

DVD 3

4. Sphenobasilar synchondrosis/synostosis

The SBS, lying in a median position, takes up a central place in the skull. Due to its position and its function as a place of attachment for muscular and fascial structures, it is an important fulcrum. Additionally this region has a great influence on the growth of the skull and face.

The movements at the base of the skull are clearly visible during movements of the skull. (until end of second scene)

The large mobility at the SBS can be seen here. (scene 3)

Movement at the SBS leads to movement at the lamina cribrosa. (scene 4)

The ossification of the SBS is completed between the age of 13 and 17.

Further research is needed to show to what extent abnormal tensions in the region of the SBS are palpable after that age.

Base of the skull = Cranial base (AB here scene 5)

Anterior cranial fossa

Middle cranial fossa

Posterior cranial fossa

Attachment of the tentorium cerebelli at the transverse sinus

Foramen magnum

Sella turcica

Petrous portion of the temporal bone

Posterior clinoid process

Anterior clinoid process

Lesser wing

4.3. Graph of possible causes (read along: possible causes for disturbances of the cranial base are...)

4.4 Graph: overview of SBS dysfunctions

4.5

(This text while graph 4.4 is shown)

The first four dysfunctions usually develop as adaptations; their influence on the general wellbeing is usually minimal. The last three dysfunctions usually develop through trauma, with obvious symptoms.

It is not seldom, that several SBS-dysfunctions occur at the same time or overlap each other. When talking about “movement” at the SBS in the following, one actually means minimal adaptations of tension in this region.

4.5.1

Flexion dysfunction

The dysfunction names the direction, into which the SBS is moved with the most ease, or in which the SBS moves most easily, or the preferred direction of tension of the SBS.

The movement dysfunction is determined through two hypothetical transverse axes.

One axis goes through the sphenoid bone, anterior to the sella turcica and the other goes through the occipital bone, above the foramen magnum, at the level of the jugular process.
-There is an obvious tension at the sphenoid bone and at the occipital bone; they move more easily into flexion than into extension.

That means that the posterior part of the sphenoid body moves more easily in an anterior-superior direction. The basal part of the occipital bone moves more easily in an anterior and superior direction.

(Text about changed head animation according to Liem's book – read also!)

(: [Quadrants](#)

The anterior quadrants should correspond to the facial and anterior skull bones.

The posterior quadrants should correspond to the posterior skull bones and the mandible.

In Flexion all quadrants are in external rotation.

Vault hold (Calvaria hold)

Palpatory features:

A tension at the greater wings and at the occipital squama pointing inferior and slightly anterior.

Flexion: main direction of movement: (sequences of finger practice)

Fronto-occipital hand hold

The fronto-occipital hold is especially useful for the palpation of torsion dysfunctions of the SBS. According to arthrokinematic descriptions, the frontal bone should move in opposite direction to the sphenoid bone during flexion, extension and in the “vertical strain”.

Osteokinematic descriptions also exist, according to which one can palpate the same movement at the frontal bone as at the sphenoid bone.

Arthrokinematic portrayal (from Liem's arthrokinematic observations P. 533)

Osteokinematic portrayal

[Extension dysfunction](#)

The axis of movement corresponds with the axis of the flexion dysfunction.

- The sphenoid bone moves into extension with greater ease and with a greater movement amplitude. The posterior part of the occipital bone moves in a posterior-inferior direction. The basal part of the occipital bone moves posterior inferior.

(Text about changed head animation according to Liem's book – read also!)

(: [Quadrants](#)

In extension all quadrants are in internal rotation.

Vault hold

Palpatory features:

A tension at the greater wings and the occipital squama with a superior and slightly posterior direction.

Extension main direction of movement (sequences of finger exercises)

Fronto occipital hand hold

Arthrokinematic portrayal

Osteokinematic portrayal

Right Torsion dysfunction

Axis of movement: One anterior-posterior axis running from nasion to opisthion, through the middle of the SBS.

-the sphenoid bone and the occipital bone rotate in opposite directions.

-The dysfunctional side is named after the side, in which the greater wing is in a more cranial position; that means, if the right greater wing is more cranial, it is called right torsion.

Opposite to that, the right occipital squama rotates caudally

(Text about changed head animation according to Liem's book – read also!)

(: Quadrants

In a right torsion, the right quadrants are in external rotation and the left quadrants are in internal rotation.

On the left side...

On the right side...

Vault hold

Palpatory features:

A superior and slightly posterior tension at the greater wings and at the occipital squama.

- A tension with a superior direction at the right greater wing.
- A tension with an inferior direction at the right occipital squama.
- A tension with an inferior direction at the left greater wing.
- A tension with a superior direction at the left occipital squama.

Main direction of movement for right torsion: (sequence of finger exercises)

Fronto occipital hand hold

Left Torsion dysfunction

The left greater wing is in a relative cranial position to the occipital squama.

(Text about changed head animation according to Liem's book – read also!)

(: Quadrants

In left torsion all the right quadrants are in internal rotation and the left quadrants are in external rotation.

Vault hold

Palpatory features:

-The right greater wing moves inferior more obviously.

-the right occipital squama moves superior more obviously.

-the left greater wing moves superior more obviously.

-the left occipital squama moves inferior more obviously.

Main direction of movement for left torsion: (sequence of finger exercises)

Fronto occipital hand hold

right Sidebending-Rotation

Sidebending is a movement around two vertical axes. One axis goes through the middle of the sella turcica, the other through the middle of the foramen magnum. The rotation takes place around an anterior-posterior axis, going through the centre of SBS.

- sidebending is supposed to induce a simultaneous rotation.

-The dysfunction is named after the side of the rotation, - in this case: right, the side at which the greater wing and the lateral part of the occipital squama rotate caudally. At this side the sphenoid bone and the occipital bone separate from each other.

-When palpating, you should bring special attention to the immediate dynamics of the tissue, for example to the amplitude of the sidebending and rotation. It is possible, for example, that there is an obvious sidebending and only a minimal rotation. After severe traumatic influences, a sidebending without rotation also seems possible.

(Text about changed head animation according to Liem's book – read also! **Asymmetry between upper and lower jaw!!!**)

(: **Quadrants**

During right sidebending-rotation the right anterior quadrant reacts in internal rotation and the right posterior quadrant in external rotation. On the left side the anterior quadrant moves more into external rotation and the posterior one more into internal rotation.

Vault hold

Palpatory features:

- The right greater wing moves inferior and anterior more obviously.
- The right occipital squama moves inferior and posterior more obviously.
- The left greater wing moves superior and posterior more obviously.
- the left occipital squama moves superior and anterior more obviously.

Main direction of movement for right sidebending-rotation : (sequence of finger exercise)

Fronto occipital hand hold

Left Sidebending-Rotation

Left greater wing and left lateral portion of the occipital squama both rotate caudally. And on the left side the sphenoid bone and the occipital bone separate from each other.

(Text about changed head animation according to Liem's book – read also!)

(: **Quadrants**

On the right side the anterior quadrant reacts more into external rotation, and the posterior quadrant more into internal rotation.

On the left side the anterior quadrant moves more into internal rotation and the posterior one more into external rotation.

Vault hold

Palpatory features:

- The right greater wing moves superior and posterior more obviously.
- The right occipital squama moves superior and anterior more obviously.
- The left greater wing moves inferior and anterior more obviously.
- the left occipital squama moves inferior and posterior more obviously.

Main direction of movement for left sidebending-rotation: (sequence of finger exercises)

Fronto occipital hand hold

Vertical strain

The two transverse hypothetical axes of movement correspond to the flexion- and extension axes.

Superior Vertical strain

-The sphenoid bone does a flexion, the occipital bone does an extension.

-The dysfunction is named after the cranial dorsum sellae.

The greater wings are shifted into an (anterior) inferior position and the occipital squama into a (posterior) superior position.

With certain traumatic forces, it can happen that the dorsum sellae is shifted into a pure cranial position, without a rotational component and without an axis, in relation to the occipital bone.

(Text about changed head animation according to Liem's book – read also and add!

Asymmetry between upper and lower jaw!!!)

(: **Quadrants**

The anterior quadrants behave more in external rotation and the posterior quadrants more in internal rotation.

Vault hold

Palpatory features:

An inferior and slightly anterior tension at the greater wings.

A superior and slightly posterior tension at the occipital squama.

Main direction of movement for superior vertical strain: (sequence of finger exercise)

Fronto occipital hand hold

Arthrokinematic portrayal

Osteokinematic portrayal

Inferior vertical strain

- The sphenoid bone does an extension; the occipital bone does a flexion.

- The dysfunction is named after the caudal dorsum sellae.

The greater wings are shifted into a posterior superior position and the occipital squama into an anterior inferior position.

With certain traumatic forces, it can happen that the dorsum sellae is shifted into a pure caudal position in relation to the occipital bone, without a rotational component.

(Text about changed head animation according to Liem's book – read also and add!

Asymmetry between upper and lower jaw!!!)

(: **Quadrants**

The anterior quadrants behave more in an internal rotation and the posterior more in an external rotation. [!!! External and internal switched around in german script]

Vault hold

Palpatory features:

A superior and slightly posterior tension at the greater wings.

An inferior and slightly anterior tension at the occipital squama.

Main direction of movement for Inferior vertical strain: (sequence of finger exercise)

Fronto occipital hand hold

Arthrokinematic portrayal

Osteokinematic portrayal

Right Lateral strain

One can imagine the lateral strain dysfunction as a movement of the sphenoid bone and the occipital bone around two hypothetical vertical axes. One axis goes through the centre of the sella turcica, the other through the centre of the foramen magnum.

The sphenoid bone and the occipital bone rotate in the same direction around these hypothetical axes.

-The left greater wing and the left side of the occipital bone move posterior.

-The right greater wing and the right side of the occipital bone move anterior.

The side of the lateral strain is named after the side at which the posterior part of the sphenoid body is shifted laterally in relation to the occipital bone.

The right side of the skull bulges anterior in relation to the left. Looking at it from a cranial viewpoint, one gets the impression of a parallelogram.

(Quadrants)

With a lateral strain the quadrants are not changed in the sense of an external or internal rotation.

Vault hold

Palpatory features:

-An anterior tension of the right greater wing and the right occipital squama.

-A posterior tension at the left greater wing and the left occipital squama.

If severe traumatic forces hit the greater wing from the side, one could also imagine a tension adaptation at the SBS, which does not organise around two vertical axes. Supposedly one gets a pure shift sideways of the sphenoid bone in relation to the articular surface of the occipital bone.

In this case both greater wings would be shifted to the right.

Rather often one gets a mixture out of both possibilities.

Main direction of movement for right lateral strain: (sequence of finger exercise)

Left lateral strain

The sphenoid bone and the occipital bone rotate in the same direction around both hypothetical axes.

-Right greater wing and right side of the occipital bone move posterior.

-Left greater wing and left side of the occipital bone move anterior.

4 The left half of the skull bulges anterior in relation to the right.

5 With the lateral strain the quadrants are not changed in the sense of an external or internal rotation.

Vault hold

Palpatory features:

-An anterior tension of the left greater wing and the left occipital squama.

-A posterior tension at the right greater wing and the right occipital squama.

In a pure sideways shift in relation to the articular surface of the occipital bone, both greater wings would be shifted to the left.

Main direction of movement for left lateral strain: (sequence of finger exercise)

Fronto occipital hand hold

Compression of the SBS

The SBS is compressed.

Palpatory findings are obviously decreased flexion- and extension movements in the SBS. It can possibly come to a reduced frequency of the CRI and, to a compensative increased movement of the vault in relation to the cranial base.

Main direction of movement for Compression and decompression: (sequence of finger exercise)

Fronto occipital hand hold

4.6. Detailed showing of the SBS palpation with the example of a superior vertical strain

The more exactly the palpatory findings are synchronized with the dysfunctional pattern and adjusted to its qualities, the more directed the correction can occur. This is made clear in the following example of the superior vertical strain.

Dependency of the dysfunction on phases

The pattern of a superior vertical strain might be more obvious during the inspiration phase of the expiration phase or during both. The abnormal strain pattern can be more obvious at the sphenoid bone or at the occipital bone or at both bones.

Therefore, there are different possibilities of a superior vertical strain.

1 In the inspiration phase with an obvious finding at the occipital bone (scene 1)

2 In the expiration phase with an obvious finding at the sphenoid bone (scene 2)

3 In the inspiration and expiration phase with equal findings at both bones (scene 3)

During the palpation, one should consider that the movement of the bone can differ from the classically portrayed movement oriented on axes’.

(Scene 4) Further differentiation of SBS-palpation with a more obvious finding at the occipital bone:

During inspiration the sphenoid bone moves toward flexion. At first, the occipital bone also moves toward flexion, but then stops its movement sooner than the sphenoid bone. That causes the occipital bone to be in an extension position in relation to the sphenoid bone.

It is of great importance to perceive the quality of this stop of the occipital bone during the flexion movement. For example: is it a sudden abrupt stop or a slowly increasing movement restriction? (Scene 5) Is it a hard or a soft stop?

Further questions to the tissue:

What is the amplitude of the movement?

Are further asymmetrical movements in the SBS taking place during the inspiration- or expiration movement? And which ones?

Is the movement restriction held from a different part of the body, a different dysfunction?

Are force vectors from an originally traumatic influence perceivable?

This Portrayal is not final. It should only help to encourage intensification of the contact, the resonance and the synchronicity with the reactive and spontaneous homeodynamic forces present in the tissue.

Advice for Treatment of the SBS (no picture)

The treatment of the SBS is usually done via a point of balance. Other treatment principles might be necessary to establish a point of balance, as for example a direct treatment, a compression or decompression.

Stacking:

When using “stacking”, one brings the most obvious dysfunction of the SBS into a point of balance, then one adds the next most concise, and then the next, and so on...

In this example one adjusts a right lateral strain first, then a superior vertical strain on top and then a right torsion.

1 Frontal bone

abdominal bandage: Biomechanical and biodynamic palpation and mobility test

Biomechanical Viewpoint

Biodynamic Viewpoint

1.1. Palpation

– The ringfingers are lying externally on the zygomatic processes of the frontal bone.

1 the little fingers are lying next to the ringfingers

- the little fingers are supporting the ring fingers.

- The middle fingers and index fingers are next to the midline of the frontal bone.
- One thumb is lying under and one thumb over the hand.

During inspiration one can palpate a flexion and external rotation and during the expiration one can palpate an extension and internal rotation.

1.2 sphenofrontal suture, “Cant hook” –technique (p 156)

The L-shaped suture edge of the greater wing is bevelled inward, the edge of the frontal bone outward. This should enable a rocking kind of mobilisation.

- The lesser wing usually shows an edge bevelled outward, on which the frontal bone can lie, enabling a gliding mobilisation.

The therapist is at the side at the head of the patient, contra-lateral to the dysfunctional side.

The little finger of the caudal hand is intra-oral, as close as possible to the lateral lamina of the pterygoid process.

It might be necessary that the patient moves his jaw to that side, so that the little finger can get to that place.

Index finger and middle finger of the caudal hand are on the greater wing of the dysfunctional side.

If possible, the thumb is on the opposite side on the greater wing.

The middle finger and index finger of the cranial hand are lying at the side on the frontal bone, directly above the sphenofrontal suture.

The thumb is lying on the opposite side, at the side, on the frontal bone and is touching the other thumb. This one is not moving and it is a pivot point for the movement to be performed.

Abdominal bandage: disengagement of the frontal bone's suture from the greater wing

- The caudal hand fixates the sphenoid bone.

-During the inspiration phase the middle finger on the dysfunctional side at the frontal bone starts to give a superior and minimally anterior traction.

- The membranous point of balance is established.

Alternative Procedure

- One alternative procedure is the following: Without reducing the disengagement, the external rotation and internal rotation of the greater wings is promoted in synchronicity with the primary respiration.

Abdominal bandage: disengagement of the frontal bone's suture from the lesser wing

-During the inspiration phase the middle finger on the frontal bone starts to give an anterior traction.

- A membranous point of balance is established.

Alternative Procedure

- 19 -One alternative procedure is the following: Without reducing the disengagement, the external rotation and internal rotation of the greater wings is promoted in synchronicity with the primary respiration.

Abdominal bandage: natural disengagement during the inspiration phase

Just as in any other technique, a further possibility is to just passively give special attention to the inherent disengagement during the inspiration phase.

- From the contra-lateral lambdoid suture or from the parietal eminence one can give a fluid impulse.

1.3 Spheno-frontal suture in little children, disengagement (p159)

-The index finger is lying laterally at the frontal bone and at the zygomatic processes, the middle fingers on the greater wings.

-The ring finger and little finger are on the side at the occipital bone.

-The thumbs are touching each other above the head.

-During the inspiration phase one starts to give a posterior traction at the occipital bone. This creates a traction at the sphenoid bone via the attachment of the tentorium at the sphenoid bone.

This is promoted through a posterior traction of the middle fingers at the greater wings. One has to pay special attention, that one doesn't give a medial pressure at the greater wings.

-at the frontal bone one gives an anterior traction.

-A point of balance is established.

(Abdominal bandage ????? Techniques of the sutures of the facial cranium are shown in DVD 4)

2 Parietal bone

One checks the amplitude, the strength, the ease and the symmetry of the movement of the parietal bone. The test of the mobility can be done synchronously or independently of the primary respiration. This is also true for all other bones.

(please remember to repeat this paragraph at the beginning of the 2nd part!!!!)

Biomechanical and biodynamic palpation and mobility tests

Biomechanically there should be an external rotation with a flattening of the sagittal suture in the inspiration phase.

Biodynamically one suspects a centrifugal movement during the inspiration phase, accompanied by a decrease of the convexity.

Palpation

Vault hold according to Sutherland

Palpation of external- and internal rotation of the parietal bone.

2.1 coronal suture

The edge of the suture of the parietal bone is facing externally in the medial portion and internally in the lateral part.

The patient's head is turned to the side opposite to the dysfunction.

The therapist is sitting on the side opposite to the dysfunction

Index finger and middle finger of the left hand are lying on the parietal bone, directly behind the coronal suture.

The index finger is medial to the pivot point; the middle finger is lateral to it.

Index finger and middle finger of the right hand are lying on the frontal bone, directly in front of the coronal suture.

The index finger is medial to the pivot point; the middle finger is lateral to it.

The middle finger lying laterally at the frontal bone and the index finger lying medially on the parietal bone give a pressure on to the bone.

A disengagement is suggested to the tissue by giving an anterior traction at the frontal bone and a posterior traction at the parietal bone.

- A membranous point of balance is established.

- A fluid impulse from Asterion on the opposite side can help the treatment.

2.2 Coronal suture alternative technique

-The cranial hand takes a hold of the parietal bone. The metacarpo-phalangeal articulations (the knuckles) are approximately on the movement axis of the bones. The metacarpo-phalangeal joint of the index finger is lying at the pivot point of the coronal suture.

Index finger, middle finger and ring finger of the caudad hand are directly anterior to the coronal suture. The middle finger is at the pivot point of the coronal suture.

The procedure corresponds to the previous description.

A general technique to release the coronal suture is the frontal lift technique.

2.3 lambdoid suture

The edge of the suture of the parietal bone is facing laterally in the medial part and medially in the lateral part.

The therapist is sitting at the opposite side of the dysfunction.

- Both hands are overlapping and lying at the left side of the skull, the fingers are pointing posterior.

- Index finger and middle finger of the right hand are lying anterior to the suture on the parietal bone.

- Index finger and middle finger of the top hand are lying posterior to the suture, on the occipital bone.

Procedure:

The middle finger lying laterally at the occipital bone and the index finger lying medially at the parietal bone give a pressure on to the bone.

In order to get a disengagement, one gives an anterior traction at the parietal bone and a posterior traction at the occipital bone.

- One engages a membranous point of balance.

- A fluid impulse from the opposite frontal eminence or from pterion can help the treatment.

2.4. Sagittal suture

The pointed edges of the suture become wider as you move posterior. This enables a further divergence or spreading apart of the suture in its posterior part compared to the anterior part.

The therapist is sitting on the opposite side of suture that is to be treated.

- the thumbs are overlapping and lying on both parietal bones.
- the rest of the fingers are lying at the side of the head.

During the inspiration phase the thumbs start giving a lateral and caudal traction at the sutural edges.

- One establishes a membranous point of balance.
- A fluid impulse can be given either from inion or caudal to it.

2.5. parieto-mastoid suture, p.124

Suture edge: mastoid process is facing inward, the parietal bone is facing outward.

The patient's head is turned to the side opposite of the dysfunction.

One thumb is lying close to the parieto-mastoid suture on the mastoid.

The other thumb is lying close to the suture on the parietal bone.

- The thumb on the parietal bone gives a pressure on to the bone and a cranial traction.
- The thumb on the mastoid gives a caudad traction.
- A point of balance is established.
- A fluid impulse from the opposite frontal eminence can help the treatment

2.5.1 parieto-mastoid suture, alternative technique for a temporal bone in internal rotation

The head of the patient is turned to the opposite side.

- the thumb of the dysfunctional side is anterior to the mastoid process.
 - The thenar is on the mastoid portion, close to the parieto-mastoid suture.
 - the thumb of the other hand is lying close to the parieto-mastoid suture on the parietal bone.
- The other fingers are holding the calvaria.

To release the suture edges from each other, one gives a medial pressure at the mastoid angle of the parietal bone.

At the same time one follows the temporal bone into external rotation during the inspiration.

This is practically an opposite physiological movement of parietal bone and temporal bone.

Afterwards both bones are gently separated.

- The point of balance is established.

Abdominal bandage for standing animation; Further procedure possibilities are in the book: Torsten Liem....

The procedure varies, depending on whether it is done in synchronicity with the primary respiration and whether an indirect technique, a direct technique or a combination of both is done. This happens in dialogue with the tissue and the acting forces.

2.6. parieto-squamous technique, disengagement

The edge of the temporal squama is facing inward, the margo squamosa of the parietal bone is facing outward.

The head of the patient is turned to the opposite side.

The hand at the dysfunctional side is lying on the temporal squama.

- The thumb is close to the parieto-squamous suture and relatively parallel to it.
 - The other fingers, in a right angle to the thumb, are lying on the neck.
 - The thumb forms a right angle to the other fingers.
 - The thumb of the other hand is on the parietal bone, close to the suture and relatively parallel to it.
 - The other fingers, in a right angle to the thumb, are pointing caudal.
- As an invitation for disengagement, the thumb gives a medial pressure and a cranial traction at the parietal bone.
- The thumb at the temporal bone gives a caudad traction. Possibly an external rotation of the temporal bone is added.
- A membranous point of balance is established.
- A fluid impulse, given from the opposite pterion, can help the treatment.

2.7 pariete-squamous alternative technique; direct technique

Alternative technique for a temporal bone in internal rotation (fig. 4.36)

The head of the patient is turned to the opposite side of the dysfunction.

The thumb of the dysfunctional side is on the squama, near the parieto-squamous suture and relatively parallel to it. The index finger is lying on the mastoid process.

The other thumb is on the parietal bone, near the parieto-squamous suture and parallel to it, while the other fingers take a hold of the calvaria.

During the expiration phase the thumb on the parietal bone, near the parieto-squamous suture, gives a medial pressure.

During the inspiration phase, an anterior and cranial movement is given at the parietal bone, without decreasing the medial pressure.

At the same time, the index finger gives a posterior and medial pressure on to the mastoid process. The temporal bone is gently pulled inferiorly in addition to the external rotation.

-A membranous point of balance is established.

2.8 speno-parietal suture Cant hook

The edge of the suture of the parietal bone is facing outward; the edge of the suture of the greater wing is facing inward.

The therapist is on the opposite side of the dysfunction.

-Caudal hand:

The little finger of the caudal hand is intra-oral, on the side, on the pterygoid process.

The middle finger is lying on the outside, on the greater wing of the dysfunctional side.

If possible, the thumb is on the opposite greater wing.

The cranial hand takes a hold of the parietal bones with the thumb, the index- and/or the middle finger.

The middle finger is on the sphenoid angle, near the suture.

-The caudad hand fixates the sphenoid bone.

-The middle-and index finger of the cranial hand give a medial pressure and a superior traction on to the sphenoid angle.

-A membranous point of balance is established.

-A fluid impulse can be given either from the opposite lambdoid suture or slightly inferior of it.

2.9 Bregma

The parietal bones are showing an outward facing edge and the frontal bone an inward facing edge.

- the index fingers are on the frontal bone.
 - The thumbs are overlapping and lying next to the sagittal suture, on the juxtaposed parietal bones.
 - The other fingers are lying at the side of the head.
- The index fingers give an anterior traction of the frontal bone.
- At the same time, the thumbs move the parietal bones posterior and lateral.
 - Afterwards a point of balance is established.
 - A fluid impulse can be given either from inion or caudal of it.

2.10 Lambda

At lambda the parietal bones show an outward facing edge and the frontal bone an inward facing edge.

- The thumbs are overlapping and lying next to the sagittal suture, on the juxtaposed parietal bones.
 - The little fingers are touching with the finger tips and lying on the occipital squama.
 - the other fingers are lying on both sides of the head on the parietal bones.
- The little fingers move the occipital bone caudally, while the thumbs at the parietal bones give an anterior and lateral traction.
- A membranous point of balance is established.

2.11 Asterion

At Asterion the occipital bone is at the bottom, on it is the parietal bone and the temporal bone is on top.

- The head of the patient is turned to the opposite side.
- The thumb is lying on the parietal bone, the index finger on the temporal bone and the middle finger on the occipital bone. All three fingers are near asterion.
- The middle fingers give a gentle pressure on to the occipital bone, as well as a posterior traction.
 - Afterwards the thumb gives a pressure on the parietal bone, as well as a centrifugal traction. At last, the middle finger also gives a centrifugal traction at the bone.
 - A membranous point of balance is established.
 - A fluid impulse can be given from the opposite frontal eminence.

2.11 Pterion

The frontal bone is at the bottom, on it is the parietal bone and then the sphenoid bone. The temporal bone is the most superficial.

Handposition:

- All fingers are close to Pterion
 - The index finger is lying on the frontal bone, the thumb is on the parietal bone, the middle finger on the sphenoid and the ring finger is on the temporal bone.
 - At Pterion one gives a gentle pressure and an anterior-superior traction at the frontal bone.
 - Afterwards one gives a gentle pressure, as well as a superior and slightly posterior traction.
 - Following that, one gives a gentle pressure at the sphenoid bone and an anterior and slightly caudad traction.
 - Finally one gives a caudal and posterior traction at the temporal bone.
 - Lastly, all fingers do a centrifugal traction at the bones.
 - A membranous point of balance is established.
- A fluid impulse can be given from the opposite lambdoid suture.

3 Temporal bone

- biomechanical and biodynamic palpation and mobility test

Biomechanically a posterior-medial movement should take place at the tip of the mastoid and an anterior-lateral movement at the mastoid portion during the inspiration phase.

Biodynamically a centrifugal movement should take place during the inspiration phase.

3.1 Palpation 1 + 2, p 93, 96

- The thenars are lying bilaterally on the mastoid portions.
- The thumbs are lying bilaterally on the anterior tips of the mastoid processes.
- The palms of the hand are on the occiput.
- the fingers are crossed.
- elbows of both arms are on the table.

Alternative hand position:

- The thumbs and index fingers are taking a hold of the zygomatic processes on both sides.
- the middle fingers are lying on the meatus auditorius externus on both sides.
- the ring fingers are lying on the tips of the mastoid processes of both sides.
- the little fingers are lying on the mastoid portions on both sides.
- Elbows of both arms are on the table.

3.2 spheno-squamous suture: spheno-squamous pivot technique

(fig. 4.37 and 4.38) P 128

The anterior and inferior edge of the temporal squama connects with the posterior edge of the greater wing.

The vertical part of the suture of the temporal bone is facing inward, the lower, more horizontal part is facing outward.

The point, where the suture edges change direction is called spheno-squamous pivot point (SSP).

The head of the patient is turned to the opposite side of the dysfunction.

The therapist is sitting at the opposite side of the dysfunction.

Thumbs and index fingers of the dysfunctional side take a hold of the zygomatic processes.

The middle finger is in the meatus auditorius externus. The ring finger is on the mastoid process and the little finger is on the mastoid portion.

The little finger of the other hand is intra-oral, as close as possible to the lateral lamina of the pterygoid process. The middle finger and ring finger are on the greater wing.

During the inspiration phase, one follows the temporal bone into external rotation and holds it there. The ring finger follows the mastoid process going posterior and medial. The thumb and the index finger follow the zygomatic process moving lateral, anterior and inferior.

-One gives a medial pressure onto the greater wing.

In addition one invites both bones to disengage by giving an anterior traction at the sphenoid bone and a posterior traction at the temporal bone.

A point of balance is established.

-One can give a fluid impulse from the opposite parietal eminence.

3.3 occipito-mastoid suture, direct technique for a temporal bone in internal rotation (p 119 ...)

The occipital bone often has a sutural edge facing outward. Sometimes there is an inward facing edge in the lower part. The change of the suture edges is called condylo-squamo-mastoid pivot point.

A dysfunction can have the consequence of a compression at the atlanto-occipital joint or at the sphenopetrous suture.

-The thumbs are lying anteriorly in the course of the mastoid process. The thenars are lying on the mastoid portion. The other fingers are on the occipital bone.

The thumb gives a medial and posterior pressure on the mastoid process of the dysfunctional side during the inspiration phase, in order to follow the temporal bone into external rotation.

The other fingers follow the occipital bone into flexion and move the occipital bone away from the suture.

The patient can hold his breath as long as possible at the end of the inspiration to promote the correction.

A point of balance is established

-One can give a fluid impulse from the opposite frontal eminence.

For an indirect technique one can follow the temporal bone into internal rotation and the occipital bone into extension.

3.3.1 occipito-mastoid suture: opposite to physiological movement

This approach is indicated after some severe traumatic dysfunctions.

In this example, one follows the occipital bone further into the direction of the greater mobility, in the sense of an indirect technique.

At the same time one moves or holds (direct technique) the temporal bone in internal rotation. In this position a point of balance is established.

(abdominal bandage: synchronous dynamic procedure with primary respiration)

This treatment principle can also be done synchronous to the primary respiration. During the inspiration phase one promotes the flexion of the occipital bone, while the temporal bone is held in internal rotation. However, in the expiration phase, one follows both bones passively into extension and internal rotation.

3.4 General disengagement: petrobasilar suture and petrojugular suture

Abdominal bandage: petrobasilar suture

The lateral edges of the suture of the base of the occipital bone form a crest at the petrobasilar suture, which articulates with the groove at the posterior lower part of the petrous portion and should enable rotational and gliding mobilisation.

Abdominal bandage: petrojugular suture

The jugular process of the occipital bone connects with the jugular articular surface of the petrous portion.

-The thumb of the dysfunctional side is in the meatus auditorius externus and with the fingers takes a hold of the antitragus of the earlobe.

The other fingers are lying sideways under the occipital bone.

One gives an anterior traction at the temporal bone.

-the occipital bone is fixated in the opposite direction or is additionally moved laterally away from the temporal bone.

A point of balance is established.

3.5 Special technique for the petro-basilar suture

-Thumb and index finger of the dysfunctional side take a hold of the zygomatic processus.

-The middle finger is laying at the meatus auditorius externus.

-The ring finger is on the mastoid process, the little finger is on the mastoid portion.

The other hand is lying sideways on the occiput.

- The invitation for the disengagement is the following: At first one gives an impulse at the occipital bone away from the temporal bone. While keeping the disengagement, one can establish a point of balance through an anterior or posterior rotation at the temporal bone.
- In addition to that, one can follow the occipital bone into flexion or extension.

3.6 Special technique petro-jugular suture

-At first the occipital bone is moved away from the temporal bone. While keeping this disengagement, one can establish a point of balance through external and internal rotation of the temporal bone.

For external rotation the therapist gives a medial and posterior pressure with the ring finger on the mastoid process.

For internal rotation the therapist gives a medial and posterior pressure with the little finger at the mastoid portion.

In addition, one can follow the occipital bone into flexion or extension.

Usually the point of balance establishes simultaneously for both sutures. It was only separated into two procedures for didactic reasons. ([both animations shown one after the other](#))

3.7 Spheno-petrous suture, disengagement (fig 4.39) p 130...

The lateral part of the posterior wall of the pituitary notch is connected to the apex of the petrous portion of the temporal bone via the spheno-petrous ligament. The horizontal posterior lower rim of the greater wing forms the foramen lacerum with the anterior part of the petrous portion.

The therapist is sitting at the opposite side of the dysfunction.

Thumbs and index finger on the dysfunctional side take a hold of the zygomatic process. The middle finger is lying at the meatus auditorius externus. The ring finger is on the mastoid process and the little finger is on the mastoid portion.

The little finger of the other hand is intra-oral, as close as possible to the lateral lamina of the pterygoid process. The middle finger and ring finger are on the greater wing.

-The middle finger and ring finger on the greater wings give a medial pressure and an anterior traction.

-Additionally one gives an inferior traction.

-the other hand follows the temporal bone into external rotation.

A point of balance is established.

Alternative technique according to E.Lay (p.131)

The head of the patient is turned to the opposite side of the dysfunction.

The therapist is sitting on the opposite side of the dysfunction.

Thumb and index finger of the dysfunctional side take a hold of the zygomatic process. The middle finger is lying in the meatus auditorius externus. The ring finger is on the mastoid process and the little finger is on the mastoid portion.

The index finger of the opposite hand is intra-oral.

The finger is at the upper molars, while the bent finger tip is as close as possible to the lateral lamina of the pterygoid process.

-While the patient clenches his teeth, the index finger moves the pterygoid process into a superior direction.

- At the same time the therapist gently moves the temporal bone posterior to promote a disengagement.
- A point of balance is established, normally in the direction of internal rotation of the temporal bone.
- After the relaxation of the jaw the therapist follows the movement of the temporal bone.

Cranial base-occiput-foramen magnum-technique for little children (fig. 1.11)

-The index finger and middle finger of one hand are on the occipital squama, and between the atlas and the occipital bone as well, while the thumb is a little higher on the occipital squama.

-The other hand is on the frontal bone, with the index finger along the metopic suture.

Abdominal bandage: Decompression of the SBS and the anterior intra-occipital synchondrosis
One gives traction in an anterior direction at the frontal bone.

Abdominal bandage: Decompression of the posterior and anterior intra-occipital synchondrosis

One gives a posterior traction on to the squama with the index finger and middle finger.

Abdominal bandage: lateral decompression of the lateral portion (partes laterals)

Index finger and middle finger are projected into the lateral portion and give a spreading force.

Abdominal bandage: rotation of the occipital squama

One gives a rotational movement on to the occipital squama against the dysfunction.

A fluid impulse can be given from the frontal bone towards the fixation.

Platy basia technique (fig 1.12)

-The thumbs are on the greater wings.

-The index fingers are on the temporal bones, anterior to the occipito-mastoid suture.

-Middle finger and ring finger and the little finger are on the occipital bone.

Abdominal bandage: Anterior posterior decompression of the Sphenobasilar synchondrosis

One gives an anterior traction at the greater wings.

Abdominal bandage: Decompression of the occipito-mastoid suture

Index finger and middle finger spread apart.

Abdominal bandage: Posterior anterior decompression

One gives a posterior traction at the Occipital bone to decompress the posterior and anterior intra-occipital synchondrosis and the occipital bone from the sphenoid bone.

A point of balance is established.

Occipital squama technique (fig. 1.13) (5)

-The hands are lying on both sides of the head.

-The little fingers are on the intra-parietal occiput

-The ring fingers are posterior to the lambdoid suture on the occipital bone.

-The middle fingers are anterior to the lambdoid suture on the parietal bones.

-The index fingers are lying loosely on the parietal bones without giving pressure.

-The thumbs are touching each other above the vertex, and are not touching the head.

At first, the lambdoid suture is decompressed by a spreading of the middle finger and ring finger.

After that, the intra-osseal tensions of the occipital bone are harmonized with the little finger and ring finger.

At last, the occipital squama is tested and treated, by feeling or testing the rotation, flexion, extension and sidebending of the squama, and the little finger and ring finger can move the squama into the restricted direction, in the sense of a direct technique.

One can also do an indirect technique, especially in adults.

A point of balance is established.

Treatment of the Sphenoid bone

Tension release between pre- and post sphenoid

This technique is especially indicated for newborn babies and small children.

The hands are placed in a vault hold according to Sutherland.

-At first one palpates the tension of the tissue between the pre- and post sphenoid.

-pre- and post sphenoid are moved in the direction of their restriction.

A point of balance is established.

Technique for the release of the body of the lesser wing- complex from the greater wing- pterygoid process complex.

At first one should do the Cant hook technique for the spheno-frontal suture.

The therapist is at the side of the patient's head, contra-lateral to the dysfunction.

- The fingers of the cranial hand are placed on the frontal bone's right upper rim of the eye, on the level of the lesser wing.

-The right hand feels the cranial movement of the lesser wing through the frontal bone.

-At the same time one notes the tension at the greater wing-pterygoid process-complex with the caudal hand.

-The parts of the bones are moved toward their restriction. A point of balance is established.

(: Intraosseous dysfunction of the temporal bone

(: **Petromastoid portion / tympanic portion**

- One hand takes a hold of the occipital bone. While the fingertips are on the mastoid portion and the mastoid process, the little finger of the other hand is in the meatus auditorius externus.

(: **Petromastoid portion / squamous portion (pars squamosa)** (Fig. 4.9)

- One hand takes a hold of the occipital bone, with the fingertips on the mastoid portion and the mastoid process.
- The index finger, middle finger and possibly ring finger of the other hand rest on the squamous portion.

(: **Squamous portion / tympanic portion**

- The index finger, middle finger and possibly ring finger of one hand are on the squamous portion.
- The little finger of the other hand is in the meatus auditorius externus.

[Abdominal bandage: direct technique](#)

-Both parts of the bone are moved in the direction of their restricted movement up to the movement barrier.

- A point of balance is established.

[Abdominal bandage: direct technique](#)

-Both parts of the bone are moved in the direction of the dysfunction, meaning in the direction of greater mobility.

- A point of balance is established.

Molding of the frontal eminence, the temporal squama and the parietal eminence

- The finger tips of one hand are placed closely together.
- They are placed onto the growth centre of the bone concerned.

If there is a bulging one gives centrifugal impulses, if there is a flattening one gives centripetal impulses; torsion or rotation tensions in the bone are copied with the fingers and a point of balance is established.

A helpful fluid impulse can be given.