THE INFLUENCE OF OSTEOPATHIC TREATMENT DURING GESTATION ONTO THE COURSE OF DELIVERY

A COMPARATIVE STUDY ON THE FREQUENCY OF MEDICAL INTERVENTION DURING CHILD BIRTH

MASTER THESIS – OSTEOPATHY

at the Donau Universität Krems

presented by

Maria Ruspeckhofer

Matr. Nr. 9208874

July 2006

translated by Mag. Dina Ismail

statistical evaluation by Dr. Gebhard Woisetschläger

Abstract

THE INFLUENCE OF OSTEOPATHIC TREATMENT
DURING GESTATION
ONTO THE COURSE OF DELIVERY
a comparative study on the frequency of medical intervention during child birth
by Maria Ruspeckhofer

Purpose: Osteopathy as a form of therapy for pregnancy troubles is the focus of many publications. It is the purpose of this study to discover if osteopathic treatment during gestation influences the course of birth with regard to the frequency of medical interventions (vacuum bell, forceps, caesarean section, episiotomy…)

Design of the study: retrospective, comparative, statistically evaluated clinical case study with a matched control group

Method: 36 primiparous women of a limited age group with a regular course of pregnancy and the fetus presenting with the head were treated osteopathically and juxtaposed to a control group with the same criteria. The comparison was done by means of data sheets. The results of the two groups are presented graphically and are also compared by χ^2-tests and relative risk ratios.

Results: The osteopathically treated group did not show a significantly lower statistical frequency of medical interventions, but there are indications that the number of sutured perineal injuries (episiotomies) is lower than without osteopathy. The evaluation of the caesarean section-, forceps-, and vacuum rates does not have a significant value due to the limited number of test persons, but also here trends might exist.

Conclusion: Apart from the limitations imposed by the small number of subjects, the absolute figures, as well as the statistical evaluation indicate that osteopathic treatment does have a tendency towards positively influencing the course of birth. The treated expectant mothers experienced, objectively as well as subjectively, an improvement of their overall condition, a more intensive body sensation and a more relaxed, anxiety free attitude towards the delivery. In this respect the holistic approach of osteopathy can be seen as having a positive influence onto the course of delivery, along with a reduction of the frequency of medical interventions.

Key words: Osteopathy, Gestation, Parturition, Obstetric surgery, Episiotomy, Vacuum, Forceps, Caesarean section.

TABLE OF CONTENTS

1. INTRODUCTION AND PURPOSE OF THE STUDY 4

2. BASICALS 6
2.1. The spontaneous delivery with vertex presentation 6
2.2. The osseous pelvis 9
2.3. The obstetric canal 11
2.4. The soft parts of the abdominopelvic cavity 13
2.5. The muscles of the pelvic floor 16
2.6. The stabilization and mobility of the uterus 19
2.7. Outline of the most important obstetric operations 21
2.7.1. Caesarean section 21
2.7.2. Forceps extraction / Vacuum extraction 24
2.7.3. Episiotomy 26

3. LITERATURE ON MEDICAL INTERVENTION AND RESULTING HYPOTHESIS FOR AN OSTEOPATHIC TREATMENT 29

4. OSTEOPATHIC APPROACH 35
4.1. Osteopathic principles 35
4.2. Osteopathic literature 38

5. METHODOLOGY 42
5.1. Selection of test persons 42
5.2. Osteopathic treatment 44
5.2.1. Anamnesis 44
5.2.2. Check up 44
5.2.3. Individual treatment 47
5.3. Statistical evaluation of the data 48
5.3.1. Critical preliminary remarks 48
5.3.2. Plausibility examination of the control group 49
5.3.3. Data basis and brief description of the statistical calculation 51

6. RESULTS 54
6.1. Caesarean section 54
6.2. Vacuum deliver / forceps deliver 55
6.3. Episiotomy 56
6.4. Sutured perineal tears 58
6.5. Sutured perineal injuries 59
6.6 Total number of medical interventions 60

7. DISCUSSION 61

8. SYNOPSIS 69

9. BIBLIOGRAPHY 71

ANNEXES

1. Table of illustrations
2. Concept for diploma thesis
3. Statistical data sheet concerning the course of the delivery
4. Medical history sheet
5. Examination sheet
6. Summary of the findings of the interviews
7. Summary of the statistical figures

ABSTRACT (loosely added)

1. INTRODUCTION AND PURPOSE OF THE STUDY

Which event has always remained the same over centuries, but nevertheless is always performed differently?
It is the creation and development of human life, the birth of a new human being. The process of anthropogenesis, on the one hand, is a natural event, developing in a period of nine months inside the mother's body without any outside help. The result is a small miracle: a complete, fully developed human being. On the other hand, pregnancy, giving birth and child bed period are practised differently in each epoch and culture[1].

No two deliveries are the same. This is not only due to every birth being unique, but also because the act of giving birth may vary for technical innovations of medicine and changed socio-cultural conditions. In the late 60s and early 70s, medicinal induction on the date was regarded as advantageous, which led to deliveries being induced by oxytocin without any compelling reason. A result was not only a medicalisation of giving birth, but also an increased usage of operative techniques for terminating parturition[2].

At the same time, however, the French doctor Frederik Leboyer coined the term ‚naissance sans violance' (birth without force). Based on the assumption that already the first few minutes of life determine the future luck of a human being, he introduced changes in the obstetric wards[3]. The women´s confidence in their own body is their most powerful tool for unlocking their potential for strength and physiological wisdom[4]. Odent (2001) writes in his book "The Scientification of Love", the most active system during labour is the archaist brain. Psychological limiting effects on the delivery originate from the neocortex[5]. Each child encounters pain during his/her delivery. A newborn is neither blind or without perception and emotion – which we learned, among other things, from

[1] Stadlober-Degwerth, 1998
[2] Siebert, 1995
[3] Pfisterer, 1994
[4] Turner, 1980
[5] Odent, 2001

the dreams and arche-events of patients in psychotherapeutic treatment, who remember their birth and sometimes even earlier events[6].

Different ideas about the "ideal" delivery are shown in a study carried out at eight university clinics in Germany, Austria, Switzerland, Slovenia and the United States in the year 1998:

- The rate of episiotomy differed between 35% and 65%.
- The rate of perineal tears differed between 14% and 80%.
- The rate of perineal tears was even higher, if no episiotomy had been carried out; the rate of severe tears, however, reached its peak with the median episiotomy.
- Epidural anaesthesia and the giving of oxytocin during delivery were handled individually; in some clinics up to 70%.
- 27% were accounted for by operative, vaginal deliveries[7].

An article in the "Österreichische Hebamenzeitschrift 04-00" reports about a 75% rate of injury of different types, and different problems affecting the lips of the vulva, the vagina, the perineum of women who deliver vaginally[8].

A substantial discussion of this matter and the good results achieved by osteopathic treatment of pregnancy problems, like aches of the back, the groin, the tailbone and headaches, as well as the treatment of mothers who had had Caesarean Section, forceps- or vacuum delivery or episiotomy, motivated me to find out if an osteopathic preparation during pregnancy would reduce the necessity of medical intervention in order to allow the mother a natural delivery.

The present thesis is to clarify this assumption by means of a comparative study carried out with a group of subjects, who took up osteopathic therapy during pregnancy, and a control group, who did not receive this accompanying treatment (concept cf. annex).

The results will be presented and discussed considering the anatomical and osteopathic basicals as well as the literature.

[6] Lothrop, 1995
[7] Tamussino, 1998
[8] Ludnquist et al, 2000

2. BASICALS

2.1 THE SPONTANEOUS DELIVERY WITH VERTEX PRESENTATION

The spark of the delivery is partly provoked by the fetus who sends chemical signs (coming from his lungs and kidneys) giving rise to the synthesis of prostaglandin in the mother. Further on, a high specific hormonal equilibrium is built between mother and child at the same time[9].

During the course of delivery, the shape of the uterus, labour, the conditions within the birth canal, and its respective possibilities to move, force certain typical motions onto the child. Furthermore, due to the not yet ossified cranial sutures, the skull might be deformed under the influence of labour and the conditions in the birth canal.

During labour, the uterine cervix, under the influence of oxytocin, will respond to the stretch stimulus by dilating. The pressure of the infant head against the cervix during each contraction stimulates dilation. Each increase of the cervical dilation initiates a neurogenic reflex to the pituitary gland to further stimulate uterine contraction by increasing oxytocin secretion.[10]

The cephalic presentation is preferred because:

- Compared to the torso, the head is more flexible and thus manages the bent around the 5th lumbar vertebra in order to enter the pelvis more easily,
- The head fits especially well into the lower uterus segment.

Since the left rim of the uterus rotates somewhat to the front and thus the child is offered more space the Ia position (cf. Ill. 1) is the most frequent one[11].The diagonal ovoid inlet of the pelvic and its longitudinal ovoid outlet determines the course.

In order to enter optimally into the pelvic inlet, the head turns diagonally, while the back is positioned laterally.

The passage into the inlet of the pelvis takes place in 3 phases (cf. Ill. 1):

[9] Odent, 2001
[10] Turner, 1980

1. The first phase follows along an axis, running from the navel to the os coccygis. The apex touches the anterior side of the os sacrum (sacrum) and of the os coccygis (tailbone) and pushes the latter to the back.
2. Once the posterior movement of the os coccygis reaches its maximum amplitude, the head rests onto the dorsal perineum (=posterior pelvic floor), which is under tension now. This tension or any eventual contraction of the perineum resists the lowering along the axis described above and leads the fetus frontwards.
3. Now the child's head rests onto the perineum, which constitutes a fulcrum and rotates in a such way that its largest diameter tallies with the largest diameter of the pelvic outlet, i.e. the head moves in the anterio-posterior axis.

In the expulsion stage (cf. Ill. 2), the fetus' head is subject to a deflection (=stretching) as a fulcrum under the pubic bone.
After the head has come out, the largest diameter of the shoulder girdle has to turn to the anterio-posterior axis of the pelvic outlet[12].

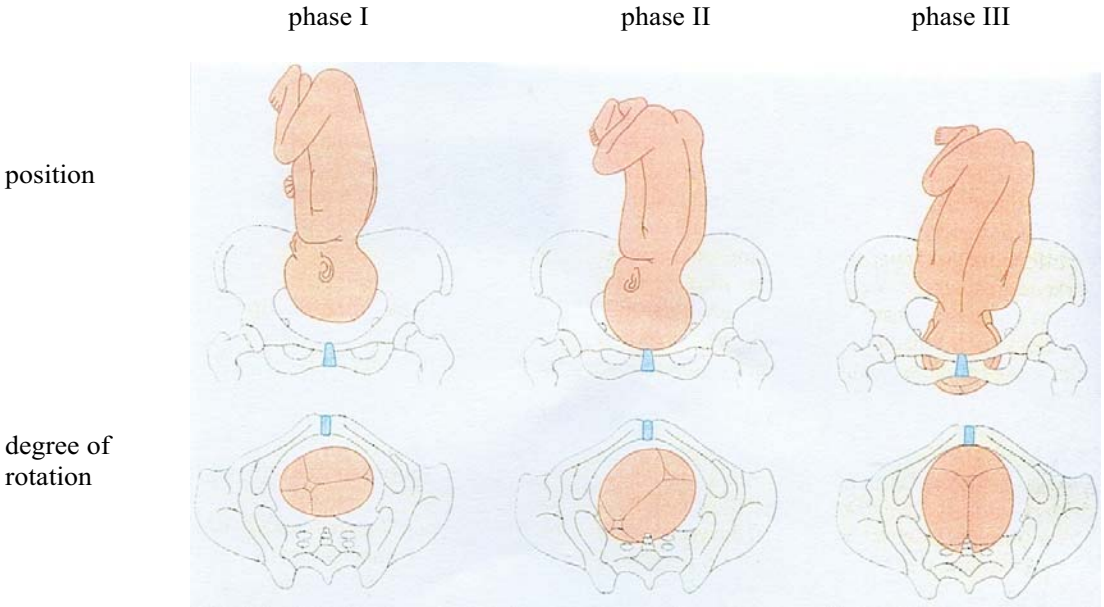


Illustration 1: Delivery with first anterior vertex presentation: phases 1-3

[11] Pfleiderer, 2000
[12] Sergueef, 1995

phase IV phase V

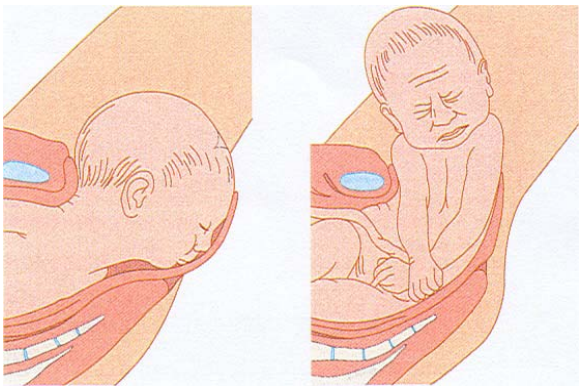


Illustration 2: Delivery with first posterior vertex presentation: phases 4 and 5

An optimal state of tension of the bones, as well as of the weak parts of the birth canal is a prerequisite for the delivery to take place without complications. The following chapters will treat this necessary balance in greater detail:

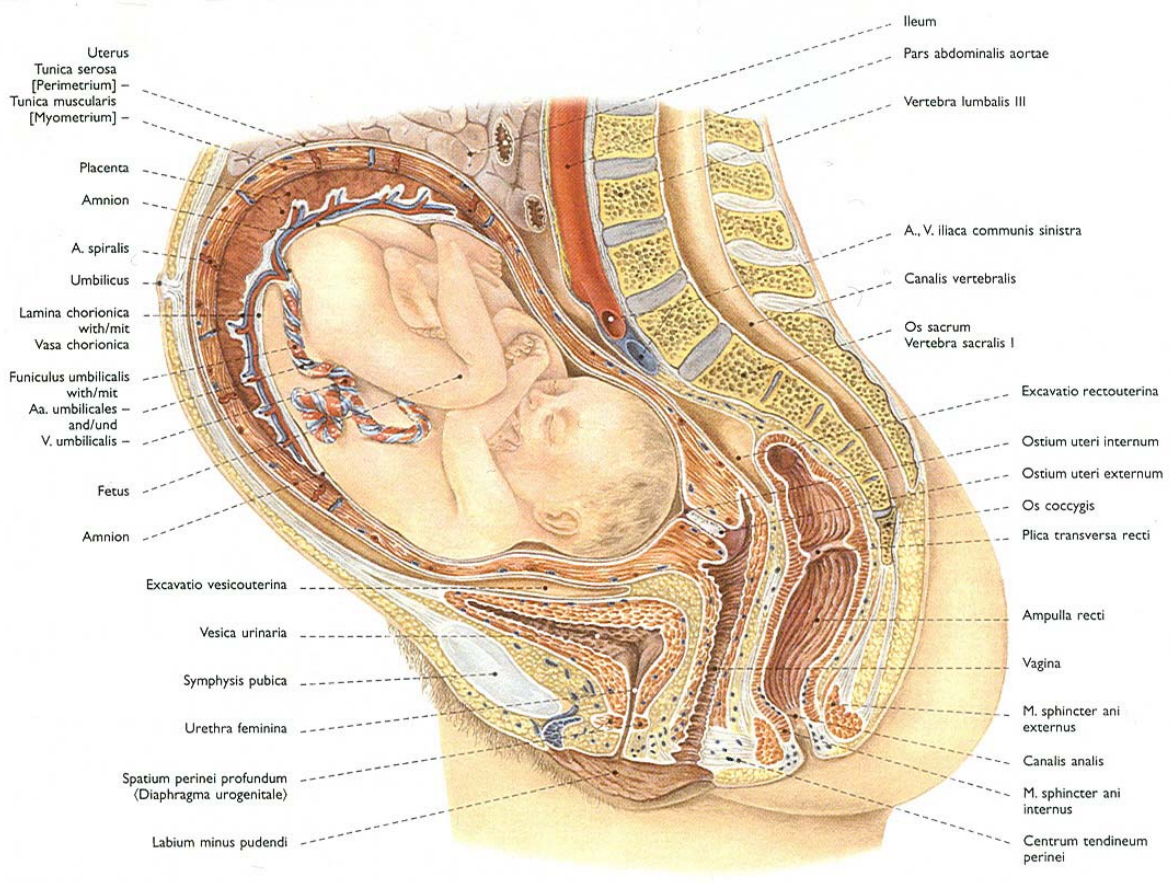
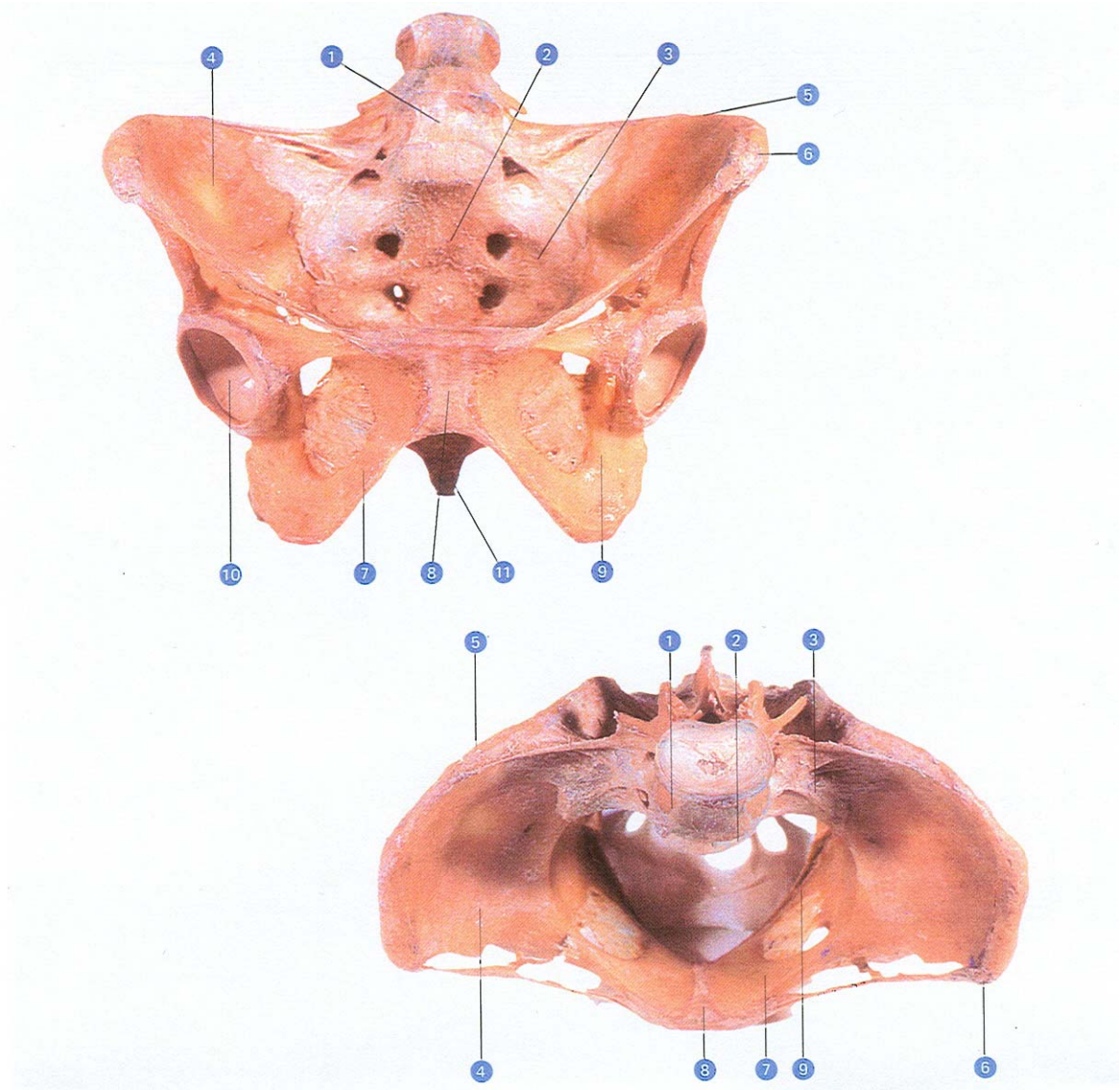


Illustration 3: Female pelvis, advanced stage of pregnancy

2.2 THE OSSEOUS PELVIS

All the constituent parts of the pelvis (cf. Ill. 4) must be mobile enough to enlarge the various pelvic diameters during the fetus' passage.



pelvic ring, bony frame of the pelvic organs; photography of a dissection from above and below

1 Vertebra lumbalis V
2 Os sacrum
3 Ligg. sacro-iliaca ventralia, Art. sacro-iliacum
4 Os ilii
5 Crista iliaca
6 Spina iliaca anterior superior
7 Os pubis
8 Symphysis pubica
9 Os ischii
10 Acetabulum
11 Os coccygis

Illustration 4: Picture of a fixated specimen of a pelvic ring

The lumbosacral, iliosacral, sacrococcygeal, intercoccygeal, coxofemoral joint connections, as well as those of the symphysis pubis carry out important tasks during gestation and parturition.

- The cotranutated (backwardly bent) os sacrum allows the opening of the pelvic inlet.
- The nutated (tilted forward) os sacrum allows the opening of the pelvic outlet.
- The sympathetic supply of the lesser pelvis largely depends on the sympathetic ganglia – the functioning of the sacrum and the lumbar spine is a good prerequisite.
- The lumbar freedom of action is absolutely necessary for a good position of the fetus during gestation: the fetus' ventral convex curvature adjusts to the mother's spinal lordosis.
- The unrestricted mobility of the sacrococcygeal joint secures an enlarging of the anterio-posterior diameter of the pelvic outlet, which is of major importance in the final expulsion phase (previous slips onto the coccyx may have negative effects).
- Hormonal changes during pregnancy enable a certain stretching of the pubic rami, which also dilute the pelvis. The os pubis assumes a key position during parturition. It has to be mobile, since the baby rotates around the os pubis on the sagittal level. Furthermore, it serves as the place of origin of the ligamentum (lig.) teres uteri.
- The hip joints are part of the pelvic girdle and thus depend on other joints, especially the iliosacral joint and the lumbosacral one (dysfunction may provoke an imbalance of the pelvic physiology)[13].
- The ligaments between the pelvic bones (pubis and sacrum) transfer any problem of these bones to the uterus and influence the uterus directly[14].

[13] Sergueef, 1995
[14] Plothe, 2003

2.3. THE OBSTETRIC CANAL

The shape of the cavity of the pelvic inlet is transverse oval. It corresponds to the anatomical separation between the lesser and greater pelvis. Dorsally, it consists of the lumbosacral joint, laterally of the linea arcuata (terminalis) and ventrally of the anterior rim of the pubic rami (cf. Ill. 5a osseous birth canal).

a osseous birth canal **b** soft parts of the birth canal

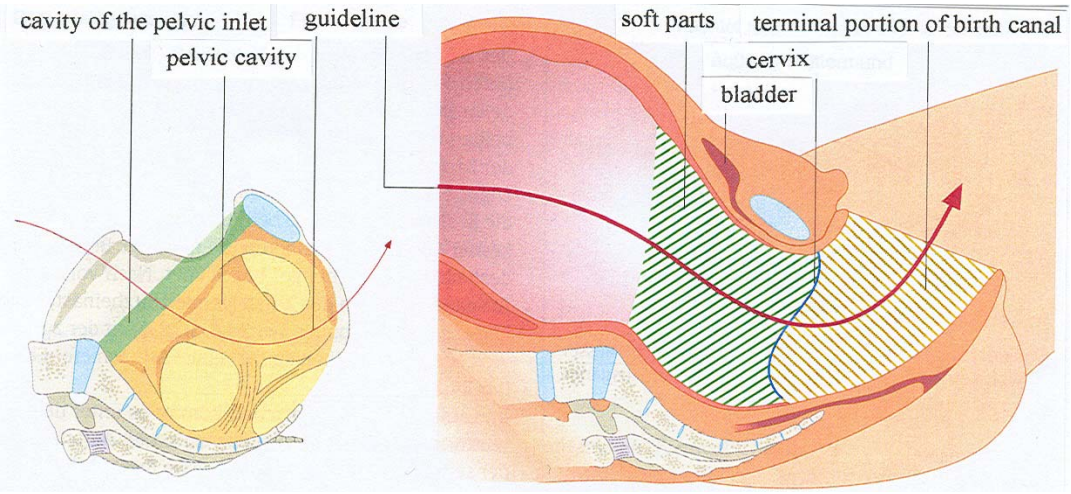


Illustration 5: Obstetric canal with terminal portion of birth canal

When entering the pelvic inlet the head passes through an asymmetrical passage, which leads to an increased one-side influence of pressure.

This asymmetry is enhanced by every disturbance in the pelvis. Thus, a dysfunction of the mother's os sacrum in torsion to the left around a left transverse axis combined with a basis of the os sacrum on the anterior right side, might produce a disturbance in the anterior left quadrant of the child's skull.

The pelvic cavity is marked off to the cavity of the pelvic outlet by a plateau at the level of the inferior rim of the symphysis and the apex of the sacrum[15].

[15] Pfleiderer, 2000

It has the shape of an irregular cylinder, following the course of the sacral concavity, which is curved around its own axis[16].

The cavity of the pelvic outlet only assumes its horizontal ovoid shape during parturition by the bend of the coccyx.
The lower uterus segment, cervix (uterine orifice), vagina and pelvic floor constitute the interior portion of the obstetric canal.
When the child's head emerges from the area of the bony pelvis during delivery, the vagina, the vulva and the pelvic floor with its muscles unfold as a pipe, bending outwardly and anteriorly. A terminal portion of the birth canal develops (cf. Ill. 5b soft parts), which anteriorly extends the obstetric canal from 3 to 5 cm and posteriorly from 4,5 to 15 cm. (Episiotomy shortens the obstetric canal)[17].

[16] Sergueef, 1995
[17] Pfleiderer, 2000

2.4 THE SOFT PARTS OF THE ABDOMINOPELVIC CAVITY

A number of muscles build a kind of 'lining' of the pelvis and thus protects the fetal head. These muscles have to be in a balanced state of tension in order to facilitate childbirth[18].

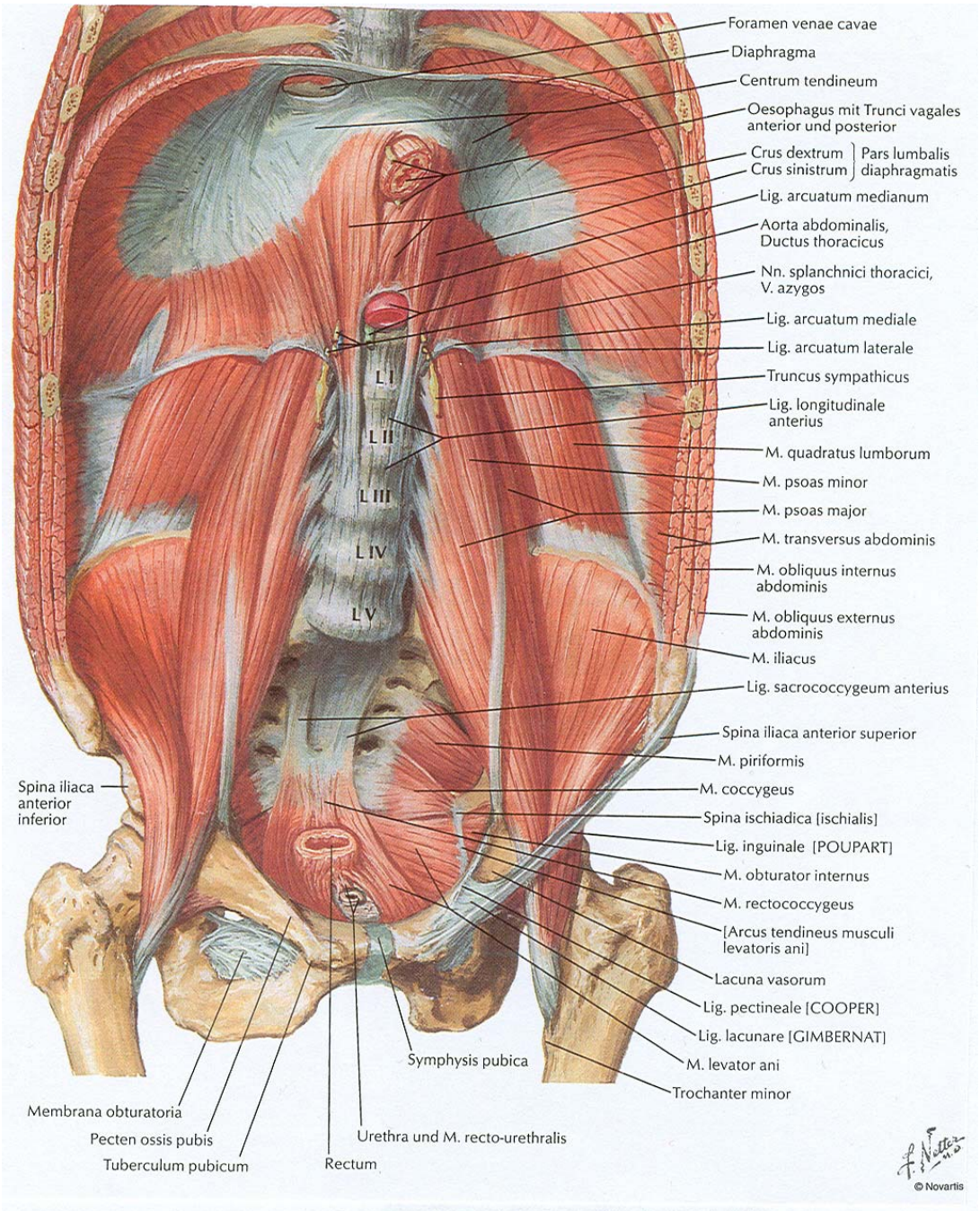


Illustration 6: Posterior abdominal wall: ventral view

[18] Sergueef, 1995

The **m. piriformis (**cf. Ill. 6) runs from the inner side of the os sacrum S2 – S4 to the tip of the greater trochanter and closes off the posterior pelvic cavity. Together with the muscle of the pelvic floor, the levator ani, it constitutes the obstetric canal. Like the m. piriformis, the lig. sacrouterina originates at the sacrum[19].

With dysfunction of the m. piriformis, a chain of lesions will extend to corpus uteri and cervix. The m. piriformis influences the sacrum in its position, the ligg. sacrouteri hold the cervix in its position. Thus the cervix is pulled downwards if there is a sacrum torsion, consequently, the contractions during labour affect the inferior uterus segment instead of the cervix. As a result the uterine orifice not diluting at all or the dilution might delay. The positional relations of the hypogastrical plexus to the uterosacral ligament might lead to a wrong information of the cervix when the ligament is in dysfunction. Apart from the position of the sacrum, previous infections, operations and scars might be a reason for a dysfunction of the lig. sacrouterina[20].

From the 12th gestational week onwards, the **m. psoas** (cf. ill. 6) serves as a guiding brace while the uterus grows out of the lesser pelvis. The result of dysfunctions might be alterations in the position and tension of uterus. Furthermore, the positional relationship between the hypertonic psoas muscle and the urether can cause discharge problems[21].

The volume of the m. psoas reduces the volume of the pelvic; it also reduces the transverse diameter of the pelvic inlet, causing the transverse diameter to become the largest one. To some extent this explains the oblique lie of the fetal head when entering into the pelvic inlet[22]. As the uterus grows, the fetus adopts a lateral position, because there is not enough space for both shoulders between the m. psoas.

[19] Heller, 1998
[20] Molinari, 2001
[21] Molinari, 2001
[22] Sergueef, 1995

The psoas brace serves as starting point for the rotation during delivery. When the head drops from the m. psoas onto the m. obturatorius internus, then onto the m. piriformis and onto the lig. sacrouterinum the fetus is provided with a pillow for its face.

The muscles react to the stretch stimulus with contractions, and push the fetus in the direction of the sacrum, where the head gets in touch with the m. levator ani. Thus, an optimal state of tension of the muscles is of great importance[23].

Dowling (2006) researches the importance of the optimal state of tension of the psoas muscle in both , the mother and the child.

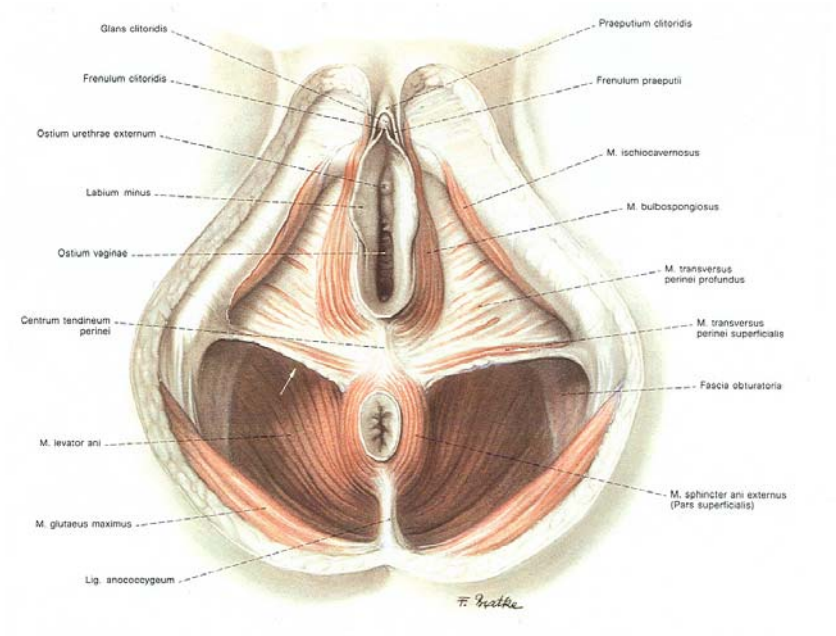
A prenatal deficiency syndrome (caused by stress or nicotine) and a prenatal syndrome of poisoning (caused by alcohol, medication, abnormal eating habits) can be shown in abnormal tension of the m. psoas. The fetus puts itself into a flexed position, which can have a negative influence of the delivery[24].

[23] Molinari, 2001
[24] Dowling, 2006

2.5 THE MUSCLES OF THE PELVIC FLOOR

The **muscles of the pelvic floor** (cf. Ill. 7) play an important role during gestation and childbirth.

The sacrotuberalia and sacrospinalia ligaments contribute to the building of the dorsal perineum.



arrow = Fossa ischiorectalis

Illustration 7: Female pelvic floor, inferior view

The pelvic outlet is closed by the striped muscles and the fasciae of the pelvic floor, which are staggered at three levels.

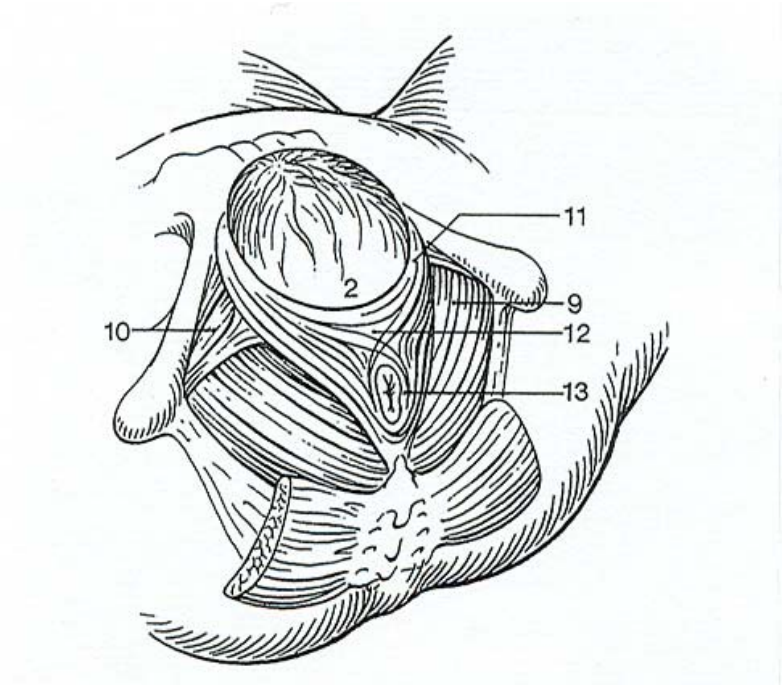
The pelvic floor consists of the pelvic diaphragm (m. levator ani, m. coccygeus), the urogenital diaphragm (m. transversus perinei profundus and superficialis) and of the sphincters of the orifices of the intestines and the urogenital tract (mm. ischiocavernosi, mm bulbospongiosi, m. sphincter ani externus).

The centrum tendineum perinei, the centrum of the perineum, which is the bridge of soft parts situated between the anus and the posterior commissure (= intersection) of the labia majora, consists of the muscular and tendious fibres of the muscles mentioned above. The destruction of the centrum tendineum (e.g. episiotomy) thus affects the function of numerous muscles[25].

The **levator ani** sets up a three-stage construction. It consists of three different types of fibres and constitutes the obstetric canal.
Due to reactive contractions the fetus is pushed in the direction of the vagina for fine tuning the head - from the first stage (m. sacrococcygeus) to the second stage (m. iliococcygeus) and further on to the third stage (m. pubococcygeus). The pelvic floor distends and the vagina takes on an almost frontal position, which leads to an enlargement of the birth canal. This, however, presupposes a large ability to stretch.
The highest pressure occurs between vagina and anus, since their distance enlarges. *The frequency of episiotomy can be seen in relation to the insufficient preparation of the m. transversus perinei profundus and the birthing position*.
It is important during the dilution that the different levels of the pelvic floor (connective tissue, muscles, glands...) stretch and can be moved against each other.
Previous events like scars, tears, emotions, stress etc. might be important in this respect.[26]

Especially for the levator muscles, the stretching is connected with a change in the course of the muscle bundles. While the levator plate normally marks off the levator hiatus on both sides by the levator crus, during childbirth the levator plate is pushed downwards and turned by 90 degrees, thus its superior surface is posed against the birth canal. In a similar manner, the transverse plate of muscles of the m. transversus perinei profundus is re-formed; the sagitally positioned mm. bulbospongiosi widen to a ring, causing a significant tension in the perineum[27] (cf. Ill. 8).

[25] Leonhardt, 1986
[26] Molinari, 2001
[27] Leonhardt, 1986



2 head
9 m. levator ani
10 m. transversus perinei profundus
11 mm. bulbospongiosi
12 centrum tendineum perinei
13 m. sphincter ani externus

Illustration 8: Muscles of the pelvic floor during parturition

2.6 THE STABILISATION AND MOBILITY OF THE UTERUS

Although the uterus is very flexible, it is physiologically marked off by the peritoneum, by ligaments, blood vessels, and by the perineum. It is so fixed and supported (cf. Ill. 9).

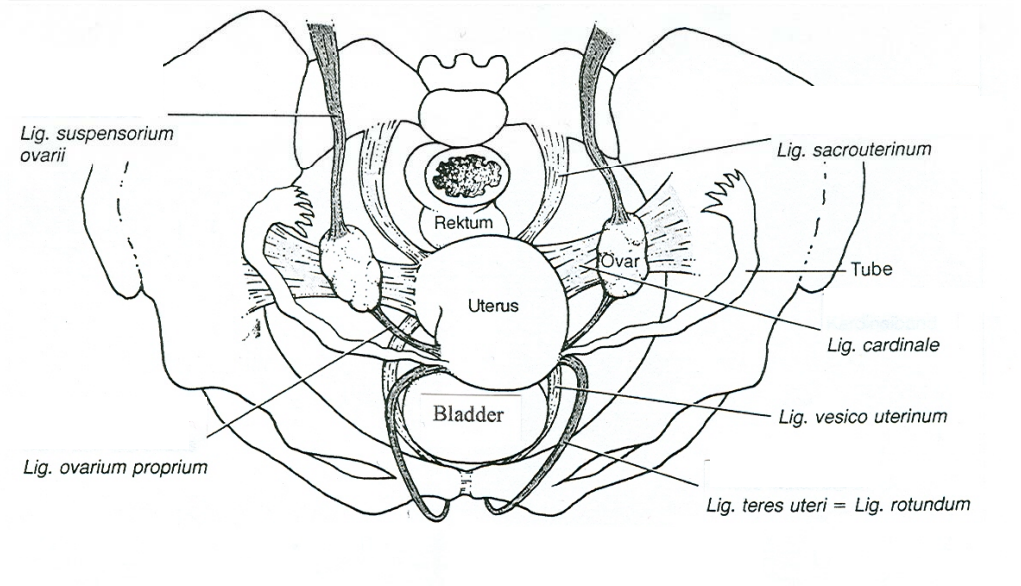


Illustration 9: Retinaculi of the internal genital organs

The **peritoneum** affixes the uterus to above at the level of the fundus; adhesions of the uterus to its neighbouring organs have an important effect with regard to certain positional deviations of the uterus.

The **ligg. lata** connect the uterus to the wall of the pelvis. They develop by two turned up folds of the peritoneum and cover up the parametrium. The latter constitutes an anchoring with the pelvic floor. The parametrium is tissue composed of lipocytes, which is crossed by elements of connective tissue and fibro-muscular elements. It contains the urethra, the uterine arteries and the lymph vessels.

The **ligg. teretia**, which can be compared to long, slim fibromuscular ropes, connect the lateral side of the fundus uteri with the labia majora. These serve for the uterus'

orientation. At the end of pregnancy, the ligaments are four times longer than in non-gestation[28].

The **laminae sacrorectogenitopubicles** distend from the sacral foramina until the os pubis and connect the intestines, the uterus, the vaginal cavity, and the basis of the urinary bladder[29].

The **ligg. sacrouterina (or ligg. uterosacralia)** form an axis for the movements of the uterus. They posses many contractile elements and contain the plexus hypogastricus[30] (cf. Ill. 10).

The total of ligaments and peritoneal duplicatures, which encircle the uterus, establish a direct communication to the pelvic bones, which thus influence the uterus directly. The uterus is sympatically supplied by the thoraco-lumbar spinal nerves and parasympathically by the sacral part of the spinal cord, which emphasises the importance of corrections in the lumbo-sacral area.(cf. Ill 10)

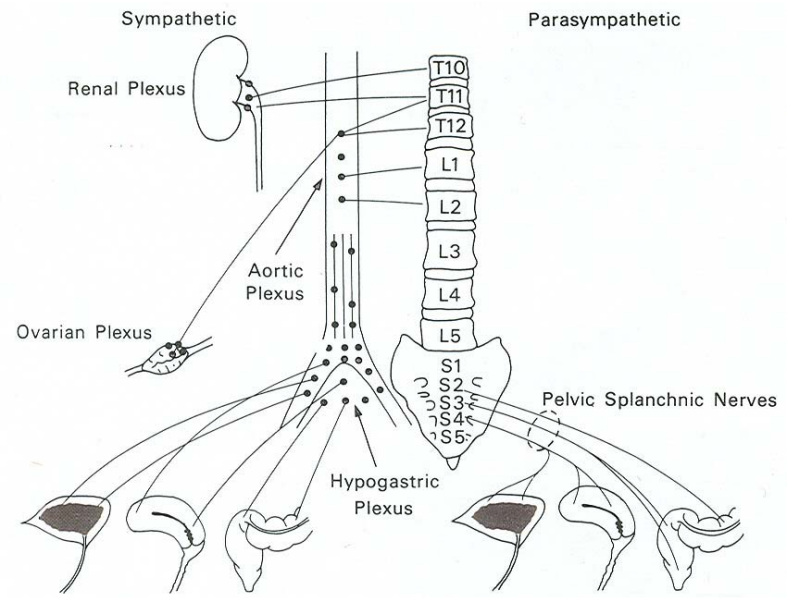


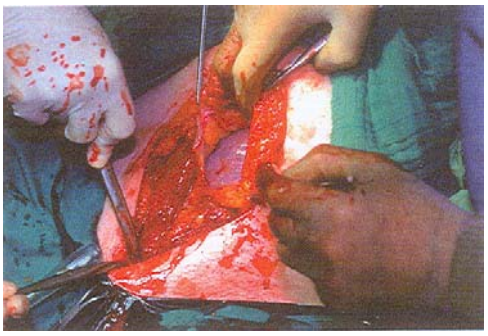
Illustration 10: Innervation of the pelvic organs

[28] Peeters, 1993
[29] Barral, 1994
[30] Peeters, 1993

2.7 OUTLINE OF THE MOST IMPORTANT OBSTETRIC OPERATIONS

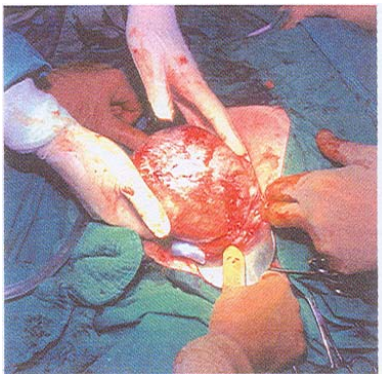
Specified fetal and maternal indications might make obstetric operations necessary.

2.7.1 CAESAREAN SECTION

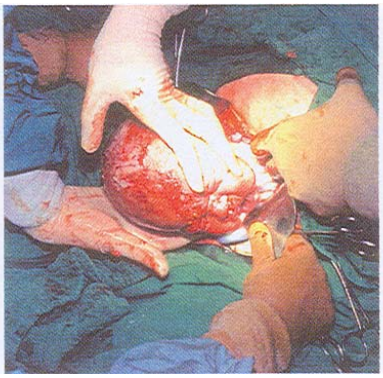


opening the different layers until the uterus appears

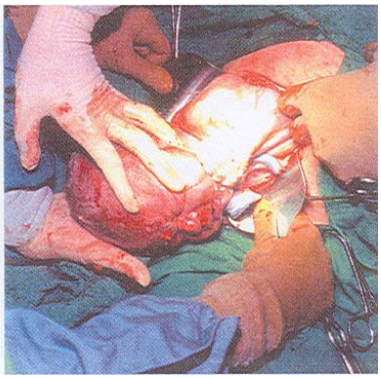
a transverse section is located above the symphysis



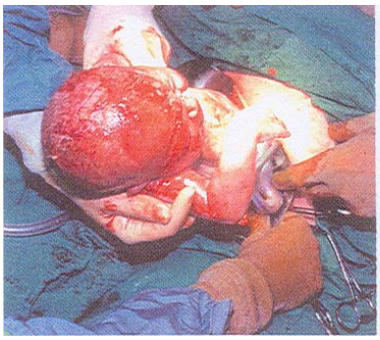
after opening the uterus the obstetrician pulls the head out of the uterus



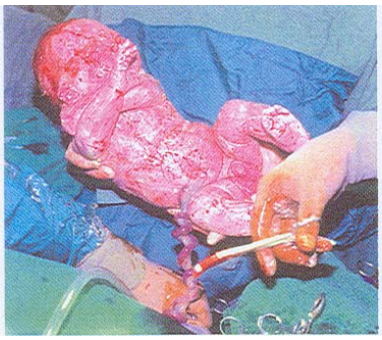
sidebending the head helps to develop the shoulder



the shoulder is born



head, arms and upper part of the body is born



umbilical cord is cut immediately

mother and baby can have the first contact, while the operation team dresses the cut.

llustration 11: Sectio caesarea

A differentiation has to be made between **primary section**, which has to take place before the onset of the delivery or labour pains, and **secondary section** carried out after the onset of parturition. (cf. Ill. 11)

The numerous indications for a section can be classified as follows[31]:

Maternal indications:

- involve those, where labour pains, especially the expulsion phase cannot be expected of pregnant women, e.g. cardiac problems, circulation troubles, respiratory problems.

Fetal indications:

- are those, where the fetus shall be saved from the arduous and strenuous way through the birth canal, e.g. premature delivery with breech presentation.

Absolute indications:

- Cephalopelvic disproportion (impossibility of delivery)
- Positional abnormalities, like transverse lie (impossibility of delivery)
- Placenta praevia (placental presentation)
- Severe EPH-gestosis
- Primary bradytocia
- Prolapsed cord
- Imminent intrauterine asphyxia (respiratory arrest)

Relative indications:

- Cephalopelvic disproportion
- Positional abnormalities (e.g. pelvic presentation)
- Bad medical history
- Danger of intrauterine infections (following premature rupture)
- Condition after previous operations of the uterus

[31] Gritsch, 1991

According to De Jong (1999) there are other reasons for a Caesarean section to become necessary during delivery[32]:

- Imminent oxygen deficiency of the child
- Insufficient progression of labour
- Prolonged first phase with increased temperature. The rise in temperature may indicate an infection.
- The fetal head still has not rotated enough.
- The child does not slide further in obstetric canal, but is still too high for a vacuum extractor or forceps
- When the uterine orifice (os uteri) does not want to dilute and the mother is already exhausted from the hours of labour.

Even though in the last years the indications for a Caesarean section were handled more generously, the morbidity and mortality risk of the mother involved, always has to be taken into consideration.

A medical study done in Hessen by Kühnert et al. (2000) reported the risk of maternal mortality at Caesarean section to be 8,9 times higher than that for a vaginal birth. Death causes after section might be thrombosis, embolism, gestosis, eclampsia, infections, sepsis and bleedings[33].

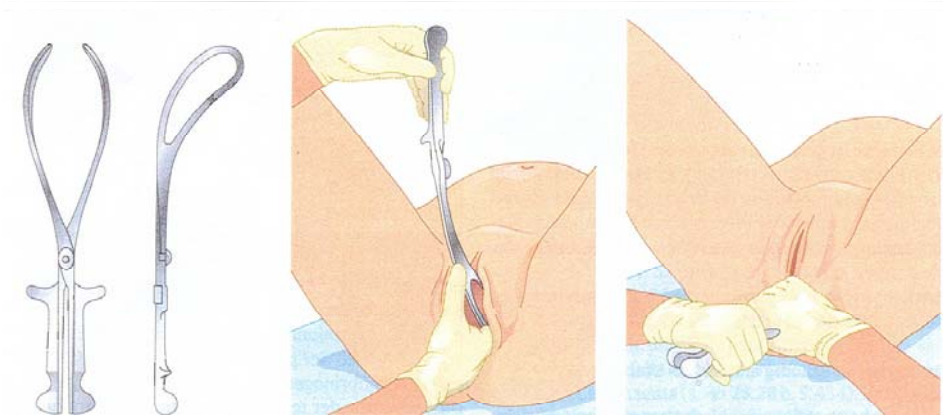
It is described in Osteopathic literature that the pressure during caesarean section is one-sided, discontinuous, intermittent and higher than the normal pressure during labour.
General compression patterns can be palpated in the cranium as well as in the whole body, the neck symmetry often is disturbed[34].

[32] De Jong, 1999
[33] Kühnert, 2000
[34] Möckel, 2006

2.7.2 FORCEPS EXTRACTION
VACUUM EXTRACTION

The oldest and at the same time most important vaginal method of delivering cephalic presentations is the forceps extraction. It dates back to the English family of doctors Chamberlen in the 17th century. Gradually, however, it is being replaced by the vacuum extraction.

forceps (model: Naegele) insert the forceps forceps extraction



vacuum insert the vacuum vacuum extraction

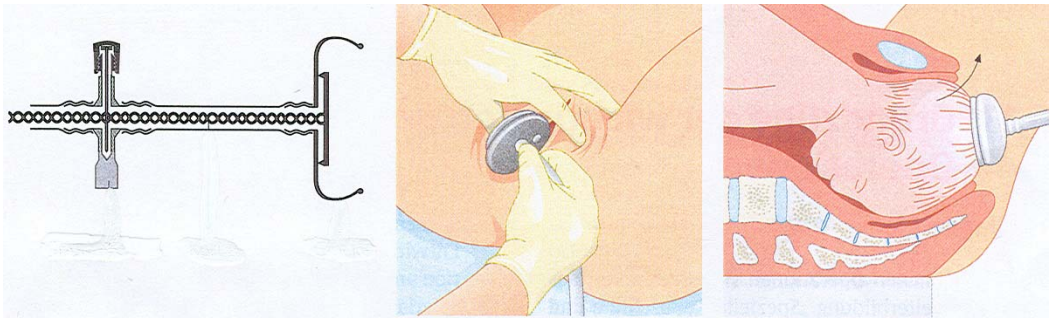


Illustration 12: Forceps extraction/vacuum extraction

Indications for a forceps or vacuum delivery[35]:

- Acute, imminent intrauterine asphyxia at birth with cephalic presentation
- Prolonged expulsion phase (exceeding 30 minutes with lack progression of labour, exceeding 2 hours with insufficient advance)
- A funis presentation when the cervix is fully diluted
- Delivery of immature children
- Uterine inertia
- Fever during delivery
- Exhaustion of the mother

Prerequisites:

- The head must have entered.
- There must not be a cephalopelvic disproportion.
- The cervix must be fully diluted.
- Amniotic membranes should be ruptured.
- The child must be alive.

Risks of forceps- and vacuum extractions[36]:

- Injuries of the soft parts of mother and child (forceps)
- Nerval lesions
- Intracranial bleeding
- Skull fracture
- Intracranial fluctuations of pressure
- Haematoma

[35] Gritsch, 1989
[36] Uhl, 1997

Effects on the child from an osteopathic point of view[37]:

The forceps applies a pressure on the cranium higher and differently placed than during labour.

Strains in the os sphenoidale and the ossa temporalia often can be palpated as a result of intervention. Sometimes, there is tension in the diaphragm or pareses of the n. facialis.

Vacuum delivery produce shiftings within the fluidfields and irregularity in the membrane system.

The extended duration of delivery is the reason for the compression along a longitudinal axis.

2.7.3 EPISIOTOMY

The episiotomy (cf. Ill. 13) is the most frequent obstetric operation.

during the labour-pains pause the obstetrician puts two fingers between the babies head and the perineum

a pair of scissors is applied for a mediolateral episiotomy, here near an old scar after a previous birth

the episiotomy gives more room for the head

Illustration 13: Episiotomy

[37] Möckel,2006

A large number of advantages are attributed to episiotomy:

- Episiotomy serves for relieving the exterior portion of the obstetric canal and should lessen the resistance of the soft parts. It should help to prevent uncontrolled injury such as vaginal-perineal tears and lesions of the sphincter[38].
- Furthermore, it should shorten the expulsion phase and reduce the pressure exerted onto the fetal head. Additionally, it should extend the space of the pelvic outlet.

Thus many indications were concluded:

- Imminent ruptures of vagina and perineum
- Prolonged expulsion phase including imminent fetal hypoxia
- Pelvic presentation
- Malpresentation
- Vaginal assisted labour (vacuum- and forceps extractions)
- Prophylactic episiotomy (routine episiotomy)

The above mentioned advantages of episiotomy cannot withstand a critical investigation by clinical studies of sufficient quality. In total, there are only a few indications of which mother and child really profit. The frequent usage of episiotomy does not go along with a reduction of higher graded ruptures of perineum and vagina.

An episiotomy does not offer protection against the risk of developing a pelvic floor trauma, which is caused by obstetrics and its consequences are urinary incontinence, anorectal inconctinence and the descensus of the genitals. Compared to a spontaneous rupture, an episiotomy does not heal better. In obstetrics, there is no room for routine episiotomy. It should make way to an individual and more restrictive indications[39].

[38] Jawny, 2000
[39] Dannecker, 2000

Different incisions are applied:

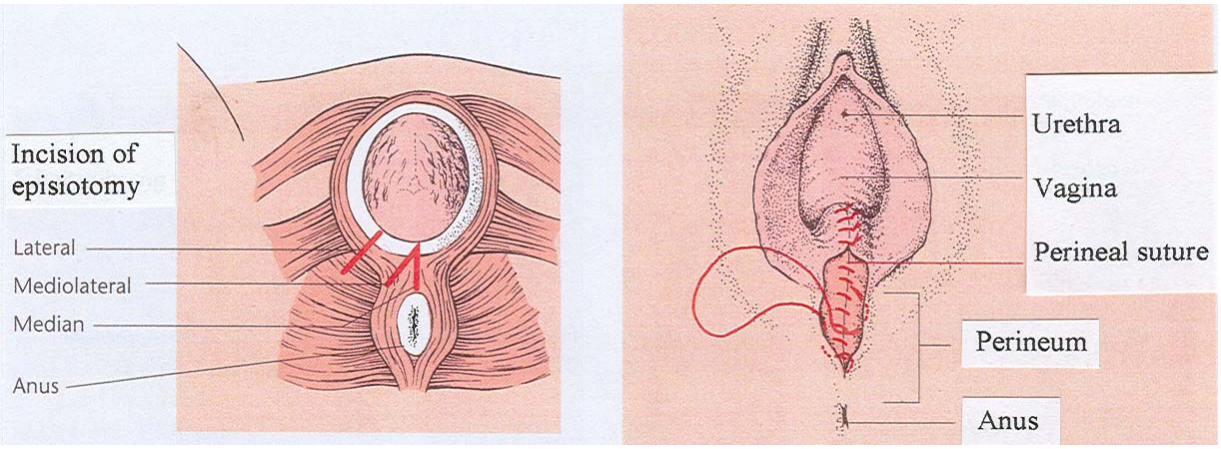


Illustration 14: Incisions of episiotomy and perineal suture.

3. LITERATURE ON MEDICAL INTERVENTION AND RESULTING HYPOTHESIS FOR AN OSTEOPATHIC TREATMENT

Numerous literature dealing with medical intervention and its consequences made me reflect about supporting the body already during gestation to the effect that in balanced condition less intervention would be necessary. Osteopathy should be the key.

Rizk and Thomas (2000) published a study dealing with the relationship between the length of the perineum and the position of the anus, as well as the vaginal delivery of primiparous. The result was a significantly higher rate of episiotomies, perineal tears or instrumentally assisted deliveries of women with a short perineum and anteriorly positioned anus. This is the first study to investigate this topic.
The majority of test persons, however, did not notice any symptoms at all[40].

This study does not consider any possibility of therapy. It would be interesting to influence by means of osteopathy the tension conditions, including the perineal relation of length and position and subsequently also the course of parturition.

Kölbl (2000) writes in an article on "Geburt und Beckenboden" (Child birth and pelvic floor) about the relation between vaginal deliveries and insufficiency of the pelvic floor and the possible defected function of urine and feces:
Vaginal operative techniques, especially those involving forceps, correlate with an increased rate of pelvic floor insufficiency[41].
Tetzschner (1997) observed a significant disturbance of the speed of conduction of the n. pudendus after vacuum delivery[42].
Deindl et al. (1998) noticed a diminuation of the pelvic floor's contraction, which indicates a dysfunction of the nervus pudendus[43].
Meyer's (1996) morphological investigations carried out by means of perineal sonography revealed that women who had had forceps delivery showed a significant

[40] Rizk, 2000
[41] Kölbl, 2000
[42] Tetzschner, 1997

caudally directed shift of the urethrovesical transition, compared to the inferior rim of the symphysis[44].

Chiarelli and his co-workers (1997) published an interesting survey concerning the examination of the pelvic floor of pregnant women. They revealed that 68% of their study group underwent a vaginal examination during pregnancy, however only 6% had the pelvic floor and its function checked during gestation.[45]

Personally, I consider this an indication that already during pregnancy the focus of attention should be directed to the pelvic floor, and preventive measures should be taken by applying osteopathy.

It is the purpose of Meyer's study (2000) published in the "British journal of Obstetrics and Gynaecology", to highlight the effect of forceps deliveries compared to spontaneous vaginal ones. It examined urinary incontinence, dysfunction of the pelvic floor, faecal incontinence and sexual functioning.

The indications for using forceps were a prolonged expulsion phase (90%) and fetal distress (10%) but surprisingly, there was not any significant difference concerning the incontinence of urine and feces to be observed. However an increased weakness of the pelvic floor and a decrease in the intra-anal pressure could clearly be detected in women who had forceps delivery[46].

Anthuber et al. (2000) describe the morphological and functional alterations of the pelvic floor after vaginal delivery [47]: A vaginal delivery strains the n. pudendus, the muscles of the pelvic floor, the anal and urethral closing devices and the connective tissue of the pelvic floor by pressure- and stretching forces.

The anatomy of the n. pudendus explains why this nerve is exposed to a special strain during delivery. The nerve originates from the sacral segments S2-S4. At the beginning its nerve trunk lies protected in the alcock-canal, a coarse canal made of fasciae. Over large distances its rami, however, run unprotectedly along the exterior surface of the muscular pelvic floor.

---

[43] Deindl, 1998
[44] Meyer, 1996
[45] Chiarelli, 1997
[46] Meyer, 2000

Episiotomy can prevent neither incontinence nor the decensus genitalis. Higher graded injury of the perineum is more frequent after episiotomy than without it. This refutes the most common indication of episiotomy: imminent uncontrollable perineal rupture. In the future, an extremely restrictive policy concerning the usage of episiotomy should be strived at.
Sultan et al. (2000) describe forceps delivery as posing the greatest danger for higher graded perineal injury and the denervation of the pelvic floor. The forceps delivery has to be regarded as the most traumatic mode of delivery for the mother. [48]

In comparison to the vacuum bell, the increased need of space of forceps leads to a greater overstretching and damaging the pelvic floor's soft parts.

MacLennan (2000) interviewed more than 3000 people (48,7% men, 51,3% women) about pelvic floor dysfunctions and their relationship to gender, age and mode of delivery. Women were affected by incontinence of urine and faeces more often than men. Also nulliparous women showed a four times higher rate of pelvic floor dysfunction than men. It was, however, impossible to pinpoint a clear reduction of pelvic floor dysfunction in women who had caesarean sections, compared to those, who had spontaneous vaginal deliveries; which, however, could well be noticed in the comparison of section and forceps delivery.
The increased attention paid to the connections between dysfunctions of the pelvic floor and giving birth and the thus occurring consideration of a planned section counters the result of this study. There is no relationship between a caesarean section and the reduced risk of pelvic floor dysfunction.
Furthermore this article refers to the position during childbirth and the preparation of the pelvic floor.[49]

Riss (2001) cites the well known gynaecologist Cardozo "Women are at risk of incontinence, and delivery is only a small factor in the article "Der Mythos vom Geburtstrauma" (The myth of the birth-trauma)."[50]

[47] Anthuber, 2000
[48] Sultan, 2000

Gupte (2000)[51] historical, intercultural survey on birth practices points out that in traditional societies, women were free to move and change their position if they wished to do so. Women avoided lying on their backs, but chose different upright positions, using furniture or hammocks for support.
They could choose between holding onto a piece of knotted fabric, kneeling- or crouching positions or using a birth chair.
Nowadays in western culture the majority of women deliver lying on their backs or in a semi lying position. These are said to allow midwifes or obstetricians to monitor the fetus more attentively and thus guarantee a safer delivery.

Upright birthing positions, however, have a lot of advantages:
- Influence of gravity
- A reduced risk of aorta-compression
- Stronger and more effective uterus contractions
- Better adjusting of the fetus for passing through the pelvis
- Radiological prove of a larger anterio-posterior and transverse pelvic diameter in crouching or kneeling positions

Furthermore, this study proved that upright positions bring about a reduction of episiotomies.

Heller (1998) lists further disadvantages of delivery in a lying position: maternal hypertension, reduced uterine blood circulation, and a deterioration of the mother's respiration, which thus cannot provide sufficient oxygen for the child[52].

Rott et al. (2000) report about the tendency in obstetrics towards "Elective Caesarean section"[53]:

[49] MacLennan, 2000
[50] Riss, 2001
[51] Gupte, 2000
[52] Heller, 1998
[53] Rott, 2000

The alleged advantages, like not having to wait for the onset of parturition and avoiding the feeling of seemingly being helpless during labour, are contrasted with the effects onto the child (increased risk of a shortness of breath syndrome or pneumothorax) and the maternal risks (nine times higher mortality risk).

Giving birth is regarded as a psychosomatic event, influencing the woman as a whole. A vaginal delivery implies actively giving birth to the child, picking it up and experiencing immediate skin contact, living through a feeling of elation for having performed the enormous labour and having managed fears.
From the psychosomatic point of view, Caesarean section poses an obstacle for undisturbed "bonding" and its effects on the relationship between mother and child, and on taking up nursing.

Emerson (1996) reports in his presentation "Life long effects of pre- and perinatal influences" held in Heidelberg that during section the fetus is extracted from its save intra-uterine environment and enters into a completely different surrounding within 37 seconds. This results in a psychological trauma, because the supporting uterine structure gets lost abruptly, caused by the sudden interference, but partly also because of the intensive manipulations during a Caesarean section. It is Emerson's assumption that there are no Caesarean sections without psychological damage.[54]

De Jong & Kemmler (1999) describe Caesarean section as a very special birth experience, elementarily different from vaginal delivery.[55] Contrary to the coming and going of the single labour cycle, Caesarean section has an "all or nothing quality", everything happens very fast, just a few minutes and the situation has changed completely. Children who were delivered by Caesarean section, who did not experience the labour contractions, have an entirely different feeling of space, because they did not get to know the boundaries of labour during their journey through the birth canal.
During a spontaneous delivery the female body produces hormones, which support the maturation process of the child's kidney and liver. The intense massage the child receives

[54] Emerson 1998
[55] De Jong 1999

in the birth canal, which is caused by the labour contractions, stimulates the whole nervous system: respiration and reflexes improve. In a completely mechanical way, the amniotic fluid is expulsed from the lunges, leaving only a small rest of mucus in the upper respiratory tract, which the child can easily sneeze out.

Sprung (1998) examined the use of medication during delivery. A common indication for medical therapy after the “induction of labour” and “bradytocia” is “rigid uterine orifice (os uteri)”. The induction of labour often causes increased labour and higher doses of analgesics, which in turn leads to a higher rate of episiotomy and an increased number of forceps deliveries and sections.[56]

In this respect, it would be interesting to apply osteopathy in order to influence the os uteri.

Anaesthesia by pudendal or perineal nerve block produces flaccid paralysis of the perineal muscles, which may be helpful for obstetric intervention, but also produces a higher incidence of malposition of the fetal head, making intervention necessary. It is commonly known that a baby´s heart rate changes with epidural anaesthesia and inhibites the sucking reflex. It is also known that epidural anaesthesia may make forceps delivery necessary. It has been found that there is a greater chance of avoiding forceps if the mother can take up the squatting position[57].

A lot of these studies made me search for a possibility to prepare the body in a way that would enable birth without medical interventions.

[56] Sprung 1998
[57] Turner, 1980

4. OSTEOPATHIC APPROACH

I would like to explain the osteopathic approach for readers who are not familiar with osteopathy by introducing the osteopathic principles.

4.1. OSTEOPATHIC PRINCIPLES

Liem (1998) and Ligner (1994) pointed out, that the knowledge of the anatomical basics and its connections, combined with the *osteopathic principles*, founded by Dr. Andrew Taylor Still, are a prerequisite for optimal results and therapy. [58, 59]

1. Life is motion

Motion is one of life's basic principles - in a mechanical sense, as well as in the senses of dynamics, alterations, action and behaviour. Motion can be seen as a means of measuring the vitality of the whole organism, as well as of its parts, down to cellular and molecular level.

2. Structure and function are in a reciprocal relationship

The mutual influence of structure and function is found on:

- The mechanical level, between joints, muscles and bones.
- The membranous level through fascial and ligament connections between organs and tissue.
- The circulatory level due to the course of blood- and lymphatic vessels and the fluctuations of the fluids of the cerebrum and the spinal cord.
- The neurological level through information transfer of the peripheral- and central nervous tract.
- The biochemical, hormonal and electro-physiological level between tissue and organs.

[58] Liem, 1998
[59] Ligner, 1994

A regular structure and a physiological tension of all of the body's tissue are necessary to assure optimal function.
The vascular systems and nerves provide an integrated and supporting framework for the whole organism.

3. The body functions as an entity
All the cells, tissue and organs of the body co-operate. Abnormal structural changes or disturbances in function of a single tissue might affect the whole organism.

4. The law of the arteries
A proper circulation of all bodily fluids (blood, lymph, liquor, and gas exchange) is a prerequisite for health. The loss of mechanical flexibility and hyper-tension inside the tissue lead to a diminuation of the dynamic behaviour of body fluids, and finally to a deterioration of the supply- and discharge condition. Problems tend to develop in less supported tissues. Apart from the defective support, the disturbed removal of toxic substances accounts for this situation.

5. Self healing mechanism
Good health is not a coincidence. It is the result of various autoregulation processes of the immune system, the endocrine system, the autonomous nervous system and other regulative systems. Through the therapeutic resolving of various pathogenic influences, the organism can gain enough compensatory possibilities and becomes able to heal itself.

Osteopathic treatment is based on understanding and knowing about the entity and the self healing powers of the body, as well as about the interaction of the different tissues in their function. By therapeutically manipulating the tissue, especially the muscular-fascial skeletal system, the life force is enabled to bring back disturbances to their normal function by relieving obstacles in the fluid movements, for instance. The integrative function of the nervous and the endocrine system on the whole organism and the supportive function of the vascular system assume a key position.

Osteopathic treatment attempts to make out relations between structures, and to normalise these, so that a ”normal” body function can be re-established. It targets to resolve or at

least reduce causal pathological factors, to re-establish free mobility of the joints and fasciae, to normalise exchange processes of the whole body fluids, to co-ordinate the bio-electric phenomena, to balance the autonomous nervous system, to bring into harmony the body statics, to resolve visceral disturbances, to support and regulate the nutrient bodily elements, to deepen the breathing, to relax and tone, to strengthen the resistance of the body and to encourage it to take over its self-regulating functions in order to heal itself.

Based on these osteopathic principles, the connections and the necessity of balanced structures were pointed out in the anatomical explanations in the chapter ”Basicals”. The treatment of the test persons was carried out under the consideration of these connections. (cf. chapter 5.2)

4. 2. OSTEOPATHIC LITERATURE

Some osteopaths commended on pregnancy, delivery and possible complications:
Their opinions, as well as the knowledge about the anatomical connections were considered in the osteopathic treatment (cf. chapter 5.2.)

Turner (1980)[60] emphasises the importance of the treatment of intracranial membranous tension during pregnancy which might influence the pituitary gland.
To gain maximum efficiency of the uterine contraction, i.e. cervical dilation pattern with minimum pain, three factors are necessary:

> *Firstly* the uterine muscle and the foetus should have adequate arterial circulation and venous drainage, both to promote their healthy function and to avoid the painful cramping effects of ischaemia.
>
> *Secondly* the adequate pressure of the infant head or amniotic membrane on the cervix is important to set up the positive feedback mechanism initiated by cervical stretching.
>
> *Thirdly* the pelvic bones and soft tissues constituting the birth canal should be balanced to fully dilute and thus minimise the resistance encountered by the gliding head of the fetus.

She emphasises the importance of the freedom of the atlantooccipital and lumbosacral areas in pregnancy, particularly for labour itself.

Upledger (1981)[61] found that intracranial membranous strains also disturb pituitary function by restricting the supply to the gland and to the portal vascular system (the neurohormonal junction between the pituitary and hypothalamus). This can affect the whole endocrine system.
He found in his work with autistic children, where the cranial rhythmic impuls is usually extremly restricted and the temporal bones were jammed medially, that there had frequently been a history of forceps or caesarian birth. He postulates that caesarian section causes as much damage to the cranium as forceps delivery, due to the slow

[60] Turner, 1980
[61] Upledger, 1981

moulding of the head in the birth canal, and the sudden elastic recoil when the pressure is released at birth. He considers this an important initiator to the cranial rhythmic impulse. He attributes the poor amplitude of the cranial flow of caesarian children to the lack of this initial powerful stimulus.

Burns (1910) demonstrated that lesions between C1 and D2 led to cellular nuclear defects and circulatory changes in the anterior pituitary, as well as oedema and haemorrhages in the posterior lobe.[62]

Clinical studies done by Whiting (1945), revealed that all patients showing both, upper cervical and upper lumbar lesions, needed exogenous stimulation of uterine contraction in labour, especially oxytocin.[63]

Still (1992) writes about lying birthing positions:[64]
„When a woman lies on her back in labour, the weight of the child, uterus, placenta and the fluids disable the uterine innervation on which they rest.“ He also recommends that the woman should take an almost vertical position „so that the uterus can prolaps slightly“.

Still (1992) believed that delay in dilation might be due to ischaemia.
As he also claims that the baby has more chance finding the easiest presentation and passage if the amniotic membranes are left intact, because it has greater freedom of movement. The uterine forces are distributed better, are less traumatic and allow better placental circulation.

Littlejohn (1975) warns that pushing before the cervix is fully dilated exhausts the mother, leading to the necessity for forceps or episiotomy later. He treats the mother soon after delivery and observed better recovery.[65]
Speiring (1979) writes that the perinatal application of cranio-sacral manipulation,

[62] Burns, 1910
[63] Whiting, 1945

[64] Still, 1992,169

combined with lumbo-sacral soft tissue stretching, decreases the need for analgesia and shorts labour.[66]

Magoun (1966) writes that in some cases, especially after a difficult labour, it is advisable to give the child a gentle cranial treatment. In some parts of Africa and India, every newborn child is given a gentle cranial massage. He also refers to the connection he found between forceps or caesarian delivery and a high incidence of cranial problems with psychomotor impairment[67].

Sergueef (1995) writes in her book about the effects of medical interventions on to the baby. Because of the pressure of the forceps the cranial bones is affected. The use of vacuum can cause membranouse irritation and intracranial dysfunctions.
Also caesarian birth is not free of risks, because the traction applied with the finger to the mouth of the baby, can lead to problems on the SSB (Synchondrosis sphenobasilaris) or in the face[68].

In osteopathy certain cases of postpartal depression to a tugging downward on the falx and tentorium resulting speedy passage of the child are known. Caudal pulling on the tentorium does not only tend to interfere with pituitary circulation, but also to hold the sphenobasilar articulations (SSB) in a relative lesion of compression.
Ligner (2006) states a relation between postpartal depression and the fixation of the os coccygis in extension or the sacrum between the ossa ilii.[69]

Korth (2001) mentioned that fascial contracture following scars from episiotomy and caesarian section, may upset the pelvic mechanics by introducing fascial stresses which exert tension onto the pelvic organs.[70]
The best position for the treatment of the uterus or for the support of the baby to find the

[65] Littlejohn, 1975
[66] Speiring, 1979
[67] Magoun, 1966

[68] Sergueef, 1995
[69] Ligner,2006
[70] Korth, 2001

right delivery position is the quadruped position[71].

The osteopathic approach on somatic dysfunctions is based on the complex interaction of structure and physiological-chemical influences of pregnancy[72].

Carreiro (2003) says[73]: “Caesarean sections subject the neonate to a different set of conditions. If surgery is performed on a mother who has been labouring, the infant is rapidly taken form the high-pressure environment of the contracting uterus to a lover pressure environment. The slow, gradual compressive and decompressive forces of the normal birthing process are replaced by a sudden change. This often creates a “rebound” effect in the tissues, similar to the way in which a tissue contracts when it is suddenly stretched. This can most often be observed in the tissues of the head, neck and thorax, which feel more taut and often demonstrate clinical signs of facilitation. The processes of labour and delivery affect systems other than the musculoskeletal system. The mechanical forces of labour impact on the fetal head, cerebral circulation, heart, umbilical cord and placenta”.

[71] Möckel, 2006
[72] Tettembel, 1995
[73] Carreiro, 2003,120

5. METHODOLOGY

This study was planned as a clinical comparative pilot study with a partly matched control group with regard to the place of delivery in 2000. The homogeneity of the study and control group was comprised by inclusion and exclusion criteria. I decided on the matched group design in order to gain a higher sample number for both groups and to be able to consider the different birth institutions and their philosophy.

5.1. SELECTION OF TEST PERSONS

Pregnant women were transferred to my office due to a co-operation with a local gynaecologist and midwives, as well as through word of mouth advertising.
The primary reasons for these women consulting me were back pains, indigestion, coccygodynae, congestion, groin aches, sciatic pain, and headaches.

A questionnaire (see appendix), handed out after delivery, was used to select the test persons from this group of patients. The participants should be primiparous women aged between 20 and 35 years, without any risk factors like diabetes, gestosis, neurological illnesses like MS or rheumatic problems. They should have had a normal course of pregnancy. The delivery should have taken place between the 37th and the 42nd week of pregnancy with the baby presenting by the head. The deliveries took place in the period from September 2000 - to April 2001 and January 2005 - November 2005.

It is the purpose of my study to find out to which extent osteopathic treatments during pregnancy, aside from treating the actual problem, influence the course of labour, with regard to the necessity of medical interventions (Caesarean section, vacuum- and forceps, delivery, episiotomy...)

Following these criteria, the test group consisted of 36 primiparous women.
As the test persons had delivered in different institutions, the following criteria served for selecting the test persons:

Different institutions, which offer birth care, have different philosophies, thus different methods and stages of support are offered, and consequently the results achieved are different. To minimise the influence of the delivery place, a difference was made between “special delivery institutes (maternal clinics)” and ”hospital wards”.
Depending on the number of osteopathically treated subjects, who delivered in special delivery institutes or in hospital wards, the same number of not treated women were selected in this concern for the control group from randomly chosen women (street questioning of mothers with children by means of the same questionnaire) in their succession. The same criteria, which were applied for selecting the test persons, were used for the control group.

5.2 OSTEOPATHIC TREATMENT

The study group contained 36 pregnant women, selected by the criteria mentioned in Section 5.1. They were treated osteopathically for different problems, like back pain, sciatic pain, groin aches, headache, urinary trouble.
Needless to say that also the routine checks of prenatal care were done. The expectant mothers additionally made use of different preparatory measures, like antenatal exercises, shiatsu, acupuncture, yoga, belly dance, teas and homeopathy.

The pregnant test persons were treated at different stages of pregnancy according to the occurrence of their problems, and received a different number of treatments. Some of them had already become acquainted with osteopathy before their pregnancy, while others did not know it at all.

5.2.1. ANAMNESIS

During the introductory conversation the women of the test group were questioned using the anamnesis sheet (cf. annex), checked up, and treated osteopathically based on the principles, explained in chapter 4.1. After delivery the treatment success was verified by a questionnaire (see appendix).

5.2.2. CHECK UP

During the check up and the treatment only external techniques were used; neither vaginal nor rectal methods of treatment were applied.
During gestation the posture undergoes permanent changes. Thus, a special focus was led on the spinal cord, and on the **osseous pelvis**, the nutation- and contranutation ability of the os sacrum, and on the mobility of the os pubis and the os coccygis.
From the muscular point of view, the psoas muscles, the m. piriformis, and the pelvic muscular system were of major importance.

<u>The following considerations served as the basis for my study:</u>

Special attention was paid to the **psoas muscle**'s ability to expand and to the quality of its tissue, because it is an important guiding brace for the expanding of the uterus and lateron for the gliding of the child's head. The quality of the tissue gives an insight into past events and into the present condition.

The **piriformis muscles** form the birth canal together with the pelvic floor muscle, levator ani. A dysfunction of the m. piriformis initiates a chain of lesions in the corpus uteri and the cervix. The m. piriformis leads the sacrum into position and the sacrouterine ligaments hold the cervix in its position.
With sacrum torsion the cervix is pulled backwards, thus the contractions of labour affect the lower uterus segment, instead of the uterine orifice. This might result in a delay of the first phase, or even totally prevent the diluting of the uterine orifice.
The positional relations of the plexus hypogastricus and the lig. uterosacrale could lead to misinforming the cervix in the case of ligament dysfunctions.
Apart from the position of the sacrum, reasons for this dysfunction of the sacrouterine ligament may be due to previous infections, surgery and scars.

The **pelvic muscle system**, as well as the ligg. sacrotuberalia and sacrospinalia, which assist in constituting the dorsal perineum, were scrutinised, because of their importance in pregnancy and childbirth.
The highest pressure during delivery can be found between the vagina and the anus, because their distance increases. Therefore, it is crucial to prepare the m. transversus perinei profundus for his task.
It is also important that all the levels of the pelvic floor (connective tissue, muscular system, and glands…) can expand and be shifted against each other during dilution.
Previous events like scars, tears, emotion, stress…might be significant in this respect.
The mobility condition has to be seen in connection to the neighbouring structures mentioned previously.

The **spinal cord** was tested assuming that the spinal areas are reflexively associated with the endocrine glands and reproductive organs. The pituitary gland is associated with the

first cervical up to the second thoracic segment. The cervico-dorsal area is connected with thyroid function; the lower thoracic and lumbar region influence uterine, ovarian and tubal activity, the sacral and sacro-iliac regions are also associated with the reproductive organs. It has been proved that a vertebral restriction at D4 can imbalance the pelvis via the spinal mechanics[74].

The craniosacral system was examined, because any influence, like for example slipping, might cause a dysfunction of membranes and of the fluctuation of the liquor cerebrospinalis through the dural connections. The result of build-ups might possibly be dysfunction of the hypophysis affecting the whole organism. [75]
In pregnacy the pituitary gland needs to enlarge by 50% due to the increased production of corticotrophin, thyrotrophin and growth hormone. It is especially important to eliminate intracranial dural pressure as membranous torsion can restrict the pituitary infundibulum and so distress the gland. For example, if the sphenobasilar symphysis is fixed in flexion this may apply traction to the tentorium cerebelli through on to the diaphragma sellae and cause pituitary circulatory changes. A lumbosacral torsion similarly affects the intracranial membranes by downwards traction to the tentorium and falx via the spinal dura[76].

During the examination a special focus was put on the ”breath of life” in a biodynamical point of view, the force which exists in the fluids and supports the body in its ”healing” process.
The “breath of life” comes along the midline and supports the changes in the body. For Jealous (2000) the midline is a bioelectric force, which is responsible for the orientation of structure and function. The bioelectric potential in the central nervous system is maintained by the midline. The midline is a spatial fulcrum (= still point or center of movement) for the bony movements, cerebrospinal fluctuation and the movement of reciprocal tension membranes. The navel is closely connected to the midline.
A special focus was also put on the midline of the uterus in connection to the midline of the mothers body.

[74] Turner,1980
[75] Liem, 1998
[76] Turner, 1980

Jealous (2000) considers good health as the result of the originality, which expresses the balance between structure and function, as intended when mankind was created.[77]

5.2.3. INDIVIDUAL TREATMENT

Osteopathic treatment was individually adjusted to patients, according to their different dysfunctions.
In this context, I would like to refer to Dr. Anne Wales, when she speaks of the value of seeing what we can do for rather than to a patient, and working with than on that person[78].
It was my first priority to offer the expectant mothers the osteopathic support needed to cope with the changes.
Aside from correcting structural imbalances of the pelvic and the spinal cord, it was very important to bring into balance the pelvic floors of all patients. Traumata, scars, stress, emotions or earlier infections were often known from the medical history and could be detected in the tissue, and thus be influenced.
The ligament suspension of the uterus (lig. uterosacrale, lig. teres uteri) in connection to the osseous connective points, was frequently found in dysfunction. The os coccygis and all its related ligaments were very often imbalanced, in most cases caused by earlier slipping. Another goal in treating some of the pregnant women was to increase the space available for the baby by influencing the diaphragm, the ligg. arcuata, the 12th rib and the psoas muscle.
Tensions were often encountered in the emotional zones of the thorax, especially in the area of the sternum, mediastinum and the heart.
Imbalances of the cranial system were treated on various levels (structure, membrane, fluid). It was equally important to draw up a good midline because otherwise the individual changes would not be maintained.[79]

5.3. STATISTICAL EVALUATION OF THE DATA

[77] Jealous, 2000
[78] Turner, 1980
[79] Colangelo, 2000

The data gathered from the study- and the control group about the course of pregnancy and delivery (cf. appendix) were compared in percent and evaluated statistically by using a computer programme (WinStat 3.1). The differences were evaluated by χ^2 tests for the different forms of medical interventions (dependent variables) and the groups (independent variables) on a level of significance of α=0,05.

5.3.1 CRITICAL PRELIMINARY REMARKS

It has to be mentioned beforehand that the validity of statistical methods increases with the number of subjects. Moreover it is necessary to have a large number of test person to make accurate statements on the effect of a parameter (i.e. the osteopathic treatment), especially in the case of various possible influences, (like for instance in the cases of preparatory measures, the birthing position chosen, the philosophy of the maternity clinic) on the result (a delivery without intervention).
Scrutinising the feedback, it turned out that none of the test persons had only tried a single preparatory measure. The number of non-osteopathic preparatory measures in both groups is almost the same (168 in the test group and 170 in the control group).
Therefore, cross influences from other preparatory measures (cf. attached questionnaire) cannot be assumed; a larger number of subjects, however, would be necessary to further validate the result.
Rare medical interventions with a probability of less than 10%, have a limiting effect. To confirm the hypothesis that osteopathy reduces these operations, an at least ten times higher sample of test persons would be needed.
A method different from the one chosen is not feasible, because osteopathy is neither known to a broad public nor fully accepted by traditional medicine. This means that a comparative study with an osteopathic group and a control group who had an identical preparation without any osteopathic treatment, delivering in the same institution, goes beyond the scope of this paper.

Therefore some of the following statistical results can only be regarded as trends.

5.3.2 PLAUSIBILITY EXAMINATION OF THE CONTROL GROUP

Before the statistical calculations were done, a general statistical parameter for Austria (Statistisches Zentralamt, 2001, Data of 1998), as well as for the institutions chosen by the test persons for their delivery, were examined. Basing on these data, expected frequencies of the medical interventions for each group (n= 36) were calculated and compared with the actual frequencies in the control group.

Gesundheitsstatistisches Jahrbuch (Health statistics annual yearbook) 1998 (Episitomy not evaluated):

	Austria	Vienna	Expected frequency of intervention in control group (Austria)	(Vienna)
Vacuum bell	4,1%	3,5 %	1 - 2	1 - 2
Forceps	1,0%	1,4%	0 - 1	0 - 1
Caesarean Section	14,6%	15,7%	5 - 6	5 - 6

The following figures for Nußdorf (acc. to their information folder) can be supposed as typical for special delivery institutes (maternal clinics). The Semmelweisklinik is rather to classify as hospital ward, in spite of its name. However, the figures for the Semmelweisklinik (acc. to Prof. Wagenpichler) are not that bad compared to the data of Austria and Vienna, given above.

	Nußdorf	Semmelweisklinik	Expected frequency of intervention in control group (Nußdorf)	(Semmelweisklinik)
Vacuum/forceps	1,31%	4%	0 - 1	1 – 2
Caesarean Section	4,36%	11%	1 – 2	4
Episiotomy	12,36%	25%	4 –5	9
Sutured perineal tears	45%	25%	16 – 17	9
Pain killers	18,78%		6 - 7	
Epidural anaesthesia		30%		11
Induction of labour	7,19%	10%	2 - 3	3 - 4

The studies mentioned in the introduction (Tamussino, 1998 and Ludnquist et al, 2000) reveal the following results:

		Expected frequency of intervention in control group
Episiotomy:	35-65%	12 - 24
Perineal tear:	14-80%	5 - 29
Rate of vaginal operative deliveries:	27%	9 - 10
Total rate of vaginal injury	75%	27

The control group, which consists of randomly questioned, unknown mothers, was investigated for its representativity compared to the above mentioned frequency. Additionally, the sum of the frequencies of both groups is investigated:

	Observed frequency in the control group (n / %)		Observed frequency in both groups (n / %)	
Vacuum bell/forceps	3	8,3%	4	5,6%
Caesarean section	5	13,9%	6	8,3%
Episiotomy	9	25,0%	14	19,4%
Perineal tear	9	25,0%	18	25,0%

From these percentages it can be deducted that the control group represents an average of the course of labour with respect to the frequency of perineal injury, Caesarean section and vacuum bell. Forceps and vacuum deliveries, however, are over represented (even in relation to the number of subjects in both groups), which might be due to the limited number of subjects and the thus accompanying statistical uncertainty.

5.3.3 DATA BASIS AND BRIEF DESCRIPTION OF THE STATISTICAL CALCULATION

The following data samples (n), taken from both groups, served as a basis for the statistical calculation:

Medical intervention	Group	Number
Caesarean Section	Osteopathic group	n=36
	Control group	n=36
Vacuum- and forceps extraction (only relevant to vaginal deliveries)		$n\text{-}n_{Sectio}$
	Osteopathic group	n=35
	Control group	n=31
Perineal tear and episiotomy: (only relevant to vaginal deliveries without compelling indications, like vacuum bell or forceps)		$n\text{-}n_{Sectio}\text{-}n_{vacuum/forceps}$
	Osteopathic group	n=34
	Control group	n=28

A 5% level of significance was assumed for the differences between the control group and the osteopathically treated group in the statistical calculation. Broadly this means that a 5% rate of mistakes was accepted for the hypothesis that osteopathic treatment has an impact onto the frequency of medical interventions; if the percentage exceeds 5, the result is statistically not significant.

Since the results of the inquiry can only be described in discrete values (yes/no), the **Chi-square test** is suitable for distinguishing between the test- and control group.

This test is applied to investigate eventual dependencies of variables between the two groups.

The **frequency matrix** looks as follows:

		dependent variable		
		medical intervention	no medical intervention	row sum
independent variable	treated group	a	$b= n_t-a$	n_t
	control group	c	$d= n_c-c$	n_c
column sum		a+c	b+d	$n=n_t+n_c$

Assuming that both groups are independent, the frequencies within both groups singularly act like their total sum.
Presuming this independence, the expected frequency for this test will be calculated as follows and will additionally be compared to the real frequency (the deviations are given as χ^2):

Expected frequency (EF) = row sum/total × column sum

As an example, the frequency matrix of Caesarean sections in the osteopathically treated group and in the control group is given. The frequencies in the first row are the real (OF), frequencies in the second row calculated ones (EF).

		C-Section	**without C-Section**	Row sums:
Osteopathy	(OF)	1	35	36
	(EF)	3	33	
Control group	(OF)	5	31	36
	(EF)	3	33	
Column sums:		6	66	72

The probability P, which is calculated for the χ^2 with regard of the so-called degree of freedom (DF), shows the level of probability for the observed random χ^2 value, provided that the variables are independent. This means, the lesser the probability P, the more possible is a significant difference between the two groups.
Or the other way around: The higher the divergence χ^2, the less likely it is that the results of both groups are based on coincidence.

The usage of the χ^2-tests is limited by the calculated frequencies, which should not be less than 5 for all classes of all groups (at least 80% of the calculated a-d) and not below 1. In the present, frequencies of ≥ 5 should be expected for all classes.

The result of the Fisher's exact-test, described further on, also shows how probable variations of the expected frequency are (more suitable for smaller samples). If the probability of exceeding the frequency is less than the assumed probability of error (5% in this study), the hypothesis of independence of the measurement-results must be overruled, thus a significant difference exists.

Roughly speaking, the smaller the values P, the higher the significance of (positive or negative) impacts of osteopathic treatment. The result is statistically significant if P<5%.

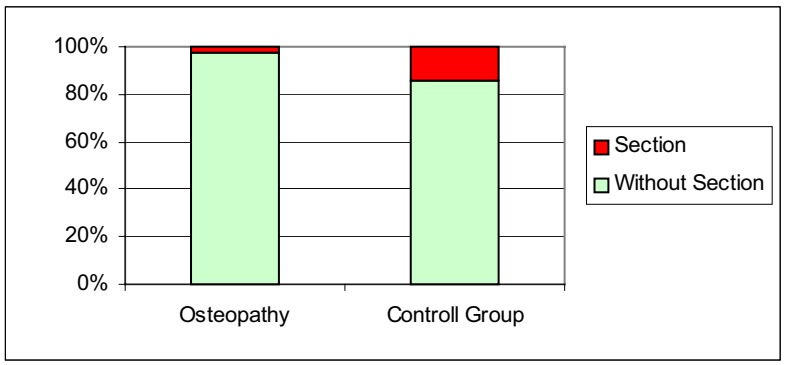
In the following chapter the results will be summed up in a short interpretation (further statistical results cf. annex). Additionally, the 95% confidence intervals (95% CI) of the probabilities of medical interventions are listed, which are wide spread due to the limited number of test persons. These intervals are a statistic assessing of range of the probability for medical interventions with a certainty of 95%.
The comparative effectiveness of the osteopathic treatment will be expressed as "relative risk", which is calculated by division of the probability for an intervention in the test group by the probability for this intervention in the control group.
The relative risk will be lower than 1, if the percentage of medical interventions in the test group is lower than in the control group, be equal 1 if there is no difference between test and control group and exceed 1, if the probability of medical interventions in the test group is higher than in the control group. These relative probability factors are only valid for the actual data, since no significant deviation between the two groups could be proved.

6. RESULTS

6.1. CAESAREAN SECTION-χ^2-TEST

	Section	Without Section	Sum	$P_{Section}$
Osteopathy	1 3,0	35 33,0	36	2,8% 95%CI: 0,5 - 14,2%
Controll Group	5 3,0	31 33,0	36	13,9% 95%CI: 6,1 - 28,6%
Sum	6	66	72	

Chi-Square	**DF**	**P**	**Cells with EF< 5**	**Fisher's exakt P**
2,909	1	0,088	50%	0,099



Probability of Caesarean sections in the osteopathically treated group (P=0,5-14,2%) and in the control group (P=6,1-28,6%), relative risk = 0,20.

Interpretation:

35 of the 36 women treated osteopathically were able to deliver vaginally, while 5 women of the control group needed to have a Caesarean section. The number of test persons, in the present case, is too small, thus the χ^2-test does not allow a definite statement. Nevertheless the similar probabilities of the χ^2-test, as well as Fisher's exact P indicate a difference (significance of 90%) between test- and control group concerning the frequency of Caesarean section; and consequently a decrease of the probability brought about by the osteopathic treatment during gestation. The relative risk in this actual case is 0,2.

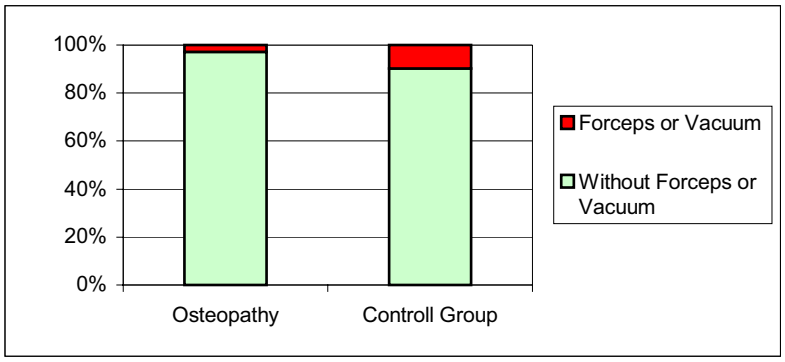
Compared to the other preparatory measures (cf. Annex) osteopathy shows the least probability for caesarian sections and the χ^2-test indicates the highest difference between test and control group.

6.2. VACUUM DELIVER χ^2-TEST/ FORCEPS DELIVER χ^2-TEST

Since it is depending on the gynaecologist's preferences whether forceps or vacuum bell is used, these dependent variables were pooled.

	Forceps or Vacuum	Without Forceps or Vacuum	Sums	$P_{Forceps/Vac}$
Osteopathy	1	34	35	2,9%
	2,1	32,9		95%CI: 0,50 - 14,5%
Controll Group	3	28	31	9,7%
	1,9	29,1		95%CI: 3,34 - 24,9%
Sum	62	4	66	

Chi-Square	DF	P	Cells with EF < 5	Fisher's exakt P
1,343	1	0,246	50%	0,262



Probability of vacuum- or forceps delivery in the osteopathically treated group (P=0,5-14,5)and in the control group (P=3,3-24,9%), relative risk = 0,30.

Interpretation:

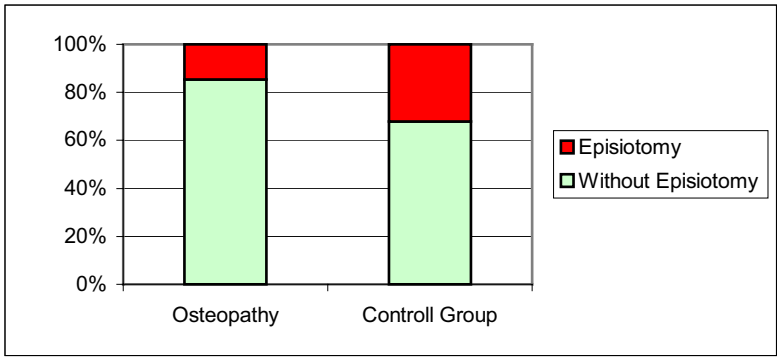
The number of vaginal deliveries (n= 35 resp. 31) served as a basis for calculating the frequency of vacuum- or forceps delivery. One vacuum and no forceps deliveries had to be carried out in the test group; in the control group both, two vacuum- and a forceps deliveries had to be done. In the actual case the relative risk for these medical interventions is 0,30.

For a statistical evaluation, the number of test persons in the present case is too small. The sample ought to be multiplied at least by the factor 10. It is however, impossible to make a statement on the impact of osteopathic treatment during gestation in view of the low frequency of medical interventions in the given sample of the test persons. Also the χ^2-tests with the other preparatory measures (cf Annex) result in no precise outcome.

6.3. EPISIOTOMY χ^2-TEST

	Episiotomy	Without Episiotomy	Sums	$P_{Episiotomy}$
Osteopathy	5	29	34	14,7%
	7,7	26,3		95%CI: 6,44 - 30,1%
Controll Group	9	19	28	32,1%
	6,3	21,7		95%CI: 17,9 - 50,6%
Sum	14	48	62	

Chi-Square	DF	P	Cells with EF < 5	Fisher's exakt P
2,671	1	0,102	0%	0,092



Probability of episiotomy in the osteopathically treated group (P=6,4-30,1%) and in the control group (P=17,9-50,6%), relative risk = 0,46.

Interpretation:

The number of non-operative vaginal deliveries was quoted for calculating the frequency of episiotomy (n=34 resp. 28). In the test group 5 episiotomies were carried out; in the control group 9 deliveries with episiotomies were registered, due to the higher sample number in the test group there were approximately 100 percent more episiotomies in the control group, resulting in a relative risk of 0,46.

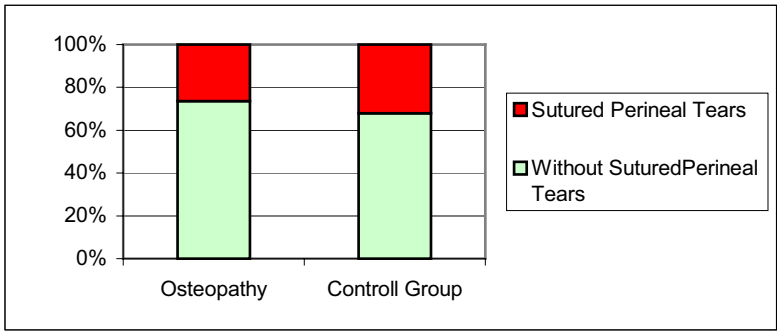
The probabilities from the χ^2 test and the Fisher's exact P point towards a difference between test- and control group concerning the frequency of episiotomies at slightly lower than accepted significance, but it has also to be considered that there are different opinions of women concerning the conscious acceptance of perineal tears, which might be higher in women using holistic methods like osteopathy. Additionally, a similar result is achieved in the χ^2-test between episiotomy and perineal massage. Therefore the reduction might be caused by the osteopathic treatment during pregnancy only to a smaller amount.

Although the number of test persons, in the cases named below, is too small for χ^2-tests the data support the statements, that less episiotomies are performed in specific deliveryhouses than in hospital wards and that dorsal position during delivery is related to episiotomies. Further on, the crouching position seems to be best for the prevention of episiotomies. The relation between the dorsal birth position with episiotomy can either be explained by a preference of this position for applying the episiotomy by midwives or obstetricians, or, the other way round, the position brings about the requirement for episiotomies.

6.4. SUTURED PERINEAL TEARS-χ^2-TEST

	Sutured Perineal Tears	Without Sutured Perineal Tears	Sums	$P_{Per.\ Tear}$
Osteopathy	9	25	34	26,5%
	9,9	24,1		95%CI: 14,6 - 43,1%
Controll Group	9	19	28	32,1%
	8,1	19,9		95%CI: 17,9 - 50,6%
Sum	18	44	62	

Chi-Square	DF	P	Cells with EF < 5	Fisher's exakt P
0,240	1	0,624	0%	0,416



Probability of sutured perineal tears in the osteopathically treated group (P=14,6-43,1%) and in the control group (P=17,9-50,6%), relative risk = 0,82.

Interpretation:

The number of non-operative vaginal deliveries was taken as the basis for calculating the frequency of perineal tears (n=34 resp. 28). Nine deliveries with sutured perineal tears occurred in both groups. There is no statistical significant difference between the two groups. The actual relative risk is 0,82.

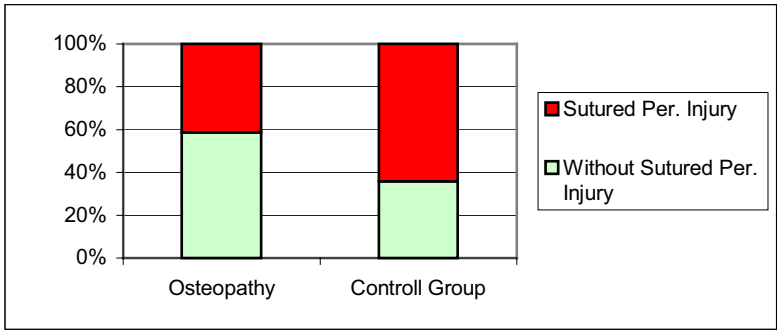
Perineal massage, which has proven a similar result in the χ^2-test for episiotomies as osteopathy, also has no significant influence on the number of sutured perineal tears. In contrary to the number of episiotomies dorsal position during delivery gives better results than the crouching position. Also the influence of the place is reverse but not significant, i.e. that more perineal tears occur in specific deliveryhouses than in hospital wards.

6.5. SUTURED PERINEAL INJURIES- χ^2-test

As explained above, there are different opinions concerning the indication for episiotomies or the conscious acceptance of perineal tears, the frequencies differ according to the delivery institution. Thus episiotomies and tears are summed up as ”sutured perineal injuries”, and both groups are compared.

	Sutured Per. Injury	Without Sutured Per. Injury	Sums	$P_{Per.\ Injury}$
Osteopathy	14	20	34	41,2%
	17,5	16,5		95%CI: 26,3 - 57,7%
Controll Group	18	10	28	64,3%
	14,5	13,5		95%CI: 45,8 - 79,2%
Sum	32	30	62	

Chi-Square	DF	P	Cells with EF < 5	Fisher's exakt P
3,283	1	0,070	0%	0,059



Probability of sutured perineal injury in the osteopathically treated group (P=26,3-57,7%) and in the control group (P=45,8-79,2%), relative risk = 0,64.

Interpretation:

The total number non-operative vaginal deliveries (n= 34 resp. 28) was taken as a basis for the calculation of the frequency of perineal injuries. In the test group 14 perineal injuries occurred, whereas in the control group 18 cases appeared. In the actual case the relative risk is 0,64.

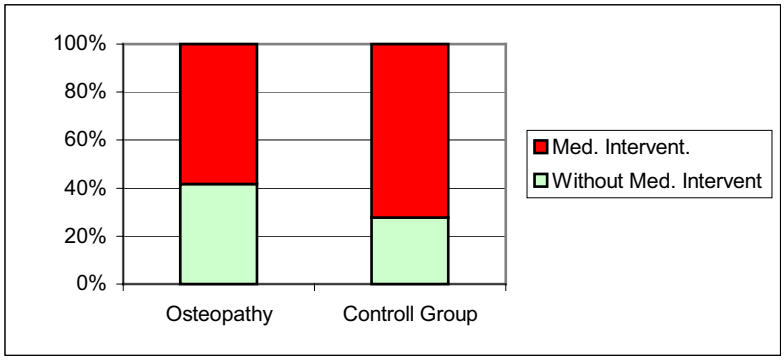
The χ^2–test shows no significant difference between the data of the present two groups on the 5% level of significance, but we can assume a reduced frequency of perineal injuries that have to be sutured, due to osteopathic treatment. The probability ratio of perineal injuries after osteopathic treatment compared to the control group (relative risk factor) is 0,64 and the probability of falsely rejecting the null hypothesis is low.

6.6 TOTAL NUMBER OF MEDICAL INTERVENTIONS - χ^2-TEST

Since we encounter the problem of a limited amount of data with every single medical intervention (Caesarean section, sutures of perineal injury, usage of vacuum bell and forceps), the total number of medical interventions of the osteopathically treated group were compared to those of the control group.

	Med. Intervent.	**Without Med. Intervent**	**Sums**	**$P_{Med. Interv.}$**
Osteopathy	21 23,5	15 12,5	36	58,3% 95%CI: 42,1 - 72,8%
Controll Group	26 23,5	10 12,5	36	72,2% 95%CI: 56,0 - 84,1%
Sum	47	25	72	

Chi-Square	**DF**	**P**	**Cells with EF < 5**	**Fisher's exakt P**
1,532	1	0,216	0%	0,161



Probability of medical intervention in the osteopathically treated group (P=42,1-72,8%) and in the control group (P=56,0-84,1%), relative risk = 0,67.

Interpretation:

21 women of the test group had to undergo medical interventions, compared to 26 cases in the control group. The χ^2–test results in no significant difference in the number of medical interventions between the two groups. The relative risk factor (osteopathy: control group) describing the reduced risk of medical interventions due to osteopathic treatment during pregnancy is 0,81.

7. DISCUSSION

The **evaluation of the present results** indicates no statistically significant positive influence of osteopathic treatment onto the need of any single medical intervention during delivery with α=0,05.

Due to the limited number of test persons, the statistic evaluation of the rate of **caesarean section, forceps** and **vacuum deliveries**, alas, does not allow a definite statement, but nevertheless, the relative risks point at a possible reduction of the usage of these operations.
Needless to say, there will always remain a certain risk for medical interventions due to *countless imponderables* during delivery, which not necessarily originate in problems solvable with osteopathy.

No significant positive influence with α=0,05 can be found either in the cases of sutured perineal injuries, neither in episiotomy nor in sutured perineal tears. At least a trend towards a reduction of the number of **episiotomies** can be observed. This fact might also be explained by a possible disapproval of episiotomy by women sensitive to holistic medicine and not only as a consequence of the osteopathic treatment.

In total, **sutured perineal injuries** should be reduced by osteopathic treatment compared to the control group in 93% of all random samples. In this actual study these injuries were approximately reduced to one third. In the samples evaluated, perineal massage, which shows similar results compared to osteopathic treatment in the statistical evaluation of episiotomies has no influence on the frequency of **perineal tears** and therefore only a lower correlation to the total number of sutured perineal injuries.

In a dorsal delivery position and in hospital wards the number of episiotomies is five times higher than in other positions and in specific delivery houses. These results are statistically significant (cf. annex).

In compliance with the results listed in chapter 6, the data gathered furthermore (cf. annex) shows that due to the osteopathic treatment, delivery started with labour more often than in the control group. However, acupuncture has a higher and more significant connection with the starting of delivery with labour.

The average duration of delivery was reduced by approximately 15%, in comparison to the control group. (9,9 compared to 11,7 hours) Although, however, in this context the error proneness of evaluating this period must be mentioned. Additionally, this difference is not statistically significant.

Taking into consideration that the average head size and birth weight of the babies delivered by the test group are significantly higher than of those delivered by the control group, the results are remarkable, though. Furthermore, according to the Apgar 1 scores a gentler delivery for the babies can be concluded significantly.
At last, the use of painkillers – aside from the indications of Caesarean section, forceps and vacuum – was equally high in both groups, although 3 of 8 test persons in the test group were treated homoeopathically.

Personally, I regard this a confirmation of my basic considerations concerning the importance of a balanced structural, visceral and cranial state of tension, explained in the previous chapters.

Once more, I would like to mention the study carried out by Chiarelli, who described that the condition of the pelvic floor is examined only very rarely. Taking into consideration my experiences with the women treated, a balanced state of tension is essential for the course of delivery.

These results can be observed very critically.

The *first point* of criticism might be the random selection of the control group. Only women with unknown courses of delivery were chosen. I decided on street questioning of mothers with babies in order to immediately exclude any women who did not fulfil the selection criteria and those who had osteopathic treatment during pregnancy. The plausibility investigation in chapter 5.3.2, is an attempt to establish a correlation between the fixed control group and the statistical parameters assessed for Austria and Vienna, respectively.

A *second point* of criticism could be seen in the different birth institutions. Since each institution or obstetrician has his own opinion on when to carry out an episiotomy or a caesarean section, the results can be distorted. It was, however, impossible to treat and evaluate women of a single birth institution. Thus, I tried to minimise influences by differentiating between ”specific birth institutes” and ”hospital wards”.
The evaluation was done by means of a questionnaire, however, certain points were subject to subjective descriptions. The length of delivery, for example, is very likely to be marked by the personal rating of the test persons, also the indication for medical intervention.

Thirdly, the large number of complementary preparatory measures could be regarded critically. It was, however, impossible to find subjects who only chose osteopathy, in a time where a women has 1,3 children on average and where a multitude of possibilities are available for the optimal preparation. Furthermore, the test persons were selected out of a group of expectant mothers who came to my surgery for different pregnancy troubles and who most frequently were already getting prepared. Additionally, the number of different methods in the study group and the control group were almost identical (168:170).

The *fourth point* of criticism concerns the unequal number of treatments and the individual onset of the treatment. Due to the different medical complaints, the women consulted me when the problems started to come up. After the first consideration of the results, it was however impossible to extract any connection between the medical interventions during delivery and the onset of treatment or the number of treatments, respectively. Thus, this criterion was rejected.
A limitation with regard to this criterion would have resulted in a reduction of the number of test persons or in an extraordinary delay of the study.
The dysfunctions found in the women of the test group were treated. The number of medical interventions was lower, compared to those of the control group. But to confirm my hypothesis that a dysfunction of the os sacrum affects the plexus hypogastricus and in consequence also the uterine orifice - which does not dilute at all, or too slowly, and thus makes medical intervention necessary – it would have been necessary to check up the women of the control group.
For ethical reasons, however, (i.e. not treating a dysfunction on purpose), I was unable to choose this procedure.

Fifthly, the validity of the results is decreased by the fact that only one therapist was performing the treatments.

The *sixth point* was already discussed in chapter 5.3.1. and concerns the low number of subjects which limits the validity of the statistical results.

Seventhly, some of the results can also be influenced by different attitudes of the patients towards some medical interventions, especially in the cases of episiotomy or the application of pain killers. The attitude of the women towards these measures was not evaluated and therefore it might influence the number of these interventions more than the osteopathic treatment itself. In this connection, it has also to be stressed that pain killers might alter the course of delivery by the loss of body consciousness.

Consequently, for further studies the evaluation of additional questions concerning the attitudes towards these interventions can be suggested. With a higher sample number, provided by direct co-operations of different osteopaths with several different maternal clinics the problems of lacking validity should be solved. Also a randomisation performed at the registration in the clinic, providing an appointed beginning of the treatments and two similar comparative groups, would ensure more valid results.

Apart from the limitations and points of criticism, this study also succeeded in confirming the **effect of osteopathy on pregnancy complaints**, which is also described in several publications.

Three studies are given as an example:

Conway (2000) describes the approach of osteopathy and its different areas of influence during gestation. She describes the changes and the different ways of influencing the problems[80].

Sandler (1983)[81]wrote about osteopathy as an ”optimal safe form of treatment in a period where the body works extremely hard”. Back pain is only regarded in connection with the distribution of the weight; and also only treated in this respect.

Montaque (1985), too, describes the possibility of treating back pains osteopathically.[82]

Osteopathic treatment also has a positive impact on the following pregnancy complaints:

- Back pains
- Pain of the coccyx
- Oedemas
- Psychological problems
- Headaches
- Early labour

[80] Conway, 2000
[81] Sandler, 1983
[82] Montaque, 1985

- Nausea and urinary trouble
- Osteopathic methods were applied to avoid painkillers, which, taken during pregnancy, could negatively affect the fetus' development.

The test persons rated the importance of osteopathy as a preparatory measure as follows:

- The treatment helped me a lot.
- I was very relaxed and motivated for the delivery and I did not have impression that it hit me.
- I am still excited that the delivery was so smooth- furthermore I believe that the treatment had an extraordinarily positive effect on my child.
- My pregnancy problems vanished completely due to osteopathy.
- Ideal, fear reducing, increasing the awareness of one's body and its changes.
- I believe that osteopathy speeded up the course of the delivery.
- Osteopathy helped perfectly against nausea, bladder spasms and the frequent urge to pass water, as well as against back pains.
- Delivery was without complications.
- Sacro illiac pain was improved persistently
- It can be recommended for the preparation of birth and for the mother's and child's aftercare.
- Low back pains were influenced, the pelvis felt more open, relaxed, and flexible; fear was reduced.
- Highly recommendable
- Back pains got better and the delivery was quite easy and without complications.
- Low back and ligament pain, as well as early labour were influenced positively. I believe that osteopathy has reduced the problems during gestation and worked perfectly well as a method of birth preparation.
- The osteopathic treatment did me very good during pregnancy. I have no basis of comparison for delivery.
- Comfortable treatment.
- A support for a successful pregnancy.
- Very positive

- Osteopathic treatment contributed to my well-being to a high amount during pregnancy, delivery was very difficult though.
- Was very good for my low back pains. Very positive.
- It helped me to hold my body in balance and to prepare it for the delivery.
- I will do it again during my next pregnancy.
- Low back pains were reduced, very comfortable.
- Osteopathic treatment gave me the feeling to be well prepared for the delivery.
- I am sure that many problems during pregnancy do not even arise. I think that the 'natural intelligence' of the body and the baby are supported by this treatment.
- I am sure that it helped.

Although pregnancy troubles and osteopathy is the topic of several articles, only little osteopathic literature or studies concerning the course of delivery could be found.

When I started this study in 2000, only one publication was touching this topic- at least to a minor extent - "Chiropractic and cranio-sacral therapy according to Uppleger during gravidity and its influence onto the course of delivery" by Phillips, Meyer and Meyer, published in the Journal of Manipulative and Physiological Therapeutics in October 1995[83]. This study, however, did not produce any significant difference between test- and control group.

Recently done studies support my findings. King, Tettambel, Lockwood, Johnson, Arsenault and Quist (2004) found evidence of improved outcomes in labour and delivery for women who received prenatal osteopathic treatment[84].
Lenz (2003) performed a study with 120 pregnant women. She deduced a tendencial significant positive influence onto the course of delivery[85].

Despite all these imponderables - especially the lack of osteopathic literature concerning the topic influence of osteopathy *during gestation* onto the course of delivery- it was my

[83] Phillips, 1995
[84] King et al, 2004
[85] Lenz, 2003

special concern to carry out this study. Screening the literature I encountered the possibility of *osteopathy during child birth* especially in the works of Still and Turner. It would be interesting to offer osteopathic support during delivery additionally to good preparation. It is also interesting to continue this study, considering the points of criticism mentioned above, and to evaluate more closely the wealth of information contained in the data.

Since the osteopathically treated expectant mothers experienced an objective as well as subjective amelioration of their general state of health, an intensification of the body sensation and a more relaxed, less anxiety ridden attitude towards the delivery, the holistic approach of therapy taken by osteopathy can be seen as a positive influence onto the course of delivery, leading to a reduction of the frequency of the medical interventions.

Years of experiences have shown me, that pregnancy and delivery is a wide and complex theme, influenced not only by physiological but also by psychoemotional aspects.
Even a connection between the own birth of the ongoing mother and her delivery is postulated.
Dowling (2006)[86] stressed in his lecture the following prenatal experiences and their effects: primary or secondary tocophobia, prenatal deficiency syndrome (caused by stress or nicotine) and prenatal syndrome of poisoning (caused by alcohol, medication, abnormal eating habits). Fetalscreening, IVF , stress and different other phenomena of our days can also influence the delivery.
All these findings show me that prevention during pregnancy is important, but *only a bleep can be influenced by therapeutic activity*.

Despite of giving my best and treating all the structures which were important for the delivery the course of delivery was not satisfying in some cases.

[86] Dowling, 2006

8. SYNOPSIS

Osteopathy brought about positive results in the treatment of pregnancy troubles, back pains, aches of groin, coccyx, or headaches. This, and the treatment of women who have had caesarean section, forceps- or vacuum delivery, or an episiotomy encouraged me to find out if an osteopathic preparation could keep the necessary medical interventions on a minimum level and additionally would grant the mother a natural delivery.

The study of special literature was the basis for my thoughts and my hypothesis. In my paper I wanted to prove that the well-balanced state of tension of all structures necessary for the course of delivery is a prerequisite for the course of delivery to be a normal one without medical intervention.

To evaluate possible influences from osteopathy, the number of medical interventions during delivery between the osteopathically treated test group and the control group was compared. The test group consisted of 36 expectant mothers chosen according to the criteria stated in chapter 5.1. They were treated osteopathically according to their complaints. The basis for my osteopathic treatment was an examination in the field of the structural, visceral and cranial osteopathy. The pregnant ladies also took advantage of different birth preparation possibilities. The routine check ups of prenatal care (Mutter-Kind-Pass) were also done.

To reduce the influence of the place of delivery, a classification was done, dividing these into ”specific birth institutes” and ”hospital wards”. Depending on the number of osteopathically treated test persons, who delivered either in a birth institute or a hospital ward, the same number of non-osteopathically treated women was chosen randomly. The same requirements were drawn up for selecting the control group. The evaluation was done by means of a questionnaire.

It has to be stressed beforehand that no statistical significance on the 5% level of significance could be gained in the χ^2 tests between the numbers of medical interventions in the test and the control group. In some cases, the evaluation does not have a significant

validity due to the small number of test persons, in other cases a significance on the 10% level would be reached. In these cases a trend can be deducted, which should be verified in further studies with higher sample sizes.
The evaluation of the number of caesarean sections, forceps and vacuum deliveries, due to the small number of test persons, does not have a significant validity.

The group that had been treated osteopathically featured trends toward lower frequency of episiotomy and the total number of sutured perineal injuries. Apart from the limitations imposed by the small number of test persons, both the absolute figures, as well as the statistical evaluation, demonstrate a *trend* towards osteopathy having a positive influence onto the course of delivery. Furthermore the evaluated data indicate that with osteopathic treatment delivery more often started with labour than in the control group. The average duration of delivery is reduced by approximately 15% in comparison to the control group. (9,9 compared to 11,7 hours), although in this context the error proneness of assessing the duration must be mentioned.
Looking at the average head size and birth weight of the babies of the test group, it can be noticed that these were larger than those of the babies delivered by mothers of the control group. In this respect, the result is even more remarkable. Furthermore, from the average Apgar 1 scores more gentle delivery for the babies can be concluded.
Lastly, the use of painkillers – aside from the indications caesarean section, forceps and vacuum extractions is fairly equal in both groups, three of eight test persons in the test group were, however, treated with homeopathy.

The subjects who received osteopathic treatment, perceived a subjective as well as objective improvement of their overall state. An intensifying of their body sensation and a more relaxed, less anxiety driven attitude towards the delivery were noticed. Therefore, the holistic therapeutic approach of osteopathy can be seen as exerting a positive influence on the course of delivery, and in turn leading to a reduction of the frequency of medical intervention.

9. BIBLIOGRAPHY

Amostegui Azcue JM, Ferri Morales A, Lillo De La Quintana C, Serre Llosa ML.: Prevencion de la disfuncion del suelo pelvico de origen obstetrico, Rev Med Univ Navarra 2004 Oct-Dec;48(4):18-31, 2004

Anthuber C., Dannecker C., Hepp H.: Vaginale Geburt – Morphologische und funktionelle Veränderungen am Beckenboden, Einfluss auf den Blasenverschluss und die Analsphinkterfunktion, Gynäkologe 2000 . 33: 857-863, Springer Verlag, 2000

Barral J.-P., Mercier P.: Handbuch für die Osteopathie - Viszerale Manipulationen I, 290ff, OSTEO 2000 b.v.b.a, 1994

Burns L.: The Pathogenesis of Visceral Disease Following Vertebral Lesions. A.O.A., 212, E. Ohio St., Chicago, 11, Ill., USA, 1910

Carreiro J.: An Osteopathic Approach to Children, 120, Churchill Livingstone, 2003

Chiarelli P. and Campbell E.: Incontinence during pregnancy, Prevalence and opportunities for continence promotion. Aust. N.Z.J. Obstet. Gynaecol. 1997 Febm 37(1): 66-73, 1997.

Colangelo G.: Pädiatrische Osteopathie, own lecture notes, OZK Vienna, 2000

Conway P. L.: Osteopathy during Pregnancy, Complementary Therapies for Pregnancy and Childbirth edited by Denise Tiran and Sue Mack, 39ff, Baillière Tindall Verlag, 2. Auflage, 2000

Dannecker C., Anthuber C., Hepp H.: Die Episiotomie - Grenzen, Indikationen und Nutzen, Gynäkologe 2000 . 33:846-871, Springer Verlag, 2000

Deindl F.M., Vodusek D.B., Bischoff C., Hofmann R. and Hartig R.: Dysfunctional Voiding in Women: Which Muscles are responsible? Br. J. Urol Dec 1998, 82(6):814-819, 1998.

De Jong T. M., Kemmler G.: Kaiserschnitt – Narben an Seele und Bauch, 47,58,122ff, Fischer Taschenbuch Verlag, 3. Auflage, 1999

Dowling T.: own lecture notes, KH Waidhofen/Thaya, 2006

Emerson W.: Lebenslange Auswirkungen von prä- und perinatalen Prägungen, Int. J. of Perinatal Psychology and Medicine, 10; 4, 1998

Georgiades O.: Diplomarbeit: Osteopathische Behandlung der Beckenendlage, 49, 2001

Goerke K., Valet A.: Gynäkologie und Geburtshilfe, 85ff, Urban & Fischer Verlag, 4. Auflage, 2000

Gitsch E., Janisch H., Reinold E., Schaller A.: Geburtshilfe, 240ff, Verlag Wilhelm Maudrich, 4. Auflage, 1991

Gupta J. K., Nikodem C.: Maternal posture in labour, European Journal of Obstetrics & Gynecology and Reproductive Biology 92: 273-277, 2000

Heller A.: Geburtsvorbereitung Methode Menne - Heller, 234ff, Thieme Verlag Stuttgart, 1998

Hofmann H., Geist Ch.: Geburtshilfe und Frauenheilkunde, 10ff, Walter de Gruyter Verlag Berlin – New York, 1999

Jawny J.: Praxis der operativen Gynäkologie, 210ff, Springer Verlag Berlin Heidelberg New York, 2000

Jealous J. S.: Emergence of Originality, A Biodynamic View of Osteopathy in the Cranial Field, 2000

King HH, Tettambel MA, Lockwood MD, Johnson KH, Arsenault DA, Quist R.: Osteopathic manipulative treatment in prenatal care: a retrospective case control design study, AAOJournal 2004 Apr; 104(4):146, 2004

Korth St.: paediatric osteopathy, own lecture notes, Wien 2001

Kölbl H. : Geburt und Beckenboden, Gyn-Aktiv, 10-11, 1/1999

Kühnert M., Schmidt S., Feller A., Vonderheit K.-H.: Sectio caesarea: ein harmloser Eingriff aus mütterlicher Sicht?, Geburtshilfe Frauenheilkunde 2000; 60:354-361, Thieme Verlag Stuttgart New York, 2000

Leonhardt H.: Taschenatlas der Anatomie, Innere Organe, 306ff, Thieme Verlag Stuttgart New York, 5. Auflage, 1986

Lenz D.: Osteopathic treatment as a prevention of medical intervention during child birth, www.ostopathic-research.com, 2003

Liem T.: Kraniosakrale Osteopathie, 6-10 , 412 ff, Hippokrates Verlag Stuttgart, 1998

Ligner B., Van Assche R.: Bildatlas der Osteopathie, Band 1, 23-24, Verlag für Osteopathie Dr. Erich Wühr Kötzting/Bayer. Wald, 1994

Ligner B.: Verschiedene Ansätze zur Behandlung postpartaler Beschwerden, Osteopathische Medizin, 4-6, Heft1, 2006

Littlejohn, J.M.: Lecture Notes on Obstetrics, in the Collection of S.G.J. Werham, D.O., M.S.O., Maidston Kent. & “Great Spinal Centres” Year Book 1975, Pub. Maidstone Ost. Clinic, 1975

Lothrop H.: Das Stillbuch, s. p., Kösel Verlag GmbH & Co München, 20. Auflage 1995

Lundquist M., Okson A., Nissen E., Norman M.: Ist es notwendig, alle Verletzungen nach vaginaler Geburt zu nähen?, Österreichische Hebammenzeitung 04/00, 23-25, 2000

MacLennan A. H., Taylor A. W., Wilson D. H., Wilson D.: The prevalence of pelvic floor disorders and their relationship to gender, age, parity and mode of delivery, British Journal of Obstetrics and Gynaecology Dezember 2000, Vol 107, 1460-1470, 2000

Magoun H. I.: Osteopathy in the Cranial Field, The Journal Printing Company, Kirksville, Missouri, 1966

Martius G., Breckwoldt M., Pfleiderer A.: Lehrbuch der Gynäkologie und Geburtshilfe, 278ff, Thieme Verlag, 1994

Meyer S., De Grandi P., Schreyer A. and Loccia G.: The assessment of bladder neck position and mobility in continent nillipara, multipara, forceps-delivered and incontinent women using perineal ultrasound: a future office procedure. Int. Urogynecol J. Pelvic Floor Dysfunct. 1996; 7(3):138-146, 1996.

Meyer S., Hohlfeld P., Achtari C. Russolo A., De Grandi P.: Birth trauma: short and long term effects of forceps delivery compared with spontaneous delivery on various pelvic floor parameters, British Journal of Obstetrics and Gynaecology November 2000, Vol 107, 1360-1365, 2000

Möckel E., Mitha N.: Handbuch der pädiatrischen Ostopathie,17-21, 67ff, Urban & Fischer Verlag, 2006

Molinari R.: Osteopathie während der Schwangerschaft, own lecture notes, Maidstone 1999 und Wien 2001

Montaque K.: Midwifery. Osteopathy during pregnancy, Nurse Mirror 1985 Jul 31; 161(5):26-8, 1985

Odent M.: Die Wurzeln der Liebe – Wie unsere wichtigste Emotion entsteht, 55ff, Walter Verlag, 2001

Odent M.: www.birthworks.org

Peeters L., Lason G.: Handbuch für die Osteopathie - Das Becken, 180ff, OSTEO 2000 b.v.b.a., 1993

Pfisterer E., Mauss S.: Erlebnis Sanfte Geburt, 23ff, Edition S Verlag Österreich, 1. Auflage, 1994

Pfleiderer A., Breckwoldt M., Martius G,: Gynäkologie und Geburtshilfe, 377ff, 429ff, Thieme Verlag Stuttgart New York, 3. Auflage, 2000

Phillips C. J., Meyer J. J.: Chiropractic Care, Including Craniosacral Therapy, During Pregnancy: A Static-Group Comparison of Obstetric Interventions During Labour and Delivery, Journal of Manipulative and Physiological Therapeutics Volume 18 . Number 8th October,1995

Plothe C.: Osteopathische Begleitung während der Schwangerschaft, 15-18, Deutsche Zeitung für Osteopathie 4/2003

Reiffenstuhl G., Platzer W., Knapstein P.-G.: Die vaginalen Operationen – Chirurgische Anatomie und Operationslehre, Urban & Schwarzenberg München Wien Baltimore, 2. Auflage, 1994

Riss P.: Der Mythos vom Geburtstrauma, Österreichische Hebammenzeitung 02/01, 5, 2001

Rizk D. E. E., Thomas L.: Relationship Between the Length of the Perineum and Position of the Anus and Vaginal Delivery in Primigravidae, International Urogynecology Journal (2000) 11:79-83, Springer Verlag London Limited, 2000

Rocker I.: Pelvic Pain in Women, 4, Springer Verlag, 1990

Rott P., Siedentopf F., Schücking B., Kentenich H.: Wunschsektio und vaginale Geburt - psychologische Aspekte, Gynäkologe 2000.33:887-890, Springer Verlag, 2000

Sandler S.: The osteopathic approach to obstetrics, Midwife Health Visit Community Nurse 1983 Sep;19(9):365, 1983

Schmeiser G., Putz R.: Anatomie und Funktion des Beckenboden, Gynäkologe 2001 34:2-9, Springer Verlag, 2001

Schneider H., Husslein P., Schneider K.T.M.: Geburtshilfe, 571ff, 594ff, 757ff, Springer Verlag Berlin Heidelberg, 2000

Sergueef N.: Die Kraniosakrale Osteopathie bei Kindern, 21-31, Verlag für Ganzheitliche Medizin Dr. Erich Wühr GmbH Kötzting/Bayer. Wald, 1995

Siebert W., Eldering G.: Alternativen der klinischen Geburtshilfe, 11ff, Hans Marseille Verlag GmbH München, 1995

Speiring N.: Manipulative Procedures Utilised during Obstetric Delivery, A.O.A. Research Conference, Chicago, Illinois, March 15^{th} –17^{th} , 1979

Sprung G.: Medikamentengabe während der Geburt, Österreichische Hebammenzeitung 06/98, 166ff, 1998

Stadlober-Degwerth M.: Von der Geburtshilfe zur Geburtsmedizin, ein geschichtlicher Rückblick., Geburtshilfe und Geburtsmedizin einst & heute. Eine Veranstaltungsreihe des Pathologisch-Anatomischen Bundesmuseums Wien, 9ff, Oktober 1998

Still A. T.: Osteopathy Research & Practice, 169ff, Eastland Press, USA 1992

Sultan A.H., Kamm M.A., Bartram C.L. and Hudson C.N.: A prospective study of anal sphincter disruption during vaginal delivery. N. Engl. J. Obstet. Gynecol 329: 1905-1911, 1993.

Tamussiono K.: Die Episiotpmie: Schnee von gestern?(1998), Österreichische Hebammenzeitung 02/01, 6, 2001

Tettembel M.: Structural an hormonal influences on pelvic mechanics in labour and delivery, AAOJournal/17, Winter 1995

Tetzschner T., Sorensen M., Jonssoon L, Lose G. and Christiansen J.: Delivery and pudendal nerve function, Acta Obstet. Gynaecol. Scand Apr. 1997, 76(4): 324-331, 1997

Turner S.: The application of osteopathic principles to obstetrics, 1980

Uhl B.: Gynäkologie und Geburtshilfe compact, 78-84, 100-102, Thieme Verlag, 1997

Upledger J.: The Cranio-sacral System, De. Anne E. Brooks, M.S.O. – Com, USA, 1981

Whiting, L.M.: Osteopathic Prevention of Certain Complications of Labour,
J.A.O.A. 44: 495, 1945

Wilson M.: Pädiatrische Osteopathie, own lecture notes, Wien 2001

ANNEX 1

TABLE OF ILLUSTRATION

TABLE OF ILLUSTRATIONS

Ill. 1/p. 7	Gynäkologie und Geburtshilfe, A. Pfleiderer, 383, 2000
Ill. 2/p. 8	Gynäkologie und Geburtshilfe, A. Pfleiderer, 384, 2000
Ill. 3/p. 8	Wolf-Heidegger`s Atlas der Anatomie des Menschen, 2. Band, P. Köpf-Maier, 243, 2000
Ill. 4/p. 9	Knaurs Medizinischer Atlas des Menschen, Prof. Dr. med. Klaus u Benner Sascha Wuillmet, 222, 2000
Ill. 5/p.11	Gynäkologie und Geburtshilfe, A. Pfleiderer, 380, 2000
Ill. 6/p.13	Atlas der Anatomie des Menschen, F.H. Netter, 246, 2000
Ill. 7/p.16	Pernkopf Anatomie, Atlas der topographischen und angewandten Anatomie des Menschen, 2. Band, W. Platzer, 217, 1989
Ill. 8/p.18	Taschenatlas der Anatomie, Innere Organe, H.Leonhardt, 321, 1986
Ill. 9/p.19	Geburtshilfe und Frauenheilkunde, H. Hoffmann, 10, 1999
Ill.10/p.20	Pelvic Pain in Women, I. Rocker, 4, 1990
Ill.11/p.21	Pflege konkret Gynäkologie Geburtshilfe, K.Goerke, 285, 1998
Ill.12/p.24	Gynäkologie und Geburtshilfe, A. Pfleiderer, 430, 2000
Ill.13/p.26	Pflege konkret Gynäkologie Geburtshilfe, K.Goerke, 275, 1998
Ill.14/p.28	Pflege konkret Gynäkologie Geburtshilfe, K.Goerke, 276, 1998

ANNEX 2

CONCEPT

CONCEPT
by

Maria Ruspeckhofer
dipl. Physiotherapist
Osteopath
Stuwerstr. 45/25
1020 Wien

Tutor: Ms. Katia Twyford

EFFECT OF OSTEOPATHIC CARE DURING PREGNANCY ON LABOR AND DELIVERY
- a comparative study of the frequency of obstetric interventions during labour and delivery

The way of being delivered more and more is considered to co-influence the rest of life.

Objective:	The aim of the study is to find out whether osteopathic treatment during pregnancy has any influence on the frequency of obstetric interventions (vacuum-extraction, forceps, sectio, perineal tear or cut...).
Hypothesis:	A positive influenced delivering by osteopathic treatment
Design of study:	Retrospective clinical case-study with a statistical control group
Probationers:	Primiparous aged between 20 and 35 years No risk-factors like diabetes and gestosis No neurological diseases like multiple sklerosis, No affections by rheumatical sicknesses Birth must be between the 37th and 42nd week of pregnancy Normal course of pregnancy
Method:	Approximately 3 osteopathic treatments at intervals of 2-3 weeks in addition to standard pregnancy care of 15-20 pregnant women (after approx. the 30th week of pregnancy) Contact is established via gynaecologists . Control-group: random sample of same number of pregnants without additional osteopathic treatment
Measurement:	comparisons of notes in the certificates of life birth (Mutter-Kind-Paß)

Evaluation: Descriptive, statistical

The frequency of the following medical interventions will be evaluated.

Perineal tear or cut
Sectio
Vacuum-extraction
Forceps

Concerning the small number of probationers all the medical interventions are evaluated in sum and also singularly. For evaluation the support by a statistician is planned.

Clinical background:

The women will be evaluated ostheopathicly and treated depending on their lesions.
As clinical background the anatomical and physiological connections to the dysfunctions will be shown.
The relation to osteopathy shall be worked out clearly.
Especially:

- Pelvis (position and mobility of the sacrum, pubis and coccygis)
- Condition of the muscles (psoas, piriformis, pelvic floor, quadratus lumborum)
  (a study shows that 50% of perineal cut happens because of a lack of preparation of the m. transversus perineus)
- Condition of ligaments (lig. uterosacrale, lig. teres uteri...) and the nerval supply
- Mobility of the uterus
- Condition of the craniosacral system

Control-group: Different delivery stations have different philosophies and offer different care.
To minimise this influence the following strategy will be used:

Depending on the number of treated probationers in one institution the same size of control-group will be chosen randomised.

ANNEX 3

STATISTICAL DATA SHEET CONCERNING THE COURSE OF THE DELIVERY

Statistical data sheet concerning the course of the delivery

1. MOTHER'S DATE OF BIRTH…….

2. IS THIS YOUR FIRST CHILD Yes ☐ No ☐
   PREVIOUS PREGNANCIES Yes ☐ No ☐
   (Miscarriage ☐ , abortion ☐)

3. PROBLEMS BEFORE PREGNANCY:
   ACCIDENTS……..
   SURGERY……..
   ILLNESSES…….……...

4. COURSE OF PREGNANCY

Problems	1. Trimenon	2. Trimenon	3. Trimenon
Nausea/Vomiting	☐	☐	☐
Pains in the ligaments	☐	☐	☐
Haemorrhoids	☐	☐	☐
Urinary trouble	☐	☐	☐
Sleeping problems	☐	☐	☐
Digestive problems	☐	☐	☐
Early labour	☐	☐	☐
Psychological problems	☐	☐	☐
Hypertension	☐	☐	☐
Oedema (swollen feet)	☐	☐	☐
Other problems	☐	☐	☐

   ……
   Amniocentesis Yes ☐ No ☐

5. PREPARATORY MEASURES
   - Birth preparation courses ☐
   - Antenatal exercises ☐
   - Shiatsu ☐
   - Acupuncture ☐
   - Yoga ☐
   - Belly dance ☐
   - Perineal massage ☐
   - Relaxation exercises ☐
   - Bach flowers ☐
   - Aromatherapy ☐
   - Teas ☐
   - Homeopathy ☐
   - Osteopathy ☐
     From which week of gestation……
     Did you have osteopathic treatments before pregnancy? Yes ☐ No ☐
   - Others……..

6. IN WHICH WEEK OF GESTATION DID THE DELIVERY TAKE PLACE?
   ……
   CHILD'S DATE OF BIRTH……..

7. HOW DID THE DELIVERY BEGIN?
   - Breaking of water ☐
   - Did it have to be induced? ☐
     - How?……..
   - Labour ☐
   - Other ☐
     - ……

8. PRESENTATION OF THE CHILD
   - Cephalic presentation
     - Vertex presentation — Spinal column right ☐
       - Spinal column left ☐
     - Face presentation (cephalic position) ☐
     - Brow presentation ☐
   - Breech presentation ☐
   - Transverse lie ☐

9. BIRTHING POSITION
   - Dorsal position ☐
   - On the side ☐
   - Half sitting position ☐
   - Crouching position/obstetric stool ☐
   - Upright kneeling position ☐
   - On all fours ☐
   - Other……. ☐

10. DELIVERY ASSISTANCE
    - Vacuum bell ☐
    - Forceps ☐
    - Cesarean Section ☐
    - Episiotomy ☐
    - Perineal tear ☐
    - Pain killers ☐
      - Which ones? ……

    Indication for applying delivery aids ……..……

11. DURATION OF DELIVERY……
    WEIGHT AT BIRTH …… SIZE OF THE HEAD……
    APGARSCORE (1min)……. (5min)…….……

12. PLACE OF DELIVERY……

13. WERE YOU SATISFIED AT THE PLACE OF DELIVERY
    Competence/considering of your wishes/other ……...……
    ……..…….

COMMENT ON OSTEOPATHY AS BIRTH PREPARATION
……..
……..
……..

ANNEX 4

MEDICAL HISTORY SHEET

MEDICAL HISTORY SHEET Date:

NAME: **Date of birth:**

Marital status: Sports/Hobbies:

Profession:

Gestational week: Due date:

CURRENT PROBLEM

Localisation:

Quality: (stitching, dull stinging, tickling, spreading, locally)

Since when/1. time or more frequently:

Cause:

Increased by:

Reduced by:

Examinations/Results

Therapies so far:

ADDITIONAL SYMPTOMS

OVERALL CONDITION:

Tiredness, sleep, diet, enough fluid:

Way of life/stress/allergies/toxines/medicine

ELIMINATION: **DELIVERY/**

intestines, kidneys, bladder, gynaecological field **PED. MED.**

HIST.

(contraception/menstruation problems) **ACCIDENTS**

ASSIMILIATION:

stomach/ösophagus/liver/gall bladder

RESPIRATION/HEART/KL(blood pressure/
cold feeling/varicose veins/oedema/skin dry, humid)

THROAT/THYROID GLAND/ENT/TEETH

PSYCHE (shock...)

MEDICAL HISTORY OF THE FAMILY: (asthma,
diabetes, rheuma, cramps, tumour, osteoporosis)

PREVIOUS PREGNANCIES (gravity/aborts)
AND COURSES OF PREGNANCIES:

CURRENT COURSE OF PREGNANCY

Planned child:

Amniocentesis:

Number of sonographies:

Labour pains:

Position of placenta:

Fetal movements:

Presentation:

ANNEX 5

EXAMINATION SHEET

EXAMINATION SHEET

STANDING POSITION
Overall impression/Posture
Colour of skin/veins/swellings
Ecoute
Standing flexion test
Spine active
- Flex/Ext
- Rot
- Latflex

Michaelism rhomb

SITTING POSITION
Ecoute
Sitting flexion test
Spine/ Mobility test
- Cervical vertebra/1. rib
- Thoracic vertebra
- Lumbar vertebra

Ribs
Diaphragm
Pelvic mobility
Coccygis
Pelvic floor
Uterus

RL
Ecoute
Length of leg
Lower extremitis
Osseous pelvis
Muscles (m. psoas, m. piriformis, m. obt.)
Pelvic floor
Ligaments (lig. sacrospinal, lig. sacrotuberale, lig. teres uteri, lig. uterosacrale...)
visceral
Urogenital tract
- Lower abdomen/uterus
- Upper abdomen

Diaphragm
Thorax/Thoracic inlet
Sternum
Mediastinum
Throat fasciae (hyoid, thyroidea)
cranial
- OAA
- SSB
- Occ/Temp/Front/Pariet/Sphen
- Face

NEUROLOG. EXAMINATION
Laseque
Reflexes

ANGIOLOG. EXAMINATION
Aneurysma test
Blood pressure
Taking of pulse
Sotto Hall

BL
SIPS
Cocc
Pelvic floor
Sacrum
ISG
Spine

FOCUS OF THERAPY:

ADVICE:

DIET:

ANNEX 6

TABULAR SUMMARY OF THE FINDINGS OF THE INTERVIEWS

ID	Mother´s age at time of delivery	Problems before pregnancy	Nausea/Vomiting	Low back pain	Pains of the ligaments	Haemorrhoids	Urinary troubles	Sleeping problems	Digestive problems	Early labour	Psychological problems	Oedema (swollen feet)	Hypertension	Other problems	Amniocentesis	Birth preparation courses	Pregnancy gymnastics	Shiatsu	Acupuncture	Yoga	Belly dance	Perineal massage	Relaxation exercises	Bach flowers	Aromatherapy	Teas	Homeopathy	Osteopathy	From which week of gestation	Osteopathic treatment before pregnancy	Others	Child´s date of birth	Breaking of water	Did it have to be induced?	Labour	Others
1o	27	×	×	×				×	×							×	×										×	×	28			40			×	
2o	35		×						×					×		×	×										×	×	36			41			×	
3o	23		×	×	×			×												×							×	×	30			38				
4o	30	×		×				×				×				×			×	×	×	×	×			×		×	22	×		41			×	
5o	30			×		×				×						×	×				×	×	×					×	32			41			×	
6o	30	×	×	×		×		×	×							×	×		×		×	×	×					×	23			41			×	
7o	35			×										×		×				×								×	16	×		39	×			
8o	29			×						×	×					×	×		×		×	×	×					×	23			37	×			
9o	29	×	×	×				×	×					×		×			×		×	×	×					×	16	×		40			×	
10o	29	×	×	×				×						×		×	×		×		×	×					×	×	16	×		41			×	
11o	35	×								×			×							×						×	×	×	17	×		39	×			
12o	26		×	×	×	×	×	×								×	×					×					×	×	×	14	×		39				
13o	26	×		×									×	×														×	20			38				
14o	29	×	×	×				×	×							×	×					×						×	20	×		40				
15o	33	×	×	×										×		×	×								×			×	12	×		41	×			
16o	30	×			×											×	×		×									×	32			39				
17o	27								×							×	×											×	25			41				
18o	26		×								×																	×	17			39				

ID	Vertex presentation	Face presentation	Brow presentation	Breech presentation	Transverse lie	Dorsal position	On the side	Half sitting position	Crouching position/obstetric s	Upright kneeling position	On all fours	Others	Vacuum bell	Forceps	Cesarean section	Episiotomy	Perineal tear	Pain killers	Weight at birth	Size of the head	Duration of delivery	Apgarscore 1 minute	Apgarscore 5 minutes	Place of delivery	Satisfaction
1o	x											x						xh	3150	32	4	10	10	K	x
2o	x					x													3535	34	8	9	10	E	x
3o	x								x										2860	33	15	10	10	E	x
4o	x					x										x		x	4140	36	29	9	10	K	-
5o	x											x							3610	36	15	8	10	E	-
6o		x						x										xh	3460	34	10	9	10	K	x
7o	x											x							3180	34	3,5	10	10	E	x
8o	x								x										2760	34	4	9	10	E	x
9o	x										x								3500	34	5,5	9	10	E	x
10o	x					x												xh	3590	32	6,25	9	10	K	x
11o	x										x								2890	34	7	10	10	E	x
12o	x							x								x			3830	35	3	9	10	E	x
13o	x					x													3000	34	5,5	9	10	E	x
14o	x								x								x		3750	35	20,5	10	10	E	x
15o	x							x									x		3435	33	8	9	10	E	x
16o	x							x									x	x	3800	35	8	9	10	E	x
17o	x						x												3790	36	9	9	10	K	x
18o		x						x								x			3590	35,5	4	9	10	K	

ID	Mother´s age at time of delivery	Problems before pregnancy	Nausea/Vomiting	Low back pain	Pains of the ligaments	Haemorrhoids	Urinary troubles	Sleeping problems	Digestive problems	Early labour	Psychological problems	Oedema (swollen feet)	Hypertension	Other problems	Amniocentesis	Birth preparation courses	Pregnancy gymnastics	Shiatsu	Acupuncture	Yoga	Belly dance	Perineal massage	Relaxation exercises	Bach flowers	Aromatherapy	Teas	Homeopathy	Osteopathy	From which week of gestation	Osteopathic treatment before pregnancy	Others	Child´s date of birth	Breaking of water	Did it have to be induced?	Labour	Others
19o	31	x	x		x			x	x					x		x			x			x				x		x			x	40			x	x
20o	27		x	x	x	x				x				x		x	x		x	x		x				x	x	x	25	x		40			x	
21o	31	x	x					x			x					x				x		x				x	x	x	35			40	x			
22o	29	x		x	x	x							x			x	x					x				x		x	34	x		38	x			
23o	33		x	x	x			x	x			x				x	x		x			x	x			x	x	x				40			x	
24o	27		x		x	x		x														x				x	x	x				41		x		
25o	35	x		x			x									x	x	x	x	x						x	x	x	24		x	40	x			
26o	27			x										x		x	x		x	x		x						x	20			42	x			
27o	28		x	x												x			x		x	x				x		x				39	x			
28o	24				x			x				x				x						x						x				41	x			
29o	29		x													x												x				39	x			
30o	31				x	x										x		x	x	x		x	x			x	x	x		x		41			x	
31o	35				x			x			x	x				x	x		x	x			x			x		x	30			37	x			
32o	23		x	x				x		x	x	x				x					x					x		x	30			39	x			
33o	33		x	x	x						x			x		x	x					x	x					x	36		x	40			x	
34o	33		x	x	x			x						x		x				x	x	x				x		x	13	x	x	37	x			
35o	30		x	x				x			x					x			x			x				x		x	36			38			x	
36o	35		x	x	x						x							x				x				x	x	x	32			38			x	
Number		14	22	23	16	7	4	16	7	6	8	7	3	12	1	31	14	4	16	12	8	28	10	0	1	27	13	36	0	12	4		14	1	21	1

Total number of preparatory measures 168

Mean	29,7	39,6
Min	23,0	37,0
Max	35,0	42,0
Median	29,5	40,0

ID	Vertex presentation	Face presentation	Brow presentation	Breech presentation	Transverse lie	Dorsal position	On the side	Half sitting position	Crouching position/obstetric st	Upright kneeling position	On all fours	Others	Vacuum bell	Forceps	Cesarean section	Episiotomy	Perineal tear	Pain killers	Weight at birth	Size of the head	Duration of delivery	Apgarscore 1 minute	Apgarscore 5 minutes	Place of delivery	Satisfaction
19o	x					x							x				x	x*	3375			7	8	K	
20o	x						x												3320		20	9	10	K	x
21o	x								x								x		3430		6	9	10	K	x
22o	x							x											3450	34	5	10	10	K	x
23o	x							x								x			3060	33	18			K	x
24o	x					x											x	x	3500	34	15	9	10	K	x
25o	x								x								x		3130	34	4,5	9	10	K	x
26o	x					x									x			x*	3780		17			K	
27o	x								x										3200		11			K	x
28o		x						x									x		3840	36	10	9	10	K	x
29o	x					x													3480	34	4,5			K	x
30o	x																x		3090	35,5	11			K	x
31o	x								x										3040	34	12	9	10	K	x
32o	x							x								x			3330		8			K	x
33o	x																x		3640	35	12			E	x
34o	x								x									x	3050	33	16,5	8	9	E	
35o	x							x										x	3342	36	7	9	10	K	x
36o	x									x									3570	35	4,5	10	10	K	
Number	33	3	0	0	0	8	2	10	8	1	2	3	1	0	1	5	10	5						22	29

Mean	3403	34,3	9,9	9,1	9,9
Min	2760	32,0	3,0	7,0	8,0
Max	4140	36,0	29,0	10,0	10,0
Median	3443	34,0	8,0	9,0	10,0

ID	1k	2k	3k	4k	5k	6k	7k	8k	9k	10k	11k	12k	13k	14k	15k	16k	17k	18k
Mother´s age at time of delivery	35	31	29	33	30	33	31	34	26	30	29	29	27	26	33	30	25	25
Problems before pregnancy	×		×	×	×	×		×										×
Nausea/Vomiting		×						×	×	×		×	×		×	×	×	×
Low back pain	×					×		×	×			×		×				
Pains of the ligaments			×			×		×		×		×				×	×	
Haemorrhoids				×		×			×	×						×		
Urinary troubles			×						×									
Sleeping problems					×				×	×		×				×	×	
Digestive problems									×			×						
Early labour									×									
Psychological problems						×							×					
Oedema (swollen feet)	×		×	×					×	×					×			
Hypertension															×			
Other problems	×		×	×		×				×			×			×		×
Amniocentesis																		
Birth preparation courses	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Pregnancy gymnastics		×	×	×	×			×		×	×	×	×		×		×	×
Shiatsu	×																	
Acupuncture		×		×								×	×		×			×
Yoga	×							×							×			
Belly dance													×		×			
Perineal massage		×	×	×	×	×			×				×	×	×	×		
Relaxation exercises		×	×	×	×	×			×	×	×				×	×		×
Bach flowers						×			×									×
Aromatherapy						×												
Teas	×	×	×	×	×	×	×		×		×		×		×	×	×	
Homeopathy	×			×	×							×			×	×		
Osteopathy																		
From which week of gestation																		
Osteopathic treatment before pregnancy																		
Others		×	×			×								×			×	
Child´s date of birth	42	42	37	40	40	40	37	37	41	41	41	40	40	37	39	40	37	40
Breaking of water					×	×	×	×	×			×		×	×		×	
Did it have to be induced?	×																	
Labour	×	×	×	×						×	×		×			×		
Others																		

ID	Vertex presentation	Face presentation	Brow presentation	Breech presentation	Transverse lie	Dorsal position	On the side	Half sitting position	Crouching position/obstetric s	Upright kneeling position	On all fours	Others	Vacuum bell	Forceps	Cesarean section	Episiotomy	Perineal tear	Pain killers	Weight at birth	Size of the head	Duration of delivery	Apgarscore 1 minute	Apgarscore 5 minutes	Place of delivery	Satisfaction
1k	x								x								x		3400	35	10	8	9	E	x
2k	x										x								3670	33,5	5	7	9	E	x
3k	x						x											x	2860	30	7	9	10	E	x
4k	x														x			x*	3350	32	17	9	10	E	x
5k	x					x										x		x	3076	33	7	10	10	K	x
6k	x								x								x	x	3730	37	15,3	3	10	E	x
7k	x								x										2710	32	5	9	10	E	-
8k	x								x								x		3165	34	4,5	9	10	E	x
9k	x														x			x*	3950	35	26	9	10	K	-
10k	x								x								x	x	3194	34	11	6	8	K	x
11k	x								x								x		3950	34	7	9	10	E	x
12k	x					x										x		x	2950	32	18	9	10	K	-
13k	x								x										3230	34	5,5	9	10	E	x
14k	x					x										x			2180	31	3,5	9	10	K	x
15k	x														x			x*	3900	34	13	10	10	K	-
16k	x					x								x				x*	2950	32	24	7	10	E	x
17k	x					x										x			2730	33	23	9	10	E	x
18k	x					x							x					x*	3880	34	7	7	10	K	x

ID	Mother´s age at time of delivery	Problems before pregnancy	Nausea/Vomiting	Low back pain	Pains of the ligaments	Haemorrhoids	Urinary troubles	Sleeping problems	Digestive problems	Early labour	Psychological problems	Oedema (swollen feet)	Hypertension	Other problems	Amniocentesis	Birth preparation courses	Pregnancy gymnastics	Shiatsu	Acupuncture	Yoga	Belly dance	Perineal massage	Relaxation exercises	Bach flowers	Aromatherapy	Teas	Homeopathy	Osteopathy	From which week of gestation	Osteopathic treatment before pregnancy	Others	Child´s date of birth	Breaking of water	Did it have to be induced?	Labour	Others
19k	27	x	x		x		x									x	x						x									41	x			
20k	33		x					x	x					x					x				x			x	x					39			x	
21k	30		x								x			x		x								x	x	x					x	39	x			
22k	25	x	x	x		x						x		x		x	x		x			x				x	x					38	x			
23k	31	x		x			x							x		x	x					x	x			x						39	x			
24k	34		x			x						x				x	x														42			x	
25k	35		x					x	x							x				x	x	x	x			x	x					40	x			
26k	28	x	x								x					x	x					x				x	x					39	x			
27k	27				x							x				x								x								38			x	
28k	30			x				x						x		x			x					x		x						42			x	
29k	25			x		x							x			x	x	x	x	x		x				x	x					38			x	
30k	29	x	x	x						x						x	x			x		x	x			x					x	42	x			
31k	33		x		x			x				x				x						x	x			x						39	x			
32k	34				x							x				x	x		x			x										39			x	
33k	27	x				x								x		x	x									x						40		x		
34k	27							x						x		x	x					x				x					x	38			x	
35k	28			x	x			x	x		x							x	x	x		x			x	x						38	x			
36k	26	x	x				x	x			x					x	x					x				x	x					40		x	x	
Number		14	20	12	12	9	5	13	5	2	6	11	2	15	0	34	22	3	12	7	3	21	13	6	3	27	12	0	0	0	7		18	3	16	0

Total number of preparatory measures 170

Mean	29,6	39,5
Min	25,0	37,0
Max	35,0	42,0
Median	29,5	40,0

ID	Vertex presentation	Face presentation	Brow presentation	Breech presentation	Transverse lie	Dorsal position	On the side	Half sitting position	Crouching position/obstetric s	Upright kneeling position	On all fours	Others	Vacuum bell	Forceps	Cesarean section	Episiotomy	Perineal tear	Pain killers	Weight at birth	Size of the head	Duration of delivery	Apgarscore 1 minute	Apgarscore 5 minutes	Place of delivery	Satisfaction
19k	x					x										x		x	3464	30	5	8	10	K	
20k	x						x												2773	30	11	6	10	E	x
21k	x								x						x			x*	3499	35	17	8	10	K	
22k	x										x								3665	33	18	8	10	K	x
23k	x					x													3079	35	17	10	10	K	x
24k	x								x								x		3120	30	10	8	9	K	x
25k	x							x											3442	33	9	7	10	K	x
26k	x								x								x		3837	32	11	9	10	E	x
27k	x								x				x					x*	3425	37	6	8	10	K	x
28k	x					x										x		x	3633	34	16	7	9	K	
29k	x								x										2843	32	18	9	10	K	x
30k	x								x									x	3794	33	4	9	10	K	x
31k	x								x								x		3830	36	13	8	10	K	x
32k	x					x											x		3688	31	7	9	10	E	x
33k	x					x										x			3488	33	13	7	10	K	x
34k	x					x										x		x	3855	30	12	10	10	K	
35k	x							x								x		x	3622	31	11	8	10	K	x
36k	x					x									x				3812	33	16	9	10	K	x
Number	36	0	0	0	0	13	2	2	14	0	2	0	2	1	5	9	9	10						22	28

Mean	3382	33,0	11,7	8,2	9,8
Min	2180	30,0	3,5	3,0	8,0
Max	3950	37,0	26,0	10,0	10,0
Median	3453	33,0	11,0	9,0	10,0

Addition to the tables:

Osteopathy group		**Control group**	
Other problems before gestation:			
2o	Pelvic torsion	1k	bronchitis
4o	Stitches around the liver	3k	vaginal mycosis
7o	Foot pain	4k	vaginal mycosis
9o	Pain in the symphysis	6k	muscular cramps
10o	Abdominal pain	10k	vaginal mycosis
13o	Pyrosis	13k	varicose veins
15o	Tingling sensation in the legs	16k	allergy
19o	Pain of thoracic vertebrae	18k	pyrosis
20o	Widening of pelvic ligaments	20k	Pain in the symphysis
26o	Coccygeal pain	25k	muscular cramps
33o	Headache		
34o	Tension in the mammal tissue		
Other preparatory measures for the delivery:			
1o	physioenergetics	2k	Qi gong, kinesiology
7o	craniosacral therapy	3k	acupressure
33o	swimming	6k	acupunctual massage
34o	acupunctual massage	14k	acupunctual massage
		21k	swimming
		30k	acupressure
		34k	acupressure

Other delivery positions:

1o "Römerrad"

5o standing upright

7o bathtub

25o many changes

Indication for applying delivery assistance:

19o bad CTG, umbilical cord around neck, exhaustion of the mother

26o mother does not know and complains about a lack of conversation (!)

9k uterine orifice only slightly diluted

15k fetus not turned downwards

16k not slided down for too long

18k child "stuck"

21k prolapsed cord

27k not slided down for too long

36k gestosis

ANNEX 7

TABULAR SUMMARY OF THE STATISTICAL FIGURES

LEGEND

<5	Number of expected frequencies <5
risc %	risc to have a certain medical intervention
95%l	lower 95% confidence interval
95%u	upper 95% confidence interval

$$\text{relative risc*} = \frac{\text{P med. interv. with osteopath. treatment}}{\text{P med. interv. without osteopath. treatment}}$$

*… reduced risk by preparatory measures or positions are marked with bold letters

Caesarian section:	no	yes	Chi²	P	<5	95%l	risc %	95%u	relative risc *
Birth preparation courses	59	6	0,705	0,401	1	4,3	9,2	18,7	-
no Birth preparation courses	7	0				0,0	0,0	35,4	
Pregnancy gymnastics	32	4	0,727	0,394	2	4,4	11,1	25,3	2,00
no Pregnancy gymnastics	34	2				1,5	5,6	18,1	
Shiatsu	7	0	0,705	0,401	1	0,0	0,0	35,4	**0,00**
no Shiatsu	59	6				4,3	9,2	18,7	
Acupuncture	25	3	0,340	0,560	2	3,7	10,7	27,2	1,57
no Acupuncture	41	3				2,3	6,8	18,2	
Yoga	17	2	0,162	0,687	2	2,9	10,5	31,4	1,39
no Yoga	49	4				3,0	7,5	17,9	
Belly dance	10	1	0,010	0,921	1	1,6	9,1	37,7	1,11
no Belly dance	56	5				3,6	8,2	17,8	
Perineal massage	44	5	0,703	0,402	2	4,4	10,2	21,8	2,35
no Perineal massage	22	1				0,8	4,3	21,0	
Relaxation exercises	21	2	0,006	0,939	2	2,4	8,7	26,8	1,07
no Relaxation exercises	45	4				3,2	8,2	19,2	
Bach flowers	4	2	5,355	0,020	1	9,7	33,3	70,0	5,50
no Bach flowers	62	4				2,4	6,1	14,6	
Aromatherapy	3	1	1,540	0,215	2	4,6	25,0	69,9	3,40
no Aromatherapy	63	5				3,2	7,4	16,1	
Teas	49	5	0,242	0,622	2	4,0	9,3	19,9	1,67
no Teas	17	1				1,0	5,6	25,8	
Homeopathy	22	3	0,674	0,411	2	4,2	12,0	30,0	1,88
no Homeopathy	44	3				2,2	6,4	17,2	
Osteopathy	35	1	2,909	0,088	2	0,5	2,8	14,2	**0,20**
no Osteopathy	31	5				6,1	13,9	28,7	
Specific deliveyhouse	27	1	1,360	0,244	2	0,63	3,57	17,71	**0,31**
Hospital	39	5				4,95	11,36	23,98	

Vacuum:	no	yes	Chi²	P	<5	95%l	risc %	95%u	relative risc *
Birth preparation courses	56	3	0,373	0,541	2	1,7	5,1	13,9	-
no Birth preparation courses	7	0				0,0	0,0	35,4	
Pregnancy gymnastics	31	1	0,289	0,591	2	0,6	3,1	15,7	**0,53**
no Pregnancy gymnastics	32	2				1,6	5,9	19,1	
Shiatsu	7	0	0,373	0,541	2	0,0	0,0	35,4	**0,00**
no Shiatsu	56	3				1,7	5,1	13,9	
Acupuncture	23	2	1,107	0,293	2	2,2	8,0	25,0	3,28
no Acupuncture	40	1				0,4	2,4	12,6	
Yoga	17	0	1,090	0,296	2	0,0	0,0	18,4	**0,00**
no Yoga	46	3				2,1	6,1	16,5	
Belly dance	10	0	0,561	0,454	2	0,0	0,0	27,8	**0,00**
no Belly dance	53	3				1,8	5,4	14,6	
Perineal massage	43	1	1,571	0,210	2	0,4	2,3	11,8	**0,25**
no Perineal massage	20	2				2,5	9,1	27,8	
Relaxation exercises	20	1	0,003	0,954	2	0,8	4,8	22,7	1,07
no Relaxation exercises	43	2				1,2	4,4	14,8	
Bach flowers	2	2	20,277	0,000	3	15,0	50,0	85,0	31,00
no Bach flowers	61	1				0,3	1,6	8,6	
Aromatherapy	3	0	0,150	0,700	3	0,0	0,0	56,2	**0,00**
no Aromatherapy	60	3				1,6	4,8	13,1	
Teas	48	1	2,750	0,097	2	0,4	2,0	10,7	**0,17**
no Teas	15	2				3,3	11,8	34,3	
Homeopathy	22	0	1,571	0,210	2	0,0	0,0	14,9	**0,00**
no Homeopathy	41	3				2,3	6,8	18,2	
Osteopathy	34	1	0,490	0,484	2	0,5	2,9	14,5	**0,44**
no Osteopathy	29	2				1,8	6,5	20,7	
Dorsal position	17	2	2,200	0,138	2	2,9	10,5	31,4	-
other Deliveryposition	46	1				0,4	2,1	11,1	
On the side	4	0	0,203	0,652	3	0,0	0,0	49,0	**0,00**
other Deliveryposition	59	3				1,7	4,8	13,3	
Half sitting position	12	0	0,698	0,403	2	0,0	0,0	24,3	**0,00**
other Deliveryposition	51	3				1,9	5,6	15,1	
Crouching position/obstetric stool	20	1	0,003	0,954	2	0,8	4,8	22,7	1,07
other Deliveryposition	43	2				1,2	4,4	14,8	
Upright kneeling position	4	0	0,203	0,652	3	0,0	0,0	49,0	**0,00**
other Deliveryposition	59	3				1,7	4,8	13,3	
Specific deliveyhouse	27	0	2,176	0,140	2	0,0	0,0	12,5	**0,00**
Hospital	36	3				2,7	7,7	20,3	

Forceps:	no	yes	Chi²	P	<5	95%l	risc %	95%u	relative risc *
Birth preparation courses	58	1	0,120	0,729	2	0,3	1,7	9,0	-
no Birth preparation courses	7	0				0,0	0,0	35,4	
Pregnancy gymnastics	32	0	0,956	0,328	2	0,0	0,0	10,7	**0,00**
no Pregnancy gymnastics	33	1				0,5	2,9	14,9	
Shiatsu	7	0	0,120	0,729	2	0,0	0,0	35,4	**0,00**
no Shiatsu	58	1				0,3	1,7	9,0	
Acupuncture	25	0	0,619	0,431	2	0,0	0,0	13,3	**0,00**
no Acupuncture	40	1				0,4	2,4	12,6	
Yoga	17	0	0,352	0,553	2	0,0	0,0	18,4	**0,00**
no Yoga	48	1				0,4	2,0	10,7	
Belly dance	10	0	0,181	0,670	2	0,0	0,0	27,8	**0,00**
no Belly dance	55	1				0,3	1,8	9,4	
Perineal massage	43	1	0,508	0,476	2	0,4	2,3	11,8	-
no Perineal massage	22	0				0,0	0,0	14,9	
Relaxation exercises	20	1	2,176	0,140	2	0,8	4,8	22,7	-
no Relaxation exercises	45	0				0,0	0,0	7,9	
Bach flowers	4	0	0,066	0,798	3	0,0	0,0	49,0	**0,00**
no Bach flowers	61	1				0,3	1,6	8,6	
Aromatherapy	3	0	0,048	0,826	3	0,0	0,0	56,2	**0,00**
no Aromatherapy	62	1				0,3	1,6	8,5	
Teas	48	1	0,352	0,553	2	0,4	2,0	10,7	-
no Teas	17	0				0,0	0,0	18,4	
Homeopathy	21	1	2,030	0,154	2	0,8	4,5	21,8	-
no Homeopathy	44	0				0,0	0,0	8,0	
Osteopathy	35	0	1,146	0,284	2	0,0	0,0	9,9	**0,00**
no Osteopathy	30	1				0,6	3,2	16,2	
Dorsal position	18	1	2,512	0,113	2	0,9	5,3	24,6	-
other Deliveryposition	47	0				0,0	0,0	7,6	
On the side	4	0	0,066	0,798	3	0,0	0,0	49,0	**0,00**
other Deliveryposition	61	1				0,3	1,6	8,6	
Half sitting position	12	0	0,226	0,635	2	0,0	0,0	24,3	**0,00**
other Deliveryposition	53	1				0,3	1,9	9,8	
Crouching position/obstetric stool	21	0	0,474	0,491	2	0,0	0,0	15,5	**0,00**
other Deliveryposition	44	1				0,4	2,2	11,6	
Upright kneeling position	4	0	0,066	0,798	3	0,0	0,0	49,0	**0,00**
other Deliveryposition	61	1				0,3	1,6	8,6	
Specific deliveyhouse	39	0	1,467	0,226	2	0,0	0,0	9,0	**0,00**
Hospital	26	1				0,7	3,7	18,3	

Episiotomy:	no	yes	Chi²	P	<5	95%l	risc %	95%u	relative risc *
Birth preparation courses	42	13	0,311	0,577	1	14,4	23,6	36,3	1,65
no Birth preparation courses	6	1				2,6	14,3	51,3	
Pregnancy gymnastics	23	8	0,369	0,544	0	13,7	25,8	43,2	1,33
no Pregnancy gymnastics	25	6				9,2	19,4	36,3	
Shiatsu	6	1	0,311	0,577	1	2,6	14,3	51,3	**0,60**
no Shiatsu	42	13				14,4	23,6	36,3	
Acupuncture	18	5	0,015	0,903	0	9,7	21,7	41,9	**0,94**
no Acupuncture	30	9				12,6	23,1	38,3	
Yoga	15	2	1,567	0,211	1	3,3	11,8	34,3	**0,44**
no Yoga	33	12				16,0	26,7	41,0	
Belly dance	8	2	0,045	0,831	1	5,7	20,0	51,0	**0,87**
no Belly dance	40	12				13,7	23,1	36,1	
Perineal massage	35	7	2,605	0,107	1	8,3	16,7	30,6	**0,48**
no Perineal massage	13	7				18,1	35,0	56,7	
Relaxation exercises	16	3	0,723	0,395	1	5,5	15,8	37,6	**0,62**
no Relaxation exercises	32	11				14,9	25,6	40,2	
Bach flowers	1	1	0,889	0,346	2	9,5	50,0	90,5	2,31
no Bach flowers	47	13				13,1	21,7	33,6	
Aromatherapy	2	1	0,209	0,648	2	6,1	33,3	79,2	1,51
no Aromatherapy	46	13				13,4	22,0	34,1	
Teas	38	9	1,309	0,253	1	10,4	19,1	32,5	**0,57**
no Teas	10	5				15,2	33,3	58,3	
Homeopathy	17	4	0,227	0,634	1	7,7	19,0	40,0	**0,78**
no Homeopathy	31	10				13,8	24,4	39,3	
Osteopathy	29	5	2,671	0,102	0	6,4	14,7	30,1	**0,46**
no Osteopathy	19	9				17,9	32,1	50,7	
Dorsal position	7	9	13,984	0,000	1	33,2	56,3	76,9	5,18
other Deliveryposition	41	5				4,7	10,9	23,0	
On the side	4	0	1,247	0,264	2	0,0	0,0	49,0	**0,00**
other Deliveryposition	44	14				15,0	24,1	36,5	
Half sitting position	7	5	3,100	0,078	1	19,3	41,7	68,0	2,31
other Deliveryposition	41	9				9,8	18,0	30,8	
Crouching position/obstetric stool	20	0	8,611	0,003	1	0,0	0,0	16,1	**0,00**
other Deliveryposition	28	14				21,0	33,3	48,4	
Upright kneeling position	4	0	1,247	0,264	2	0,0	0,0	49,0	**0,00**
other Deliveryposition	44	14				15,0	24,1	36,5	
Specific deliveyhouse	24	2	5,678	0,017	0	2,1	7,7	24,1	**0,23**
Hospital	24	12				20,2	33,3	49,7	

Sutured perineal tear:	no	yes	Chi²	P	<5	95%l	risc %	95%u	relative risc *
Birth preparation courses	39	16	0,001	0,977	2	18,8	29,1	42,1	1,02
no Birth preparation courses	5	2				8,2	28,6	64,1	
Pregnancy gymnastics	23	8	0,313	0,576	0	13,7	25,8	43,2	**0,80**
no Pregnancy gymnastics	21	10				18,6	32,3	49,9	
Shiatsu	4	3	0,732	0,392	2	15,8	42,9	75,0	1,57
no Shiatsu	40	15				17,3	27,3	40,2	
Acupuncture	19	4	0,240	0,121	0	7,0	17,4	37,1	**0,48**
no Acupuncture	25	14				22,7	35,9	51,6	
Yoga	12	5	0,002	0,968	1	13,3	29,4	53,1	1,02
no Yoga	32	13				17,7	28,9	43,4	
Belly dance	9	1	2,096	0,148	1	1,8	10,0	40,4	**0,31**
no Belly dance	35	17				21,5	32,7	46,2	
Perineal massage	30	12	0,013	0,908	0	17,2	28,6	43,6	**0,95**
no Perineal massage	14	6				14,5	30,0	51,9	
Relaxation exercises	12	7	0,811	0,368	0	19,1	36,8	59,0	1,44
no Relaxation exercises	32	11				14,9	25,6	40,2	
Bach flowers	1	1	0,441	0,507	2	9,5	50,0	90,5	1,76
no Bach flowers	43	17				18,5	28,3	40,8	
Aromatherapy	1	2	2,167	0,141	2	20,8	66,7	93,9	2,46
no Aromatherapy	43	16				17,4	27,1	39,6	
Teas	35	12	1,155	0,282	1	15,3	25,5	39,5	**0,64**
no Teas	9	6				19,8	40,0	64,3	
Homeopathy	15	6	0,003	0,954	0	13,8	28,6	50,0	**0,98**
no Homeopathy	29	12				17,6	29,3	44,5	
Osteopathy	25	9	0,240	0,624	0	14,6	26,5	43,1	**0,82**
no Osteopathy	19	9				17,9	32,1	50,7	
Dorsal position	14	2	2,861	0,091	1	3,5	12,5	36,0	**0,36**
other Deliveryposition	30	16				22,7	34,8	49,2	
On the side	4	0	1,749	0,186	2	0,0	0,0	49,0	**0,00**
other Deliveryposition	40	18				20,6	31,0	43,8	
Half sitting position	9	3	0,117	0,732	1	8,9	25,0	53,2	**0,83**
other Deliveryposition	35	15				19,1	30,0	43,8	
Crouching position/obstetric stool	9	11	9,663	0,002	0	34,2	55,0	74,2	3,30
other Deliveryposition	35	7				8,3	16,7	30,6	
Upright kneeling position	4	0	1,749	0,186	2	0,0	0,0	49,0	**0,00**
other Deliveryposition	40	18				20,6	31,0	43,8	
Specific deliveyhouse	16	10	1,932	0,165	0	22,4	38,5	57,5	1,73
Hospital	28	8				11,7	22,2	38,1	

Sutured perineal injuries:	no	yes	Chi²	P	<5	95%l	risc %	95%u	relative risc *
Birth preparation courses	26	29	0,242	0,623	2	39,8	52,7	65,3	1,23
no Birth preparation courses	4	3				15,8	42,9	75,0	
Pregnancy gymnastics	15	16	0,000	1,000	0	34,8	51,6	68,0	**1,00**
no Pregnancy gymnastics	15	16				34,8	51,6	68,0	
Shiatsu	3	4	0,097	0,756	2	25,0	57,1	84,2	1,12
no Shiatsu	27	28				38,1	50,9	63,6	
Acupuncture	14	9	2,281	0,131	0	22,2	39,1	59,2	**0,66**
no Acupuncture	16	23				43,4	59,0	72,9	
Yoga	10	7	1,022	0,312	0	21,6	41,2	64,0	**0,74**
no Yoga	20	25				41,2	55,6	69,1	
Belly dance	7	3	2,230	0,135	1	10,8	30,0	60,3	**0,54**
no Belly dance	23	29				42,3	55,8	68,4	
Perineal massage	23	19	2,119	0,146	0	31,2	45,2	60,1	**0,70**
no Perineal massage	7	13				43,3	65,0	81,9	
Relaxation exercises	9	10	0,011	0,915	0	31,7	52,6	72,7	1,03
no Relaxation exercises	21	22				36,8	51,2	65,4	
Bach flowers	0	2	1,938	0,164	2	34,2	100,0	100,0	2,00
no Bach flowers	30	30				37,7	50,0	62,3	
Aromatherapy	0	3	2,956	0,086	2	43,8	100,0	100,0	2,03
no Aromatherapy	30	29				36,8	49,2	61,6	
Teas	26	21	3,738	0,053	0	31,4	44,7	58,8	**0,61**
no Teas	4	11				48,0	73,3	89,1	
Homeopathy	11	10	0,203	0,652	0	28,3	47,6	67,6	**0,89**
no Homeopathy	19	22				38,7	53,7	67,9	
Osteopathy	20	14	3,283	0,070	0	26,4	41,2	57,8	**0,64**
no Osteopathy	10	18				45,8	64,3	79,3	
Dorsal position	5	11	2,536	0,111	0	44,4	68,8	85,8	1,51
other Deliveryposition	25	21				32,2	45,7	59,8	
On the side	4	0	4,561	0,033	2	0,0	0,0	49,0	**0,00**
other Deliveryposition	26	32				42,5	55,2	67,3	
Half sitting position	4	8	1,350	0,245	0	39,1	66,7	86,2	1,39
other Deliveryposition	26	24				34,8	48,0	61,5	
Crouching position/obstetric stool	9	11	0,136	0,713	0	34,2	55,0	74,2	1,10
other Deliveryposition	21	21				35,5	50,0	64,5	
Upright kneeling position	4	0	4,561	0,033	2	0,0	0,0	49,0	**0,00**
other Deliveryposition	26	32				42,5	55,2	67,3	
Specific deliveyhouse	14	12	0,534	0,465	0	28,8	46,2	64,5	**0,83**
Hospital	16	20				39,6	55,6	70,5	

Med. Interventions:	no	yes	Chi²	P	<5	95%l	risc %	95%u	relative risc *
Birth preparation courses	16	20	0,188	0,664	0	39,6	55,6	70,5	**0,93**
no Birth preparation courses	26	39				47,9	60,0	71,0	
Pregnancy gymnastics	16	20	0,057	0,812	0	39,6	55,6	70,5	**0,95**
no Pregnancy gymnastics	15	21				42,2	58,3	72,9	
Shiatsu	3	4	0,005	0,946	2	25,0	57,1	84,2	**0,98**
no Shiatsu	27	38				46,3	58,5	69,6	
Acupuncture	14	14	1,309	0,253	0	32,6	50,0	67,4	**0,79**
no Acupuncture	16	28				48,9	63,6	76,2	
Yoga	10	9	1,277	0,258	0	27,3	47,4	68,3	**0,76**
no Yoga	20	33				48,8	62,3	74,1	
Belly dance	7	4	2,578	0,108	1	15,2	36,4	64,6	**0,58**
no Belly dance	23	38				49,7	62,3	73,4	
Perineal massage	23	26	1,754	0,185	0	39,4	53,1	66,3	**0,76**
no Perineal massage	7	16				49,1	69,6	84,4	
Relaxation exercises	9	14	0,089	0,765	0	40,8	60,9	77,8	1,07
no Relaxation exercises	21	28				43,3	57,1	70,0	
Bach flowers	0	6	4,675	0,031	2	61,0	100,0	100,0	1,83
no Bach flowers	30	36				42,6	54,5	66,0	
Aromatherapy	0	4	3,025	0,082	2	51,0	100,0	100,0	1,79
no Aromatherapy	30	38				44,1	55,9	67,1	
Teas	26	28	3,733	0,053	0	38,9	51,9	64,6	**0,67**
no Teas	4	14				54,8	77,8	91,0	
Homeopathy	11	14	0,086	0,770	0	37,1	56,0	73,3	**0,94**
no Homeopathy	19	28				45,3	59,6	72,4	
Osteopathy	15	21	1,532	0,216	0	42,2	58,3	72,9	**0,81**
no Osteopathy	10	26				56,0	72,2	84,2	
Dorsal position	5	16	3,890	0,049	0	54,9	76,2	89,4	1,49
other Deliveryposition	25	26				37,7	51,0	64,1	
On the side	4	0	5,929	0,015	2	0,0	0,0	49,0	**0,00**
other Deliveryposition	26	42				49,9	61,8	72,4	
Half sitting position	4	8	0,411	0,521	0	39,1	66,7	86,2	1,18
other Deliveryposition	26	34				44,1	56,7	68,4	
Crouching position/obstetric stool	9	13	0,007	0,931	0	38,7	59,1	76,7	1,02
other Deliveryposition	21	29				44,2	58,0	70,6	
Upright kneeling position	4	0	5,929	0,015	2	0,0	0,0	49,0	**0,00**
other Deliveryposition	26	42				49,9	61,8	72,4	
Specific deliveyhouse	14	14	1,309	0,253	0	32,6	50,0	67,4	**0,79**
Hospital	16	28				48,9	63,6	76,2	

Labour:	no	yes	Chi²	P	<5	95%l	risc %	95%u	relative risc *
Birth preparation courses	32	33	0,103	0,749	2	38,9	50,8	62,5	0,89
no Birth preparation courses	3	4				25,0	57,1	84,2	
Pregnancy gymnastics	17	19	0,056	0,814	0	37,0	52,8	68,0	**1,06**
no Pregnancy gymnastics	18	18				34,5	50,0	65,5	
Shiatsu	3	4	0,103	0,749	2	25,0	57,1	84,2	**1,13**
no Shiatsu	32	33				38,9	50,8	62,5	
Acupuncture	9	19	4,974	0,026	0	49,3	67,9	82,1	**1,66**
no Acupuncture	26	18				27,7	40,9	55,6	
Yoga	12	7	2,186	0,139	0	19,1	36,8	59,0	0,65
no Yoga	23	30				43,3	56,6	69,0	
Belly dance	8	3	3,023	0,082	0	9,7	27,3	56,6	0,49
no Belly dance	27	34				43,3	55,7	67,5	
Perineal massage	22	27	0,847	0,358	0	41,3	55,1	68,1	**1,27**
no Perineal massage	13	10				25,6	43,5	63,2	
Relaxation exercises	11	12	0,008	0,927	0	33,0	52,2	70,8	**1,02**
no Relaxation exercises	24	25				37,5	51,0	64,4	
Bach flowers	4	2	0,854	0,355	2	9,7	33,3	70,0	0,63
no Bach flowers	31	35				41,2	53,0	64,6	
Aromatherapy	4	0	4,477	0,034	2	0,0	0,0	49,0	0,00
no Aromatherapy	31	37				42,7	54,4	65,7	
Teas	27	27	0,167	0,683	0	37,1	50,0	62,9	0,90
no Teas	8	10				33,7	55,6	75,4	
Homeopathy	10	15	1,137	0,286	0	40,7	60,0	76,6	**1,28**
no Homeopathy	25	22				33,3	46,8	60,8	
Osteopathy	15	21	1,390	0,238	0	42,2	58,3	72,9	**1,31**
no Osteopathy	20	16				29,5	44,4	60,4	