William Garner Sutherland

The founder of Cranial Osteopathy

From the vision of moveable skull bones to therapeutical concept

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Fig.: William Garner Sutherland

Abstract

This paper deals with William Garner Sutherland and the development of the Cranial Concept and is a literary study. The books “The Cranial Bowl” by von William Garner Sutherland and “Osteopathy in the Cranial Field“ by Harold I. Magoun are the most important historical foundations.

Contents are outlined briefly and compared to each other, in order to analyse the beginning, continuation and further development of the hypothesis.

Furthermore this thesis deals with the terms used in the Cranial Concept, the explanation and demarcation of which seems to be a problem of the Concept.

The discussion of the terms used as well as of the scientific provability of the Concept is a necessary and important element for the positioning of the Cranial Osteopathy in our times.

Key words:
Cranial Osteopathy, W.G. Sutherland, H.I. Magoun, Terminology, scientific proof, Concept development

Wär´ nicht das Auge sonnenhaft,
die Sonne könnt´ es nie erblicken![1]
Goethe

Preface

The title of my master thesis is:

> **„William Garner Sutherland – The founder of Cranial Osteopathy.**
> **From the vision of movable cranial bones to a therapeutical concept.“**

Why this topic? When craniosacral therapy was firstly mentioned on our curriculum we were all very excited. In the introduction we heard of William Garner Sutherland as being its founder and saw a picture of an elderly looking man who seemed to be kind-hearted and tranquil and whose hand rested upon the model of a skull. Furthermore we were informed about his dates of birth and death and that was it for the time being. Later we learned about a so-called “Sutherland – fulcrum“. In the following uncountable lessons we learned every anatomic detail of the skull, numerous techniques and we heard of Magoun as being the author of the “bible” of the Cranial Osteopathy.

As I was really interested in the topic, I immediately bought the “bible” and started reading. The amount of information was huge, reading often heavy-going and thus the “bible” went onto my bookshelf. The adventure “craniosacral osteopathy” took its course and my interest in the topic increased, especially when I had first successes in practice, which were even for me surprising. When the book “The Sutherland Compendium” (Ger. „Das große Sutherlandkompendium“) – luckily in German - became available the story has come full circle.

While reading I was surprised how much of what we had learned during our lessons could already be found in W. G. Sutherland’s achievements. This was the point when I wanted to know it all: What was taught originally? What was added later? Up to what extent do Sutherland’s findings still play a role?

[1] If not the eye were sun-like it could not see the sun!

Contents

Introduction

It is the aim of this paper to highlight how Sutherland's Cranial Concept was further developed. The two works, which served as a basis for this research topic, are: "The Cranial Bowl" by W.G.Sutherland and "Osteopathy in the Cranial Field" by H.I.Magoun. The reasons why I focussed on these two books are that, Sutherland for the first time broadly described his concept in "The Cranial Bowl" on the one hand and that Magoun created with his oeuvre the first textbook on the other hand. Sutherland's publication floated a hypothesis that triggered off a discourse in osteopathy, which still continues today. This discourse deals with the scientific provability of Sutherland's hypothesis. Positive voices who acknowledge the concept and use it without questioning it as opposed to those critical voices who demand its evaluation.

> „The techniques associated with osteopathy in the cranial field are possibly the most controversial forms of OMT [Osteopathic Manipulative Treatment]."
> (Nelson et. al, 2006, p.337)

> "The research investigation by Wirth-Pattullo and Hayes represents an excellent attempt to improve the scientific credibility of physical therapy in an area [i.e. cranial osteopathy] that has generated considerable controversy and emotional debate. The controversy will continue, but at least the debate can now become empiric instead of emotional." (Ottenbacher, 1994, p. 919)

There are various studies which deal with the measurement of the rhythmic movement of the living skull/cranium or its craniosacral movement, respectively (Frymann,1971, Tettambel,1978, Rogers, Witt, 1997, Upledger - Vredevoogd, 2003).

Feinberg and Mark examined the movement of the brain and the circulation of the cerebrospinal fluid and confirm the existence of movements of the brain (Feinberg, Mark,1987).

Retzlaff et. al. examine the cranial mobility, using the example of the squirrel monkey and describe, in addition to movements that are coupled to respiration and heartbeat, another slow movement and ascribe its origin to a change in the pressure of the cerebrospinal fluid (Retzlaff, Michael, Roppel, 1975).

One study examines the radiological evidence of cranial mobility and comes to the result that cranial mobility can be documented and measured by means of radiographs (Oleski, Smith, Crow,2002).

Concerning measurement reading and interpretation Klein looks at this study critically and points out that a mean value of 2° can occur only due to the soft tissues between fixation frame and skull (Klein, 2002).

Fuchs examines if it is possible to find shifts in the Sutura sphenobasilaris [SBS] and arrives at the result that there are some but that major shifts are rare. In this study there is no proof for the mobility of the SBS (Fuchs, 2007).

Other research deals with the reliability of palpation, with the result that there is no significant compliance of the individual researchers (Sommerfeld, 2006, Wirth-Pattullo, Hayes, 1994).

Sutherlands findings are based on merely empirical research and experience. The following quotation describes the balancing act between clinical achievements and scientificity that the cranial osteopathy has to do, very well:

> „Ja, man gewinnt zum Teil den Eindruck, als ob sich die Medizin zunehmend in zwei Richtungen aufspaltet; einerseits in die wissenschaftlich orientierte Medizin, welche ihr Handeln an evidenzbasierten Leitlinien, ausgefeilten Studien und Qualitätskontrollen, sowie dem Qualitätsmanagement ausrichtet und andererseits in eine Fülle von alternativ- und komplementärmedizinischen Heilmethoden, welche die Individualität des Patienten völlig in den Vordergrund stellen, die aber auch einen Anspruch auf **Wissenschaftlichkeit** aufgrund von **Wirksamkeitsnachweisen** erheben.“ (Beck, Unverricht, 2005, p.26)

[Yes, one partly gets the impression as if medicine progressively splits in two directions; on the one hand there is a scientifically oriented medicine that follows evidence based guidelines, sophisticated research studies and quality check as well as quality management and on the other hand there are plenty of alternative and complementary medical healing methods that foreground the individuality of patients but that also raise a claim for being **scientific** by means of **effectiveness proofs**]

> „[...]denn die Zukunft der Osteopathie muss sich von einer unglücklichen Verkettung von Annahmen, die zum Teil ihre Begründung in der Tatsache finden, dass A.T. Still dies so praktiziert habe, befreien und sich ihre Grundlage neu erarbeiten.“ (Beck, Unverricht, 2005, p.27)

[... because osteopathy has to free itself from an unfortunate series of assumptions which are partly only justified by the fact, that A.T. Still has practiced it this way and thus has to newly develop its foundation.]

The same applies to Sutherland who smarted – as did Still – under the lack of provability of his hypothesis. His concept, which is based on empiricism, is applied in therapy, is taught and shows success in practice.

1 Biography

Cf. “With thinking fingers” by Adah Strand in: Hartmann, Christian: Das Sutherland Kompendium, Jolandos 2004 [The Sutherland Compendium]

William Garner Sutherland was born on March 27 in 1873 as the second of four children of Robert and Dorinda Sutherland. Shortly after William’s birth RobertSutherland opened a smithery in Troy, Minnesota. After the birth of the third son the family moved to Blund, South Dakota, where the fourth child, a daughter, was born. Robert Sutherland found a job at the blacksmith and lumberjack of the town. As the income was not enough to feed the family of six, the sons had to accept a job. William started to work as a “handyman” in the office of the “Blunt Advocate“, which was the local newspaper then. When its publisher left Blunt and went to Aberdeen to found “The Aberdeen Daily News“, he wanted William to come with him.

Thus, only aged fourteen, William left his family and at the age of seventeen became chief assistant of the “Aberdeen Daily News“ and member of the Typographical Union. In 1890 quit his job in Aberdeen and a restless year of travelling began. In 1891 he started to work as the assistant foreman of the newspaper “The Mapleton Enterprise“ in Mapleton, to where his family had moved in the meantime.

Two years later he went to Fayette in order to study at the Upper Iowa University. It is, however, unknown which subjects he chose and why he did not graduate. After an employment at the “St. Paul Pioneer Press“ he continued to work as foreman at “Mapleton Enterprise“.

In 1895 William Sutherland went to Austin, Minnesota in order to continue on his journalistic career at the “Austin Daily Herald“. It was during this time that he first heard from his friend Herschel Connor about Dr. Andrew Taylor still and his new method of cure, namely osteopathy. William’s interest immediately awoke and he wanted to learn more about it. He got the chance in the form of a talk two osteopaths held in Austin. The first of the two lecturers was Dr. E. Pickler, a close friend of Dr. Still, and the second one was Dr. Charles Still, who was the son of the founder of osteopathy. At the same time William’s younger brother Guy suffered from a health problem. After the osteopathic treatment had led to his brother’s recovery, William’s interest in osteopathy became a matter of personal interest.

When Herschel Connor was awarded a grant for the American School of Osteopathy in Kirksville, he accepted it and tried to convince his friend to come with him. William visited the school, talked to its students and after one more year at the "Austin Daily Herald" he began in the autumn of 1898 with the study of osteopathy from which he graduated with honors in 1900.

During his studies he made a discovery that should become decisive for his further life. While watching the dissected bones of a skull that were relatedly mounted on a cradle he thought: „Abgeschrägt wie die Kiemen eines Fisches, das ist ein Hinweis auf eine gelenkige Mobilität für einen respiratorischen Mechanismus." [Beveled just as the gills of a fish, this hints at a flexible mobility for a respiratory mechanism.] Although he wanted to dismiss this thought as a "crazy thought", he could not get it out of his mind for the rest of his life. With the exception of the jaw joint, the skull bones were considered as being immovable then.

Dr. William G. Sutherland opened his first osteopathic office in Mankato in a modified room of his parents' house. He was, however, that successful that he could soon rent his own office. After his attempt to establish an osteopathic hospital in San Diego had failed, he returned to Mapleton, where he ran an office. In 1905 he got married and in 1907 his daughter Alice was born. In the same year Sutherland returned to Mankato and became president of the "Minnesota State Osteopathic Association". He got the chance to hold lectures about health, which were partly published in the "Minneapolis Journal". During all that time he persistently continued his anatomic research of the skull.

In 1924 W. G. Sutherland married for the second time. This time he got married to Adah Strand. Their wedding trip brought them to Kirksville to the annual congress of the American Osteopathic Association. On their way back home, Sutherland bought plenty of material in order to build certain special devices for his experiments on his own skull. He began to compress sutures on his own skull in order to have first-hand experiences of the resulting disorders.

After some time of secretly experimenting, he let his wife in on his secret and asked her for help. He was convinced that he would only understand if he experienced the "feelings, sensations and reactions" by himself. Only then he could really "know". For this experiment he put on a kind of V-shaped head rest and increased pressure by means of ever stronger tightening a strap. Thereby he firstly nearly lost consciousness but then felt, after loosening the strap, a "sensation of warmth and a notable movement of fluid back and forth along the

spine". Furthermore he felt a movement in the sacral bone. Repetitions of this experiment showed, that this was not an accidental result, but that a pattern could be observed, which supported the conclusion, that skull and sacral bone act jointly as a unit. All these experiments, as well as the successful application in practice, encouraged Sutherland to present his "cranial idea" after a talk about "Techniques at the sickbed", at a union's assembly in 1929.

There was hardly any interest on the part of listeners, nor did anyone react to a short manuscript he sent in. Despite those adverse circumstances, he continued his research and began to publish his "Ideas about the skull" in form of a column in the journal "The Northwest Bulletin", published by the "Minnesota State Osteopathic Association", under the pseudonym "Blunt Bone Bill".

At least these articles brought about a certain correspondence with colleagues and information requests on the part of osteopathic offices concerning "cranial cases". Sutherland started to devote himself to the examination of children, the growing patterns of their skulls and the embryonic development. He examined the results of the pressure to the skull during birth and concomitant strains on skull and sacral bone. His work treatment of partly severely disabled children and apparent successes led to an increased demand for osteopaths who devoted themselves to the cranial idea.

In 1939 Sutherland published a book that was entitled "The Cranial Bowl" as he wanted to make his ideas about the cranial mobility generally accessible. The subsequent reactions were disappointing, as there was hardly any interest. In 1940 even an invitation to discuss "The Cranial Bowl" at an osteopathic congress was withdrawn, which was due to protests against the involvement of the cranial concept.

Nevertheless Sutherland got the chance to spread his ideas when he was invited to give a lecture at the postgraduate college in Denver. From 1944 onwards he regularly gave lectures for postgraduates at the Des Moines Still College of Osteopathy and Surgery. Slowly the cranial idea began to cast wider circles. It was, however, not accepted by everyone who dealt with it.

In 1943 a book named "Manual of Cranial Technique" was published under the copyright of the Academy of Applied Osteopathy. Authors were Rebecca and Howard Lippincott, both doctors of osteopathy and followers of Sutherland's concept. In the summer of 1945

Sutherland conducted – together with the Lippincotts – his studies about the prenatal development as well as about the development of sucklings and toddlers. In connection with infantile development disorders he talked about "Bent twigs". Results of these studies were published under the heading "Compression of the Condylar Parts of the Occiput".

A further "fruit of his labour" was the founding of the "Osteopathic Cranial Association" as a branch of the "Academy of Applied Osteopathy" in 1946.

In 1949 W.G. Sutherland received numerous honors:

- Medal for special merits, awarded by the Minnesota State Osteopathic Association
- Life-long honorary membership of this association
- Yearbook of the Academy of Applied Osteopathy, dedicated to Dr. William G. Sutherland
- Medal of honor and life-long honorary membership, awarded by the Academy of Applied Osteopathy
- Honorary doctorate Doctor of osteopathic sciences, awarded by the Kirksville College of Osteopathy and Surgery.

In 1950 he received the honorary certificate "Fifty in practice" from the American Osteopathic Association.

In 1951 the book "Osteopathy in the Cranial Field" by Harald I. Magoun, a colleague and faculty member of W.G Sutherland, was published. This publication showed that there was great demand for a textbook. This fulfilled Sutherland with joy and contentment.
In the same year the Sutherlands moved to Pacific Grove on Monterey Peninsula. They had got to know this place during their period of teaching and were fascinated by it. The house in which the Sutherlands lived was called "fulcrum" and became their place of quietness after a long years of exhausting travelling.

In 1953 Sutherland founded a foundation, which was called "The Sutherland Cranial Teaching Foundation" and whose first president he was himself. Although his physical strength slowly decreased, he kept good contact to his friends, who visited him in "fulcrum" and with whom he lively discussed.

> "One who was present wrote to a group of colleagues: `The well-spring in Pacific Grove flows on. New approaches to venous drainage and movement of tissue fluids have been developed. It is Dr. Sutherland´s wish that they may be spread for the benefit of all.`" (With Thinking Fingers [abbr. WTF], p. 96.)

In 1954, however, this spring "ran dry". W.G. Sutherland died on September, 23.

Everybody's well-being was an important element in Sutherland's life which made him to continue his work despite adverse circumstances. Against all doubts and partly even hostilities he persistently went his own way. He developed a concept that is still valid today. Even more, it is still an acknowledged part of osteopathy.

Adah Strand Sutherland writes in "With thinking fingers":

> "Dr. Sutherland´s dream of dreams, his therapeutic air castle, was that the cranial component in osteopathy would be granted official recognition as an integral part of the science of osteopathy. This vision included the incorporation of a cranial instruction into osteopathic college curriculums, [...] (WTF, p.84)

2 From idea to technique

At the beginning there was the idea, that the conjointments of the skull must be made for mobility. But as the official doctrine proceeded on the assumption that the bones of the skull must be linked immovably to each other, first difficulties arose. How could be proofed, that the "skull joints" move? After detailed research of the individual bones of the skull, as well as their distinct forms and bevels and considering the fact that the bones of the skullbase are of cartilaginous origin while those of the skullcap are of membranous origin, W.G. Sutherland came to the conclusion:

> "*Articular mobility* occurs in the basilar area, and at that of the facial bones; such basilar mobility being accommodated through compensatory expansile and contractile service at the vault sutures.(The Cranial Bowl [abbr. TCB], p. 24)

How did he come to this conclusion?

Sutherland himself sees the origin of his dedication to the cranial idea during his years of study in Kirksville. There something like an initial spark happened while he looked bones of Still's collection:

> "Suddenly there came a thought- I call it a guiding thought-`beveled, like the gills of a fish, indicating articular mobility for a respiratory mechanism." (WTF, p. 13)

First this thought seemed somehow odd and crazy to himself. Nevertheless he could not suppress it anymore. Thus Sutherland began to occupy himself intensively with the anatomy of the skull. He examined each and every bone and studied above all the conjointments.

A completely new language developed. Terms, such as cranial articular surfaces, reciprocal tension membrane or fulcrum were introduced. Something entirely new developed. There were only few who were curious and showed interest, many showed disinterest and refusal. Only in 1929 Sutherland spoke about his "discovery" in public for the first time, after he had published a few thoughts about the cranium under the pseudonym Blunt Bone Bill.

As Handy puts it:

> „[...] Dr. Sutherland wanted to interest others on his ideas and pass on his work, but those with whom he talked shrugged it of as "the dream of an erratic". However, an opportunity was presented trough an invitation to appear at a Minnesota district meeting in September, 1929. Dr. Sutherland prepared a paper on "Bedside Technique", but he incorporated in it his first presentation to the profession of the cranial thought. The response, or rather the lack of it, was definitely not encouraging." (Handy, 1948, p.270)

Only ten years later Sutherland published his work "The Cranial Bowl". In this writing he describes his thoughts and conclusion in a very concentrated form. Furthermore he presents in it his techniques for correcting dysfunctions. Obviously techniques are necessary, in order to make the procedure of a treatment comprehensible and repeatable.

How did Sutherland develop these techniques?

One can only approach this question by looking closely at Sutherland's statements about himself, which he issued during his speeches and lectures. During a lecture in April 1948 he said the following:

> "You see before you a dreamer – one who had to get away from the texts, as did Dr. Still, and follow something he could not explain. Something that kept him digging into his dreams."
> (Contributions of Thoughts [abbr.COT], p.183)

This kind of "digging on" was of great importance for Sutherland's work. He started his work on the cranium by studying the anatomic details of all skull bones. As he wanted to proof mobility, he examined in particular the conjointments, bevels and peculiarities of the individual bones. Thereby he noticed that bevels showed inwards as well as outwards and concluded from that that they are shaped this way because they were made for slides. Furthermore he investigated the tooth systems with regard to possible mobility. He saw in those manifold connections ball joints, ball bearings, pulleys and talked of brake equalizer, pressure pumps and controllers.

In the course of his research he started to make conduct first-hand experiments, using self-made "helmets". He reported on it during a dissertation:

> "For experiments, I had to perform upon my own skull, that is, upon a live specimen. I could not take a doctor and use him for a guinea pig. He would have all the knowledge and I would have none. By so doing, I learned something about the cerebrospinal fluid differs from the texts." (COT, p.187)

Here Sutherland's understanding of digging on can be clearly observed. He had to doubt and question the official meanings in order to be free to develop his own thoughts and models and, furthermore, to proof them. The mechanistic idea of a repeated motion sequences, through rhythmic expansion and contraction are a core point of Sutherland's model and are, in addition to that, the basis for his working hypothesis.

Another important point for the development of techniques are the experiences, he could make in practice. Thus, his success spoke for itself. Due to his self-experiments Sutherland himself could experience the highly effective impact of his concept of treatment in two cases.

Concerning the first time he describes a significant detumescence of joints in the case of rheumatic fever and concerning the second time he speaks of successful self-healing in the case of trigeminal irritation after dental treatment. (cf. Hartmann, III-31, III-55)

At times he also cited case studies in his lectures. On one occasion, for example, he talked about a woman, aged 25, who saw double, due to a birth injury:

> "I am happy to say that she no longer sees double and is able to drive a car." (COT, p.208)

Sutherland realized that it was necessary that he would bring his newly developed therapeutic methods in public, if he wanted to help people or mankind in general.

First steps were the articles in which he presented the so-called "skull-ideas". Reactions were diverse:

> "It strikes me that you have something that is worthy of investigation. The proposition is an interesting one and personally I would like to know more about it. It is not one to be passed upon lightly." (COT, p.60)

> "I have gone over your article very carefully and discussed it with members of the faculty but find we are unable to follow you in theories" (COT, p.61, 62)

> "The matter of the mobility of the cranial bones is not yet a new idea altogether. The idea that the falx and tentorium may have some bearing on any possible movement is a new idea as far as I know." (COT, p.62)

Sutherland writes that he would be rather careful concerning his descriptions and claims. Furthermore he did not mention case studies and cas histories as he did not want his statements to sound like welfare promises of medical miracle cures. (cf. Hartmann,2004,II-70)

> "Description of the technique is rather difficult to put into words. Like all the osteopathic technique, it should be seen through demonstration in order to be comprehended." (COT, p.66)

The decisive step was done when he published "The Cranial Bowl".

In this book he described techniques. Nevertheless it took a few more years until he could teach these techniques in lectures, which supported the spread of the Cranial Idea. T.L. Northup met Sutherland at a meeting of the New York Osteopathic Association. He says:

> "From his brief demonstration I was convinced that there were great possibilities in Osteopathic Cranial Therapy." (AAO, Yearbook, 1948, p.70)

This shows very well that the breakthrough of the Cranial Idea could only be achieved by means of its implementation in daily therapeutic practice, i.e. by means of teaching it to as many osteopaths as possible. It was therefore highly important to transfer the result of

research into techniques. First regularly held lectures for postgraduates began in 1944 at the Des Moins Still College of Osteopathy (cf. Handy, 1948, p.271).

Nevertheless one has to bear in mind that the concept was developed empirically. It is based on Sutherland's own first-hand experiences and experiments, which clearly do no longer meet the standards of scientificity. Sutherland knew about the importance of scientific provability of his hypotheses, but the technical devices therfore were not developed yet.

Handy writes:

> „The material he had for study was very limited. It consisted of a complete skeleton (aquired in college days), a couple of skulls, and a few books. (Handy, 1948, p.269)

He also writes about Sutherland's experiments:

> „He experimented with various means of applying force to his own cranium, using ingenious, homemade devices - different kinds of straps and belts with boxig gloves and felt for padding,[...]. Every maneuver was carefully thought out beforehand and studied during the application.(Handy, 1948, p.269,270)

Sutherland's concept is pillared by a broad knowledge of anatomy, careful palpation training, the hypothesis that the brain constantly moves rhythmically and, in addition to that, by a spiritual approach that consisted in his belief that human beings are ensouled by a Higher Power.

3 People who influenced Sutherland

First of all I would like to stress, that the following list of examples is not intended to be exhaustive. As Sutherland himself did not leave behind anything autobiographical, information stems mainly from notes and records of his lectures, as well as from his biography.

Especially his social background and his apprenticeship in printing were decisive for his later life. He often cites examples from his childhood. A very popular example is the one involving seed potatoes, in which he describes that his father made him and his brother dig up field and every time they could unearth some more potatoes.

The handling of printing machines seems to have influenced Sutherland's technical understanding, which becomes obvious when draws comparisons, such as the following one:

> "*Corrugations*, running transversly, diagonally and so forth, picturing: worm gears, cone gears, compensative gears, cryptic gears, friction gears and screw gears. Ball and socket, ball bearing, ball crank, boxcoupling, pintle pulley countershaft and even a cradle. Equalizing bars, escapements, feather keys, flexible shafts, force pumps, grovenors, jiggers and fulcrums." (COT, p.228)

3.1 Andrew Taylor Still

Above all the Old Doctor, for whom he had great admiration, was Sutherland's most important role model. Still is the teacher, whom Sutherland acknowledged and admired. Sutherland thinks that Still already forethought the Cranial Concept.

> "The cranial concept, as I endeavor to teach it, is the science of osteopathy as envisaged by Dr. Still." (COT, p.214)

He often cites Still's statements about Cerebro-spinal fluid [CSF] as being the "highest element" and the comparison of "dry fields" which lack "irrigation", which means the supply of the tissues (cf. Hartmann, 2002). Sutherland states that Still was streets ahead with his visions.

> "The cranial concept, as I endeavor to teach it, is the science of osteopathy as envisaged by Dr. Still." (COT, p.214)

Also in Sutherland's terminology one can find parallels to Still.

In Jane Stark's book *Still's fascial concepts* one can read that Still used excpetional comparisions in order to attract his audience (cf. Stark, 2006, p. 65). Being his student, Sutherland experienced Still's way of delivering his lectures and later continued to talk in similar manner. Sutherland says, for example:

> "Our knowledge is like that of the electrician who merely *knows* that the potent current, or M-element, is present and that he is learning *how to utilize its force.*"(COT, p.273)

Still, in comparison, says:

> „Das Herz ist die Maschine, das Gehirn der Dynamo und die Nerven verteilen die Elektrizität." (Stark, 2007, p.75)

[Our heart is the machine, the brain the distributor and the nerves distribute electricity.] Possibly the change from an agrarian to an industrial time also plays a role for this style of phrasing.

3.2 Emanuel Swedenborg

Swedenborg was a Swedish polymath, who devoted himself theological as well as scientific subject matters. His scrptures formed part of the basis of the spiritual movements in America that envolved during Sill's lifetime. It is said, that Still was a follower of spiritualism. Stark states that there are close similarities of Still's and Swedenborg's views, which are said to be even closer than the views of Swedenborg and Sutherland (cf. Stark, 2006, p.96). Also Trowbridge mentions that Still, and therefore also his students, were influcenced by spiritualism. (cf. Trowbridge, 2003).

Sutherland, however, mentions Still only once in his writing:

> "Swedenborg, 200 years ago, said there is movement of the brain." (COT, p.163f.)

Swedenborg originally said:

> "*The brain* similarly possesses a reciprocal undulatory motion, which accomodates itself to the wringing motion of the heart, or it may be that the latter moves in obedience to the undulation of the brain; moreover, it has been discovered in our own age that the medullas, both the oblongata and the spinalis, vibrate and respire and sise and fall as in fermentation." (Swedenborg, 1899, p.13)

One can assume that Sutherland knew Swedenborg's writings about physiology.

3.3 Charlotte Weaver

Weaver also dedicated her work to the skull and published articles about cranial vertebrae. Ray G. Hulburt D.O. writes in an article about Sutherland's diagnosis and treatment of cranial disorders and about the publication of Sutherland's *"The Cranial Bowl"*. In the same article he mentions that Dr. Charlotte Weaver published several articles in the journal of the American Osteopathic Association from March to June 1936 and that she had written and talked about cranial vertebrae already for years.

Sutherland mentions Charlotte Weaver in an article, which was published in the journal „The Osteopathic Profession" in 1935. He reports on the conjointment of Os sphenoidale and Pars basilaris of the Os occipitale, which he could demonstrate by means of specimens of the skull. He writes:

> "In connection with this two convincing specimens, Dr. Charlotte Weaver provided additional testimony in the presentation of several specimens, prenatal and postnatal, which show the normal articulation." (COT, p.118)

However, it is not known whether he and Weaver ever met.

Abesehra writes:

> „Als eine Zeitgenossin von Sutherland, 1912 Absolventin der ASO [American School of Osteopathy] und enge Mitarbeiterin von Still, hat Dr. Weaver ein originelles Craniales Konzept entwickelt, dass z.T. ähnlich ist, wie einige von Sutherlands Hauptlehren. [...] Ihr System fundierte auf unzähligen Präparaten, klinischen Beobachtungen, Röntgenstudien, einem ausgeprägten Wissen der Embryologie, der Physik und Technik. Ein wahrhaftig klarer Ansatz, verglichen mit dem intuitiven und "heilerischen" Konzept, dass von Sutherland und seinen Anhängern entwickelt wurde." (Abesehra, 2000, p.13)

> [Dr. Waever, who graduated from the ASO [American School of Osteopathy] developed, as being one of Sutherland's contemporaries and close collaborate of Still, a cranial concept that is in part similar to Sutherland's main theses [...] Her system was based on innumerable preparates, clinical observations, radiographical studies, a broad knwoledge of embryology, physics and technology. A vertibale approach in comparison to the intuitive and helaing concept that was developed by Sutherland and his followers.]

3.4 Speransky Aleksej

Speransky was a Russian experimental pathologist who devoted his work to the nature of the cerebrospinal fliud. He made experiments with dogs. Therefore he examined the circulation of the CSF in the brain, the submembranous areas and in the nerves as well as the movement of the CSF within the medulla and in the submembranous areas (cf. Speransky, 1943). Sutherland quotes him again and again in his lectures:

> "If I interpret correctly, fluctuation of the cerebrospinal fluid now has evidence from the laboratory experiments outlined by Speransky in his book, *A Basis for the Theory of Medicine."* (COT, p.215)

> "You read in Speransky about [...]" (COT, p.340)

> "Speransky would have recognized a movement of the brain and cranium as a respiratory mechanism, if he had go further in his experiments." (COT, p.164)

4 W. G. Sutherland

4.1 Sutherland about himself

If one reads about Sutherland in order to gain an insight into his personality, one often comes across the statement that he was a modest man and no friend of big speeches. Therefore it is not easy to find many statements by himself about himself. However, the following few examples shall serve to get an idea of him and his personality. In a lecture in 1948 he said:

> "You see before you a dreamer – one who had to get away from the texts, as did Dr. Still, and follow something he could not explain. Something that kept him digging into his dreams." (COT, p.183)

That Sutherland sees himself as a dreamer is interesting, as during his research he appeared to be rather sturdy and focused. Presumably he was hinting at following one's vision, as Still already did.

The modest one

> "If you read the writings of Dr. Andrew Taylor Still carefully, even between the lines, you will find that his thinking was along the same lines. You will find that the cranial concept in the science of osteopathy was his, not mine." (Teaching in the Sciece of Osteopathy, [abbr. TSO], p.3)

Sutherland constantly refers to his teacher, Dr. Still, who, according to Sutherland, knew already very much which he could not pass on as we (the students of osteopathy) were not ready for it. (cf. Hartmann, I-21)

Similar claims can be read in Jane Stark's book about Still's fascial concepts, in which she quotes Goodman, who said:

> „Er [Still] sah zu viel und musste erkennen, dass die Welt noch nicht entwickelt genug war, um seinen singulären Beitrag zu schätzen." (Stark, 2004, p.57)

> [He [Still] saw too much and had to realize that the world was not developed far enough to acknowledge his unique contribution.]

In one of his lectures Sutherland reports on his experience during his time of studies in Kirksville, where he realized, for the first time, while looking at the disjointed bones of a skull, that they were made for mobility and says:

> "That is how the cranial concept came. It is not mine. It never has been." (COT, p.185)

About Magoun's introduction of the term "Sutherland fulcrum":

> "I did not consent to that idea for a long time. Now that I have, I expect to emphasize its significance." (TSO, p.45)

> "Authorities have various ideas as to how the cerebrospinal fluid originates. They know as much as I do, and that is close to zero." (COT, p.191)

The doubter who was happy to try out new things:

> "I had to perform many serious experiments on my own cranium because of my scepticism about the mobility of the cranial bones." (TSO, p.49)

> "The thought came, like a bolt from the blue: "*Beveled like the gills of a fish; indicating articular mobility for a respiratory mechanism."* Because of my doubt of the possibility of such mobility, that guiding thought became a compelling whip, stimulating me to dig and find out." (COT, p.146)

> "For experiments, I had to perform upon my own skull, that is, upon a live specimen.[...] I had to be my own guinea pig." (COT, p.187)

> "I failed to prove that there is no mobility between the bones of the living craniumat the sutures in the adult,[...]." (TSO, p.5)

As he found his calling:

> "I have told you that this is my mission. I had to be doing this. Then you will understand that He cannot show you a task without making you capable of fulfilling it." (TSO, p.8)

> "My mission has been *applied anatomy*." (TSO, p.5)

In a lecture Sutherland held at the annual conference of the Osteopathic Cranial Association in July 1950, he states that the thought of flexible joints in the skull seemed somehow irrational to him, but he believed that the cranial mechanism came from God. He speaks about "Maker", "Dad" and "Heavenly Father".

> "In such understanding it became a personal task to prove this thought,[...].Through this interpretation it became my personal mission to *dig* and *dig* for an intimate acquaintance[...]".(COT, p.228)

Here Sutherland's spiritual side shows. He seems to see his work and research as something God has imposed on him. When being asked, if the cranial concept is something religious, he answered:

> "If the recognition by Dr. Andrew Taylor Still of God as creator of the human body is religious, then the science of osteopathy is religious. If the science of osteopathy is religious, then the cranial concept *in* osteopathy is religious." (COT, p.145)

4.2 Other osteopaths about Sutherland

In his dedication Magoun calls Sutherland one of the few original thinkers in the science of medicine as well as the founder of the art of cranial osteopathy. (Magoun, 1997, unpag.)
This dedication contradicts the opinion that Still had already forethought the concept and that cranial osteopathy is a part of Still's osteopathy. (see chapter 4.1).

Ch. Handy:

> „In his modest attitude we find a clue to the character of the man who has devoted almost 50 years of his life to the study and practice of the cranial concept as a part of osteopathy." (Handy, 1948, p.269)

V. Frymann:

> „Dr. William Garner Sutherland was a gentle and gracious man of few words. He never used ten when one would suffice. [...] He knew and understood the anatomy of the brain, the membranes and the bones in remarkeable detail, and he expected his students to know it too."
> (Frymann, 1995, p.264)

R. Fulford:

> „Dr. Sutherland war ein stiller Mensch, dessen Austrahlung von einer enormen Lebhaftigkeit zeugte. In seinen Augen leuchtete ein beständiges, feinsinniges, begeisterndes Licht. Wenn Dich seine Visionen gefangen nahmen und sich die Augen verengten, konntest Du spüren, dass er nicht Deinen physischen Körper, sondern Dein inneres Wesen betrachtete."
> „Dr. Sutherland ist niemals von seiner Überzeugung abgewichen, dass man die Bestandteile des Lebens und des Menschen genauestens untersuchen muss, wenn man deren Gesamtheit verstehen möchte – ganz nach Newtons Theorie, dass das Ganze die Summe seiner Teile ist. Dr. Sutherland ging aber noch einen Schritt weiter. Er glaubte, dass sich die charakteristischen Eigenschaften des Ganzen nicht aus den Eigenschaften seiner Bestandteile herleiten ließen, sondern nur durch ihre Interaktionen.[...] Als Dr. Sutherland diese Überlegung vorstellte, wurde sie weder begrüßt noch akzeptiert." (Fulford,1996,S.170)

[Dr. Sutherland was a tranquil person, whose charisma bore witness to his extreme liveliness. In his eyes shone a constant, subtle, enthusiastic light. When you were captured by his visions and his eyes narrowed, you could feel that he was not seeing your physical appearence but your inner self.
Dr. Sutherland alway stood his ground concerning his conviction that you have to examine the anatomy of life and the human being if you want to understand it as a whole – following Newton's theory, that entirety is the sum of all its individual parts. But Sutherland went an extra mile. He believed that the whole entirety can not be understood by looking at its individual characteristics only, but that one has to look at their interaction. [...] When Dr. Sutherland presented these thoughts they were neither welcomed nor acknowledged.]

R. .E. Becker:

> "Dr. Sutherland´s discovery went far beyond the description of a mechanical system; he came to understand that the movement he observed is the basic life force in operation. It is a manifestation of life in motion - an outward sign of the fundamental self-regulating, self-healing mechanisms in the body." (Becker, 2001, The Stillness of Life, p.XX)

H. Milne:

> „William Sutherland, der Begründer der Cranialen Osteopathie, auf die sich Craniosacralarbeit gründet, setzte ein leuchtendes Beispiel, indem er es sich leistete, sich von Offenbarung, Vertrauen, Wahrnehmung und seinem eigenen intuitivem Genius führen zu lassen. Auch besaß er das Vertrauen, einer Sache auf den Grund zu gehen." (Milne, 1999,vol.1, p.19)

[William Sutherland, the founder of cranial osteopathy, which is the basis of craniosacral work, set a shining example, as he dared to go by epiphany, trust, perception and his own intuitive genius. Furthermore he was trustful enough to get to the bottom of things.]

> „Sutherland war der erste, der Cranialarbeit in osteopathischen Begriffen erklärte, obwohl er – natürlich – nicht der erste Heiler war, der mittels Wahrnehmung und Berührung den Kopf heilte. Sein „verrückter Gedanke" entwickelte sich zu einer Heilmethode die zu einem außergewöhnlichen Geschenk an die Menschheit geworden ist. Sein Beitrag war gewaltig." (Milne,1999,vol.1, p.19)

[Sutherland was the first to explain the cranial work by means of osteopathic terminology, although he was certainly not the first healer who healed the head by perception and touch. His "crazy thought" developed into a method of healing, which became an extraordinary gift for mankind. His contribution is enormous.]

J. Upledger:

> „Er betrachtete das Gehirn als die Primärquelle der Kraft, die das Craniosacrale System betreibt und die Bewegung erzeugt. Heute erkennen wir diese Einsichten als eine außerordentliche Leistung. Im Großen und Ganzen unterstützen unsere Forschungen dieses Modell. Allmählich bestätigen moderne Techniken das von Sutherland erstellte Modell in seinen wesentlichen Zügen als allgemein richtig." (Upledger, Vredevogd, Lehrbuch der Craniosacralen TherapieI, 2003, p.32)

["He regarded the brain as primary source of power, which animates the craniosacral system and creates the movement. Today we acknowledge this realization as an extraordinary achievement. On the whole our research supported this model. Step by step modern technologies ratify Sutherland's model as being generally correct with regard to its most important claims."]

P. Greenman:

> „William G. Sutherland, DO., entwickelte die osteopathische Behandlung des Schädels. Nach vielen Jahren des Studiums, der Forschung und der Selbstbehandlung begann er in den 40er Jahren dieses Jahrhunderts, die Prinzipien der kraniosakralen Techniken zu unterrichten. Die kraniosakralen Techniken wurden innerhalb der Ärzteschaft nur zögernd akzeptiert, gewannen jedoch durch die Arbeit Sutherlands und seiner zahlreichen Studenten zunehmend an Popularität.“ (Greenman, 2003, p.181)

> [William Sutherland, DO. developed the osteopathic treatment of the cranium. After many years of studies, research and self-treatment he began to teach the principles of the craniosacral techniques in the 1940s. Craniosacral techniques were accepted only hesitantly by the medical profession, but gained more and more popularity because of Sutherland’s work and numerous students.]

Magoun, Handy, Frymann, Fulford and Becker were all in direct contact with Sutherland. All their statements contain a certain adoration and admiration. They stress Sutherland’s modesty, his friendly and tranquil character and his broad knowledge of the anatomy of the brain. Furthermore one can read from their statement that they admired him for having created a new concept.

5 The Cranial Bowl by William Garner Sutherland

"The Cranial Bowl"is the only book Sutherland has ever published himself. Apart from that there are only those articles he published in several different newspapers, as well as letters and lectures from his estate, which Adah Strand published together with Anne Wales. Entitled "Contributions of Thoughts" Anne L. Wales published Sutherland's collected writings. She also published a second volume, entitled „Unterweisungen in der Wissenschaft der Osteopathie", which contains a summarized version of lectures, partly of Sutherland himself, but also of Howard Lippincott, a member of Sutherland's faculty. This volume contains transcribed recordings of Sutherland's lectures of the years 1950 and 1951. The capacious biography "With thinking fingers" was written by Adah strand.

In my thesis I would like to investigate "The Cranial Bowl", as it is the first concise description of the cranial idea and thus plays an important role for the expansion of the osteopathic concept in general and cranial osteopathy in particular. It is the aim of this paper to find out about contents and techniques Sutherland presents in his book.

As a next step I would like to take a closer look on the first cranial textbook, "Osteopathy in the Cranial Field", by Harald I. Magoun, one of Sutherland's students, in order to find out if and how contents and techniques have changed in comparison to Sutherland's writing.

"The Cranial Bowl" was published in 1939. Sutherland writes in the preface of the reprint of the first edition (published in 1947) that the book was not intended to serve as a school- or textbook, but that it was written to awaken interest among experts.

5.1 Structure

Sutherland divides his book into seventeen chapters. He starts out with an introduction (chapter 1), continues with anatomic description of cranial mobility, the cranial articular surfaces and the Reciprocal Tension Membrane (chapter 2,3,4). In chapter 5 he describes ventricles and cerebrospinal fluid. Chapter 6 is dedicated to a concise description of cranial dysfunctions. Chapter 7 to 14 deal with basic thoughts about the cranial idea (7) as well as with the description of certain specific techniques (8-14). The last three chapters describe possible dysfunctions of the cranium which are divided into dysfunctions of traumatic origin (15), dental-traumatic origin (16) and dysfunctions of the facial bones (17).

5.2 Completion

In chapter one, the **introduction**, Sutherland speaks about the beginnings of his research work.

He stresses that he is already 66 years old and that he has practiced in the field of osteopathy for 39 years. Thereby he makes explicit how long and intensively he has done research before making his ideas public. Furthermore he mentions that the manuscript of "The Cranial Bowl" was rejected by „The Journal of The American Osteopathic Association" as well as by „The Journal of Osteopathy". Subsequently he let the manuscript rest for a while and published an article about "Cranial membranous articular strains" in „The Western Osteopath" instead.

Only this publication awoke interest and led to an invitation to a conference of the American Osteopathic Association, where Sutherland got the chance to talk about his research. The result was a discussion of Dr. John A. Mac Donalds, which was published, together with an article of Sutherland in the „Journal of The American Association". As a consequence W.G. Sutherland could hold several lectures in many different places.

These lectures were published in the Journal of The American Osteopathic Association (JAOA). Sutherland considered this as an increase of interest in his cranial idea. The articles were prefaced by an editorial. Sutherland writes:

> "The clause in the editorial reads as follows: "But it is easily conceivable that the standard nomenclature will need to be enlarged to include this field. " (TCB, p. 20)

This hints at the necessity that a number of new terms were necessary for the description of the cranial idea.

At the beginning of the second chapter about **cranial articular mobility**

Sutherland states that it is a basic prerequisite for the acceptance of this thesis that there actually is a mobility between cranial and facial bones.

He quotes two completely contradictory opinions of anatomists. On the one hand he quotes Gerrish (s.a.) who says that the skull bones are connected fixedly by sutures. And on the other hand there is Davis (s.a.) who writes in his "Applied Anatomy" :

> "The bones at the base of the skull originate in cartilage, while those of the vault originate in membrane.....the sutures of the vault *begin to ossify* at about the age of *forty years*, and *continue to fuse* until about the *eightieth* year." (TCB, p. 23)

Sutherland stresses that there is a big difference between the nature of the tissues of the skull of a living human being as compared to those of an anatomic specimen.

> "I contend that in the living skull, normal mobility in the form of expansile and contractile articular service occurs in the vault through the especially designed dovetail arrangement of the sutures; and that these sutures *continue to fuse while life remains.* (TCB, p. 24)

Skull base and facial bones also have mobility, due to a reaction to the mobility of the sutures of the cranial roof.

In this chapter Sutherland introduces the term "Primary Respiratory Mechanism" [PRM]. This term is not explained in detail, he only states that this mechanism works in connection with the brain, the ventricles and the intercranial membranes. Magoun, on the other hand, dedicates a whole chapter to the Primary Respiratory Mechanism, even more: he dedicates the first chapter to this topic, which spans nine pages (see p.40). Sutherland refers to the respiratory mechanism of the diaphragm as secondary respiratory mechanism.

Chapter three deals with **cranial articular surfaces**.

Here Sutherland describes in very much detail the individual connections between the bones. He stresses that "establishing a mental picture of the articular surfaces of cranial and facial bones" is highly important in order to detect cranial articular mobility. He challenges students to intensively study articulating bones of a dissected skull and states that anatomic texts can not be a sufficient base.

He divides the topic into three areas, which are:

- Mobility of the skull base
- Adaptability of the cranial roof
- Mobility of the facial bones

Mobility of the skull base

First of all he mentions the importance of the sphenoid which articulates with eleven bones and has a key position for the skull base as well as for the facial area. He compares the L-shaped connection of the sphenoid and frontal bone with the L-shaped area of the iliosacral joint. Sutherland expresses this very carefully:

> „In ihrem Kontakt mit zwei anderen L - förmigen Bereichen am Os frontale funktionieren sie [die Alae majores] wahrscheinlich wie ein Fulkrum und passen sich so der Mobilität in den verschiedenen Artikulationen des Os sphenoidale an.“ (Hartmann, 2004, III-18)

[By means of their contact with two other L-shaped areas at the frontal bone they [the alae majores] probably act like a fulcrum and thus adapt to the mobility in the different articulations of the sphenoid.]

Furthermore he describes the articulation of inertly and externally bevelled surfaces of the frontal bone and the parietal bone and explains:

> “This indicates gliding mobility.” (TCB, p. 29)

He describes the connection of the skull base sphenoid with the basilar part of the occiput, using the specimen of a 25-30 years old:

> “Its sphenoidal and basilar process articular surfaces indicate the presence of a so-called intervertebral disc. This articular area indicates a provision for flexion, extension and sidebending rotation of the sphenoid upon the basilar process. (TCB, p. 30)

Expressions, such as “probably” or “indicates” hint at Sutherland’s hypothetical approach (my accentuations).

Sutherland introduces terms which he does not explain in much detail; it seems as if he expected them to be known. Terms, such as extension and flexion are used in therapeutic nomenclature for hinge joints, as well as for the movements of the spine, for which other terms, such as sidebending/rotation are used as well. How to understand this sort of movements between sphenoid and occiput, is not further explained in this passage. Neither the term “fulcrum” is explained here.

Handoll writes:

> „Obwohl Sutherland konventionelle anatomische Begriffe verwendete, um die Aktivität in seiner Hypothese zu beschreiben, gebrauchte er diese Begriffe dennoch auf unkonventionelle Weise.“ (Handoll, 2004, p.23)

[Although Sutherland used conventional anatomic terms in order to describe the activity of his hypothesis, he used them in an unconventional way.]

Further on he describes that, during his visits in osteopathic offices, he could bring forth a movement at the skull base and between partes sqamosae of the temporal bones and the parietal bones, as well as an expansion of the fissura orbitalis superior on undissected adult skulls by means of compressions using his hands. And that he had demonstrated these movements with old living persons of high age.

> "I visualize an intervertebral disc at the sphenobasilar junction as present up to twenty-five or thirty years, and thereafter a mere movable articulation; yet providing to a modified degree, flexion, extension and sidebending rotation." (TCB, p. 31)

In describing the Ossa temporalia he stresses the very differentiated connections, the changes of bevels of the bones, which can bring about "gliding" as well as "swinging" movements. With regard to the skull base he talks about "gliding" and "rotational" movements between the pars petrosa of temporal bone and the pars basilaris of the occiput.

Furthermore he hints already at possible lesions:

> "Many lesions occur here that effect the tension of the intarcranial membranes and disturb venous circulation as well as cerebrospinal fluid activity." (TCB, p. 32)

Thereby he stresses the significance of the skull base as well as the importance of its flexibility.

The adapting function of the skullcap due to sutures.

It is already apparent from the headline that Sutherland deems the function of the skullcap of cranium in adjustment. He points at the membranous origin of the bones, while the base of skull is of cartilaginous origin. Sutherland characterizes the creator of the scull with its adapting function "Master-mechanic".

The term Master-mechanic indicates the teacher Dr. Still very clearly since he often talks of the human engine and of god as an architect.

> "[…] the human being, the most complex, trickiest and most delicate engine of the whole Creation [...]." (Hartmann, Das große Still-Kompendium, 2002, p.125)

> "Since this architect and exceptionally gifted mechanic created the human being [...]."(Hartmann 2002, p.222)

While describing the lambdoid and the coronal suture, Sutherland stresses the external and internal cants as well as their change in the middle of the respective suture. He depicts coarser interlocking at the posterior area than at the anterior one, which adverts, according to Sutherland, to the possibility of enlargement at the posterior area.

Also in this area a dysfunction is possible which Sutherland mentions as well. By slapping one's forehead, the frontal bone might wedge with the parietal bone and so the basilar

mobility can be reduced. Furthermore, he points out that because of the existence of two centres of ossification inside the frontal bone, the sagittal suture is continuous at a few adults and a certain amount of flexibility and plasticity is possible.

Mobility of the facial bones.

The sphenoid bone is decisive for the mobility of the facial bones. Every malposition or blockage of this bone changes the facial outline and the orbita. Sutherland responds to the connection of the sphenoid and the ethmoid bone, whereby, according to him, the ethmoid bone is one of the bones belonging to the base of skull. The ethmoid bone has a special meaning because of the attachment of the falx of cerebrum to the crista galli.

Sutherland describes the sphenoid bone as “vibrant seesaw” and one end is the sella turcica, the other one the facial bones. The L-shaped conjointment to the frontal bone is considered as fulcrum and suspension.

The orbita consist of seven bones and enable the mobility of the eyeballs in the sense of enlargement and restriction, an adaptation to the movement of the eye, coupled to the respiration.

The pterygoid processes allow a vibrant movement and are linked to the palate bone. These are described as being prone to fixations. Furthermore the palate bones are described as being responsible for pathologies of the eye, as they have small processes, which are involved in the development of orbital cavities.

The maxillas are described as “hanging” on the frontal bone and Sutherland points out malpositions or twists, respectively of the frontal processes because of tooth extraction. Such malpositions can restrict the nasal conches as well as the nasal septum.

The palate bones have an indirect connection with the sphenoid as does the zygomatic bones have with temporal bones. Sutherland calls them “two intraosseous mechanic devices”, which “hint at an articular mobility in the region of the skull base”. He expresses that his claims are not intended to be exhaustive:

> “The student may go *deeper* in detail.” (TCB, p. 39)

The fourth chapter deals with the **"Reciprocal Tension Membrane"**

The term reciprocal tension membrane is a newly introduced term. Therefore Sutherland tries to explain how he has come to chose this term. He differentiates between "ligamentary articular strains" for spinal dysfunctions and "membranous articular strains" for cranial dysfunctions.

While ligaments are regarded as controlling entity of arbitrary muscle movement, the author describes cranial movements as being automatic and involuntary ones. By means of a "special intracranial membranous tissue", which acts as "reciprocal tension entity", the extent of movement is limited. Sutherland compares this tissue to the balance spring of a clock. Thereby his fondness for comparisons is revealed.

In the following he minutely describes the insertions of the tentorium and of the cerebral falx and how the individual fixation points move during inhalation and exhalation, respectively. Two of the three illustration of the entire book stress the importance of the reciprocal tension membrane.

Chapter five deals with **ventricles, vertebral canals and subarachnoid space in relation with the circulating activity of the cerebrospinal fluid**.

Sutherland presents his insights as his temporary hypothesis and explains that the brain moves in a rhythmical and involuntary way and that therefore no muscular activity is needed. This movement consists in expansion and contraction during normal respiratory breathing and results in a circulatory activity of the liquor, which in turn animates a movement of the dura mater and the arachnoid membrane. The reciprocal tension membrane mentioned above leads to mobility in the skull base.

During inhalation the lateral ventricles are extended and hemispheres expand, the spinal marrow is pulled upwards. This process inverts during exhalation. The cerebrospinal fluid "fluctuates" due to this rhythmical change. Sutherland explains in his subchapter "Experiences" that the term "to fluctuate" is used here, in order to describe an "undulatory movement with subsequent rise and fall".

The movement of the spinal marrow is understood as reactive up- and downward movement, fluctuation of the cerebrospinal fluid is caused by the arachnoid membrane, which is described as being dangling with only one fixation the sacrum.

Sutherland hints at dysfunctions which are either caused by restrictions of the jugular veins and the resulting increased pressure of the cerebrospinal fluid or by an increased tension in the cranial membranous articular system.

After a reference to Dr. Still, for whom the normal blood flow in the arteries was most important, Sutherland writes:

> "I believe the circulatory activity of the cerebrospinal fluid to be primary to the arterial, venous and lymphatic activity." (TCB, p. 53)

Furthermore he is of the opinion that the hypophysis contributes to basilar mobility, triggered by the expansion of the third ventricle, which thus moves the stem of hypophysis because of its fixed anchorage on the sella turcica.

In the subchapter "Experiences", Sutherland comments on his work in practice, in order to back the hypothesis mentioned above. Also his self-experiments served this same purpose. He tried to restrict the movement of the gyri by using mentation only and thereby realized an undulatory movement of fluid at the basis of the brain. Because of the attempt to direct the Cranial Respiratory Movement, he found out, that the diaphragmatic respiratory mechanism adapts to the cranial, which led him to the conclusion, the diaphragmatic mechanism can be regarded as being subordinated to the cranial mechanism.

In the sixth chapter he describes the **diagnosis of cranial dysfunctions**.

The form of the skull gives a first hint at the position of bones, palpation shall confirm these assumptions. First of all the occiput is examined. Any twists would indicate the position of the basilar processes. On the sphenoid the ala majores are compared. Here again any asymmetry would hint at the skull base. On the temporal bones the mastoid processes are compared, in order to find out if they are in internal or external rotation.

For the tests concerning the region of the skull base, Sutherland refers to following chapters, in which he introduces techniques. Furthermore he stresses the importance of the knowledge of normal articular devices, as only with this knowledge it is possible to see abnormalities.

Chapter seven deals with **basic thoughts of the cranial idea**.

A skillful tactile sense is the precondition for the osteopathic technique. This, however, cannot be trained by mere observation. Sutherland writes:

> "It may be best acquired by the student having the hands upon the site of the desired movement alongside those of the instructor; following therewith intelligently with tactile sense, feeling, seeing, thinking, as the tissue is being guided carefully, gently, firmly, and scientifically, into normal relationship." (TCB, p. 67)

Sutherland explains in very much detail the technique Still used for the correction of dysfunctions of the wrist and states that he has applied this technique for the treatment of the cranium. He uses the leverage effect, which can be created with the flexor digitorum profundus muscle and the flexor longus pollicis muscle. In this chapter there is the third figure which depicts these two muscles.

The eighth chapter introduces a **technique to stimulate the cerebrospinal fluid**.

Sutherland explains that the interest for the lymphatic pump has led to the development of this technique. He details how the hands have to be placed on the cranium and that movements have to be adapted to the patient's cycle of breathing. The duration of the treatment depends on the reaction to it. It should be applied until circulation, as well as the movements of the diaphragm have changed.

Furthermore he points out that visualization of the cranial region is important and that the reciprocal tension membrane, due to its fixation on the petrosal part, stimulates the cerebrospinal fluid.

The ninth chapter is called: **Techniques to lift the skull cap**

Sutherland distinguishes three lift techniques on the parietal bone, which are lift of the posterior angle, of the medial parietal bone and of the anterior angles; furthermore a spread technique of the parietal bone and a technique for a lift of the frontal bone.

Firstly he describes the lift of the posterior angles of one side, whereby he explains the exact hand position and the leverage effect of flexors which is created by crossing the fingers. A compression down- and inwards is followed by a lift up- and forwards, the compression shall

be held for a few seconds. In connection to this technique its stimulating effect on the venous flow and the circulating activity of the cerebrospinal fluid is highlighted.

Responsible therefore is the pathway of the lateral sinus via the posterior angles of the parietal bones, because the insertions of the tentorium form the sinus and act, together with the cerebral falx, like the reciprocal tension membrane. When lifting the medial partietal bone, an inwardly directed compression is caused, by means of contact with the palms, with the aim of relieving the joints with the partes squamosae of the temporal bones and by that again, the posterior and anterior inferior angles of the parietal bones.

The lift of the anterior inferior angle takes place analogously. Thereby it is mentioned that very often a fixation of the great wings to the sphenoid occur, which result in a restriction of the sphenobasilar mobility.

The spread-technique of the parietal bone is employed in order to guarantee the normal extent of mobility of the compensatory dilation of the sutures between parietal bone and occiput and thus improve the venous flow of the superior and inferior sinus sagittalis, as well as the circulating activity of the cerebrospinal fluid. Again the practical application is described in very much detail with regard to hand contact and use of compression, including the subsequent movement. The patient aids by means of taking in a deep breath.

Sutherland stresses once again the anatomic peculiarity of external and internal bevel of the articulating bones, in this case the upper part of the lambdoidal connection. It is made clear that visualizing the articular surfaces as well as the direction of the compression is important for the practical application of this technique. Sutherland describes, apart from its effect on the venous drainage and the cerebrospinal fluid, a dilation of posterior and medial lobe of the central hemisphere as well as a dilation of lateral ventricles as being the results.

The lift of the temporal bone follows the same regularities that were mentioned above. It shall loosen a fixation between frontal bone and ethmoid, particularly in the region of the ethmoidal notch. Sutherland highlights the insertion of the reciprocal tension membrane on the crista galli of the ethmoid and that the ethmoid is a basilar bone for which basilar articulation is of great importance.

Chapter ten presents the **sphenobasilar technique**.

First of all Sutherland for what it is used, namely for the normal extent of articular extension, flexion and sidebending/rotation on the skull base as well as for external and internal rotation on the partes petrosae of temporal bones. Furthermore he adds that it is useful in order to establish basilar mobility.

The practical application of this technique is firstly explained for extension, including exact instructions of how hands are held and a detailed depiction of the movements of the sutures between sphenoid and temporal bone. This is followed by a similar explanation, concerning flexion. Regarding sidebending/rotation movement, the technique is only explained for one side.

Sutherland compares the sphenobasilar structure to the arch of a bridge, stating that the connection of sphenoid and occiput would be the highest point, which moves downwards during extension. Furthermore Sutherland draws a connection between pterygoid process of the sphenoid and palatinum on the one hand and sphenobasilar movement on the other hand and introduces an intraoral technique whose practical application is described and explained in his chapter on dysfunctions of dental-traumatic origin.

Chapter eleven presents the **Pars Petrosa- Technique**

This technique is used for the treatment of catarrhal infections of the auditive tube. It shall establish the normal movement between pars petrosa of the temporal bone and the basilar process of the occiput, which means external rotation during inhalation and internal rotation during exhalation. For application one contact is described on the mastoid process and the other one on the inferior angle of the parietal bone on the opposite side. Fingers are crossed under the occiput. Again Sutherland mentions the leverage effect of flexores.

While the hand on the mastoid region is active in pulling it back and rotating the mastoid process outwards, the other hand on the parietal bone only serves contact. This position is held and with his/her thorax the therapist pushes the patient’s head downwards. Due to the external rotation of the pars petrosa and its backwards movement along the connection to the basilar process, the pars cartagilena of the auditive tube is expanded; during the compression

of the skull it relaxes. At the end of the treatment the pars petrosa shall be led back by internal rotation. The technique is employed on both sides.

In connection with this technique, two further ones are described, which shall free the pivot point of the mastoid parts at their connection with the occiput.

Chapter twelve describes the **four-hand-technique.**

It is used for the treatment of fixations in the sphenobasilar region. One therapist places his/her hands on the occiput, while his/her assistant places his/her hands on the inferior angles of the frontal bone. After a compression, the therapist pulls the occiput towards posterior, the assistant pulls the frontal bone towards anterior. After that the therapist takes hold of the mastoid parts of the temporal bone and brings them into external rotation, while the assistant completes the same movement as before. Firstly the sphenobasilar articulation is “pulled” in extension, secondly during external rotation in flexion.

In case of necessity patients can employ this technique on the frontal bone themselves. Sutherland describes this treatment as “extremely effective” and states that a “great reaction“ can occur. How this reaction looks like is not mentioned.

Chapter thirteen describes **temporomandibular technique**

Sutherland restricts himself to the interpretation of the phenomena of trigeminus neuralgia. He acknowledges the mandibular technique, taught by Dr. Still, as being effective. It loosens by means of traction of the sphenomandibular as well as the temporomandibular ligaments fixations of the sphenoid with the temporal bones. Sutherland states to find these fixations regularly in cranial treatments. They cause an abnormal movement. Furthermore they cause an expansion of the membrane that encloses the trigeminal ganglion. The resulting increase of nervous impulses leads to trigeminus neuralgia.

Chapter fourteen deals with the **structural or moulding technique**.

It shall be used for children who show a deviation from the norm. A precondition is the knowledge of ossification centers. What follows is a division into frontal bone, parietal bone,

occiput and the facial bones. As far as the frontal bone is concerned, there are two ossification centers. Thus one can assume that there are two bones, which form a sutural articulation in the middle, which restricts the movement between frontal bone and ethmoid in case of malformation. The way of application is a “forming” compression on the inferior angle and the medial part of the frontal bone.

Concerning the parietal bone a compression of the bone’s edges is described. There is only one ossification center.

For the occiput this technique is only applicable for the membranously developed part. It shall bring the structural parts in flexion and normalize the tension of the intracranial membranes.

With regard to facial bones, Sutherland recommends to study the embryologic development of orbital, nasal and oral cavities. No technique is described decidedly. He points out the successful treatment of dental surgery concerning malpositions of the maxillae and states that he thinks that therapists applying cranial osteopathy should dare to advance in this field.

Chapter fifteen treats **dysfunctions of traumatic origins**.

Sutherland distinguishes seven types that are often found in practice:

- The frontoparietal type
- The parietosqamous type
- The parietofrontal type
- The parietooccipital type
- The occipitomastoidal type
- The atlantooccipital type
- The migraine-type

He states that all these dysfunction types are caused by a local trauma, which can have an either bilateral or unilateral effect, depending on the impact of force. He names them according to the effected suture or structure. All subchapters are further divided into “diagnosis“ and “treatment”. Diagnosis implies a description in which position or malposition the affected bone can be found. Diagnosis is made by means of palpation.

Treatment aims at bringing the bone(s) back into its normal position and is described for each dysfunction separately and explicitly. The migraine – type is an exception, which is said to be

of traumatic and of reflectory origin as well. During examination one could find a typical sidebending/rotations dysfunction, which is concave on one side of the cranium and convex on the other one. Dysfunction is rarely due to an acute trauma; in most cases it causes stem from early childhood and which result in a malformation over the years.

Very often a blocking of the great wings of the sphenoid can be found and Sutherland recommends the sphenobasilar or the pars petrosa-technique for treatment, in order to re-establish mobility.

Chapter sixteen deals with **dysfunctions of dental- traumatic origin**.

As becomes clear from the heading, this chapter treats dysfunctions that occur during dental surgery. Sutherland states that he wrote this chapters for dentists, too and advises the collaboration of dentists and osteopaths.

He describes these dysfunctions as affecting the temporal bone, the sphenoid as well as maxilla and mandibula. He gives the pressure of the headrest of the dentist's chair on the mastoid part one the one hand and the leverage effect of the forceps which is used for tooth extension on the other hand as reasons for the origin of these dysfunctions.

During the extraction of a lower tooth it comes to a compression of the Articulatio temporomandibulare on the side of the tooth and to a strain on the sphenomandibular ligament on the opposite side. During the extraction of an upper tooth strain occurs on the same side. Dysfunction consists of an internally rotated temporal bone and a lateral standing pterygoid process.

As a result it comes to the impairment of the ganglion gasseri and the ganglion pterygopalatinum, which can lead to trigeminus neuralgia. Furthermore internal rotation of the temporal bone can impact the auditive tube and lead to ear complications as well as to a strain of the intracranial membranes.

An impairment of the venous drainage can also lead to eye pathologies because of a narrowing of the fissura sphenomaxillaris due to a malposition of the maxilla. What follows in the text is a detailed description of the orbita and all bones involved and its great adaptability is stressed. Again it is pointed out that a fixation of the sphenoid can impact the normal

function of the orbita, which could furthermore be responsible for disorders in the nasal regions due to its connection to ethmoid and vomer.

For testing and treating the pterygoid process, Sutherland mentions an intraoral technique, for whose application the processus is held with the index finger, while the patient closes the jaw over the finger. This shall lead to an intensification of the dysfunction with subsequent solution. Usually a correction of the sphenoid leads to a loosening of the fixated maxilla.

The seventeenth and last chapter is dedicated to **dysfunctions of the facial bones**.

At the beginning Sutherland points out a peculiarity of the sphenoid:

> „Die Mehrheit der Fälle von Dysfunktionen der Gesichtsknochen werden in Verbindung mit sphenoidalen Dysfunktionen gefunden und reagieren gewöhnlich auf eine sphenoidale Korrektur.“ (Hartmann, 2004, III-56)

> [Most cases of dysfunctions of the facial bones are connected to sphenoidal dysfunctions and usually react to a sphenoidal correction.]

He describes malpositions and corrections for the zygomatic bone, the maxillae, the palatinum and the ethmoid for local injuries, which are mainly caused by car accidents. Dysfunctions of the zygomatic bone can be easily determined by means of comparing. It affects, above all, the orbita, and via the connection to the temporal bone also the skull base. For correction direct action with contact on the zygomatic and frontal bone are described.

The maxillae are mostly found in an down-and outwards position, whereby the frontal process is turned inwards. This affects the nasal conchae and the orbita, because due to the narrowing of the fissura sphenomaxillaris the venous flow via the ophtalmic vein is disturbed. In extreme cases the palatinum is restricted that much, that it comes to disturbances in the ganglion pterygopalatinum, which impacts the orbital nasal and pharyngal regions. Correction is achieved by means of an intraoral technique, which is applied bilaterally in bilateral cases.

As far as the palatinum is concerned, one has to bear in mind, that a little process participates on the orbita, which can be responsible for eye problems. The malposition is palpated in the mouth at the connection of maxilla and palatinum. For correction this spot is held by the therapist, and the patient should move his/her face first downwards and then upwards.

As far as the ethmoid is concerned, only the conchal processes are part of the facial bones, all other parts belong to the skull base. In case of sinus troubles the joint connection with the

frontal bone has to be loosened. As technique the same technique as that for frontal-lift is recommended.

5.3 Summary of all techniques presented

- Wrist technique of Dr. Still, applied to the cranium
- Technique to stimulate the cerebrospinal fluid
- Technique to lift the skull cap
- Sphenobasilar technique
- Pars petrosa – technique
- Four – hand – technique
- Temporomandibular technique
- Structural or moulding technique
- 7 types of dysfunction, according to affected suture
- Dysfunctions of dental-traumatic origin – one intraoral technique, for techniques for the correction of zygoma, palatinum, ethmoid and maxillae

6 Osteopathy in the Cranial Field by H. I. Magoun

The book was published with the support of the Cranial Association. W.G. Sutherland wrote the preface and the book is dedicated to him.

GRATEFULLY DEDICATED

To one of the few original thinkers in medical science
And the originator of the art of Cranial Osteopathy --

WILLIAM GARNER SUTHERLAND

(Magoun1997, Copyright1951)

6.1 Structure

The content can be described as being structured as follows: list of illustrations, preface, acknowledgements, introduction, which are followed by eleven chapters and an appendix.

The list of illustrations comprises 86 figures, which are partly drawings by Howard Lippincott, D.O. and partly photographs of skull-specimens and of the application of the techniques described, whereby Sutherland himself applies the techniques.

The preface contains a short outline of the history of the development of cranial osteopathy, the scepticism it caused in the beginning –

> "At first osteopathy in the cranial field was generally regarded as the dream of an erratic. "(Magoun, Osteopathy in the Cranial Field, 1997, page XI)

– and the slowly increasing interest –

> "From 1940 on, the acceptance became much more general." (Magoun, Osteopathy in the Cranial Field, 1997, page XI)

This is followed by the explanation that the fundamental idea behind of cranial osteopathy is the improvement of mobility of fluids connected with the Central nervous system [CNS] and thus an improvement of the supply along the perivascular and perineural canals. Magoun quotes a list of disorders of which is said that they can be improved by means of cranial osteopathy, which includes disorders directly affecting the CNS, birth traumata as well as disorders of the ear nose and throat [ENT] area.

6.2 Completion

The introduction explains that the cranial concept is the application of Still's principles of osteopathy on the skull. Furthermore it is explained what is included in the study of the cranial concept.

Under the headings SECTION I to IV follows:

Arthrology – a systematic classification of the connections between the individual bones, whereby explanation and example are always quoted in brackets. In order to give the reader an impression, here a quotation from the text:

A. Synarthrosis (continuous binding substance)
    1. Suture (membranous union)
        a. Serrate (saw tooth as sagittal)
        b. Squamous (overlapping as parietosquamosa) (Magoun,1997,1)

Osteology – describes the "external landmarks" of the skull, divided into areas, such as superior, anterior and so on. Furthermore this section contains a classification of the skull bones and describes their connections.

Gross Morphology of the Central Nervous System – lists what is part of the central and what is part of the peripheral nervous system. It explains the classification of the cerebrum and the structure of the Medulla Spinalis. The last part of this section is dedicated to the development of the CNS. A graph depicts the embryonic development of the neural tube.

Meninges of the Central Nervous System – comprises the description of pia mater, arachnoidea und dura mater. Arachnoidea and cerebrospinal fluid are described concerning their appearance, production and resorption. When describing the pia mater, the term "Sutherland fulcrum" is introduced:

> „ The falx and the tent join along the straight sinus, WHICH JUNCTURE IS CALLED THE „SUTHERLAND FULCRUM". (Magoun, 1997 ,p.12)

Chapter one deals with the **Primary Respiatory Mechanism (PRM).**

This chapter will be analysed in more detail, as it plays an important role for the cranial concept and in order to show Magoun's systematics and classifications.

I. Introduction – The life principle

By means of point A. is expressed that all life is manifested in energy or motion. Without motion there is no life. Furthermore it is states that a superior being is needed to lead this motion.

> „ There must be a channeling of the Universal Intelligence down to the individual cell or organism. Otherwise would be chaos." (Magoun, 1997, p.15)

It is said that nobody know what this superior being actually is, but that its existence is certain.

Point B. states that Dr. Still was aware of this superior intelligence. This statement is backed by one of his quotes:

> "[...] he wrote and later added: „God manifests Himself in matter, motion and mind."(Magoun, 1997, p.15)

Furthermore the significance of the cerebrospinal fluid is stressed:

> "[...] Dr. Still referred to the cerebrospinal fluid as „the highest known element in the human body [...]"(Magoun, 1997, p.15),

and that Still regarded it as recipient (of the superior intelligence).

Point C. quotes Dr. Sutherland's opinion that the cerebrospinal fluid is connected to the "breath of life". Because of the dynamic relation to every cell of the body, particularly to the cells of the CNS, the cerebrospinal fluid has to be regarded as being the initiating and controlling factor of the Primary Respiratory Mechanism. Being asked what this PRM actually is follows the following explanation:

II. Definition of PRM

It is defined according to Stedmans Medical Dictionary. Everyword is explained individually:

A. Primary
B. Respiratory
C. Mechanism

III. Components and characteristics of the PRM

Divided into A. Cerebrospinal fluid

B. Meninges and reciprocal tension mebrane (RTM)

C. Central Nervous System

D. Articular mobility of the cranial mechanism

E. Articular mobility of sacrum and between iliae

Point A. ascribes two main characteristics to the cerebrospinal fluid.

Firstly it is the highest known element. Magoun refers to various different descriptions by Sutherland:

> "Dr. Sutherland variously describes this invisible element as the „fluid within the fluid", „the liquid-light", "the juice in the electric battery" or „the sheet lightening in the cloud".(Magoun, 1997, p.16)

None of these terms is explained in further detail or defined, respectively. A further description is that of Sutherland, when he describes it as coaxal cable, which can simultaneously transfer thousands of messages by means of its electric potential.

Secondly the cerebrospinal fluid moves within a closed system. It can be channelled by the hands of the therapist and thus loosen membranous or articular strains. Fluctuation comes into being because of the motility of the cerebrospinal fluid, because of a shift in the reciprocal tension membrane as well as because of a change of volume within the ventricles. The fluid moves along the perineural canals.

Other functions of the cerebrospinal fluid, that are worth mentioning, are metabolic functions for the CNS, the transport of hormones from the hypophysis and its protective and regenerating powers important for the whole body.

Point B. describes meninges and the reciprocal tension membrane as being responsible for articular mobility, for securing balance and limitation of motion. Furthermore the motion of the most important parts, such as falx, tentorium and spinal dura during inspiration are described, however, without going into detail about what respiratory flexion means.

Point C. refers to the inhalation phase as flexion of the sphenobasilar synchondrosis with simultaneous external rotation of the peripheral bones. As a result of this motion the neural axis shortens, the medulla shortens towards sphenobasilar synchondrosis and hemispheres expand and thus their lateral diameter widens. Ventricles extend, as well as all connecting canals, the production of cerebrospinal fluid is increased. The hypophysis raises during flexion, which is important for its function. During exhalation phase just the opposite should happen.

Point D. explains that articular mobility is necessary in order to allow expansion and contraction of the brain. Mobility of the bony structures are said to come into being because of the fluctuation of the CSF, in brackets referred to as "potency", as well as due to the action of the reciprocal tension membrane with its anchorages. These anchorages are described anatomically.

As for example:

> „a. ANTERIOR SUPERIOR POLE. The anchorage of the Falx cerebri to the Crista frontalis, Crista galli, Crista ethmoidalis and Spina ethmoidalis." (Magoun, 1997, p.18).

An anchorage is labelled as fulcrum – in brackets Sutherland – and as a complete connection of falx with tentorium. Three figures show the falx, the reciprocal tension membrane and the cranial mechanism in flexion.

Point E. deals with the motion of the sacrum, which are described as being involuntary and independent from position. The up- and forward movement of the great foramen is transferred via the spinal dura to the sacral bone and is thus the connection of cranium and pelvis. The insertion of the spinal dura is described to be at the spinal processus of the second sacral vertebra. The axis that goes through this vertebra is referred to as respiratory axis and the motion of the sacrum, whose basis moves up- and backwards, is called respiratory flexion. (In our nomenclature the motion of the sacrum mentioned above is called extension, however, without the attribute respiratory.) The countermovement completes a cycle.

IV. The cycle of the Primary Respiratory Mechanism

The movement is described as being constant and rhythmic and follows a cycle. The movement of the individual bones happens synchronically. The bones of the midline are described; these are the unpaired bones, such as sphenoid, occiput, ethmoid etc., which move in flexion or extension. The paired bones move in internal and external rotation, whereby the frontal bone is referred to as paired bone.

A schematic representation shows the effect of the movement of the midline on the facial bones. Flexion expands the orbital cavity, enlarges the transversal diameter of the nasal plexus and extends the sinus. During extension just the opposite happens.

V. Function of the Primary Respiratory Mechanism

Point A. sates that every organism depends on the constant movement of its fluids.

Point B. stresses the importance of the CNS and the CSF for controlling the “human machine”.

Point C. states that PRM is more important than diaphragmatic breathing. They do not necessarily have to correspond.

Point D. In normal circumstances fluctuation of CSF and cranial articular mobility correspond.

Point E. A disorder of the PRM results in symptoms of disease. Disorders of the articulation of the skull bones result in a faulty rhythm of fluctuation.

VI. Lesions of the Primary Respiratory Mechanism

Point A. gives a definition. Lesion means an impairment in structure, function or their interrelated collaboration in every part of the PRM.

Point B. is a classification of lesions:

- Different types of lesions, due to fluids, bones and tissues.
- According to its origin they are subdivided into primary and secondary lesion, whereby a primary lesion is said to have a trauma as its origin, a secondary lesion, on the other hand, arises from compensation.
- According to age they are subdivided into prenatal or intrauterine, during or after birth arising lesions.

VII. Possible lesion areas in the articulation of the PRM

Divided into

A. skull base

B. skullcap

C. facial skull

D. spine

Systematically all connections are listed and in brackets the number of "joints" are mentioned.

For example: 1. Frontal bone.

a. Metopic suture (1)

b. Coronal suture (2) etc.

An exception hereby is the sphenobasilar connection. Here movements, such as flexion, extension are mentioned, which were already described in paragraph IV. But further terms such as torsion to the right and to the left, sidebending to the right and to the left, strain and compression or separation are introduced. Although they are new, these terms are not further explained.

Chapter two deals with **mechanics of the physiological movement of sphenobasilar suture and sacrum.**

This chapter is subdivided into five subchapters. It contains eleven figures and explains terms such as extension, flexion, torsion and sidebending/rotation. The structure is exactly the same as in chapter one.

Under the heading Osteology anatomic peculiarities of sphenoid and occiput are described. Whereby the word “described” cannot be understood here in a traditional sense.
As illustration:

A. SPHENOID
1. LOCATION. Center of base of the skull. [...]
2. PARTS.
a. Body (central).
b. Lateral expansions (great and lesser wings).
c. Inferior projections (Pterygoid processes).
3. DESCRIPTION
a. Body – hollow cuboid
1) Sphenoid sinuses and apertures
2) Superior surface
a) Sphenoidal crest and ethmoid spine
b) Olfactory grooves

In this manner the “description” goes on for three pages; the occiput is dealt with in the same way. There is a figure of both bones at the time of birth, in order to show their ossification centers.

Cranial articular mobility.

Point A. – Normal motion - is performed so that every movement in the skull proceeds in determined limitations. Free movement requires flexibility in the bone itself, sufficient mobility in the sutures and sufficient freedom of movement in the membranes.

Point B. – flexion and extension of the sphenobasilar suture – says that movement is free, when all bones of the skull adapt to the movement of sphenoid ad occiput in different positions. Furthermore flexion and extension are described as being the only physiological movements with regard to inhalation and exhalation.

Point C. – torsion and sidebending/rotation – explains that despite every deviance due to restriction the flexion and extension movement continues, however in a different way. Torsion and sidebending become part of the physiological movement. An example is given: when someone leans his/her head into their hand, it comes to a part-way restriction of os zygoma and ala major of the sphenoid. As a result it comes to a deviance of the cranium in torsion or sidebending/rotation. These movements intrinsically or extrinsically compensate upcoming deviances.

Point D. describes factors that additionally influence these movements, such as the flexibility of the skull bones or the numerous articular contacts, the formability of bones until ossification is completed and the anchorage of the reciprocal tension membrane.
As Sutherland did, Magoun also stresses the importance of a clear mental picture of possible movements of all cranial bones.

After these general statements the third subpoint follows with definition of the terms flexion and extension with regard to the cranial mechanism. It is made clear that the movement relates to the sphenobasilar suture, which is permanently in a slightly flexed position. This flexion increases during inhalation, on a cranial level this means respiratory flexion. During extension just the opposite happens. The sphenobasilar suture is lowered. Both movements influence the form of the skull whereby the sphenoid influences orbital cavity, forehead and mouth, while the movement of the occiput has impacts on the temporal bones. A figure depicts the flexion movement of the sphenobasilar suture by means of arrows and marking of the axis of rotation.

Classified by means of capital letters from A. SPENOIDALE to J. PARIETALE the individual bones and there movements are described. This classification resembles the classification mentioned above.

Four figures of the external rotation of the frontal bone, the flexion of the ethmoid, the external rotation of the os palatinum and the flexion of the vomer shall facilitate the imagination of the movements described.

The os palatinum is not only described, furthermore different functional characteristics are highlighted. The infraorbital nerve runs via the orbital process of the os palatinum, so that the process can be regarded as tension adjuster for the nerve. Furthermore the os palatinum acts via its pyramidal process as a speed reducer in relation to the sphenoidal movement via the pterygoid process. Especially the significance of this connection is mentioned in connection with eye-, nose- and ear problems.

After that a description of the reciprocal tension membrane follows. It regulates and limits the normal articular mobility and is compared to the balance spring of a clock. It is in permanent tension, anchored by its poles. It is highly important for the fluctuation of the liquor and the venous drainage.

The contact between the posterior edge of the falx cerebri and the lateral edges of the tentorium cerebelli is called “Sutherland fulcrum” as Sutherland especially pointed at its importance. He calls it a relatively fix fulcrum, as the center of the fluctuating movement. A figure shows the movement of the reciprocal tension membrane during the flexion of the sphenobasilar suture.

Chapter three deals with **diagnosis principles of cranial lesions.**

In chapter three some general remarks, how age and physical condition are mirrored in the skull but also in the spine of a human being. Abnormal patterns of posture, which cause tension, influence the skull. On the other hand patterns of movement of the skull also influence the nervous system. Magoun describes the anamnsesis concerning questions that have to be asked.

The next point – observation – describes different types of skull as well as their characteristics. For example: flexion skull. All four quadrants in external rotation. Broad, transversal, shortened antero-posterior diameter.

What follows is the description of palpation in order to define the position of the bones. Magoun gives very general guiding principles for palpation. Besides general diagnostic findings, like approximation or separation of sutures, he explains what one has to look at when examining the individual bones. For example:

> “Sphenoid, as to displacements, vertical or lateral. Check whether high or low, or right or left.” (Magoun, 1997, p.56)

Magoun starts the palpation for motion with the following words:

> “A SOFT HAND AND AN INTELLIGENT BRAIN are the ones that get the results in osteopathy according to Dr. A. T. Still. This was never truer than in palpation for motion. One must start with a trained tactile sense and focus it down to as fine a point as the dexterity required for fine watch repairing.” (Magoun, 1997, p.56)

Sutherland writes in “The Cranial Bowl”:

> “The picture should be like that of a watchmaker in his mechanical knowledge concerning the intricate works of watch.” (TCB, p. 27)

Cranial motion is subtle, includes the flexibility of the living bone and is qualified by the reciprocal tension membrane. Again the visualization of the structure is stressed.

Again Sutherland:

> "The formation of a "mental picture" of the *articular surfaces* of the cranial and the facial bones, is the first necessity for recognizing the fact of cranial articular mobility." (TCB, p. 27)

Magoun speaks of "thinking, watching, feeling and knowing fingers" and of concentration as preconditions for sensing what the membranes are saying. In 1941 Sutherland wrote an article that was published in the journal *The Osteopathic Physician*, which was entitled "Let's go! Let us feel!" In this article he writes:

> "His [the osteopathic physician] professional task to a great degree is a finger task – that of locating etiological factors beneath as well as throughout all body tissues, being as problematic as it is the" searching for a needle in a hay stack" and requiring fingers with brain cells in their tip. Fingers capable of feeling, thinking, seeing." (COT, p.19)

Further on Magoun explains that the term membranous articular strain or lesion is used for lesions of the cranium, in contrast to the term ligamentary articular strain which is used for spinal lesions. In order to speak of lesions, strain has to exist, which limits movement. The lesion can affect either a single bone or the whole cranium. The lesion is named after the easier possible movement. This is made clear by means of a graphic representation.

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In the case of unpaired bones lesions are called extension or flexion lesion, in the case of paired bones as in external or internal rotation. Magoun classifies lesions according degree of severity from zero to four plus. Further on he describes that one can use the potency of the cerebrospinal fluid for diagnosing. He writes:

> „THE CEREBRAL FLUID IS IN COMMAND. It possesses an innate intelligence which moulds the head of the new born and often reduces the traumatic lesions encountered in childhood or later. In the physiology of the body we do not know why muscles contract, why the same food will grow hair in one place and nails in another, why the leucocytes flock to a focus of infection. It occurs and we take it as part of the Infinite Wisdom that shapes our ends. Nor do we know why this potency is inherent in the cerebrospinal fluid. But it is there and it does an excellent job (of shaping one end)." (Magoun, 1997, p.59)

After that he describes how this fluid potency can be used for diagnosis and treatment and how to conduct examination and treatment. One thing that should be stressed:

> "Lesioning produces a change in the molecular structure of the tissues involved, increasing their resistance to the transmission of the potency." (Magoun, 1997, p.60)

Chapter four deals with **principles for the treatment of lesions.**

The correction of lesions is said to be the goal of treatment. At the start of the chapter several different triggers for lesions are listed, such as e.g. the impairment of cranial nerves by pressure, triggered by bony constrictions, membrane tension, venous or lymphatic stasis. Affected structures are described sententiously, without describing their anatomy. He seems to expect his readers to know. In the following points different possibilities of pathology or osteopathic dysfunctions are discussed – partly very generally. As for example:

> "Organs and their function may be disturbed." (Magoun, 1997, p.66)

Magoun also lists the facilities necessary for treatment (measuring tape, gloves) and describes the correct position of patients, best positions for the therapist and the necessity of visualization of the sensitive procedure.

In the section about well-balanced membranous tension he states that a free movement of joints is only possible if falx, tentorium and all other membranes involved are well-balanced. Still's technique of bringing the joint into a neutral position, to hold it and to wait for the relaxation of ligaments, supported by the patients breathing, can be transferred to the cranial field. The potency of the CSF is pointed out once again:

> "The neural tube is a sponge pump with fluids inside and out. Thus the power of the fluid is not to be ignored." (Magoun, 1997, p.69)

When choosing the method of treatment the therapist should carefully consider the patient's age and general condition, as well as the type of lesion and the length of time it has been existing.

As methods are listed:

a. Exaggeration,
b. direct action,
c. Disengagement,
d. Opposite physiological motion and
e. Molding. (direct action, in order to change the bone's form)

These techniques are explained. Contraindications are mentioned. In a simple diagram the direction of the powers in action are depicted.

Further on Magoun writes about directing the potency of the cerebrospinal fluid. To start he poses the question:

> "What is meant by directing the tide of fluctuant motion?" (Magoun, 1997, p.72)

In the heading he speaks about directing the potency. Now it is called directing the tide. Thus, a new term is introduced, namely tide, which has not been defined so far. In the following he quotes Sutherland who describes potency as electric potential which constantly charges and discharges.

A drawing with the heading "The Ground Swell" shall depict this kind of charging and discharging. In order to clarify how this potency can be used for the correction of lesions Dr. T. F. Schooley is quoted, who deals with the term fulcrum and the movement of the fulcrum, respectively (see Schooley 1953, p.31f). This movement of the fulcrum is equated with directing the tide here:

> "[...]the use of this potency for lesion correction by directing the tide or moving the fulcrum[...]"(Magoun, 1997, p.72)

So far the term fulcrum, also Sutherland-Fulcrum has been introduced as the point of intersection of falx and tentorium, i.e. as an anatomic term. Now its meaning is somehow changed, that the fulcrum, by being the center of movement, also the center of potency, creates movement. Thus fulcrum would be the central point, the point where no movement takes place but around which movement spreads out.

In an ideal situation the fulcrum is in balance with its environment. One speaks of lesions if the fulcrum is unbalanced. In order to correct such lesions the potency is used, by directing the tide or shifting the fulcrum into the direction of the lesion:

> "This is done by shifting the center or fulcrum to the area of perverted function and allowing the motion to adjust itself to this natural state." (Magoun, 1997, p.73)

The methods mentioned above shall be used in order to bring the bones smoothly and carefully to the point of well-balanced membranous tension, whereby fluctuation of the fluid shall bring about the equilibrium. This sort of treatment, triggered by means of soft touch with one or more fingers, is called "transference of energy" and proceeds in four phases.

a. Confusion in fluctuation: the more severe the lesion is the bigger is the confusion.
b. The fluid reaches its „still point" or fulcrum, correction takes place. Here fulcrum and "still point" are equated. It is added that the CSF' immanent intelligence presumably has corrected from the beginning of mankind and that this would be the best way anyway.
c. The fluid tide reappears, but this time without any restriction.
d. The therapist feels the completeness of mobility.

Magoun introduces a multiple-hand technique. A figure shows Sutherland and three other therapists while working with a patient. General remarks about the recommended sequence of correction, the frequency of treatments and prognosis are made. Once again he states the importance of age. The younger persons are the better formable are their bones, especially as long as ossification has not been completed.

Chapter five deals with **special techniques in order to influence the cerebrospinal fluid**.

First of all the technique compression of the IV. ventricle is introduced. The original name for this technique was "bulb compression". Neither of these terms can be found in "The Cranial Bowl". Nevertheless Magoun refers to Sutherland already at the beginning of his chapter. While Sutherland originally only talked about stimulating the cerebrospinal fluid, Magoun presents special techniques in order to influence fluctuation of the fluid. This makes clear that cranial osteopathy was subject to further development right from the start.

Compression of the IV. ventricle is used for a number of disease patterns and disorders. Cerebral bleeding, as a result of apoplexy or trauma is mentioned as the only counterindication. The use of this techniques is described and clarified by means of two figures. The effects of this technique are manifold.

> "There is a change in the electrobiology of all body fluids as well as the chemistry. Stasis of cerebrospinal fluid, lymph and venous blood is overcome. The vital centers in the medulla, along the aqueduct and in the floor of the fourth ventricle are detoxified, nourished and stimulated. [...] Body metabolism is improved, resistance to disease increased and immunity enhanced through effects on the liver, spleen and pancreas, as well as the endocrine system. [...]" (Magoun, 1997, p.84f)

Directing the potency of the cerebrospinal fluid can be also applied starting from the sacral bone or the temporal bones. Three figures show the position of the hands for the different techniques.

Using it on the temporal bones is also called "Father Tom" technique. Once again this term cannot be found in Sutherland. But there is a case study, in the paragraph "experience", where Sutherland describes how he used this technique for a man who lost consciousness after he nearly had drowned. By doing so he brought him back to life. Magoun mentions shock or accident as indication for this technique.

Furthermore a bilaterally alternating technique on the temporal bones is described. It is also called “Pussy Foot“ or “Mother Puss“ – technique. Both terms cannot be found in Sutherland, neither in “The Cranial Bowl” nor in the “Sutherland Compendium”, which is a hint that those techniques were developed in collaboration at the Faculty of Cranial Osteopathy and that the techniques were partly modified and partly newly developed. As the founder of cranial osteopathy as well as a teacher Sutherland thereby played an important role.

Chapter six deals with lesions of the **sphenobasilar symphysis and of the sacrum**

The sphenobasilar connection is said to be the key for the whole skull as all the other bones directly or indirectly depend on it.

Sutherland concludes from the acticular connection of the alae majores of sphenoid bones with the squamous part of temporal bones the articular mobility of the skull base.

The significance concerning the central nervous system consists of its close relation to important vital centers such as medulla, spinal marrow, hypothalamus and hypophysis. In eight points all possible structural details, that are connected to the skull base, are listed: bones, nerves, arteries, veins, muscles, connective tissue, cortical centers and hypophysis. Under the heading lesion mechanism Magoun lists all possible lesions connected to SBS. These are discussed one by one in the following section about lesion diagnosis and correction.

First of all flexion is described, again in very much detail, the position of sphenoid and occiput. Flexion dysfunction is defined that both alae majores are stand high and both sides of the occiput inferior. For the correction several techniques are described.

Extension is just the opposite of flexion and treated in an analogue way.

Torsion is a converse rotation around an antero-posterior axis. The ala major of sphenoid stands high on one side, the basilar apophysis stands low. This is followed by a definition which states the erected ala major determines the name of the lesion. If the right ala major is stand high, one talks about torsion right and vice versa.

Under sidebending/rotation Magoun understands a lateral inclination of sphenoid and occiput around two vertical axes, whereby sphenoid and occiput approximate on the concave side, while they depart on the convex side. At the same time both bones rotate towards inferior around an antero-posterior axis on the convex side.

The lesion is named after the convex side. The text says:

> „The lesion is named as sidebending rotation to the side towards which the mechanism moves readily and completely." (Magoun, 1997, p.103)

Strain is also called a shift of the SSB and defined as follows: the body of the sphenoid and the basis of the occiput move into oppositional directions. This can either be vertically – in this case both bones rotate around their transversal axes into the same direction. In the case of lateral strain the bones rotate around their vertical axes, again into the same direction. The classification of lesions is made according to the position of the sphenoid. Lateral strain is called left strain, when the sphenoid moves leftwards and the occiput moves rightwards and vice versa. In contrast to the sort of lesions mentioned above, where the ala major is the point of reference, in the case strains the sphenoid is chosen as reference point.

Compression is defined as an approximation on the part of the body of the sphenoid towards the basis of the occiput. Degrees of severity may differ – from a slightly restricted flexibility to total loss of mobility in the case of very severe compression. Lesion can either develop as a result of birth trauma or intrauterinely as well as a result of trauma. For correction "The two way tension" is applied. This technique is about moving apart sphenoid and occiput. Therefore several different techniques exist, even a "Multiple hand technique", whose applications are explained.

This "Two way tension" could be regarded as new technique as this term does not occur in Sutherland's writings. He does, however, describe a very similar technique in chapter 10, the so-called sphenobasilar technique. He says:

> "The technician then moves the greater wings forward and upward with the thumbs and draws the occipital downward with the fingers." (TCB, p. 84)

Magoun describes it as follows:

> "a. Vault approach. Lift the lateral angles of the frontal anteriorly with both forefingers while holding the lateral angles of the occiput posteriorly with the little fingers."(Magoun, 1997, p.106)

The only difference is the position of fingers. However, Sutherland chooses a totally different way of describing it. While Magoun describes the position of the individual bones for the lesion explained, Sutherland explains in very much detail to where the individual bones move and how sutures relate to each other. For example:

> "During the flexion of the sphenobasilar articulation, the upper half posterior external bevel articular surfaces of the greater wings glide forward away from the upper half anterior internal bevel articular surfaces of the squamous portions, while the lower half posterior internal bevel articular surfaces of the greater wings

> swing backward in contact with the lower half anterior external bevel articular surfaces of the squamous portions. At the same time the petrous portions of the temporals rotate externally." (TCB, p. 84)

Sutherland's description is as condensed as possible, there would not have been any shorter way of saying it. While Sutherland more or less describes the anatomic details, Magoun speaks about directing the cerebrospinal fluid and about the balance of the membranous tension.

> „After the fluid tide has carried the mechanism to the point of balanced membranous tension [...]. The cerebrospinal fluid is the directed to the symphysis from the vertex [...] to make the correction." (Magoun, 1997, p.99)

Magoun tries to give an overview by means of a systematic depiction. But in his text information is dense and very much condensed and thus challenges readers or students, respectively.

Furthermore Magoun mentions "Molding", which is to be understood as moulding technique. By means of it, bones shall be brought into a "normal" position. Another point is intraosseous lesion, which can either affect sphenoid or occiput.

Towards the end there is a summary of sphenobasilar lesions with a schematic representation of the axes of movement and another summary of sutures, which can be affected by lesions.
Again I would like to mention an example here, as a sort of illustration:
SAGITTAL

> Flex: Spreads posterliorly. Depressed at bregma. (Ext. opposite)
> Tor: To side of high great wing posteriorly and opposite anteriorly.
> Sbr: To convexity, especially at lambda. (Magoun, 1997, p.110)

All other sutures are explained in the same way.

As far as the sacrum is concerned, the connection of sacrum and occiput via dural membrane is described as well as the fact that they are influencing each other.
Magoun comes up with a classification of lesions:

1. Respiratory Flexion: is defined as a movement towards cranial at the basis and a movement of the apex towards anterior around a transverse axis.
2. Respiratory Extension is defined as the opposite
3. Torsion is a rotation around an anterio-posterior axis
4. Sidebending/Rotation, a combination of movement around an anterio-posterior and a vertical axis.

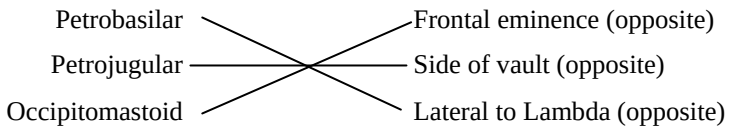
Chapter seven deals with **the temporal bone**

He uses the same systematics and classification as in all other chapters mentioned above. A very detailed description of the bone, its ossification and connections to adjacent bones. Physiological movement is described as external and internal rotation, respectively, as it happens in the case of paired bones.

In the description of its effects on surrounding structures the significance of the temporal bone is pointed out. The cerebral nerves III and IV can also be compressed at the point of passage at the anterior end of the tentorium. The ganglion gasseri and thus cerebral nerve V can also be influenced by dural tensions, cerebral nerve VI because of the petrosphenous ligament. Cerebral nerves VII and VIII also depend on the tension of the dura, which is due to their passages through the acoustic meatus accusticus, in addition to that cerebral nerve VII furthermore because of its passage through the foramen stylomastoideum. Nerves IX, X, and XI pass through the foramen jugularis and can thereby be compressed at the point of contact of occipital and temporal bone.

The jugular vein runs the same course. The carotid artery runs through the apex petrosus and can be irritated there. Numerous muscular connections influence the movement of the temporal bone. The eustachian tube can be partly or completely closed due to the rotation of the temporal bone. Via the cervical fascia as well as ligaments, the position of the hyoid is also influenced by the temporal bone.

Again anamnesis, observation, palpation according to position and movement are mentioned as criteria for examination. The V-spread technique is mentioned as technique for the diagnosis of lesions. This technique can also be used for correction. Fingers are formed to a V over the suture that has to be tested and the fluid is directed from the opposite side.
As an example here the scheme for petrobasilar, petrojugular and occipitomastoid suture.



As far as petrobasilar and petrojugular suture are concerned it is mentioned that there is a projection of the fluid impulse, even if the suture cannot be directly touched.

Because of the numerous possible disorders there is also a large number of possible techniques, which are presented in this chapter. Furthermore there is also a number of figures that should clarify the description of these techniques.

Chapter eight deals with **the skull cap**

This chapter contains the description of the frontal as well as the parietal bones, again according to the same classification that was used in previous chapters. The membranous origin of the bones as well as their adapting function, which becomes clear from their toothed structure have to be stressed here.

Techniques for lesion correction on the frontal bone:
External rotation or Frontal Spread. This technique brings the frontal bone in external rotation and thus extends the incisura ethmoidalis. It positively influences the frontal sinus.

Internal rotation or Frontal Lift. The frontal bone is compressed laterally and thus is lifted towards anterior. Thus the incisura ethmoidalis is narrowed and tensions the reciprocal tension membrane [RTM]. Both techniques are depicted by means of an illustration.

“Cant Hook“ or frontosphenoidal technique. Affects the connection of the L-shaped articular surfaces of the great wings to the frontal bones. The technician controls the sphenoid by means of intraoral contact on the pterygoid process, while the other hand lifts the frontal bone. Fig. 46 shows this technique.

For the connection to other bones articulating with the frontal bone, V- Spreads are used. This is also applies to the parietal bone.

Molding is used for the parietal as well as for the frontal bone likewise.

External rotation, internal rotation, parietal lift and parietal spread are mentioned as being the techniques for the parietal bone.

Chapter nine deals with **orbita and facial skull**

One by one the individual bones, which are ethmoid, maxilla, zygoma, palatinum and inferior conchae, lacrimal bone, nasal bone and vomer are described concerning their position, their connection to other bones as well as concerning the axes around which their physiological movement takes place.

Molding is mentioned as correction technique for the orbita – either to extend or to narrow it. Application is shortly described and there is an illustration for both, for expansion as well as for constriction of the orbita. As a sort of completion and in order to reach certain goals other techniques, which can be used for the orbita, are mentioned, which have been, however, already explained in previous chapters. For example compression of the IV. ventricle for fluid change, petrobasilar technique for venous drainage or frontal lift for the improvement of the mobility of the eyeball and of muscular functions.

The bones of the facial skull are described as follows:

> „Hung beneath the frontal and anterior to the sphenoid.“ (Magoun, 1997, p.163)

Six paired and two unpaired make up the facial skull. The ethmoid is a special case. Technically it belongs to the skull base, but contributes to the nasal part of the facial skull, too. Magoun writes that Sutherland has described the facial bones as being the one end of a seesaw, the sella turcica being at the other one.

Possible dysfunctions are manifold, as the regions of eyes, nose and mouth can be affected. Traumata are very often the origin of dysfunctions. One has to stress especially maxillary and sphenoid sinus for which a “plunger-like action” due to zygomatic bone and vomer is described. This means that a good mobility of these parts is needed for a proper venous drainage.

Correction techniques for the individual bones are described and references concerning other techniques are made to previous chapters. The palate bone is not only regarded as “speed-reducer“ between sphenoid and maxilla, but also as being significant for their adaptation and for the sphenopalatine ganglion.

The pterygopalatine technique is described in four steps. It is an intraoral technique, which is depicted on two illustrations – one time applied to a patient and the other time when applied to a skull specimen. For the connection of the palate bone with maxilla, vomer and the second palate bon CSF – fluid techniques are applied.

The vomer is regarded as sustainer between sphenoid and palate. Treatment of the vomer is called “Wagon Tongue“ technique. Magoun writes that Sutherland has drawn an analogy between sphenoid and “wagon box“ and another one between pterygoid processes and wheels in order to clarify this technique.

> „Place a fulcrum under the wagon tongue just in front of the wheels (at the whiffletree) and then press down on the front end of the tongue. The wheels must go up.” (Magoun, 1997, p.172)

Chapter ten deals with **babies and children.**

Magoun repeats embryology as it has been described already at the beginning of his book. The special features of the skull of a newborn are explained clearly and systematically. There are three figures for illustration: Fig. 60 shows the dissected skull of a newborn, Fig. 61 shows different skulls from newborn to toddlers and Fig. 62 is a drawing of the ossification centers of the skull base of a newborn. The development of the bones of different age groups is described. As later changes SSB and second and third sacral vertebra are mentioned, as they ossify completely only between 20th and 25th year of age.

In the second section all possible factors for lesions are listed: from prenatal factors, such as genetic impairment, diseases of the mother or impairments which are due to medication or x-rays right through to birth traumas. Furthermore the natural birthing process including physiological adaptation of the skull bones is described.

A further point is dedicated to lesions of children under six.

Traumas of children over six are very similar to those of adults, as sutures are already well developed at that age. In addition to that specific disease patterns of spinal anomalies, cerebral damages, hydrocephalus and mongolism are discussed.

The third section, which deals with diagnosis of lesions, explains behavior patterns of newborns. This is followed by a timetable which informs on the normal development of the child, from the first day up to his/her fifth year of age. After that signs of abnormal development are listed.

The fourth section deals with the correction of lesions. It is pointed out that the technician always has to consider the age of the child when using certain techniques. As a technique for newborns, molding and fluid-directing via the sacrum are mentioned.

Concerning interosseous lesions, he defers to the following chapter. Two types of deviations can be treated by means of molding: prominent and oblete zones.

Two and Three Way Tension, as well as Base Spread of the Condylar parts are mentioned as corresponding techniques. Sphenobasilar techniques, correction of overlapping sutures, Parietal Spread and Frontal Spread have to be adjusted in accordance with the respective age of patients.

Chapter eleven treats **intraosseous lesions of the occiput**.

This chapter seems to have originated from a piece of writing Sutherland published in cooperation with the Lippincotts in the summer of 1945. Adah Stand writes in her biography:

> "When the so called vacation came to a close the booklet titled *Compression of the Condylar Parts of the Occiput,* was ready for the printer." (WTF, p. 81)

Magoun writes:

> „Dr. Still's reference to the "Hole in the Tree" and the squirrel whose tail protruded there from may well have referred to the foramen magnum. Dr. Sutherland has done much to open the possibilities of osteopathic diagnosis and treatment in this most important area." (Magoun, 1997, p.196)

The development of the occiput is described, as well as possible effects of disorders, which mainly affect cerebral nerves VI – XII, but also medulla, venous drainage, reciprocal tension membrane and brainstem.

The description of lesion mechanisms goes into very much detail concerning the impact of compression on condylar part, basilar part and squama as well as resulting pathologies. This very detailed description of the individual elements furthermore shows up to what extent they depend on each other. As for example:

> "SQUAMA. This may be rotated or flattened or angulated. Consequent effects on the sqamocondylar junctions and occipitomastoid articulations cause distortions of the base of the skull.[...] This disturbs the relationship of the poles of attachment of the reciprocal tension membranes." (Magoun, 1997, p.199)

For diagnosis the same regularities are applied as in the previous chapters. Further on he advises against doing too much during one treatment session in the case lesion correction.

> "Treatment should consist essentially of spreading the condyles, using the pull of the spinal membranes from the sacrum to stabilize the basilar part and allowing the fluctuation of the fluid and the pull of the cranial membranes to make the correction." (Magoun, 1997, p. 204)

The technique of decompression of the condylar parts is explained in detail and depicted by means of an illustration of applying it to the skull. Further techniques are rotation of the squama occipitalis, molding or decompression of the squama, molding of the foramen magnum and spread of the base. Decompression of the condylar parts and an Atlano-occipitale technique are mentioned as techniques that can be used for the treatment of adults. (Fig. 71 and 72)

The last point deals with severe lesion – "Bent Twigs".Five illustrations depict a severe deformation of an infant's skull which are also described regarding the different deviations. For comparison the skull base of an adult with similar deformation is presented.

The appendix contains a suggestion for the documentation or findings report – one for adults and another one for children.

Under the heading Cranial Study Groups Magoun recommends that local groups shall be formed who should meet monthly, in order to increase their knowledge of the cranial concept.

> „In either case it is only by intense application and continued study that the individual can hope to attain the accumen necessary for successful application of the principles laid down by Dr. Sutherland." (Magoun, 1997, p.223)

A discussion of radiographies concerning technique and interpretation is the conclusion.

At the very end there are eight photographies of dissections.

6.3 Summary of the techniques introduced by Magoun

1) Directing the cerebrospinal fluid – in general
2) Specific techniques which influence the CSF
    a) compression des IV. ventricle
    b) compression IV. V. access via the sacrum
    c) with access via the temporalia
    d) Lateral Fluctuation
    e) Lateral Fluctuation with access via the sacrum
    f) Combination of longitudinal and lateral fluctuation.

3) Techniques for the SSB

a) Flexion of SSB
b) Extension of SSB
c) Torsion
d) Sidebending/Rotation
e) Lateral or vertical strain
f) Compression
g) Intraosseous lesion

For these seven types of lesion correction techniques are described as vault approach, as fronto-occipital approach or as Multiple Hand Technique.

4) Techniques for the temporal bone

a) for temporal bone in ER
b) for temporal bone in IR
c) Technique for the auditive tube
d) Technique for temporooccipital lesion
e) Technique for temporoparietal lesion
f) Technique for sphenoparietal lesion
g) Technique for sphenopetrosa lesion
h) Technique for temporocygomatic lesion
i) Technique for temporomandibular lesion
j) Technique for intraosseous lesion

5) Techniques for the frontal bone

a) Molding
b) ER or Frontal Spread
c) IR or Frontal Lift
d) Frontosphenoid technique or “Cant Hook”
e) V – Spread for all connections frontozygomatic, -maxillary, -nasal, -ethmoidal and -parietal

6) Techniques for the parietal bone

a) Molding
b) ER
c) IR
d) Parietal Lift
e) Parietal Spread
f) V-Spread for parietofrontal, -sphenoidal, -squamous, -mastoid and –lambdoidal

7) Techniques for the orbita

a) Orbital Molding
b) Expanding and narrowing the orbita

8) Techniques for the facial skull

a) for ethmoid
b) for intraosseous lesion of the ethmoid
c) for maxilla –molding-ER-IR- and for all connections to adjacent bones
d) for zygoma
e) for palatinum
f) for vomer –Wagon tongue and vomerosphenoid technique
g) Technique for ganglion sphenopalatinum

9) Techniques for infants and toddlers

a) Molding of prominent or oblete zones
b) Directing the CSF via the sacrum
c) Two or Three Way Tension
d) Base Spread of condylar parts

10) Techniques for intraosseous lesions of the occiput

a) Technique for the decompression of the condyles
b) Technique for the derotation of the squama occipitalis
c) Molding of the squama
d) Molding of the foramen magnum
e) Spread technique for the base

11) Occipitoatlantal technique

7 Comparison

7.1 Introduction

The original aim of comparing Sutherland's "The Cranial Bowl" and Magoun's "Osteopathy in the Cranial Field", and of thereby investigating if and how changes concerning contents and techniques have happened, has modified during my work on it.

A comparison is difficult in so far as the first one is the presentation of a new concept and the second one is a systematically structured textbook for students, for the genesis of which Sutherland played an important role.

Thus we have to deal with an ideal symbiosis of an original thinker, who devoted himself to his own idea on the one hand and someone who managed to document already existing knowledge in a very painstaking and exact way, on the other hand.

7.1.1 Formal comparison

The first striking difference between the two books is their volume. Sutherland's book contains only 45 pages (text only, from chapter one to chapter sixteen, in the translation by Hartmann), while Magoun's book comprises 228 pages.

Sutherland describes in the introduction how the "Cranial Idea" appeared to him and the history of the idea's development up to the publication of his "booklet". In four chapters he describes the anatomic foundations of cranial mobility and the articular surfaces, the reciprocal tension membrane and the activity of the cerebrospinal fluid. The chapter "Diagnosis of Cranial Dysfunctions", as well as the chapter "Basic thoughts of the Cranial Technique" comprises only one page.

Eight chapters deal with the description of techniques. The last two chapters cover different dysfunctions, whereby origin, development and correction are described. Sutherland uses only three drawings for illustration, all of which are anatomic figures. None of the techniques is depicted by means of a drawing or a photo. However, techniques and movement of the affected sutures or bones are described in an exact and pictorial way. Sutherland is fond of lively comparisons, most of which come from a mechanic or technical field.

Magoun's book is divided into eleven chapters, most of which are subdivided into four subchapters. 86 figures, partly drawings of anatomic foundations, partly photographies of techniques illustrate the written content. While Sutherland describes, Magoun tries to classify and systematize.

The individual chapters are headed by means of Roman numerals in bold type. The next subdivision is made by means of Roman numerals, too, namely, I., II., III. For the next subdivision he uses capital letters A., B., C. and then the Arabic numerals 1., 2., 3.

The next subdivision is headed by small letters a., b., c., and the again next one by numerals followed by a bracket 1), 2), 3), and finally there is a last subdivision which is headed by small letters followed by brackets a), b), c). (see chapter 3)

Where possible he uses lists instead of descriptions and content is as packed as possible. The book's structure is very clear which should help readers to keep track. Actually this way of structuring works very well for those chapters that cover lists of bones and sutures.

The advantage is that information is condensed and compact. Magoun rarely uses inserted texts or describing elements. The disadvantage is, on the other hand, that the density of information is somehow tiresome and it is actually possible to loose track, despite or because of the huge amount of points and subpoints.

7.1.2 Comparison of contents

Sutherland starts his presentation by giving the reader an understanding of the cranial articular mobility. He does so by describing the individual bones as well as his thoughts about articular surfaces, which are formed ideally for this mobility.

Magoun can already base his writing on the acceptance of the thesis of moveable skull bones. He starts out by means of a systematic classification of all skull bones, the sutures and a short explanation of the embryological development of the CNS. After that Magoun explains the Primary Respiratory Mechanism. His remarks go very much into detail. He describes five components that make up this mechanism (see p. 42).

In "The Cranial Bowl" there is a short explanation which refers to the cranial articular structure as being in connection with the brain, ventricles and intracranial membranes the Primary Respiratory Mechanism. Sutherland dedicates a whole chapter to the description of

the reciprocal tension membrane (S, ch 4)[2]. A further chapter deals with ventricles, spinal canal and the activity of the cerebrospinal fluid (S, ch 5)

During his years of teaching after the publication of "The Cranial Bowl", Sutherland already named the fluctuation of the CSF, the reciprocal tension membrane, the motility of the neural tube, the mobility of the skull bones as well as the involuntary movement of the sacrum as decisive features for the Primary Respiratory Mechanism. These features of the PRM are still described in literature in the same way (Frymann 1971, Greenman 2003, Handoll 2004, Liem 2000, Brown 2006).

In his chapter on the diagnosis of cranial dysfunctions (S, ch 6) Sutherland restricts himself to the presentation of several "landmarks" on occiput and temporal bone. He mentions observation and palpation as means of diagnosis. In his chapter on the basic thoughts of the cranial technique (S, ch 7) Sutherland only describes Still's technique on the wrist, which he has applied on the cranium and stresses the importance of a skillful tactile sense.

Magoun dedicates a whole chapter to the physiological movement of SBS and sacrum (M, ch 2). He names flexion and extension as the only physiological movements.

After that Magoun continues with principles of diagnosis (M, ch 3) and of treatment (M, ch 4) of cranial lesions. Both chapters are lengthy and detailed. For Magoun palpation is an important element in the process of diagnosing. He explains what the technician should avoid, as well as frequent mistakes of palpation. Magoun declares that lesions are named according to the direction of movement that is less restricted and classifies lesions according to their severity from zero to four plus – from no to excessive mobility.

What is also new, is that the potency of cerebro-spinal fluid [CSF] is used for diagnosis. In connection with this he describes the so-called V-spread technique.

In the chapter on treatment principles he starts out with possible pathologies in the cranial region, concerning nerves, membranes, CSF and blood circulation. Then he states that the aim of treatment is balancing membranous tension, which is called point of balanced membranous tension. This aim is reached by means of directing the cerebrospinal fluid.

[2] The reference to chapters of Sutherland is marked with a S; the reference to chapters of Magoun is marked with a M.

> „He [the operator] then directs the potency of the cerebrospinal fluid so that it, plus the pull of the membranes, makes the correction. NO FORCE IS USED." (Magoun, 1997, p.68)

Magoun describes different methods that can be used in order to reach the point of balanced membranous tension: Exaggeration, Direct Action, Disengagement, Opposite Physiological Motion und Molding (see p.50). This sort of list of methods cannot be found in Sutherland, but what he does is to describe the technique of molding as a structuring and moulding technique. Sutherland dedicates a whole chapter to this technique (S, ch 14) and describes it as technique for frontal bone, parietal bone, occiput and facial bones.

Magoun dedicates one of his subchapters to the cerebrospinal fluid, in which he introduces and defines terms, such as potency, fluid fluctuation, still point and fulcrum as being characteristic features of the CSF.

While Sutherland mentions only one technique for stimulating the cerebrospinal fluid (S, ch 8) Magoun distinguishes several specific techniques for influencing the CSF (M, ch 5). Both explain the use of the technique in nearly the same way. Both describe the position of hands, the leverage effect of the technician's musculature and the utilization of the patient's respiration. Also the effects of the technique on RTM and CSF are described in the same way. This indicates that Magoun directly took over Sutherland's techniques.

> "The technic is applied by placing the thenar eminences upon the mastoid portions of the temporal bones, with thumbs extending down along the mastoid processes; and the fingers locked together beneath the occiput to secure flexor profundus digitorum and flexor longus pollicis muscular leverage. The mastoid processes are then gently compressed inward and forward, and then the mastoid portions inward; and then alternating the movement between the two at respiratory intervals.[...] The reciprocal tension membrane has its lateral poles of attachment upon the petrous portions; and the technic causes alternating movement of the intracrnial membranes, which in turn incites circulatory activity of the cerebrospinal fluid." (TCB, p. 72)

> "PROCEDURE. Bilateral internal and external rotation of the petrous temporals is accomplished by the contact of the thenar eminences on the mastoid portions only. The thumbs lie parallel to the processes but do not provide part of the motive force. The fingers are interlaced beneath the cervical area. The muscular motive power is in the flexor profundus only. With a gentle, barely perceptible movement the temporal bones are rotated together, externally and internally, synchronously with respiration.
> RESPONSE. This tends to balance the membranes and increase the fluctuation of the cerebrospinal fluid, thus stepping up retarded vital functions." (Magoun, 1997, p. 86)

Magoun describes the compression of the IV. ventricle. This technique is not yet described in "The Cranial Bowl", but was, however, developed Sutherland. Magoun writes:

> „Dr. Sutherland has often said that no one is too sick for fourth ventricle compression and in almost any case, if you do not know what else to do, compress the fourth ventricle." (Magoun, 1997, p.82).

Further on Magoun presents a technique for the lateral fluctuation:

> „The term „pussy foot" is used by Dr. Sutherland to emphasize the gentleness of the repressant technic, as contrasted with the more forceful incitant "Father Tom." (Magoun, 1997, p.87).

Both terms were coined by Sutherland only after the publication of "The Cranial Bowl". What he calls "Father Tom" is actually his technique for stimulating the cerebrospinal fluid. „Pussy foot" is a bilaterally alternating technique applied to the temporal bones.

Another technique Sutherland dedicates a whole chapter to, is the sphenobasilar technique (S, ch 10), which is explained as follows:

> "In the application, the fingers contact the basilar process beneath the mastoid processes of the temporals. The thumbs are placed upon the greater wings of the sphenoid. The technician then compresses the greater wings backward and downward with the thumbs, and the basilar process upward with fingers." (TCB, p. 83)

Sutherland names flexion, extension and sidebending/rotation as the articular movements of the SBS. He defines flexion as the upward movement of the SBS.

Magoun goes into more detail concerning the anatomy of the SBS (M, ch.6, Lesions of SBS and sacrum). He lists all structures that are connected with the SBS. In contrast to Sutherland, Magoun describes the different types of lesion. He adds torsion, strain, compression and intraosseous lesion to flexion, extension and sidebending/rotation. He defines all types of lesions and then describes a correction technique for every type (see p.53 ff.). Concerning the sacral bone, Magoun lists respiratory flexion and extension as well as torsion and sidebending/rotation, with the axes around which movement takes place.

Magoun dedicates one chapter each to temporal bone (M, ch 7), to skull cap (M, ch 8) and to orbita and facial skull (M, ch 9). All chapters are structured according to the same scheme and describes 1. anatomy, 2. lesion mechanism, 3. the diagnosis of the lesion and 4. correction of the lesion. He mentions ten techniques for the temporal bone. Sutherland describes three techniques concerning the temporal bone. He calls them pars petrosa technique (S, ch 11), four-hand-technique (S, ch 12) and temporomandibular technique (S, ch 13), and explains them in three separate chapters.

What Sutherland calls the pars petrosa technique and is recommended in his work for the treatment of catarrhal infections of the auditive tube, is called technique for the auditive tube in Magoun's text. It is, however, explained in the same way.

The temporomandibulare technique is explained identically as well and derived from Still's mandibular technique.

According to Sutherland, the four-hand-technique is used for articular fixations in the sphenobasilar region and of the partes patrosae. Magoun calls this "Two Way Tension" or "Multiple Hand Technic" and mentions in his writing that it is employed for the correction of compressions of the SBS. Those techniques Magoun mentions for the skull cap, are basically identical with Sutherland's techniques "lift of the skullcap" (S, ch 9).

In "The Cranial bowl" Sutherland dedicates a whole chapter to dysfunctions of traumatic origin (S, ch 15), in which he describes different "traumatic types" that he classifies according to the localisation of the force effect on the skull (see p. 35). What Sutherland explains in his chapter on dysfunctions of the facial bones (S, ch 17) is described in the chapters on orbita and facial skull.

Magoun, however, adds several new techniques. He describes the technique of orbital molding, one technique for the vomer, which is called "Wagon Tongue" as well as a technique for the ganglion sphenopalatinum. Here again "new" means in comparison with "The Cranial Bowl", as Sutherland himself already taught these techniques and demonstrated them in Magoun's book. What are originally Magoun's ideas, cannot be revealed definitely from the text.

Sutherland writes one whole chapter on dysfunctions of dental-traumatic origin (S, ch 16). The descriptions of these dysfunctions have very much to do with the current method of tooth extraction and dentist's chairs used at that time. Today they are not relevant anymore, concerning their genesis. But what still plays an important role is the significance of the sphenomandibular ligament for the dysfunctions of the sphenoid.

In Magoun's book there are two more chapters that do not occur in Sutherland's. The first one is called infants and toddlers (M, ch 10), the other one interosseous lesions of the occiput (M, ch 11). In the tenth chapter Magoun briefly explains embryology and infant development. On the whole, the techniques he refers to in this chapter are all known from previous chapters.

What is new, is one technique he calls Base Spread of the condylar parts. The 11th and last chapter coversseveral new techniques, such as the technique of derotation of the squama occipitalis, molding squama and foramen magnum, as well as a spread technique for the base. These techniques stem from Sutherland, too, they are, however, not mentioned in "The Cranial Bowl". But it becomes obvious from his biography that he had already dealt with this subject matter, as Adah S. Sutherland writes:

> „Er [Sutherland] verspürte eine dringende Notwendigkeit eine größere Vielfalt pathologischer Erscheinungen bei Säuglingen und Kindern zu beobachten und zu untersuchen, als ihm in seiner Praxis begegneten. Die einzige Lösung bestand darin dorthin zu gehen, wo er diese Möglichkeit hatte. [...] Den größten Teil seiner Zeit in den Zwillingsstädten verbrachte er in einer Augen- und Sprachklinik, die ihm die Möglichkeit zur Beobachtung, Diagnose und im Bedarfsfall zur Behandlung bot. (Hartmann, 2004, IV-65)

[He (Sutherland) felt that there is a necessity of observing andexamining a greater a variety of pathological occurrences on infants and children than those he got to know in practice. The only solution was to go wherever he had the opportunity to do so. [...] Most of the time he spent in the twin cities he went to an eye- and language clinic where he had an opportunity for observation, diagnosis and, in the case of need, for treatment.]

The fact that Magoun again refers to Sutherland in his 11th chapter, becomes obvious from the text. Under the heading Collateral reading he writes in his appendix:

> „*Compression of the Condylar Parts of the Occiput* (Private printing by Dr. Sutherland). An additional teaching aid dealing with intraosseous lesions of the occiput." (Magoun, 1997, p.215)

7.1.3 Summary

The difference between Sutherland's and Magoun's book is more of a structural than of a content-related kind. If one compares the techniques presented by both of them, it becomes obvious that Magoun mentions many more. This difference can be easily relativized if one takes into account Sutherland's records of his lectures as well.

By looking at Sutherland's first depiction one notices an essential difference: he describes the sacrum as an element of the Primary Respiratory Mechanism.

Sutherland writes with regard to this topic:

> "The hypothesis does not include dilation nor contraction of the spinal canal. The spinal cord merely moves upward and downward, much as would a tadpole´s tail, were the body of the tadpole to expand and contract laterally. The cerebrospinal fluid throughout the vertebral column fluctuates by way of the arachnoid membran; the membrane being hung from above, with only one attachement, and that at the sacrum." (TCB, p. 52 f.)

But this is only a difference, if compared to "The Cranial Bowl". One has to bear in mind that "The Cranial Bowl" reflects the standard of knowledge and of research of the year 1939. Craniosacral Therapy was, however, subject to constant further development. Sutherland writes in the preface of its reprint in 1947:

> "Therefore: our little volume may now be considered an "echo from the past," or a memento presented by the Osteopathic Cranial Association." (TCB, p. 8)

From this passage becomes clear that the further development happened as a sort of teamwork of a whole group, in which lively discussions and constant exchange must have taken place. Sutherland now calls his lifework, for which he had worked, experimented and researched for 39 years [see Introduction: "After thirty-nine years of the osteopathic practice, [...]" (TCB S. 17)] "our little volume".

Also the expression "echo from the past" hints at the changes that have taken place in the meantime. Nevertheless Magoun's book "Osteopathy in the Cranial Field" has to be regarded as an idependent piece of writing.

Adah Strand Sutherland calls the publication of the "Osteopathy in the Cranial Field" as being one of the most satisfactory publications the Osteopathic Cranial Association has ever sponsored. She writes:

> "Dr. Sutherland´s joy in this came particularly from what the publication of such a text indicated. To him, it meant that this volume for which no one was ready in 1939 when *The Cranial Bowl* was launched, was written twelve years later by a fellow physician, a cranial faculty member, because now there was evident need for it." (WTF, p. 88)

7.2 Sutherland and Magoun – an ideal complement?

V. Frymann writes in a manuscript:

> „1944 meldete sich Harold I. Magoun, DO, aus Denver bei einem der Kurse von Dr. Sutherland, um diese unsinnigen Vorstellungen vom Schädel zu enthüllen und zu widerlegen. Aber Dr. Magoun litt seit 45 Jahren auch an einer furchtbaren Migräne. Nach diesem Kurs und der Behandlung durch mehrere Hände gleichzeitig, hatte er nie mehr Kopfschmerzen und von da an widmete er sein gesamtes Vermögen, seine Zeit und seine Energie der Förderung von Dr. Sutherlands Arbeit. Er sammelte Informationen für ein umfangreiches Buch, das 1951 veröffentlicht wurde und *Osteopathy in the Cranial Field* hieß." (Die gesammelten Schriften von V.M. Frymann, DO, 2007, p.259,260)

[In 1944 Harold I, Magoun, D.O., from Denver wanted to reveal and confute these absurd ideas about the skull within the frame of one of Dr. Sutherland's courses. But Dr. Magoun has suffered for 45 years from terrible migraine. After this course and the treatment with many hands he never had headaches anymore and from then on he dedicated his whole fortune, time and energy to the promotion of Dr. Sutherland's work. He collected information for a voluminous book, which was published in 1951 and called *Osteopathy in the Cranial Field*.]

Magoun, who had come as a doubter made an essential contribution to the promotion of the Cranial Idea by means of his book.

Sutherland himself writes:

> "We are looking forward to the studa of another text, known as *The Science of Osteopathy in the Cranial Field*, wherein anatomy-properly-understood invites intelligent application." (COT, p.255)

> "At long last the text *Osteopathy in the Cranial Field* by Harold I. Magoun, D.O., will be ready as a valuable aid in the continued progress in teaching." (COT, p.256)

Sutherland was more interested in the practical side of his idea than in putting this idea in many words. Apart from newspaper articles and several letters, only some prints of his lectures and the book "The Cranial Bowl" are available in a written form. He dedicates this book to his wife:

> "To My Wife, ADAH STRAND SUTHERLAND, who has assisted and given encouragement in the writing of this treatise." (TCB, unpag.)

One is tempted to read from this dedication that he would maybe never have written his book without the support and encouragement of his wife. Sutherland's lectures were recorded on audio tape, which means that there are actually several somehow "literary" remains.

It is in part thanks to Howard and Rebecca Lippincott that there is a sort of the written depiction of Sutherland's work. They wrote the book "A Manual of Cranial Technique", published in 1943, which is a summary of the cranial techniques. The Lippincott's made also significant contributions to "The Compression of the Condylar Parts of the Occiput", which was written in the summer of 1945 during a "holiday" they spent with Will and Adah Sutherland. Furthermore Howard Lippincott wrote an extensive article, which was entitled „Die Osteopathische Behandlung von William Garner Sutherland D.O." [The Osteopathic Treatment of William Garner Sutherland, DO].

Harold I. Magoun was the first who managed to write an extensive, systematically structured textbook on Cranial Osteopathy. It was the only one for several decades. Anne L. Wales writes in the preface of "Teachings in the Science of Osteopathy":

> "Harold Ives Magoun, Sr., D.O., compiled and edited a text, *Osteopathy in the Cranial Field*. The text was a valuable addition to the teaching program because it permitted a change in the format of the classes, with a reduction in their length from two weeks to five days." (TSO, p.XV)

The expression "compiled text" does not really do justice to the book. Magoun sought for every detail, in order to present the cranial idea as entirely as possible. That the whole content can be presented within five days seems to be difficult to imagine. Participants of that course must have had a profound knowledge of anatomy. In order to intensify what has been learned in courses Magoun recommended the formation of study groups. The Yearbook of 1946 of the AAO reports of such groups.

> „By far the larger number have taken up Cranial Technic, there now being fifteen such groups which were formed following studies by Dr. Sutherland and the Des Moines College." (AAO Yearbook, 1964, p. 108)

After that all 15 groups are listed, including their reporting. This makes clear that there was a dynamic development of the Cranial Concept and that it was promoted by participants of the courses.

8 Terminology

During my work on Sutherland's and Magoun's writings especially the creation of new terms, which are important for the explanation of ongoing processes as well as for communication, was striking. Sutherland speaks of a necessity to enlarge the standard-nomenclature.

Many of these terms are used quite naturally in literature on cranial osteopathy and in educational fields. Whether all people using this terms, intend to mean the same things is not that clear.

Cranial Osteopathy was developed empirically. Sutherland regarded it the use of Still's concept on the cranium. Thus new insights, which are partly presented as hypotheses, bring along new terms and expressions.

8.1 Terms originally coined by Sutherland

8.1.1 Cranial articular mobility

The first new term that is introduced in "The Cranial Bowl is "Cranial articular mobility".

Here the first hypothesis can be found:

> "I contend that in the living skull, normal mobility in the form of expansile and contracile articular service occurs in the vault [...]. "(TCB, p. 24)
>
> "Acceptance of the thesis that there is mobility throughout the articulations of the cranial and facial bones is a primary requisite to the consideration of cranial membranous articular strains,[...]." (TCB, p. 23)

Sutherland introduces a new thought and tries to explain it in a comprehensible way.

8.1.2 Primary Respiratory Mechanism

The second new term is called „Primary Respiratory Mechanism" and is explained in only one sentence:

> "I consider the cranial articular structure as a primary respiratory mechanism, that operates in connection with the brain, the ventricles and the intracranial membranes." and he adds: "[...] the diaphragmatic respiratory mechanism being secondary thereto [the primary respiratory mechanism." (TCB, p. 24)

So far no further explanation is offered.

8.1.3 Reciprocal tension membrane

Next comes the term "Reciprocal tension membrane". Sutherland proceeds in his explanation from the spinal ligaments, which he regards as a sort of controlling entity of arbitrary muscular movement, as reciprocally tensioned ligaments. He refers to the intracranial membranous tissue falx and tentorium as reciprocal tension entity, which restricts the normal dimension of articular mobility. In the original text he writes:

> "Hence, the term reciprocal tension membrane is chosen in relation to the intracranial membranous tissue functioning with the cranial articulation." (TCB, p. 46)

8.1.4 Activity of the cerebrospinal fluid

Activity of the cerebrospinal fluid is another of those newly coined terms.

Sutherland speaks about his current hypothesis, according to which the brain moves rhythmically and involuntarily and according to which this movement leads to a rhythmical deletion and contraction of ventricles:

> "The ventricle dilation and contraction in term effects cerebrospinal fluid circulatory activity; [...]"(TCB p. 52)

He calls this activity of the cerebrospinal fluid "fluctuation".

He explains this as follows:

> "The cranial thought views the cerebrospinal fluid as *fluctuating* rather than circulating, as other fluids in the body system do. "Fluctuation" according to Websters medical definition reads: "The motion of a fluid contained in a natural or artificial cavity, observed by palpation or percussion." (COT, p.215)

What is cerebrospinal fluid?

In Sutherland's "The Cranial Bowl" it is referred to the fluid that circulates within the subarachnoidal space and the ventricles. On another occasion he says that it is the fluid of life. He quotes Magendie, who defines the task of the CSF as a mechanic one and also Hilton who says talks in "Rest and Pain" of waterbeds of CSF, on which the basilar parts of the brain rest. In addition to those mechanic functions, Sutherland names a chemical function of the CSF:

> "The cerebrospinal fluid is a *life fluid*, according to indications, possessing many chemical constituents similar to those found in the blood; [...]"(TCB, p. 55)

Where from these indications come is not stated and there are no further explanations.

8.1.5 Extension, Flexion, Sidebending/ Rotation

Sutherland introduces these terms in connection with the description of the mobility of the skull base. He cites as an example one of his skull specimen on which he has found an indication for an intervertebral discs. He writes:

> "This articular area indicates a provision for flexion, extension and sidebending rotation of the sphenoid upon the basilar process." (TCB, p. 30)

In the following he writes that he had demonstrated these movements on living people of higher age. Further description of how to visualize this movement is given in chapter 10, which deals with the sphenobasilar technique. In this section Sutherland describes flexion as being an upward movement at the connection of occiput and sphenoid, whereas extension is depicted as a downward movement. Sidebending/rotation is mentioned only briefly:

> "Sidebending rotation of the sphenoid upon the basilar process of the occipital is accomplished by confining the technic to one side." (TCB, p.84)

Handoll:

> „In Sutherlands Sprache bezeichnen die Ausdrücke *Flexion* und *Extension* nicht die Annäherung gebeugter oder gestreckter Flächen, sondern sie beziehen sich auf die Bewegungen, die bei medialen Strukturen des Körpers auftritt." (Handoll, 2004, p.23)

[In Sutherland's language the terms flexion and extension do not mean an approximation of bent or stretched surfaces, but refer to the movements that occurs in the medial structures of the body.]

8.1.6 Transmutation

Sutherland uses this term very often, however always in a slightly modified way. In "The Cranial Bowl" it is not used yet. Magoun does not use it either, which might be due to the fact that there is no clear definition of this term. As a sort of illustration, I would like to cite a few quotes, which contain the term "transmutation":

> "This thought carries one into deep water, figuratively speaking, and into the studious consideration of that highest known element throughout nerve fiber to terminal. Perhaps this transmutation is the nerve force to which Dr. Still referred." (COT, p. 214f.)

> "Someone has *asked* me to explain what meant by the term transmutation. *Transmutation* ...It is a change into another nature, substance, form or condition." (COT, p. 291)

> "Restriction in the movement of that membrane means restriction in the normal fluctuation of the cerebrospinal fluid. Hence we not only have venous channels to consider in restriction leading to pathology in the brain but also a limitation of the normal nourishment from the cerebrospinal fluid to the nerve cells and its transmutation along the nerve path to its terminal." (COT, p. 194)

Further on Sutherland describes one of the functions of the cerebrospinal fluid as mediating between blood and brain (cf. Milne, 1999, vol.2, p.36ff.), by using again various comparisons, from which, however, does not become clear, whether he means only the end of the nerve pathways in the brain or whether he refers also to the peripheral nerves. With regard to Still's quotations on the cerebrospinal liquor, which Sutherland often uses, the latter seems to be the case.

8.2 Terms that are adopted and modified by Magoun and those terms that he coined

8.2.1 Primary Respiratory Mechanism

Magoun dedicates one entire chapter to the description of the Primary Respiratory Mechanism. Unlike Sutherland, who presents Cranial Articular Mobility, Reciprocal Tension Membrane and the activity of the CSF one after the other, Magoun states, that all of them are parts of the PRM.

Magoun presents the cerebrospinal fluid as the first component of the PRM (see p.42) and names it a number of metaphors, such as e.g. "liquid - light".A more factual description follows under point D. which deals with the depiction of meninges of the CNS. In this section the CSF is described as clear fluid which encloses the CSF as a buffer and which transports substances from the hypophysis. Furthermore the production in the lexus choroideus and the evacuation via sinus and perineural and perivascular canals into the lymphatic system.

The second component Magoun mentions are the meninges of reciprocal tension membrane.
It is described as helping, controlling and securing function for the craniosacral mechanism. Magoun only describes the movement of the crista galli here and states that as a result the tentorium towards anterior. Sutherland mentions the origins of the meninges on the sphenoid, the temporal bones and the occiput and describes where to these origins move during respiratory inspiration.

Magoun writes that the cranial articular mechanism moves in respiratory flexion. An explanation, what this flexion is, follows. A further difference is that Magoun includes the spinal dura and the movement of the sacrum via it.

The third component is the central nervous system (CNS). Magoun states that there is an inherent motility of brain and spinal marrow. He describes the inhalation phase, which comes along with the flexion of the SSB and, in connection with this, a dilation of the ventricles which results in an increased production of liquor.

The fourth component he mentions is the articular mobility of the cranial mechanism. He states that this is necessary in order to allow the brain movement. Elements, which cause this movement are, according to Magoun, the fluctuation of the CSF and the activity of the RTM.

A fifth component is the articular activity of the sacrum between the ilia. This does, however, not refer to the reactive movement, which arises, e.g while walking, but an involuntary one. The spinal dura is said to be a “core link” between foramen magnum and pelvis. It is responsible for the transference of movement. When the foramen magnum moves up- and forwards in flexion or during inhalation, the sacral bone rotates in respiratory flexion around an axis, which is described as running through the processus spinosus of the second sacral vertebra. This axis is called respiratory axis, which is again, a newly introduced term.

8.2.2 Flexion, Extension, Sidebending/ Rotation, Torsion

Magoun also describes flexion as lifting and extension as lowering of the SBS. In addition to that he introduces a new aspect, namely respiration and describes an increase of flexion of the SBS during inhalation and as well as an extension.

The term torsion is new and is described as rotation around an antero-posterioraxis, whereby occiput and sphenoid rotate conversely. Sutherland did not mention such axes of movement.
Sidebending/Rotation is described as lateral inclination around two vertical axes and a rotation around an antero-posterior axis – towards inferior on the convex side.

8.2.3 Strain, Compression, Molding, Intraosseous Lesion

All of those are new terms, Magoun introduces in the frame of describing the lesions of the SBS. Strain terms a shift of the SBS in vertical or lateral direction.

Compression is the approximation of the bones of the skull base, which can result in severe cases to a mobility loss of the SBS.

Molding terms a direct action that aims at normalizing the form of the skull bones. This technique is especially applicable in the treatment of children.

By intraosseous lesion he means disorders during the ossification of occiput and sphenoid. Both of these bones consist of three or four parts, respectively, at the time of birth and can thus be impaired during the prenatal state or while birth.

8.3 Terms that occur in the records of Sutherland's lectures and in Magoun

8.3.1 Fulcrum

Fulcrum is a term that also occurs in structural osteopathy. It is, however, a core term for cranial osteopathy. The following passages are quotations, which contain this term, in order to illustrate its usage:

> „FULCRUM. (Sutherland) The complete junction of the falx with the tent." (Magoun, 1997, p.19)

This definition describes an anatomic detail, which is part of the reciprocal tension membrane. He called it "Sutherland-fulcrum" in honor of Sutherland. On another occasion, he writes:

> „The jugular process is the pivot fulcrum [...]." (Magoun, 1997, p.38)

In this sentence fulcrum is used with another meaning, but not defined explicitly. The meaning has to be conveyed from the context. It terms here a point, around which movement takes place. The term "fulcrum" can, however, not be found in Sutherland's "The Cranial Bowl". In "Teachings in the Science of Osteopathy", it is defined as follows:

> "The fulcrum in the action of the reciprocal tension membrane in the membranous articular mechanism of the living human cranium is a still point around which or over which the constantly tense membrane operates the poles of articular attachment." (TSO, p.18)

> "A fulcrum is the still point from which you get the power to lift something heavy." (TSO, p.46f.)

Sutherland himself writes about terming it the "Sutherland-fulcrum":

> "Harold I. Magoun, Sr., D.O., was moved to call this important functional point the "Sutherland Fulcrum" [...]." (TSO, p.45)

> "The three sickles join together at the area of the great sinus, the junction which was so kindly christened the "Sutherland Fulcrum" by Dr. Harold I. Magoun, the editor of the text, *Osteopathy in the Cranial Field*." (COT, p.305)

Milne writes:

> „Sutherlands Fulcrum ist eine imaginäre Linie, die geradewegs durch die Mitte des Sinus rectus hindurchführt (der an der Verbindungsstelle von Falx und Tentorium liegt und anterior und superior der I.O.P. [Interne Occipitale Protuberanz, Erklärung nicht im Original] verläuft) und mit jeder Bewegung des Sphenoidale ihre Form und Position ein bißchen verändert." (Milne, 1999, vol.2, p.130)

[Sutherland's fulcrum is an imaginary line, which runs right through the sinus rectus (which is situated at the connection of falx and tentorium and anterior and superior of the Internal occipital protuberance.]

This definition leads over to a new term.

8.3.2 Automatic-shifting-suspended-fulcrum

> "The Fulcrum is the still leverage junction over or through which the three sickels function physiologically in the maintenance of balance in the cranial membranous articular mechanism. Like all fulcrums, it may be shifted from point to point, yet it remains still in its lever functioning. The fulcrum in relation to the reciprocal tension membrane is a *sill leverage* point from which the three sickles are suspended. It also has provisional *automatic shifting* accommodation to the periodic respiratory changes occurring in the cranial mechanism, [...].Once again, we ran into difficulty in search of descriptive terminology. This still leverage point is now described as the *suspension-automatic-shifting fulcrum*." (COT, p.306)

On another occasion he compares this automatic-shifting fulcrum to a balance scale:

> "To illustrate what these words refer to, consider the mechanism of this little balance scale that I am holding up. Where is the fulcrum over which the balance operates? Right here, at the point where the beam is suspended. At present, as I hold it, the balance is working automatically in response to the convection currents in the room. Now as I shift my hold and alter the position of the beam, the balance shifts to another place; every point is in another place and the whole is working over the fulcrum just the same." (TSO, p.44)

Sutherland tries to give a picturesque example for the constant adaptation of the reciprocal tension membrane.

Magoun writes in his section on treatment principles for cranial lesions:

> „We merely initiate the movement and follow as the fulcrum shifts.[...] When the balance point is reached, the cerebrospinal fluid has found its proper fulcrum and it is at this time that correction takes place." (Magoun, 1997, p.76)

Wales writes:

> „Dr. Sutherland saw that this whole dynamic action [reciprocal tension membrane] occurs around an *automatic shifting suspended fulcrum* located in the area of the straight sinus." (Wales, 1972, p.789)

> „Ein Fulcrum ist ein Ruhepunkt oder (variables) Zentrum einer Bewegung. Ein Fulcrum ist nicht nur im menschlichen Organismus, sondern auch in der übrigen Natur anzutreffen. Ein markantes Beispiel für ein Fulcrum in der Natur, das eine Vorstellung seiner potentiellen Stärke gibt, ist das Auge eines Wirbelsturmes. Becker beschreibt das innere Auge eines Wirbelsturms als „Ruhepunkt" und „potentielle Kraftquelle". Es kann sich dennoch über Land und Meere bewegen **„automatic shifting suspended fulcrum"**. (Liem, 2001, p.297)

> [A fulcrum is a stillpoint or (variable) center of movement. A fulcrum does not only exist in the human organism, but also in nature. One example for a fulcrum in nature, which gives an impression of its potential power, is the eye of a cyclone. Becker describes this inner eye of a cyclone as "stillpoint" and "potential source of power" .Nevertheless it can move over land and sea **„automatic shifting suspended fulcrum"**.]

Although all of them seem to agree concerning the location of the fulcrum, the sinus rectus, definitions are quite differing.

8.3.3 Stillpoint

Stillpoint is another core term of the cranial concept. Sutherland describes it as follows:

> "I want you to think about what is happening when you perform these operations for managing the fluctuation of the cerebrospinal fluid. When that short period is vibrating, sense it as a rhythmic balance in the fluid. This is the point of change. It seems like a state close to suspended animation. That is why the work of the operator is completed when this aim is complished. After the still point, the patient's body carries on the work." (TSO, p.175)

> "In the still point that arises from the application of these techniques, the motor is idling and there is an interchange between all the fluids of the body." (TSO, p.176)

Magoun writes:

> „The fluid settles down to its still point or fulcrum, adjusts to the point of balance of the membranes and THE CORRECTION TAKES PLACE. In the "moment of stillness" the potency of the cerebral fluid manifests itself." (Magoun, 1997, p.73)

Alone from these two definitions it becomes clear how difficult it is to find an exact term. Sutherland tries to explain it by means of comparisons, Magoun equates the term stillpoint with fulcrum. Some examples of how Sutherland's and Magoun's successors have defined stillpoint:

> „Das Sutherland – Fulcrum ist ein Stillpunkt, um den die Spannungsmembrane wirken. Ein Fulcrum ist ein Stillpunkt, durch den es möglich wird, etwas Schweres zu heben. Das Fulcrum der zerebrospinalen Flüssigkeit bzw. der Stillstand der Liquorfluktuation wird Stillpunkt genannt. Die kraniosakrale Bewegung kommt zum Stillstand." (Liem, 2000, p.585)

[The Sutherland-fulcrum is a stillpoint around which the tension membranes act. A fulcrum is a stillpoint, by means of which lifting something heavy becomes possible. The fulcrum of the cerebrospinal fluid or the idleness of liquor fluctuation is called stillpoint. The craniosacral movement is deadlocked.]

> „Es handelt sich dabei um eine therapeutische Unterbrechung des CranioSacralen Rhythmus, die es dem CranioSacralen System erlaubt, seine Aktivität neu zu organisieren, um einen optimalen Effekt auf den Körper auszuüben." (Upledger, 2002, p.240)

[It is the therapeutic interruption of the CranioSacral rhythm, which allows the CranioSacral system to rearrange its activity, in order to have an optimal effect on the body.]

> „Während einer Behandlung lassen sich immer wieder **Stillpunkte** beobachten, Augenblicke und längere Zeiträume, in denen keine wahrnehmbare unwillkürliche Bewegung stattfindet. Sie sind ein normales Merkmal des Heilungsprozesses, wobei die Physiologie innehält, um eine Reorganisation zu ermöglichen. Sie werden deshalb auch als „Pause für den Atem des Lebens" bezeichnet. Bei einem Stillpunkt sind alle Gewebe empfänglich für die Stille und Gesundheit im Inneren." (Brown, 2006, p.177)

[During treatments again and again stillpoints can be observed, which are either short moments or longer periods of time and in which no perceivable, involuntary movement happens. They are a normal characteristic of healing processes, whereby physiology pauses for a moment, in order to make rearrangement possible, Therefore they are also called "pauses for the breath of life". During a still point all tissues are receptive to stillness and health inside.]

8.3.4 Potency – Tide – Breath of Life

These three terms are used in Sutherland, as well as in Magoun, in connection with the movement of the cerebrospinal fluid. Rollin E.Becker writes in a letter to W.G. Sutherland:

> „My next investigation is to examine the full meaning of the Potency of the Tide. As near as I can figure it now the Potency, the Intelligence, the Knowing and the Breath of Life are all the same thing." (Brooks, 2000, p.183)

From this passage it becomes obvious that a clear-cut demarcation between these terms is not possible. Already at the start of Magoun's text he mentions the fluctuation of the cerebrospinal fluid, which is equated with potency there, as the cause for the movement of the skull bones:

> "The fluctuation of the cerebrospinal fluid (potency)."(Magoun, 1997, p.18)

The potency of the CSF is used for diagnosis as well as for correction. Magoun states that it is inherent to the CSF and says that its origin is unknown. What follows is the expression "Direction of the Potency of the Tide", which is not explained any further. But he states that this is a further possibility for diagnosing and correcting. (see Magoun, 1997, p.61) Within the frame of his chapter on treatment principles for cranial lesions, Magoun writes that Sutherland describes potency as a constantly charging and discharging electric potential.

In his summary of "fluid techniques" Magoun writes:

> „[...] the selectivity of the potency directs the effect to the area of pathology." (Magoun, 1997, p.89)

The term "breath of life" is used only once in Magoun's book. He says about Sutherland:

> „He feels that the cerebrospinal fluid receives and is endowed with "the breath of life". (Magoun, 1997, p.15)

Sutherland refers in many of his lectures to potency, tide and breath of life. In the following some of his various different attempts to explain this concept, which is actually not really explicable and hard to capture are quoted. All quotations are taken from the Sutherland Compendium. In connection with his self-experiments he says:

> "So, that is where I went to find something simple regarding a *primary respiratory mechanism* of the living body. I gained the knowledge that included the Tide and something within that I call the "Breath of Life", not the breath of air." (TSO, p.5)

During a lecture on the primary respiratory mechanism, Sutherland said:

> "The first feature is the fluctuation of the cerebrospinal fluid - the potency of the tide. (TSO, p.13)

He compares this tide to the tides of the sea with ebb and flood.

> "Do you see the Tide as a battery with waters within which are chemicals? What do you have in that combination? The "juice", that invisible potency, the battery of the human body." (TSO, p. 33)

During a course Sutherland refers to a case study and ends by saying:

> "No force was applied, but the tide – an unerring intelligent motive force – did the work." (COT, p.205)

In his explanations Sutherland again and again refers to Still, who used to call the cerebrospinal fluid the highest known element.

> "It is something that is invisible: the Potency, the Breath of Life, or Dr. Still's highest known element." (COT, p.347)

Stephen Paulus writes in his article "The Breath of Life":

> "Sutherland derived the term "Breath of Life" from the Bible:"And the Lord God formed man of the dust of the ground and breathed into his nostrils the breath of life and man became a living soul." He was not speaking of the breath of air, which Sutherland considered to be one of the material elements or one of the effects of the Breath of Life. The Breath of Life is non-material, invisible and Intelligent. The Breath of Life drives the function of all natural phenomena and physical forces in a living being. He likens the Breath of Life to a spark, which ignites the motor. (Paulus, 2004, p.1)

Trottier talks about one main change in Sutherland's theory:

> „Im Alter von 75 Jahren verändert Sutherland im April 1948 anläßlich eines Einführungskurses in das Konzept der cranialen Osteopathie am College of Osteopathic Medicine in Des Moines (in Iowa) grundlegend. Zuerst beschrieb er, wie gewöhnlich, die biomechanischen Prinzipien des PRM,[...].Anschließend, und das war dort das Neue, erklärte er den Breath of Life: „*...something invisible in the cerebrospinal fluid..*" [...]. (Trottier, 2001, p.11,12)

[At the age of 75, Sutherland held an introductory course into the concept of cranial osteopathy at the College of Osteopathic Medicine in Des Moines, Iowa in April 1948. At the beginning he described, as usual the biomechanical principles of the PRM [...] Subsequently, and that was new, he explained the Breath of Life: "*...something invisible in the cerebrospinal fluid..*"]

8.4 Summary

Sutherlands understanding was decisively influenced by the philosophical approach of his teacher, Dr. Still. The demand, to base osteopathy on scientific foundation, led to the fact that terms, such as "breath of life", "tide" or "intelligent force" disappeared from textbooks or are annotated, respectively.

Liem writes in the introduction to his glossary:

> „Im Folgenden werden einige wichtige Begriffe der kraniosakralen Osteopathie erklärt, die auch einen Einblick in die spirituellen Aspekte geben. Die Erklärung orientiert sich zum größten Teil an den Originalschriften von W. G. *Sutherland* sowie der Erstausgabe von *Magouns* Osteopathy in the cranial field (1951), an der *Sutherland* mitgearbeitet und sie ausdrücklich gutgeheißen hat. Es kann im Einzelfall vorkommen, dass bestimmte Sachverhalte aus heutiger Sicht überholt gelten.[...] Es ist anzunehmen, dass *Sutherland* viele Begriffe gewählt hat, um seinen Studenten bestimmte palpatorische Herangehensweisen zu verdeutlichen und sie an bestimmte subtile palpatorische Erfahrungen heranzuführen. Im Weiteren ist es für die Verständigung im kraniosakralen Bereich der Osteopathie im kranialen Bereich und ihrer Weiterentwicklung von Vorteil, wenn ihre Anwender das gleich Vokabular benutzen.“ (Liem, 2000, p.579)

> [In the following some important terms which are important for craniosacral osteopathy but which also give an insight its spiritual aspects are explained. The explanation is oriented to a great extent on *Sutherland's* original writings as well as on *Magoun's* “Osteopathy in the Cranial Field” (1951), to which *Sutherland* has contributed and which he highly appreciated. Some contents seem to be somehow old-fashioned from today's point of view. [...] It seems as if *Sutherland* had chosen certain terms, in order to clarify palpatory applications to his students and in order to lead them to subtle palpatory experiences. Furthermore it is of great advantage for the communication within the field of craniosacral osteopathy and its further development if technicians use the same terminology.]

Missing definitions of terms is one of the core problems for the transparency of contents as well as for the scientific discourse in general. That Sutherland uses so many different descriptions in his lectures reveals the difficulty of explaining his ideas. In order to give people a certain idea of his thoughts e tries to explain them by means of comparisons or metaphors.

Handoll refers to the problems of terminology, too:

> „Obgleich Sutherland konventionelle anatomische Begriffe verwendete, um die Aktivität in seiner Hypothese zu beschreiben, gebrauchte er diese Begriffe dennoch auf unkonventionelle Weise.[...] *Außenrotaion* und *Innerotation* beziehen sich auf die Bewegung paariger bzw. bilateraler Strukturen. *Inhalation* und *Exhalation* beziehen sich auf die Bewegungen von Zentralem Nervensystem und Zerebrospinaler Flüssigkeit. Man sollte der Versuchung widerstehen diese Begriffe mit einer gewöhnlichen Begrifflichkeit zu vergleichen, denn sie sind nicht darauf bezogen. Es ist gut möglich, dass die Verwirrung späterer Schüler vermieden hätte vermieden werden können, wenn Sutherland andere Begriffe geprägt hätte, um sein Konzept auszudrücken – was er freilich nicht tat.“ (Handoll, 2004, p.23)

> [Although Sutherland uses conventional anatomic terms, in order to describe the activity of his hypothesis, he uses them in an unconventional way. [...] *External rotation* and *internal rotation* refer to movements of paired and unpaired or bilateral structures.

Inhalation and *exhalation* refer to the movements of the central nervous system and of the cerebrospinal fluid. One should refrain from the temptation to compare those terms with common terminology as they do not refer to the same. It is possible that the confusion of later students could have been avoided if Sutherland had coined other terms in order to express his concept – which of course he did not.]

Abehsera writes:

> „Parallel zu dieser recht esoterischen **Sprache** hat die kraniale Osteopathie über die Jahre hinweg eine rationale Erklärung ihrer selbst entwickelt, die auf „ungewöhnlichen" anatomischen und physiologischen Fakten beruht. Ansonsten aber, wenn sie sie sich nicht auf die „ätherischen Dimensionen der Realität" bezieht, verwendet sie den identischen Wortschatz der „strukturellen" Osteopathie. Die Biomechanik des Schädels z.B. ist recht ähnlich in Bezug auf die der Halswirbelsäule. Die „Strukturellen" akzeptieren die Invasion ihrer Prinzipien nicht. Sie sind entsetzt über den „kranialen" Gebrauch von Begriffen wie „side-bending" oder „Torsion" bei Betrachtung der Synostosis sphenobasilaris. (Abesehra, 2002, p.19)

[In addition to this rather esoteric language cranial osteopathy managed to develop a rational explanation of itself over the years, which is based on "unusual" anatomical and physiological facts. But when it does not refer to the "essential dimension of reality", it uses the same terminology as "structural" osteopathy. Biomechanics of the skull is relatively similar concerning the cervical spine. "Structurals" do not accept the invasion of their principles. They are baffled by the "cranial" use of terms such as "side-bending" or "torsion" by looking at the SBS.]

Klein writes that Sutherland has presented the cranial concept mainly by using metaphors. (see Klein,2002, p.17).

The lack of clarity might also be due to the fact that Sutherland used several terms that had already been connected to a certain meaning before. That Sutherland himself was also aware of this linguistic and terminological dilemma, when trying to depict his findings, becomes clear from some of his own statements (see „automatic-shifting-suspended-fulcrum p.80). And Wales writes, concerning this topic:

> „Although he could see the nature of this mechanism, describing it was difficult. (Wales, 1972, p.789)

By this mechanism the Primary Respiratory Mechanism is meant. In connection with PRM another term exists: Cranial Rhythmic Impulse (CRI). Sutherland had already talked about rhythmical movements, the term CRI, however, was coined only later. In an interview Anne L. Wales said:

> „Ich weiß nichts über irgendeine bestimmte Frequenz des Primär Respiratorischen Mechanismus und ich kann mich nicht daran erinnern, dass Dr. Sutherland den Rhytmus der Fluktuationen gezählt hätte. Die Ärzte Woods führten den Begriff „Cranio Rhytmic Impulse" ein und zählten den Rhytmus." (Liem, 2001, p.10)

[I don't know anything about any specific frequency of the Primary Respiratory Mechanism and I cannot remember Dr. Sutherland having counted the rhythm of fluctuations. The physicians Woods introduced the term "Cranio Rhythmic Impulse" and counted the rhythm.]

That so much research work was done on PRM, CRI and the reliability of palpation speaks for itself. In 1962/63 V. Frymann began to measure the movements of the skull by using instruments and came to the conclusion that actually there is a movement inherent to the living skull but that these are smaller than was assumed until then. (Frymann, 1971)

Many more studies followed. Many of those, partly conducted on animals, came to the result that a movement of cranial bones exists (Retzlaff et.al, 1975, Adams et.al,1992). Oleski, Smith and Crown (2002) claim, as a result of their study, that cranial movement can be verified on radiographs.

Other studies, which deal with the Cranial Rhythmic Impulse or the verification of palpation, come to variable, partly critical, results concerning validity (Wirth-Pattullo, Hayes, 1994, Nelson, Sergueef, Glonek, 2006, Sommerfeld, 2006, Downey, 2004). Scientific provability becomes more and more important for the position of osteopathy within the medical field. Especially because it developed empirically, this is a challenge for cranial osteopathy. A further challenge is to find a common language or standardized terminology as well as a clear-cut demarcation of individual terms.

> „The analysis was hampered by the fact that no standardised, precise definitions of terms exist; a common language has yet to be found." (Dunshirn, 2006, Abstract)

What is true for osteopathy in general, is also true for cranial osteopathy in particular:

> „Damit die Osteopathie ihren eigenständigen Stellenwert im Gesundheitssystem behaupten kann, muss sie Standards definieren und ihre Wirksamkeit belegen." (Schmidt, 2006, p.22)

[Osteopathy has to define standards and proof its effectiveness in order to assert its independent rank in the field of health care.]

9 Prospects

In her Sutherland Memorial Lecture (Frymann, 1955) Viola Frymann poses the question: „Can the Concept stand the test of time?" This question implies a certain fear. But finally the Concept has succeeded. Craniosacral therapy is included in the curriculum of many schools of osteopathy today. Furthermore it is taught in separate courses, too.

But there are still people who are critical and the question "What is happening here?" is frequently asked, by students who study the Concept as well as by patients, who are treated according to it. Numerous clinical studies and master thesis deal with proofing whether the assumptions included in the Concept are effective and reliable or not.

Sommerfeld (2006) acknowledges in his master thesis that the Cranial Concept is relevant, even if two or more technicians could not agree in the palpation of the PRM.

As well as osteopathy in general, the Cranial Concept is subject matter to constant further development as well. Some outstanding personalities have contributed to this fact. James Jealous developed his own concept, called biodynamic cranial osteopathy. The large number of offers for further educational training or separate courses shows that the Concept has passed the test of time.

10 Conclusion

Cranial Osteopathy is a part of osteopathy.

The Concept was empirically developed by W.G. Sutherland. He followed his idea, according to which the skull bones were made for mobility, for a respiratory mechanism. He spent much time searching for connections and published his thoughts only very late in his life.

He had to fight against current theories and in the beginning he found only little interest – people reacted sceptically and with a lack of understanding. But due to his successes in practice, his idea or concept are of essential significance in osteopathy. Another outstanding personality is H. I. Magoun, who has contributed significantly to the promotion of osteopathy by means of writing his textbook.

My research led to the conclusion that Sutherland presents in “The Cranial Bowl” (1939) a concept that started out as a construct built upon observation and self-experiments. The basic idea therefore was the idea of movable skull bones. Sutherland presents the Primary Respiratory Mechanism as the animating element. Only later he developed a more complex picture of this PRM. During his last years Sutherland brings a spiritually influenced component into his Concept. He talks of “Breath of life”, “potency” and “tide” and tries to find comparisons for his thoughts, in order to make them accessible to others (see ch.8, Terminology).

Magoun, who was Sutherland’s student, wrote a school- or textbook. It is thanks to him that a systematic depiction of the cranial concept has come into existence. Magoun tried for a scientific description of the Concept. He was the first to describe in detail one basic element of cranial osteopathy, namely the Primary Respiratory Mechanism. He did, however, leave out (apart from a few hints – see p. 41) Sutherland’s spiritual approach in his book.

Magoun took over most of the techniques that Sutherland had described, as well as their names, such as e.g. “wagon tongue“ or “cant hook“. According to A. Strand Sutherland, Sutherland smarted under the fact that his Concept lacked scientific proofs. In the lifetime of Sutherland there was dissection process, which examined the Reciprocal Tension Membrane and a research project, which examined the spread of the cerebrospinal fluid in vertebrates. (see Hartmann, 2004, IV-78f.)

In conclusion it can be stated that Cranial osteopathy is a significant part of osteopathy, although its foundations are based on a model.

Cranial osteopathy is taught in schools of osteopathy and is, in the same way as osteopathy in general, subject to constant change and further development.

Sutherland presented a complex and fully developed concept. In 1939 he introduced to his basic ideas; while teaching he revealed more and more of his thoughts. About that James Jealous says in an interview:

> „Dr. Sutherland war ein sehr präziser Mensch, und er war kein Mensch der übertrieb. Meiner Meinung untertrieb er die kraniale Arbeit mit Absicht."
> (Osteop. Med. 7.Jg., 3/2006, p.4-8)

[Dr. Sutherland was a very precise person, who did not exaggerate. In my opinion he understated the cranial work on purpose.]

Magoun reproduced Sutherland's knowledge, which he modelled on the original, as exactly as possible.

To express in Sutherland's words what is still true today:

„DIG ON!"

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Figures:

Fig.1
http://www.osteohome.com/graphics/WGS4.jpg from the 25th March 2008 at:10:45