone along the grooves for the transverse sinuses, which it encloses. Its concave anteromedial border is free, and between it and the dorsum sellae of the sphenoid bone is an opening called the tentorial incisure. This oval opening surrounds the midbrain as it passes from the middle to the posterior cranial fossa.

The Falx Cerebelli. This is a small sickle shaped, median, dural fold in the posterior part of the posterior cranial fossa. It extends almost vertically, inferior to the inferior surface of the tentorium cerebelli. Its free edge projects slightly between the cerebellar hemispheres. The occipital venous sinus is located in the base of the falx cerebelli.

The Diaphragma Sellae. This is a small, circular horizontal sheet of the dura, that forms a roof for the hypophyseal fossa, in the sella turcica. This fold is formed by the dura surrounding the hypophysis cerebri and encircling the stalk of this gland. The diaphragma sellae covers the hypophysis cerebri, which lies in the hypophyseal fossa. The diphragma sellae has a central aperture for passage of the hypophyseal veins and the hypohyseal stalk of infundibulum, which connects the hypothalamus and the hypophysis. (Plate 2)

5.5 The Arachnoid Mater

This delicate, transparent membrane is composed of web like tissue. The arachnoid forms the intermediate covering of the brain and is separated from the dura by what has been clinically described as a film of fluid in a potential subdural space.
The arachnoid does not form a close investment of the brain but passes over the sulci fissures without dipping into them. The arachnoid is partly separated from the pia by the subarachnoid space containing CSF. Numerous trabeculae, which are delicate strands of connective tissue, pass from the arachnoid to the pia, giving it a web like structure.

5.6 The Pia Mater

This membrane is very thin, but it is thicker than the arachnoid. The pia is the innermost of the three layers of meninges and is a highly vascularized, loose connective tissue membrane that adheres closely to the surface of the brain. It dips into all sulci and fissures and carries small blood vessels with it. The cerebral veins run on the pia within the subarachnoid space. When branches of cerebral vessels penetrate the brain, the pia follows them for a short distance, forming a sleeve of pia. Hence, the perivascular spaces (Wirchow-Robin) are continuous with the subarachnoidal space. They extended in an increasingly attenuated form as the arterioles and venules in the brain.

5.7 The Meningeal Spaces

The extradural (epidural) space is a superficial to the dura, between the bone and the internal periosteum. Because the dura is intimately attached to the periosteum of the calvaria, the extradural space is only o potential space. It becomes a real space when blood accumulates in it form torn meningeal vessels. The so-called subdural space is in the deepest part of the dura. When a tissue space is created in this area, it appears to be the result of tissue damage. It represents, in most instances, a cleaving open to the dural border cell layer. In these cases the extracellular spaces in this layer are enlarged, creating what has classically been called subdural space.

5.8 Venous Sinuses of the Dura Mater

These sinuses are venous channels located between the dura and the internal periosteum lining the cranium, usually along the lines of attachment of the dural septa. The venous sinuses drain all the blood of the brain. The sinuses are lined with endothelium that is continuous with that of the cerebral veins entering them. These sinuses have no valves and no muscle in their walls. Several of the sinuses are triangular in transverse section because their bases are on bone and their sidewalls are formed by the origins of the dural folds.

5.9 The Superior Sagittal Sinus

This venous sinus lies in the median plane, along the attached border of the falx cerbri. It begins at the crista galli, runs the entire length of the superior attached portion of the falx cerebri, and ands at the internal occipital protuberance. At the termination of the superior sagittal sinus is a dilatation, known as the confluence. This sinuns is triangular in transverse section, the superior wall being formed by the endocranium lining the calvaria and the lateral walls by the dura. The superior sagittal sinus communicates on each side through slit like openings, with venous spaces in the dura, called lateral venous lacunae, into which some arachnoid villi project. The main site of passage of CSF into venous blood is through the arachnoid villi, especially those projecting into the superior sagittal sinus and the adjacement lateral venous lacunae.

5.9.1 The Inferior Sagittal Sinus

Is smaller than the superior sagittal sinus and occupies the posterior two thirds of the free inferior edge of the falx cerebri. It ends by joining the great cerebral vein (of Gallen) to form the straight sinus.

5.9.2 The Straight Sagittal Sinus

It is formed by the union of the inferior sagittal sinus with the great cerebral vein.
It runs inferoposteriorly along the line of attachment of the falx cerebri to the tentorium cerebelli.

5.9.3 The Trasvers Sinuses

They pass laterally from the confluence of the sinuses in the attached border of the tentorium cerebelli. They leave the tentorium and become the sigmoid sinuses.

5.9.4 The Sigmoid Sinuses

These venous sinuses follow S-shaped courses in the posterior cranial fossa, forming deep groves in the inner surface of the posterior part of the mastoid parts of the temporal bones, and the lateral surfaces of the jugular tubercules of the occipital bone. This sinus enters venous enlargements called the superior bulbs of the internal jugular veins. These large bulbs receive the inferior petrosal sinuses and continue as the internal jugular veins.

5.9.5 The Occipital Sinus

Is the smallest of the dural venous sinuses. It begins near the posterior margin of the foramen magnum and ends superiorly in the confluence of sinuses. It lies in the attached border of the falx cerebelli.

5.9.6 The Cavernous Sinuses

They are located on each side of the sella turcica and the body of the sphenoid bone. Each cavernous sinus receives blood from the superior and inferior ophthalmic veins, the superficial middle cerebral vein in the lateral fissure of the cerebral hemisphere, and the sphenoparietal sinus. The cavernous sinuses communicate with each other through intracavervous sinuses, which pass anterior and posterior to the hypophyseal stalk.
The lateral of each cavernous sinus contains, the following structures: the oculomotor nerve (CN III); the throchlear nerve (CN IV); and the ophthalmic and the maxillary divisions of the trigeminal nerve. Inside each cavernous sinus is the internal carotid artery with the sympathetic plexus and the abducent nerve.

5.9.7 The Superior Petrosal Sinuses

They are small channels that drain the cavernous sinuses. Each superior petrosal sinus lies in the attached margin of the tentorium cerebelli running in a small groove on the superior margin of the petrous part of the temporal bone.

5.9.8 The Inferior Petrosal Sinuses

They drain the cavernous sinuses directly into the internal jugular veins, just inferior to the skull. It enters the jugular foramen and joins the superior bulb of the internal jugular vein. It receives cerebellar and labyrinthine veins.

5.9.9 The Basilar Sinus

The sinus consists of several interconnecting venous channels on the clivus, the posterior surfaces of the basilar part of the occipital bone and the basisphenoid. It connects the two inferior petrosal sinuses and communicates inferiorly with the internal vertebral venous plexus. (Illustration 2 and Illustration 3)

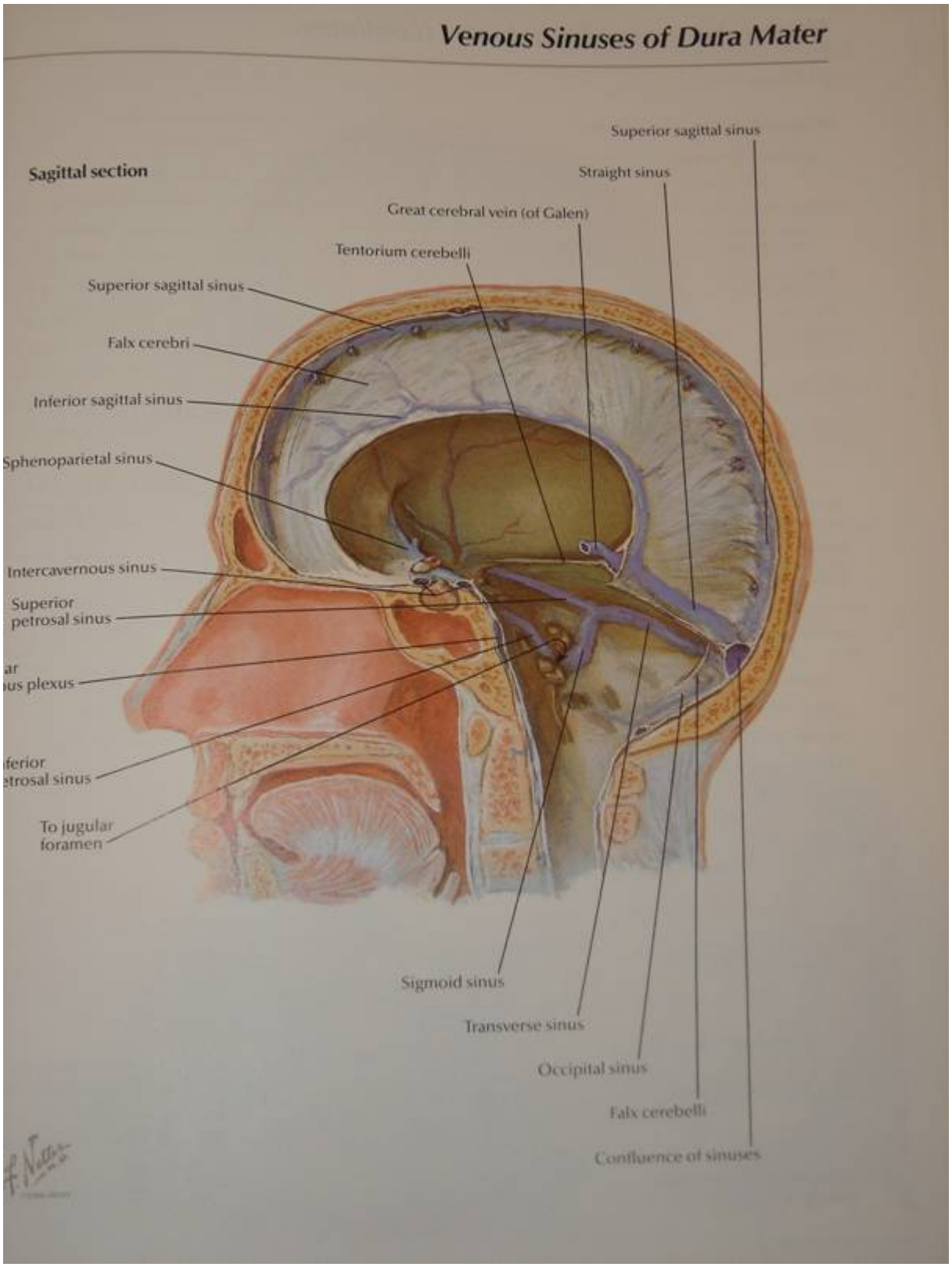

Illustration 2 (F. Netter Atlas of Human Anatomy 1995 page 97)

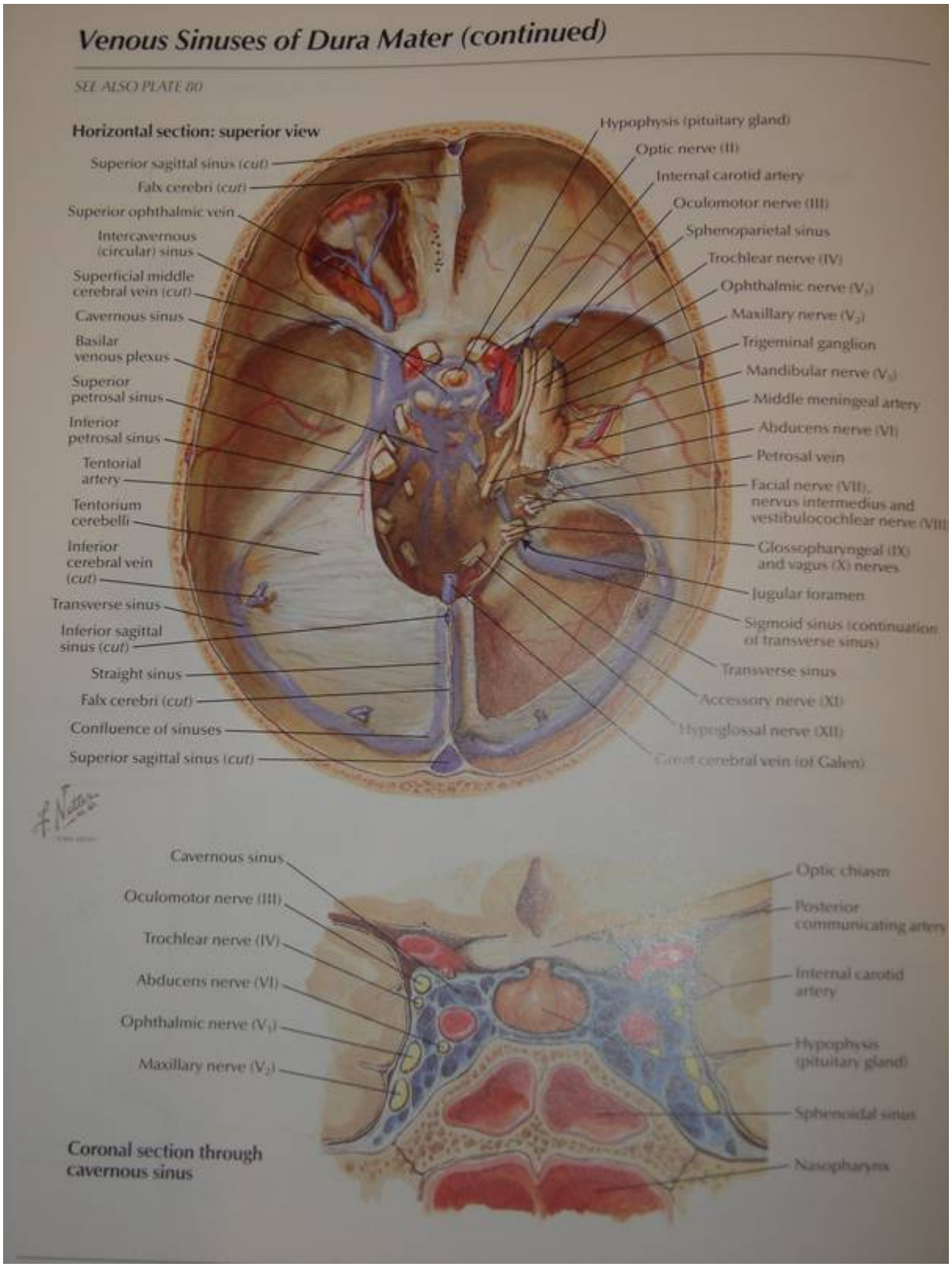

Illustration 3 (F.Netter Atlas of Human Anatomy 1995 page 98)

5.10 Ventricular System and CSF

The ventricular system in the brain consists mainly of four cavities called ventricles. The firs and second ventricles, called lateral ventricles are the largest components of the system. They occupy a considerable part of the cerebral hemispheres. Each lateral ventricle opens in the third ventricle through an interventricular foramen. The third ventricle is a narrow, slit like cavity between the two thalami. It is continuous posteriorly with the cerebral aqueduct in the midbrain, which connects the third and the fourth ventricles. The fourth ventricle is located in the pons, anterior to the cerebellum, and ends posteirorly into the central canal of the spinal cord. CSF escapes from the fourth ventricle into the subarachnoid space through the median and lateral apertures. CSF is formed by choroids plexus in the ventricles and circulates through the ventricular system and the subarachnoid space before being reabsorbed into the dural venous sinuses.

The main source of CSF is the plexuses of the lateral, third and fourth ventricles of the brain. Choroid plexuses are located in the roofs of the third and fourth ventricle and on the floors of the bodies and inferior horns of the lateral ventricles. The choroid plexuses in the lateral ventricles are the largest and the most important producers of CSF. They are continuous with the choroid plexus in the roof of the third ventricle through the interventricular foramina. The lateral apertures of the fourth ventricle are also partially occupied by parts of the choroid plexuses, which protrude through them from the fourth ventricle and secrete CSF into the subarachnoid space. Each choroid plexus is composed of vascular pia called tela choroidea covered by a simple cuboid or low-columnar epithelium.

The subarachnoid cisterns are located mainly at the base of the brain, the arachnoid is widely separated from the pia and forms large pools of CSF, called subarachnoid cisterns. They communicate freely with each other and with the subarachnoid space of the spinal cord and cover all surfaces of the cerebral hemispheres.

The cerebellomedullary Cistern (Cisterna Magna) is located in the space between the cerebellum and the inferior part of the medulla. It receives CSF from the median aperture of the fourth ventricle and is continuous with the large subarachnoid space around the brain and the spinal cord. I mention also the Pontine Cistern as a space along the ventral and lateral surfaces of the pons, containing the basilar artery.

The Interpeduncular Cistern is located between the cerebral peduncles and contains the posterior part of the cerebral arterial circle (of Willis).

The Cistern of the Lateral Sulcus contains the middle cerebral artery and is located anterior to each temporal lobe where the arachnoid covers the lateral sulcus.

The Superior Cisterna lies between the splenium of the corpus callosum and the superior surface of the cerebellum. It contains the great cerebral vein and the pineal body.

5.10.1 Circulation of CSF

CSF leaves the fourth ventricle through its median and lateral apertures and passes into the subarachnoid space, where it collects in the cerebellomedullary and pontine cisterns. From these cisterns, some CSF passes inferiorly into the spinal subarachnoid space around the spinal cord and the posterosuperiorly over the cerebellum. Most CSF flows superiorly through the tentorial incisure into the subarachnoid space around the midbrain (interpeduncular and superior cistern). CSF from the various cisterns spreads superiorly through the sulci and fissures of the medial and superolateral surfaces of the cerebral hemispheres. Pulsations of the cerebral arteries and movements of the cerebral hemispheres aid this flow of CSF. CSF also passes into the extensions of the subarachnoid space around the cranial nerves.

5.10.2 Absorption of CSF

The site of absorption or passage CSF into venous system is through the arachnoid villi, which are protrusions of the arachnoid into the dural venous sinuses, especially the superior sagittal sinus and its adjacent lateral lacunae. The rate of CSF absorption is pressure dependent, and the arachnoid villi appear to act as one-way valves. When CSF pressure is greater then venous pressure, the open and CSF passes into the blood in the venous sinuses of the dura. When the venous pressure is higher than CSF pressure the valves close, preventing blood from entering the CSF. Some CSF appears to be absorbed by the ependymal lining of the ventricles in the spinal subarachnoid space and through the walls of capillaries in the pia.

5.10.3 Functions of CSF

Along with the meninges and calvaria, CSF protects the brain providing a cushion against blows to the head. Because the brain slight-heavier than CSF, the gyri on the basal surface of the brain are in contact with cranial fossae in the floor of the cranial cavity when a person is erect. In many places at the base of the brain, only the cranial meninges intervene between the brain and the cranial bones. In this position, the CSF is in the subarachnoid cisterns and in the sulci on the superior and lateral parts of the brain. Hence, CSF normally separates the superior part of the brain from the calvaria. There are small, rapidly recurring changes in intracranial pressure owing to the heart- beath, as well as slow recurring changes resulting from unknown causes. In addition, momentarily large changes in intracranial

pressure occur during coughing and straining. Any change in the volume of the intracranial contents will be reflected by a change in intracranial pressure. This is called the “Monro-Kellie doctrine”, which states that the cranial cavity is a closed rigid box and that a change in the quantity of intracranial blood can occur only through the displacement or replacement of CSF”.

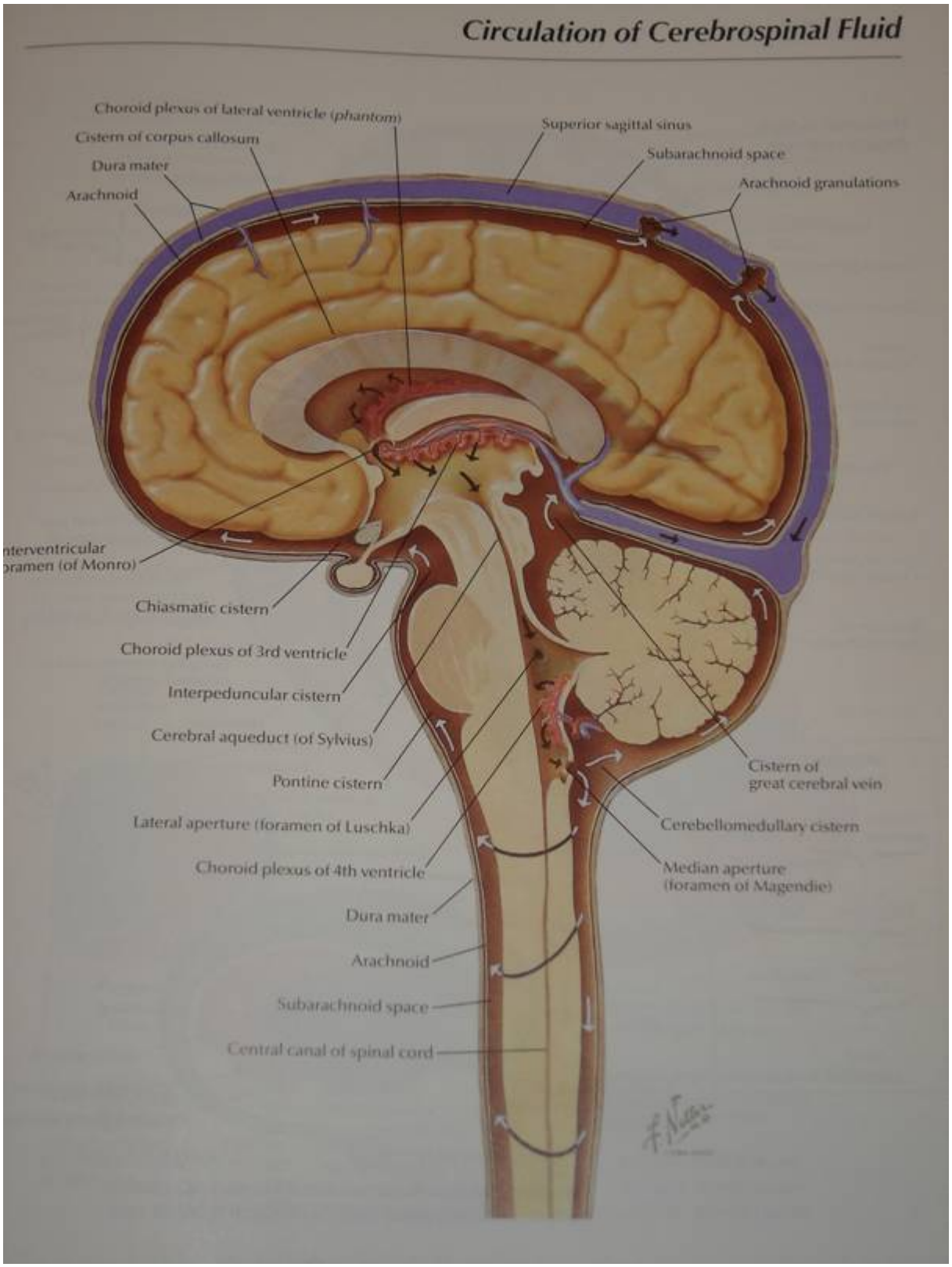

Illustration 4 (F. Netter Atlas of Human Anatomy 1995 page103)

6 THE PATHOGENESIS OF MULTIPLE SCLEROSIS

Multiple sclerosis (MS) is a chronic disease of the central nervous system, which predominantly affects young adults during their most productive years. Approximately two and a half million people throughout the world suffer from MS, which represents a major burden for the patients, their families, caregivers and communities.

MS causes the loss of two million „healthy life years" worldwide each year, and is one of the 100 disorders causing the greatest burden of disease, ranking above ovarian cancer, prostate cancer, trachoma and leprosy. This provides policy makers with an important sign when they are allocating resources and setting research priorities.

Although the evidence is almost entirely circumstantial, the overall weight of information from several directions leads most observers to believe that MS is an organic-specific autoimmune disorder of the central nervous system. Evidence supporting this point of view includes epidemiological data showing that diseases are more com-mon in females, the apparent precipitation of relapses by viral infect and, perhaps most importantly, the pathological evidence of active immunological participation in both acute and chronic plaques.

Although macrophages may be first to the site of acute lesions, there is abundant evidence that T cells are also present at the site of lesions, and that circulating T cells are activated in relationship to this activity. Nevertheless, it can be said that the postulates for establishing autoimmunity laid out by Witebsky and patterned after those by Koch for the identification of infectious disease have yet to be satisfied.

Over many years, the concept of MS as being either an acquired transmissible disease or a primary genetic disorder has given away to the prevailing concept that it is likely to be a spontaneous autoimmune disorder in which both environmental factors and genetic factors play a role in susceptibility. The well-known association of relapses of MS with viral infections has not been recognized to entail any impact on susceptibility itself.

Recent studies of adopted children and half-siblings seem conclusive in identifying that familial aggregation is determined by

genes. Familial aggregation in permissive areas approaches a 5% risk for first-degree relatives.

The location and identification of genes determining susceptibility seemed a more tractable problem a few years ago than unravelling how environment interacts with physiological functions to reduce risk.

Few disease of the nervous system provides broader manifestations than MS. The clinical manifestations are sufficiently diverse that the complexity and heterogeneity should be expected. The clinical spectrum of disorders presently under the name of MS includes isolated optic neuritis and MS Marburg variant and several other patterns in between. It seems most likely that these represent phenotypes, which could have partly overlapping mechanism, but there might be entirely different entities included under what we now call MS.

The mechanism of chronic progression in MS remains somewhat of an enigma. Certainly, progression occurs in the absence of attacks, raising the possibility that a separate mechanism or mechanisms are at play. Nevertheless, the impact of relapses at an early stage of the disease is appreciable and raises the possibility, that the clinical effects relapse preventative therapies will amplify as time goes on. It should be remembered, that association does not always mean causality, and that prevention of relapses does not necessarily mean that any associated disease progression would by necessity be prevented.

6.1 Heterogeneity of multiple sclerosis immunopathology

In multiple sclerosis, a chronic inflammatory in the central nervous system is accompanied by widespread focal demyelisation. The demyelinated plaques, which are located in random topographical distribution throughout the brain and the spinal cord, are characterized by selective loss of myelin, the denuded axons being embedded in a dense glial scar. Oligodendrocytes, the cells responsible for myelin formation, are destroyed to a variable degree within the lesions.

In inactive lesions, in particular at early stages in the evolution of disease, numerous oligodendrocytes, that are at least partly recruited from a pool of progenitor cells, are distributed throughout the demy-elinated plaques and give rise to extensive remyelination. In fact, an extensive extent of axonal damage occurs in active MS lesions and the degree of the axonal damage appears to be the major correlate of permanent functional deficit in this disease.

The inflammatory reaction in MS is dominated by mononuclear cells and the pattern of inflammation is consistent with T-cell-mediated immune reaction being the driving force of inflammation.

In chronic lesions, in addition, a variable number of B-lymphocytes and plasma cells are present within the infiltrates, apparently being responsible for intrathecal immunoglobulin synthesis. It is generally believed and well documented by immunopathological studies, that the inflammatory reaction in general precedes the destruction of myelin sheaths.

Demyelisation and degradation of myelin is generally accomplished by macrophages. Indeed, signs of macrophage activa-tion and the presence of myelin fragments within macrophages is so far the best pathological marker for demyelinating activity.

Recent experimental data clearly show that multiple immunological mechanisms may lead to selective destruction of myelin sheaths in the central nervous system. These mechanisms involve products of acti-vated macrophages and cytotoxic cytokines, specific demyelinating antibodies, as well as factors that interfere with oligodendrocyte metabolism. Whereas in models of central nervous system autoim-munity demyelisation is mainly induced by demyelinating antibodies or cytotoxic macrophage products, a disturbance of oligodendrocyte metabolism is an important additional pathogenetic factor in virus -induced demyelinating diseases.

Recent immunopathological studies in MS suggest that, in this disease also, the mechanisms of demyelisation may be heterogeneous.

So far, the data support the view that particular MS patients and at a particular time point of the disease, all active lesions follow the same immunopathological pattern. The heterogeneity between different MS patients, however, indicates that different pathogenetic subgroups of the disease exist that may require different therapeutic strategies. The identification of clinical and para clinical markers that allow the defi-nition of an immuno pathogenetic pattern in individual MS patients during live will become a major research task in the near future.

6.2 Clinical patterns of multiple sclerosis

From the clinical viewpoint can be a question addressed by describing the various courses of the disease and by considering findings from

technical investigations such as magnetic resonance imaging (MRI), cerebrospinal fluid (CSF) analysis and evoked potentials studies.The most common form of MS (>60%) is relapsing-remitting MS (RRMS).

The clinical course lasts over years with relapses and remissions (full recovery or with sequelae and residual deficits upon recovery; the periods between relapses characterized by a lack of progression) of various duration. This form is more frequent in females. Clinical relapses are mainly due to the focal inflammatory process in the central nervous system (opening of the blood-brain barrier, release of cytokines, and rearrangement of electrolyte channels) inducing reversible conduction failure in affected areas. Over the natural course, frequency of relapses decreases with longer disease duration. After an average of 10 years, there is complete recovery after relapses and steady progression with occasional plateaux may occur indicating secondary-progressive MS (SPMS) disease. These two forms of MS

differ clinically by the temporal factor of their development, by the degree of the remaining disability and handicap (and therefore by the necessary coping strategies); but there are no obvious differences on MRI, CSF or evoked potentials or on pathological examinations.
In less than 20% of all MS patients there is disease progression form onset with occasional plateaux and temporary minor improvements (Primary-progressive MS; PPMS).
Progressive Relapsing MS (PRMS) is a newly defined subtype with progressive form onset and, later acute relapses, with or without full recovery.
Expanded Disability Status Scale (EDSS) / time is more rapid than in
SPMS, but a longer time in life had been disease-free. After a definite diagnosis of MS, the clinical course is benign in at least 20 %; patients remain fully functional in all neurological systems 15 years after onset.
Rarely in MS is there a rapidly progressive course, leading to signifi-cant disability in multiple neurological systems or to death in a relatively short time after disease onset (malignant MS). This may be due to the location of the plaque in the brainstem respiratory centre or due to a fulminate immunological attack leading to the formation of plaques of similar ages (Marburg type).
The very heterogeneous pattern of clinical presentations in MS with relapses, remissions, progression and irreversible deficits is most probably due to the fine balance of intertwined factors, genetically determined and acquired from the environment. These facts lead to the opening of the blood-brain barrier, to the release (and removal) of cytokines in the inflammatory process, to demyelisation (and re-myelination) and re-arrangement of electrolyte channels and to damage and ultimately loss of axons in various sites of the central nervous system and at different times. The differentiation of the various clinical patterns is important for counselling individual patients and their relatives, and for planning therapeutic trials. (Compare illustration 5)

6.3 Diagnosis of Multiple Sclerosis

The ability to make an accurate diagnosis of MS and to minimise the period of uncertainty for the patient represent two of the major issues of neurologists dealing with people with MS. It is important that the neurologist remembers that even with the increased sensitivity and improved specificity of modern tests, MS remains a diagnosis of exclusion; the differential diagnosis should always be considered.
The process begins with the history from the patient, includes the elicitation of relevant signs, then the institution of appropriate investigations, the exclusion of other diagnoses and the provision of appropriate information to the patient.

The History from the patient should indicate the occurrence of symptoms consistent with white matter lesions in the central nervous system (CNS) that are distinct form each other in their time of appearance and location within the brain and the spinal cord.

The Examination of people with MS has to elicit those relevant clinical signs, which are objective and that support or refute the diagnosis. The important sings include those, which give evidence for previous episodes of disease affecting multiple sites within the CNS.

The presence of optic atrophy together with extensor plantar responses or the presence of an afferent pupillary defect with limb ataxia are particularly significant, though neither are diagnostic of MS. In addition, the “Charcot’s triad” of nystagmus, ataxia and dysarthria, though typically found in MS, is by no means confined to the condition.

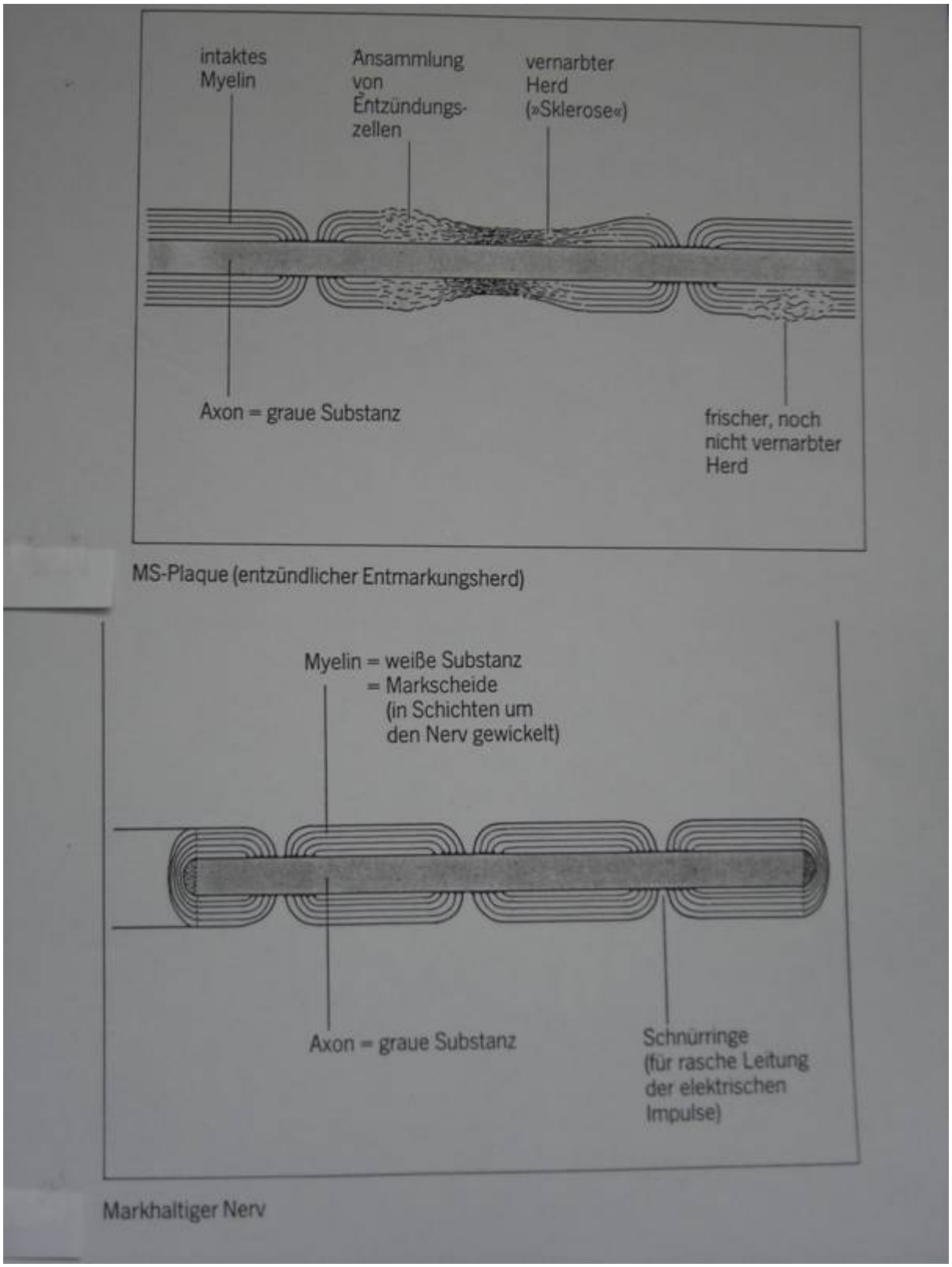

Illustration 5. (E. Maida Der MS- Ratgeber 1993 page 100)

Magnetic Resonance Imaging

The technique of MRI has provided a window on the brain in order for the actual pathology of MS to be visualized as it evolves in the living patient. Natural history studies of the activity of new and otherwise active lesions have shown that the pathological activity can be seen at a rate of 5-10 times the rate of clinical relapses. Systematic MRI monitoring has now been used to supplement the clinical monitoring of clinical trials (Paty and McFarland, 1998; Miller et al, Beginning in the 1980s, it was very clear that MRI could define MS lesions quite precisely in both the brain and the spinal cord.

The correlation between clinical findings and MRI findings in individual patients is not high. This lack of specific correlation is probably because most of the lesions are located in the frontal and temporal lobes. However, there is no doubt that the analysis of data of groups of patients has shown that MRI can measure the evolving pathology over time in both an accurate and objective way and correlate modestly with clinical findings. When natural history studies are performed using frequent MRI scans, new lesions can be seen to appear, old stable enlarge, and most active lesions enhance. In addition, MR spectroscopy (MRS) may also identify the elements of active demyelisation by the detection of neutral fat. The final irreversible damage in the MS lesion is axonal loss. These new possible combinations of investigative techniques are very exiting for the future of understanding the evolution of MS. (Illustration 6+7)

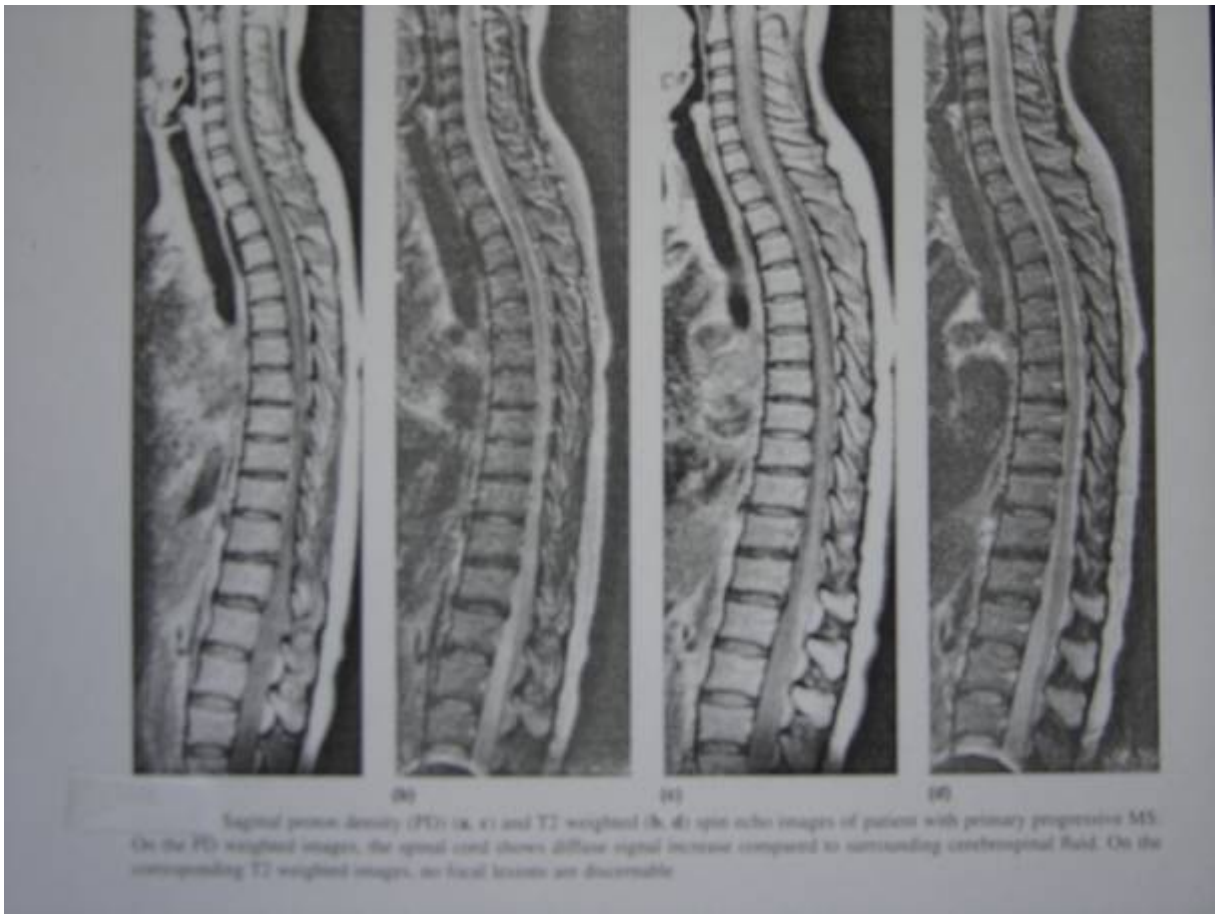

Illustration 6. Sagittal proton density (PD) (a. c) and T2 weighted (b. d) spin echo images of patient with primary progressive MS. On the PD weighted images, the spinal cord shows diffuse signal increase compared to surrounding cerebrospinal fluid. On the corresponding T2 weighted images, no focal lesions are discernable.(Advances in MRI Contrast , MRI in MS,MS/ MRI Centre, Free University Hospital , Amsterdam, Volume 4 No.2 August 1996 page 73)

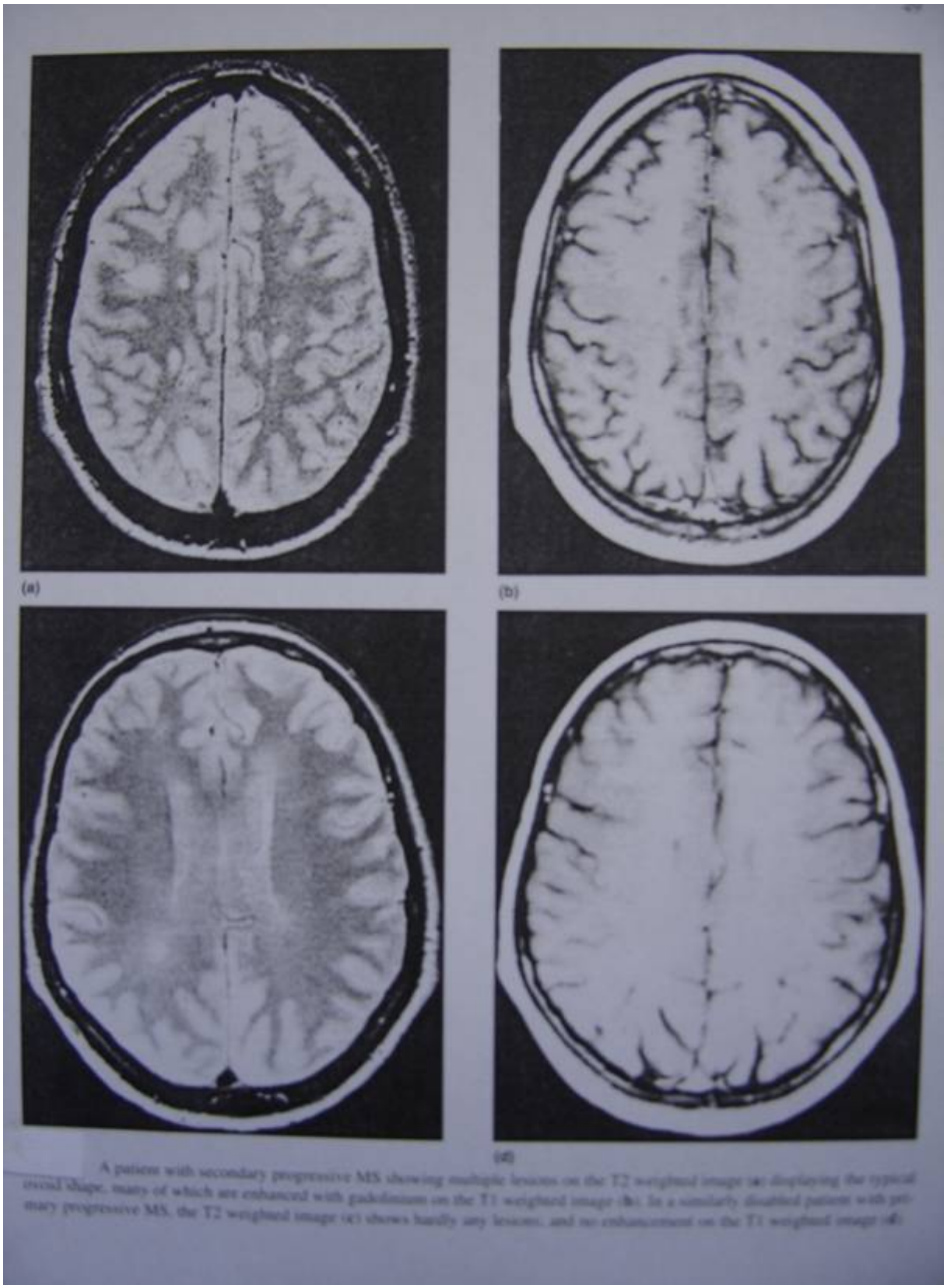

Illustration 7. A patient with SP MS showing multiple lesions on the T2 weighted image(a) displaying the tipical ovoid shape, many of which are enhanced with gadolinium on the T1 weighted image (b). In a similarly disabled patient with PP MS the T2 weighted image(c) shows hardly any lesions and no enhancement on the T1 weighted image(d) (Advances in MRI Contrast, Volume 4 No.2 August 1996 page 49).

CSF examination

When changes in CSF cytology, protein and immunoglobulin content have been recognised for many decades, the ability to measure blood-brain barrier dysfunction by the ratio of immunoglobulin to albumin in CSF and serum (and more recently the determination of oligoclonal bands present in the CSF but not in the plasma), is of considerable help in the establishing the diagnosis of MS.

6.4 The Differential Diagnosis

A very important aspect for the neurologist in establishing the diagnosis of MS is to be aware of the possibility of “misdiagnosis”.

A useful way to consider the differential diagnosis is to recognise those diseases that may:

*Give symptoms and signs resembling MS

*Mimic MS on MRI scans

*Result in oligoclonal bands in the CSF

*Clinically definite MS does not exclude other diseases, e.g. myasthenia gravis.

6.5 Symptomatic Management of MS

The management of the patient suffering an acute exacerbation of MS depends upon the nature and severity of the symptoms and usually involves the use of corticosteroid medication.

*Spasticity

About 90% of people with clinically definite MS experience spasticity at some time in the course of their disease.This symptom is the most disabling factor for the patients. Spasticity may result in problems with mobility, make the patient liable to experience spasms and consequently to suffer from pain and discomfort.Most people with spasticity benefit from the use of oral medications, a few require the use of intrathecal or intramuscular preparations and for a small minority surgical procedures still have a role.

*Pain

Causes of the pain : -directly relate to the CNS ; neurogenic pain syndromes as trigeminal neuralgia, painful tonic spasms, chronic dyaestethic symptoms, result of spasticity, complications in terms of infection, arising from the arthropathy accompanying prolonged in mobility.

*Fatigue

Is a prominent symptom in more than 75% of people with MS and some would argue that all individuals report fatigue at some stage in their disease. The patients associate their fatigue with impaired physical, rather than mental, activity; the effect of this fatigue upon their activities of daily living is considerable.

*Bladder and Bowel Dysfunction

Dysfunction of the urinary bladder is common in MS yet remains poorly recognised and often under-investigated. The type of dysfunction in the urinary bladder in MS usually involves either in-complete bladder emptying, detrusor, hyperreflexia or combinations of both. Bowel dysfunction is a common problem that usually causes constipation.

*Sexual Dysfunction

The recognition of a management of sexual dysfunction in MS has improved in recent years.

*Psychological Symptoms

Most patients with MS will experience some degree of depression during their illness. This requires recognition and appropriate therapy either by counselling or with drugs.

*Paroxysmal symptoms

Paroxysmal symptoms, ranging from seizures through to transient dysarthria, disequilibrum syndromes, trigeminal neuralgia, kinesogenic choreoathetosis and other ephaptic syndromes, usually respond to the use of an anticonvulsant agent.

6.6 Treatment of Multiple Sclerosis

Clinical experimentation in MS is largely empirical because the cause of the disease is a “mystery”. Modest claims for treatment effects with new agents have not greatly improved the understanding of pathoge-nesis.

It is difficult to treat diseases of unknown pathogenesis. The disease progression in MS is slow and it is difficult to measure.

Measurement is prone to inter- and intra-rather variability

*6.7 *Treatment for the Acute Attack*

For patients with acute attacks, corticosteroids remain the mainstay of treatment. Physicians are cautioned against long-term use of steroids; side effects can be major problems and these drugs have not yet been shown convincingly to alter long-term disability.

*6.8 *Prevention of the Acute Attack*

Until 1993, there were few options for the prevention of acute attacks in patients with relapsing/remitting disease. Azathioprine seemed to have a modest effect in reducing attack frequency by about one third, with marginal effects of disability. Type 1 interferon have been shown to reduce the frequency of attacks Intravenous immunoglobulin appear to have a beneficial effect. In addition, other agents have been experimented.

*6.9 *Intervention of Disease Progression*

It is a weak medicine for this outcome. Methylprednisolone has a modest effect on the rate of disease progression, but patients resume their continued progression within a few months of treatment.

*6.10 *Prevention of Disease Progression*

A variety of lymphocyte poisons has been investigated in progressive
MS. Azathioprine appears to have a modest effect, deduced from the meta-analysis of several studies.
Considerable interest was lavished upon cyclophosphamide as an immunosuppressive agent following an encouraging report from Harvard-based study in 1983.
The beta interferons, known for their substantial effect on MRI activity measures and their modest effect on clinical activity measures in RRMS are under study in patients selected for chronic (secondary) progression.

6.11 Rehabilitation in Multiple Sklerosis

> The philosophy of the rehabilitation might be considered an ideal approach to the management of MS. (Thompson, 1998).

It aims to maximize functional independence through stabilisation of function, reduction of disability and prevention of secondary complications through an educational process that encourages self-management. Such an approach would seem highly appropriate in a condition such as MS, which has such a profound impact over many decades, producing diverse symptoms and resulting in multiple needs that cover the physical, emotional and social domains. Rehabilitation is of relevance at all stages of the condition from the initial diagnostic phase to later stages, which are associated with moderate and severe disability. The role of rehabilitation has become better defined and some initial attempts have been made to evaluate its benefit. Further work needs to be done in the area that will be greatly assisted by the seating of standards and the development of more appropriate outcome measures.

7 OSTEOPATHIC BASIS

“Osteopathy is the knowledge of the structure, relations and functions of each part and tissue of the human body applied to the adjustment and the correction of whatever may be interfering with their harmonious operation“.(Still.,,Research & Practice” 1992 Preface xxiii)

The philosophy of Dr. A.T. Still revolutionised therapeutic ideas and established the osteopathic school of medicine.

Osteopathy is an example explaining and utilising powers of resistance, relief and recuperation in the human body, powers

largely unknown or little known before the days of Dr. A. T. Still.

Osteopaths conceive of man as a bio mechanism, an organic machine, which, as long as the cells, tissues, organs, muscles, ligaments and bones are normal in themselves and in their reciprocal relationships, will function normally. They maintain that structural integrity and physiological adjustment of the tissues and fluid- tensions of the organism form the most important factors in maintaining health.

Life essentials, food, air, water, light, heat, exercise, protection and rest, are necessary, also environmental and psychological harmony, and in an organism structurally perfect these constitute the requirements of man for maintaining health.

The osteopathic physician is a skilled engineer of the vital human

mechanism, influencing by manipulation and other osteopathic

measures the activities of the nerves, cells, glands and organs,

the distribution of fluids and the discharge of nerve impulses, thus

normalising tissue, fluid, and function.

It is our responsibility as physician to work within ourselves and within our patients to allow physiologic function within to

manifest its own unerring potency to bring this health pattern to the surface.

The basic osteopathic principles are:

1. The body is a unit;
2. The body possesses self-regulatory mechanism
3. Structure and function are reciprocally interrelated
4. The rule of the artery is supreme
5. Rational therapy is based upon an understanding of the body unit’s self-regulatory mechanism and the body’s interrelationship of structure and function.

I want to talk in this work about living body, about a living self-regulatory mechanism about a living structure and a living function that are reciprocally interrelated, and about a living therapy based on this understanding.

We need to understand that the living anatomic physiological details of the primary respiratory mechanism, of the cranial sacral mechanism, are not separate unit of function.

The science of osteopathy includes knowledge of philosophy, anatomy and physiology for the whole body, together with their clinical application in both diagnosis and treatment.

The cranial concept, as developed and taught by Dr. Sutherland, includes the following set of principles:

1. The fluctuation of the cerebrospinal fluid, or the potency of the Tide
2. The function of the reciprocal tension membrane
3. The motility of the neural tube
4. The articular mobility of the cranial bones
5. The involuntary mobility of the sacrum between the ilia

Dr. Sutherland named the integrated structure and function of these five components the primary respiratory mechanism.

7.1 THE MECHANISM

The word mechanism as used in craniosacral work refers to the sum total of the parts that make up the craniosacral system, including the connective membrane of the meningeal and spinal dura.

It includes:

1. All 21 cranial bones
2. The brain, spinal cord,and cerebrospinal fluid
3. All 24 vertebrae
4. The sacrum
5. The dural membrane system, or reciprocal tension membrane (RTM), which includes the spinal dura

The osteopathy in the cranial field is applicable to all ages, from the newborn baby through to the aged.

It can be involved in all the disciplines of medical science.

It may be the primary health care needed for a specific trauma of disease, or it may be supplemental health care in a specific case that requires additional medical of surgical intervention.

Problems that involve the cranial field itself obviously require a solution in that mechanism.

In addition, there are problems arising elsewhere in the body

physiology that are solved more easily when the cranial mechanisms are coordinated with other treatment.

The mechanisms within the body physiology have no problems.

They are at work within each one of us.They are doing their best job

to keep us alive.If they acquired a problem through an accident,

birth, trauma or some environmental pattern and their mechanism in not in accord with what it is supposed to be, they are also bringing the solution for that problem. The mechanism itself is not aware of this.

The mechanism itself will teach us. The mechanisms that require health are also the mechanisms that can express health.

7.1.1 The Activity of the Cerebrospinal Fluid

We know that the normal brain lives, moves and thinks within its own specific membranous articular mechanism.

The automatically involuntary rhythmical movement of the CNS involves dilation and contraction of the ventricles, during the respiratory periods. This movement of the ventricles in turn, effects CSF circulatory activity, and this activity of the CSF effects movement of the arachnoid and dural membranes, and this membranes through the reciprocal tension membrane, effects mobility in whole the sutures of the skull, dural tube and sacrum. During the period of inhalation the lateral ventricles are dilating and the hemispheres in convolution the third ventricle dilates in a V-form, the fourth ventricle dilates in a lozenge form, while the spinal cord is draw upward, and the CSF fluctuates within the subarachnoid spaces and the ventricles.

During the exhalation period are the convolutions relaxing, the ventricles contract, and the spinal cord drops downward, and the CSF fluctuates again within the subarachnoidal spaces and ventricles.

The CSF fluctuates by way of the arachnoid membrane throughout the vertebral column.

The dural tissues act as walls to the main venous channels leading into the jugular veins.Restriction of the jugular veins increases the CSF pressure, which fact is verified by the lumbar puncture spinal fluid test, wherein an assistant holds the veins.

In most types of cranial membranous articular strains or lesions, we may reason that there may be abnormal restriction by way of dural and arachnoid membranes, not only to the intracranial venous channels but to the subarachnoid channels also.
Such restriction limits the circulatory activity of CSF and secondarily disturbs the normal activity of the ventricles and convolutions. Dr. Still stressed the importance of the normal flow of blood in the artery; Dr. Sutherland believes that the circulatory activity of CSF is primary to the arterial, venous and lymphatic activity.
He said „the rule of the artery is supreme, but the CSF is in command. The Breath of Life in the cerebrospinal fluid Tide is the fundamental principle in the primary respiratory mechanism“.
I want to mention some important elements, even decisive, for the clinical application in the daily work with the patients.
With this thought in mine mind, let us take the terms he used:
Breath of Life, Potency, Fulcrum, Stillness, Tide, and also a few words about Midline.

7.2 BREATH OF LIFE

The Breath of Life is that which is the vehicle for primary respiration and related to involuntary activity and it proceeds from the source of life at a steady rate.
The Breath of Life forms life, perfectly then the form is modified by genetic and cultural forces (Jealous. ,,The Biodynamics of Osteopathy”. Course Vienna Oct. 1998) It has the capacity to transmutate its energetic form dynamically.
It permeates through all function without diminishing its force.
It creates form and function but it cannot be “used“, it exists.
It is effective only by direct action, transmutating form and function.
Dr. Sutherland stated that no force is necessary during the treatment and that one can follow the intention of the Breath of Life and serve its Potency:
The Breath of Life is the fundamental principle in the science of osteopathy.

7.3 THE POTENCY

When the osteopath places his hands upon a patient who has a good health, he can feel the sense of wellness as well as the respiratory cycle of his breathing.
He also feels the flexion and extension of his midline sutures in their functioning.
He feels many involuntary motions from different organ systems within the body.

We can sense throughout the whole body something that has not been mentioned in the physiology texts of today; it is an overall tidal movement of whole the body, a coming in and ebbing out.
It is a rhythmic movement within all the fluids of the body similar to the moving of the tides in the ocean.
“It is more, in its quiet way, than any other physiological functioning within the body mechanism, more important and more powerful than the respiratory cycle, the voluntary, or the involuntary movements or any of the other movements we ordinarily consider. This is rhythmic Tide in physiological functioning with its Highest Known Element and its innate Potency. (Rollin Becker DO ,,Life in Motion”1997 page98)
A very important diagnostic tool with which we learned to understand this Potency is the principle of use of the fulcrum. The body has the capacity to express health through this inherent potency, and it has the capacity to maintain compensatory mechanisms in response to trauma or disease through variant potencies. It is up to us to learn to feel this potency. Within manifesting of trauma or disease through tensions and stress that we can fell with our hands, there is a potency that is able to control of influence, having authority and power. It can be sensed and read by feeling touch.

7.4 FULCRUM

Developing of the sense of touch it was necessary to learn the principle of the fulcrum. As next, we have to develop a method of using the fulcrum in the diagnostic approach. Dr. W. G. Sutherland, in describing the fulcrum in relationship to the two halves of the tentorium cerebelli and the falx cerebri, stated the Fulcrum. The junction of the falx cerebri and tentorium cerebelli at the straight sinus, is the still-leverage junction over and through which the three sickles function physiologically in the maintenance of balance in the cranial membranous articular mechanism. A fulcrum is not a still point but fulcrums are still points that shift. The fulcrums are spatially related to the midline and they are automatically shifting. Fulcrums activate neutrals toward motion, the Breath of Life has a fulcrum and the whole spatial motion of the cranium has also a fulcrum. A fulcrum shifts automatically from time to time to adapt and to change within the body, yet remain in its leverage functioning.

7.5 MIDLINE

Through the human body, there are multiple midlines, of varying intensity. The anterior midline is an extension of the posterior notochord midline. Another one is present in the fluid

of the ventricular system; the bioelectric potentials in the CSF are sustained by the midline ventricles. These are the primary ones. The midline is considered as a point of organisation of the Tide before it is dispersed into the body functions. We can fee along the midline an involuntary bilateral movement, which is present throughout the life span of the individual. This important element has to be used as a diagnostic tool as well before each treatment as to evaluate the corrective process of a given treatment. This bilateral movement along the midline is present throughout the whole body physiology, and although small in degree of motion, it can be palpated anywhere in the body. We have to place our palpatory observing of the area of stress, torsion or dystorsion and then on a comparative area of relative health away from the area of stress (non-motion and motion present). The rhythm of the two areas will be the same, but the quality in the area of health and in the area of stress will be distinctly different. If the structures, along the midline show a definite return towards that experienced in health area, we can be assured we initiated a self corrective change in that dysfunction.

7.6 THE TIDE

There are hundreds of self-regulatory mechanisms in the body physiology. Interpreting this mechanism as a movement, I want to mention a very important element: The Tide.
Tidal movements can be palpated with the development of a trained sense of touch. We can fell the involuntary mobility of the fast tide, 6 to 8 times / min. and the slow tide 6 times in 10 minutes. Both tides are innate, inherent, and involuntary self-regulatory mechanisms.
It is important to spend a very long time practicing distinguishing the Tide from the fluid. We can also say that we have to distinguish the tidal effect of the Tide on the fluid.
The fast tide is one of the fluid components of the midline-bilateral involuntary mobility. Its fluctuation patterns can be modified to meet physiological needs within the patient. The slow tide is a physical phenomenon that occurs in the body physiology. It is demonstrating its presence during the application of a corrective treatment procedure; the slow tide will not manifest itself. Feeling it our perception will change.
“ As old habits fall away, we are not distracted by lesions, fluid activities or concepts based on the repair of structure. At this point we enter in to the metabolic fields of life as unit without partitions.” (Jealous. Course. The Biodynamics of Osteopathy. Vienna Oct.1998)

7.7 STILLNESS

The idea of stillness may confuse us in our thinking in trying to understand the function of the mechanisms. If we observed the eye of the hurricane, it is a tremendous centre of stillness and yet it is a potent stillness.
It is both an automatic-shifting-suspension-fulcrum site as it moves across the ocean. There must be a point of calm.
,, A Still point manifests an organisational potential that exceeds the limits of the human mind. It recharges the bioelectric, molecular and physical properties of life with function and form, reinstating the pre-genetic Matrix of the Breath of Life." (James S. Jealous DO. ,,The Biodynamics of Osteopathy" Course Vienna Oct.1998). I have discussed about function, automatic-shifting suspension fulcrums, Tide, Stillness, Potency, that operate all within body physiology.

7.8 TRANSMUTATION

It is a natural phenomenon occurring within the body throughout the life. It is the change of one thing into another; the change of one chemical element into another. The rhythmic fluctuation of CSF involves transmutability and creates rhythmic balanced interchange with the choroids plexuses. The physiological centres are placed in the floor of the 4th ventricle, the neurons of the central and peripheral nervous system, the pituitary-hypothalamic axis, pineal gland and other hormonal glands throughout the body, the lymphatic system, and in the fact with all the cellular and fluid systems of the body.
Diagnostic
The diagnostic in the cranial osteopathy is both, an art and science. Diagnosis and treatment are inseparable.
The art of diagnosis is the ability applied by the osteopath himself. The science has extended our senses through instrumentation, introducing a battery of tests to diagnose conditions in the human body.

The diagnosis as a science brings data to the physician that can be learned objectively with a minimum of human error. Following factors are involved: first, the interpretative skill of the osteopath analysing the data, and this supplied by scientific knowledge and tools, and second, the use of the physician's personal skills in evaluating the patient. All these factors are subjective in nature.
The physician's concept of what is wrong with the patient is based on many years of training.

Another important factor is the anatomical-physiological mechanism's knowledge of its own case. This mechanism and its structure-function carry the total picture for disease and restored health.

The next important element in the diagnosis and treatment of the CNS is the use of the cerebrospinal fluid Tide.

Dr. Sutherland says, "I have been calling your attention to the potency of the tide. It has more intelligence and potency in it than any blind force that can be safely applied from the outside. The CSF with that 'highest known element' can work for you".

The osteopath has to follow the fluctuation of the CSF and the tidal movement within the CSF in the inhalation phase, of the Primary Respiratory Mechanism, and to find its rebounds that are bumping up against something that obstructs its fluctuation. It may rebound when there is an obstruction in a particular place. If there is no obstruction in the tissue, we can feel a gentle yielding with motion. We can use this phenomenon in diagnosis as well as in treatment.

Dr. Sutherland considers diagnosis and treatment inseparable.

8 MATERIALS AND METHOD

8.1 MATERIALS

I selected a group of 50 multiple sclerosis patients to take part in the study. All of these were in-patients at the hospital „Evangelisches Krankenhaus Wien-Alsergrund" where they were treated by Univ. Prof. Dr. Eva Maida and O.A. Dr. Ingrid Fuchs.
Although the group had consisted of 50 patients in the beginning, relevant statistics of only 30 of them could be recorded because 20 patients did not appear for a third treatment.
Therefore, eventually, 20 patients were included in the study group and 10 patients in the control group. The patients came from all over Austria and were in-patients at the Department of Neurology for a week.
The disease had been diagnosed in all patients at least 5 years before their entering the study. All patients had already had MRI scans.
All patients were able to walk and showed moderate spasticity.
Despite intensive medication, they did not show any improvement of motoric function.
The patients did not show irreversible neurological damage.
All patients received the same medication.
Medicaments: Steroids, Mannit, Endoxane.
The patients had physical therapy in groups.
The patients were male, female, and 20 to 60 years of age.

8.2 METHOD

The patients were osteopathically examined, and treated on the second and fourth day after enrolment.
About 5 to 6 weeks after the second treatment, the patients were examined, and treated a third time as outpatients.

8.3 MEASUREMENT

Applied to the study group, as well as the control group.

1. Step length diff. in cm ratio
2. Step width diff. in cm ratio
3. Romberg's test yes/no nominal
4. Lasegue's test (leg flexion) by goniometry 0°left and right ratio
5. Active leg flexion by goniometry ratio
6. Active head raising, dist. Inion-table supine position in cm ratio

8.4 STUDY GROUP

Day 1: medication and physical therapy (kinesetherapy)
Day 2: medication and physical therapy
Day 3: medication /measurement /osteopathic therapy /measurement/
no physical therapy
Day 4: medication and physical therapy
Day 5: medication /measurement /osteopathic therapy / measurement /
no physical therapy
Outpatient treatment and follow-up was scheduled after 5-6 weeks.
Measurement /osteopathic therapy / measurement were carried out.

8.5 CONTROL GROUP

Day 1: medication / physical therapy
Day 2: medication /physical therapy
Day 3: medication /measurement / physical therapy / measurement
Day 4: medication /physical therapy
Day 5: medication /measurement /physical therapy / measurement

Outpatients' follow-up was scheduled after 5-6 weeks.
Measurement / physical therapy /and final measurement were carried out.
Each patient was filed separately. About 5 patients were recorded on video in order to give a better picture.

8.6 EXAMINATION

I started examining the patient by taking measurements in standing position (step length, step width, Rhomberg's test, Lasegue's test, leg flexion, head flexion).
Then I proceeded with osteopathic examination of the standing patient in the usual order (viewing the body from anterior, posterior and lateral position, mobility tests).
Afterwards, I carried out the mobility tests in the sitting patient, viewed the patient in supine position and, at the end of the general examination, carried out the mobility tests in supine position.
The general examination is of great importance in view of the MS patient's diffuse neurological status. Each patient develops his very own motoric picture. Depending on the clinical patterns of MS, the body develops "compensations", which lead to a distinctive posture.
As mentioned before in the chapter „Hypothesis", overlapping functional disturbances can aggravate the neurological motoric picture of the patient.
The statement of Dr. W G Sutherland, "The rule of artery is supreme, but the cerebrospinal fluid is in command " was of main importance in my choice of therapy. Therefore, the guideline in the treatment of MS patients was the auto regulatory power of the CSF and its effects in the CNS.
According to the main principle of osteopathy, "The body functions as a unit", the favourable effects in the CNS spread to the periphery and lead to positive changes in the muscle tonicity and the general posture and in MS patients, to the improvement of the motoric status.

8.7 DIAGNOSIS

Diagnoses were made according to the general principles of cranial osteopathy, already described in the chapter „Osteopathic Basis".
When making diagnosis on MS patients, one must take account of pathologic changes in the tissues.
These pathologic changes reveal themselves as stress areas in the process of sensing.
The MRI scans show plaque formation in the area of the central nervous system mostly around the ventricles or the corpus callosum (lateral ventricles and third ventricle) and in the area of the brain stem and the cerebellum or around the fourth ventricle.
The MRI scans in the area of the cervical spine also show well-located plaque formation at different levels. One can easily differentiate condensed areas from healthy tissue. Plaques constitute scare-tissue in the area of the CNS and have to be considered as restrictive areas

or stress areas of tissue that negatively affects the circulation and fluctuation of the CSF the way genuine obstacles do.
The clinical patterns of multiple sclerosis and duration of the disease are important parameters that play an essential role in diagnosis and therapy in cranial osteopathy by MS patients.

Medication, too, is a factor that influences diagnostic elements like quality, power, potency, and vitality.
The long-suffering inevitably leads to psychological changes, called impairment of the longitudinal fluctuation in cranial osteopathy.
I would like to describe more diagnostic and therapeutic elements that lead to an efficient management of the patient.

The CNS activity, the movement of cerebral hemispheres, nervous tissue and leptomeninges are very important elements in our diagnostic touch. The hemispheres move with the neural tube converging towards the anterior wall of V 3. This is spatially related to tip of notochord. The suprapineal arachnoid body is a link between leptomeninges and the dural sac.
Above tentorium cerebelli lodges the cerebellum. The tissue forces converge towards the superior roof of V4 and synchronize with the tadpole motion of CNS. Proper texture is key entry point.

Therapeutic forces organize into vectors that can be interpreted during the inhalation phase. Coiling refers to an action in the epithelial walls of the ventricles. The brain proper gelatinous and has a different shape of motion and a very different texture. During the Inhalation phase the forces turn back to the Fulcrum of the V3 to the Lamina terminalis. In the Exhalation phase, the forces get into development direction. All elements of CNS except microglia, leptomeninges and vascular elements arise from the epithelial layers that coil. A constant cellular replacement of structure is evident. The internal walls of the ventricles fall off into CSF as new cells arise from the basal layer. Cellular spacing and arrangement, as well as cellular regeneration are oriented to the midline. CSF and CNS nurture this process. Liquid genius: there is more to the mind than neural networks. Messages also percolate through the soup -like fluid bathing the brain. Kjell Fuxe from Sweden‘s Karolinska Institute in Stockholm and Luigi Agnati believe that not all nerve signals follow this traditional route. They now think that the nerve cells use the fluid -filled spaces to communicate in an entirely different way – a process they have christened „volume transmission“. They imagine this alternative from of signalling as being less like a private conversation between pairs of neurons and more like a

radio broadcast. Signals can go just about anywhere, and can be picked up by any properly tuned receiver. (Anders Janson. New Scientist March 1999)
(*Birth of Nerve Cells, or neurons, in the adult brain has been documented in the human hypocampus, a region important in memory. The steps involved, which occur in the dentate gyrus region of the hypocampus, were originally traced in rodents. First unspecialized „stem"cells divide at the boundary of the granule celllayer; which contains the globular cell bodies of granule neurons,and the hilus --- an adjacent area containing the axons, or signal - emitting projections,of the granule neurons ----.Then certain of the resulting cells migrate deeper into the granule cell layer. Finally, some of those cells differentiate into granule neurons complete with their characteristic projections.)* (Joseph Altman, Scientific American May1999page39)

The term DISENGAGEMENT describes a process that is related to normal metabolic activity, embryological development, and Tidal influences on the bodily function.
ACCSESS supposes to find Inertia the Motion present and their Fulcrums. (J. Jealous phase II) They have different Fulcrums. By following the motion present during inhalation is our first step towards appreciation of the sense of the Tide prescribing remedies. The reciprocal tensions on tissues, fluids and bioelectric fields are one reciprocal tension responding to the Tide.

The Tide density induces motion into all facets of living physiology. Our perception is designed to disengage and receive impressions that dynamically increase our sense of well-being and vitality. Under stress, the natural disengagement allows strains to be "worked out" through the process of disengagement and automatic shifting of inertial vectors. The "work" of treatment is a natural setting without help. (Rollin Becker. Life in Motion 1997 page 95)
During the inhalation phase the stress is internally disengaged and at peak inhalation the self regulatory forces move the Fulcrum in the strain towards a more physiological position. During the exhalation phase, the system reorganizes its function and shape in response to the shifting that occurred at the end of the inhalation phase. Our attention must be on primary respiratory phase and the treatment at the same time. It is the biphasic system of work.
In the cranial osteopathy, diagnosis and treatment are inseparable. (Rollin Becker. Life in Motion 1997 page 41)
In the chapter "Anatomy and Physiology", I have already given a detailed description of other important elements that we have to take into account in diagnosis and therapy in MS patients.
The fluids have continuity, like the fascia.

The fluid body is a single consciousness that is not under the control of the CNS. The tidal body is made up of electromagnetic energy, part of which is the tide. The fluid is capable to make decisions. (Dr.J.Jeaous phase lll) . Automatic shifting is a therapeutic shifting in the patient's fluid body.

You feel the automatic shifts like a little fish moving in one place, then disappearing, then reappearing in another place.

Usually it makes 10-15 movements during 23 minutes. It tells you where this patient needs to be treated.(Dr.J.Jealous phase l+ll+lll.) If it shifts somewhere, do not assume that it is the tissue, which is in lesion, because the change happens in the fluid body, not in the tissue body.

The area, which the automatic shifting is moving around, is also a diagnostic hint.

We can divide our attention between the motions inside the patient and the stillness inside the patient and around the patient.

At the end of treatment, we should feel the rate of change in the patient's stillness. This means we have synchronized with the stillness inside the fluid. It has transmuted.

The treatment actually begins when the patient leaves our office. The therapeutic process takes place during the next three or four days.

After the treatment, we have to look at the interface between the patient's illness and health and at its permeation. Then ask for the fulcrum around which these two are interacting. The lesion was primarily organized by primary respiration. (Dr. J.Jealous, phase I+II+III).

9 RESULTS

9.1 MEASUREMENTS

The study considers the following parameters: ratio

1) Length of the stride
2) Width of the stride
3) Rhomberg test
4) Lasegue angle
5) Active leg flexion in supine position
6) Active head flexion (Inion-bed-distance)

9.2 STUDY GROUP

The results will be interpreted as following:

Number of patients who have shown an improvement after the first treatment:

		Patients	**%**
In each of	6 measured data	1	0, 25
	5 measured data	12	51
	4 measured data	18	90
	3 measured data	20	100
	2 measured data	20	100

Number of patients that stabilized: Second test before second treatment shows an improvement, referred to the first test.

		Patients	%
In each of the	6 measured data	1	0, 25
	5 measured data	17	85
	4 measured data	20	100
	3 measured data	20	100
	2 measured data	20	100

Number of patients that stabilized: Third test before third treatment shows an improvement, referred to the first test.

		Patients	%
In each of the	6 measured data	1	0, 25
	5 measured data	15	75
	4 measured data	16	80
	3 measured data	18	90
	2 measured data	18	90

The measure with the most positive results:
Active head flexion, Inion-bed-distance: 20 100
All the results above are valid for the study group.

9.3 CONTROL GROUP

Number of patients that show an improvement after first treatment:

		Patients	%
In each of the	6 measured data	0	0
	5 measured data	0	0
	4 measured data	0	0
	3 measured data	6	60
	2 measured data	9	90

Number of patients that stabilized: Second test before second treatment shows an improvement, referred to the first test:

		Patients	%
In each of the	6 measured data	0	0
	5 measured data	0	0
	4 measured data	0	0
	3 measured data	5	50
	2 measured data	8	80

Number of patients who stabilized: Third test before third treatment shows an improvement, referred to the first test

		Patients	%
In each of the	6 measured data	0	0
	5 measured data	0	0
	4 measured data	0	0
	3 measured data	0	0
	2 measured data	1	10

The measure with the most positive results:

Active leg flexion: 9 90

All the results above are valid for the control group

9.4 RESULTS SURVEY

I Treatment .		STUDY GROUP		CONTROL GROUP	
		Patients	%	Patients	%
In each of	6 meas. Data	1	0, 25	0	0
	5	12	51	0	0
	4	18	90	0	0
	3	20	100	6	60
	2	20	100	9	90

II Treatment .		STUDY GROUP		CONTROL GROUP	
		Patients	%	Patients	%
In each of	6 meas. Data	1	0, 25	0	0
	5	17	85	0	0
	4	20	100	0	0
	3	20	100	5	50
	2	20	100	8	80

III Treatment .		STUDY GROUP		CONTROL GROUP	
		Patients	%	Patients	%
In each of	6 meas. Data	1	0, 25	0	0
	5	15	75	0	0
	4	16	80	0	0
	3	18	90	0	0
	2	18	90	1	100

The measure with the most positive results for:

Study group: active head flexion “Inion-bed-distance” 20 Patients → 100%

Control group: active leg flexion 9 Patients → 90%

As Dr. W. G. Sutherland DO (Teachings in the Science of Osteopathy 1990) had already mentioned, I want to emphasize as well that cranial osteopathy might and

should be employed in the treatment of MS patients as a valuable accompanying therapy. This could increase the quality of life of MS patients considerably.

10 DISCUSSION AND SUMMARY

10.1 DISCUSSION

10.1.1 The Study Group

As the figures show, positive results were accomplished.
In all 6 measurements only 0, 25% could be achieved after the first treatment. Only one patient showed positive results in “step width”.

Progress can bee seen in 5 measurements:
Step length, Lasegue’s angle, leg flexion, head flexion, and Rhomberg’s test: 51% of the patients improved.
In 4 measurements further increase could be noted, namely positive results in 90% of the patients.
In 3 and 2 measurements a surprising 100% were registered.
In” active head flexion” all patients improved.
Patients stabilized after the first treatment (after 2 days, test before the second treatment) as follows: 0, 25% in 6 measurements, 85% in 5 measurements, 100% in 4, 3, 2, measurements.
Patients stabilized after the second treatment (after 5-6 weeks, test before the third treatment) as follows: 0, 25% in 6 measurements, 75% in 5 measurements, 80% in 4 measurements, 90% in 3, 2 measurements.
Relevant were:

1) **The results after the first treatment,**
2) **The difference between the first and the second test** before the second treatment,
3) **The difference between the first and the third test** before the third treatment.

This is just one possible form of evaluation. We could differentiate and interpret this data in several different ways.

I think that this is a first stage of a quantitative evaluation and provides a basis for further studies and thus contributes to achieve higher quality. I have only considered general criteria for my study: diagnosis MS, for at least 5 years, male female, ambulatory, no irreversible neurological damages.

10.1.2 The Control Group

In the control group, no progress was achieved after the first treatment in 6, 5, and 4 measurements.
In 3 measurements 60% of the patients showed positive results, 30% less than the study group.
In 2 measurements the results in both groups are the same: 90%.
After the second test before the second treatment, in 6, 5, 4, measurements no progress was registered, in 3 measurements 50% and in 2 measurements 80% of the patients could stabilize.
After the third test before the third treatment, 10% of the patients could stabilize in two measurements only.
The figures are in favour of the study group.
After this study, I got very many questions from Germany and Australia. The results of the study were published in Germany (“Still Point” 2001, last issue). From the University of Melbourne, Dr. Ray Mayers showed a great interest for this study. He has also started a pilot study on MS patients.

10.2 SUMMARY

More than a century ago, Dr.T. A. Still MD (1828-1917), the founder of osteopathy, and Dr. W. G. Sutherland, the discoverer and founder of cranial osteopathy, looked for a holistic way of treatment. The philosophy of osteopathy and the five fundamental principles of osteopathy, established by its founder A.T.Still, are actually the basic laws of holistic medicine in general.
It is important to stress that the osteopath does not heal disease of functional disturbances, but removes barriers that prevent the body from healing and regulating itself.

Subject: “Along the Dura Mater in Patients with Multiple Sclerosis”

I have chosen this subject after many years of work in hospital, observing and treating MS Patients.

Hypothesis: In my hypothetical exposition, I started with the assumption that plaques develop at the onset of the disease and immediately after each relapse. Those plaques turn later into scar tissue. The resulting scares in the CNS, affect the circulation and fluctuation of the CSF the way genuine obstacles do. They are a great disruptive factor in the reciprocal membrane tension system.

Anatomical and Physiological Basis: I tried to accord the anatomical elements to the subject, so it follows from this: the external aspect of the skull, the internal aspect of the skull with the Anterior Cranial Fossa, the Middle Cranial Fossa, and the Posterior Cranial Fossa with the Foramen Magnum.
For a clear understanding of the membranes covering the brain and their relationships to the CSF as an essential basis for understanding intracranial disease and head injuries, I find the anatomy of the cranial meninges very important. These are the dura mater, with its folds and septa; the arachnoids mater and the subdural space, the pia mater and the all-meningeal spaces. The venous sinuses of the dura mater play a very important role. They drain all the blood of the brain.
The ventricular system in the brain and its choroids plexus are the main source of the CSF. All the cisterns communicate freely with each other and with the subarachnoid space of the spinal cord and cover all surfaces of the cerebral hemispheres. They are responsible for an optimum of fluctuation of the CSF.

The Pathogenesis of Multiple Sclerosis: MS is a chronic disease of the CNS. The blood-brain barrier leakage and inflammation is a consistent feature of new focal MS lesions, and clinical relapses are likely due to such inflammatory demyelization foci when they develop in clinically strategic locations.
Although the evidence is almost entirely circumstantial, the overall weight of information from several directions leads most observers to believe that MS is an organic-specific autoimmune disorder of the CNS.

Clinical patterns of MS.
(RRMS) Relapsing/Remitting MS
(PPMS) Primary/Progressive MS
(SPMS) Secondary/Progressive MS
(PRMS) Progressive/Relapsing MS

Severity Outcomes

Diagnosis of MS:

The History, the Examination, MRI, CSF examination.

Symptomatic:

Spasticity, pain, fatigue, bladder and bowel dysfunction, sexual dysfunction, psychological symptoms.

Treatment of MS:

Treatment for the Acute Attack, prevention of the Acute Attack, intervention of Disease Progression, prevention of Disease Progression.

Rehabilitation in MS.

It aims to maximize functional independence through stabilisation of function, reduction of disability and prevention of secondary complications through an educational encourages and self management.

Osteopathic Basis

The cranial concept, as developed and taught by Dr. Sutherland includes the following set of principles:

The fluctuation of the CSF; of the potency of the Tide

The function of the reciprocal tension membrane

The motility of the neural tube

The articular mobility of the cranial bones

The involuntary mobility of the sacrum between the ilia

These 5 components constitute the Primary Respiratory Mechanism

THE MECHANISM includes:

*all the 21 cranial bones

*the brain, spinal cord, and CSF

*all 24 vertebrae

*the sacrum

*the dural membrane system.

The osteopathy in the cranial field is applicable to all ages, from the newborn baby through to the aged.

The activity of the cerebrospinal fluid: The movement of the ventricles in turn, affects CSF circulatory activity, and this activity of the CSF effects movement of the arachnoid and the

dural membranes, and these membranes through the reciprocal tension membrane, effects mobility in the whole sutures of the skull, dural tube and the sacrum. During the inhalation phase, the lateral ventricles are dilating and the hemispheres in convolution. During the exhalation phase, the convolutions are relaxing and the ventricles are contracting.

Breath of life: is that which is the vehicle for the primary respiration and related involuntary activity. Potency, Fulcrum, Stillness, Tide, Midline, Transmutation, are terms included into the fluid language.

Diagnosis and Treatment: are in the cranial osteopathy inseparable.

MATERIALS AND METHOD

Material:

30 in-patients male and female, with diagnosis MS, diagnosed at least 5 years before their entering the study.

Method:

Treatment: Cranial Osteopathy, AUTOMATIC SHIFTING FULCRUM.

The patients were osteopathic examined and treated on the second and fourth day after enrolment. About 5 to 6 weeks after the second treatment the patients were examined and treated a third time as outpatients.

MEASUREMENT

Applied to the study group as well as the control group:

1) Step length diff. in cm. ratio
2) Step width diff. in cm ratio
3) Romberg's test yes/no nominal
4) Lasegue's test (leg flexion) by goniometer, left and right ratio
5) Active leg flexion by goniometer, left and right ratio
6) Active head raising, dist. Inion-table supine position in cm. ratio

STUDY GROUP

Day 1: medication and physical therapy

Day 2: medication and physical therapy

Day 3: medication /measurement /osteopathic therapy /measurement no physical therapy

Day 4: medication and physical therapy

Day 5: medication /measurement /osteopathic therapy /measurement no physical therapy.

Outpatient treatment and follow-up was scheduled after 5-6 weeks.

Measurement / osteopathic therapy / measurement were carried out.

CONTROL GROUP

Day 1 medication / physical therapy

Day 2 medication / physical therapy

Day 3 medication / measurement / physical therapy / measurement

Day 4 medication / measurement / physical therapy

Day 5 medication / measurement / physical therapy / measurement

Outpatients follow-up were scheduled after 5-6 weeks.

Measurement / physical therapy / and final measurement were carried out.

Each patient was filed separately.

About five patients were recorded on video in order to give a better picture.

11 PHILOSOPHY

11.1 FLUID LANGUAGE

Language to be precise must be absolute as a mathematical proof.
It must contain the perfect, the imaginary, and the infinite.

Dynamic Stillness	Fluid Drive
Still point	Fluid Fulcrum
Breath of life	Soul
Potency “I”	Fluid Hydraulics
Long tide	Position, Form, Space
Spiritual Fulcrum	Biokinetics
Hansen’s Node	Automatic shifting
Midline	Neutrophic flow
The Spark	Trophicity
Ignition	Metabolic fluid
The Tide	Field
The Potency	Original blueprint
Life forces	Health
Soft	Groundswell
Vectorial	Molding
Fluid body	Transmutation
Fluid in the fluid	Rates 2-3& 6-10
Axial Fluctuations	False Fulcrums
Fluid Fluctuation	Tempo

Like the heart chambers, the ventricles are the chambers of the spirit. The heart of the spirit, like the heart of the soul residing in the heart and the divine implant of our perfections stills itself almost silently upon the centre of the third ventricular chamber. Here, with each inhalation of primary respiration the matrix of life re-ignites, fired by divine warmth and a sense of the eternal. (J.S. Jealous phase III 2000, Gut Sedlbrun. Germany, notice, no published)

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