THE IMPORTANCE OF PEDIATRIC ORTHOPEDICS IN OSTEOPATHY

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JUNE 3, 2022

SUMMARY

One of the most important things parents and other family and friends can do for kids with an orthopedic ailment is learn how to support their child. Injuries, illnesses, and medical conditions can cause anxiety and depression in kids and knowing how to support children is an important role for parents to take.

There is little that causes more fear in a parent than an injured or sick child. Fortunately, most orthopedic ailments in kids are temporary frustrations. A child's skeleton has a tremendous ability to heal after trauma, to recover from injury, and to tolerate treatments.

Parents are best served by taking their children's conditions seriously to ensure they are getting the right treatment and then listening to their child to ensure they have the emotional support to recover from their condition

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INTRODUCTION

ORTHOPEDIA

Whether it's a broken bone after a fall off their bike, a sore knee from too much sports activity, or a growth abnormality that causes a parent to be concerned, kids are prone to many types of orthopedic problems. Given the differences in the bodies of children and adults, the specialized area of medicine known as pediatric orthopedics focuses on the care of bone and joint problems in still-developing bodies.

Childhood Orthopedic Conditions
Some of the more common conditions seen in children include:
Broken bones
Spinal deformities (scoliosis)
Limping and gait abnormalities
Infections of bones and joints
Painful joints after sports and activity

In addition, there are some orthopedic conditions that occur in specific age groups, such as in newborns.

Unique Aspects of Orthopedic Care for Kids
Sometimes kids thought of as small adults. When it comes to bones, that is not the case, and there are special considerations that need to be taken into consideration when treating orthopedic issues in children.
Children are growing, often very quickly, and the areas where bone is growing most quickly, called the growth plate, can be susceptible to injury. A child's bone is also more elastic (it can bend, without breaking all the way through) and has a capacity to remodel over time.

While healing of a growth plate injury often occurs very quickly because of the rapid growth occurring at that site, a doctor will need to ensure the growth plate was not damaged or if special treatment of that growth plate is needed.
Unrecognized injuries to a growth plate can lead to growth abnormalities such as early closure of the growth plate, or abnormal growth of the bone.
It's also important that any age-specific lifestyle concerns or long-term issues related to a pediatric orthopedic condition are considered, especially when weighing treatment options.

For example:
Does the child need to restrict her activities? If so, how so and for how long
Should she avoid specific sports, running, or jumping?
Will the condition affect further growth and development?
Is the condition likely to lead to long-term problems or require further treatment?
Could this lead to any future limitations?

Kids are often less able than adults to express their symptoms or fears in a way that can be easily understood. Physicians treating young children with orthopedic issues, need to

be skilled in extracting information about a child's condition, even in situations where they may not be able to ask simple medical questions, such as "where does it hurt?"

Who Treats Pediatric Orthopedic Issues
Not every bone problem requires the care of a pediatric orthopedic specialist. Many problems are well taken care of by general orthopedists, pediatricians, or emergency care providers. However, when the problem is more complex, a pediatric orthopedic surgeon may be called in to help.
Pediatric orthopedic surgeons have received specialty training in the management of bone and joint problems in children.

The importance of Pediatric Orthopedics cannot be stressed enough. We all know the saying, “Kids will be kids.” A child does not always understand what pain is telling them, or the extent of their injury. They simply see trees to climb, puddles to jump in, and pets to chase. Despite the possibility of pain or injury, children are constantly going through growth spurts that may also present orthopedic challenges.
There are several musculoskeletal reasons why you may need to take your child to see a doctor that specializes in Pediatric Orthopedics.

Broken Bones
In the pediatric population, a broken bone poses a potential risky situation. Some bones don’t fully mature until the end of puberty. If your child suffers from a broken bone, they may have injured one of their growth plates. It is important to see a Pediatric Orthopedic doctor for a proper assessment and plan of care to avoid long lasting impairments by ensuring the bone heals in a straight and stable position.

Limb or Spinal Deformity
Unfortunately, deformities may be present at birth, or they may develop later in childhood. Some examples are scoliosis and clubfoot. No matter what the time frame or diagnosis is, a Pediatric Orthopedic will be able to decide if surgery, braces, or occupational or physical therapy can help improve the deformity to avoid lifelong pain or disability.

Hip Dysplasia
Hip dysplasia, an unstable hip joint, can cause long term problems if not treated properly right away. There is the potential for long term hip pain, weakness, uneven leg lengths, and even the risk of early onset of arthritis. A visit with a Pediatric Orthopedic doctor will ensure there are no long-term dysfunctions.
Broken bones, deformities, and hip dysplasia barely begin to cover what Pediatric

Some other pediatric specific diagnoses include:
Slipped Capital Femoral Epiphysis
Perthes Disease
Spina Bifida
Toe Walking

THE IMPORTANCE OF PEDIATRIC ORTHOPEDICS IN OSTEOPATHY

When looking at the scope of osteopathic practice, the physical examination will need to include more than just a musculoskeletal assessment. Ideally the osteopathic pediatric assessment should be an integration of Osteopathic as well as orthopedic, orthodontic, optometric screening procedures.
Osteopathic sources describe how somatic dysfunction may be an influencing factor in relation to several different areas of disease. Authors as Jane Carreiro (2003), Ward (1997), Barral and Mercier (1998), Stone 2001 have described the role of somatic dysfunction in relation to visceral disease. Both Magoun (1976) and Fryman (1976) mentioned the potential effects of cranial articulation dysfunction on the subsequent growth and development of the cranium and the face.
An assessment of active range of motion (AROM): this is a movement initiated by muscular activity and consciously acts out by the patient.
The evaluation of passive range of motion (PROM): in this case the motion is induced and performed by the practitioner. The end feel of the induce motion (motion barrier) gives important diagnostic clues as to e type of tissue dysfunction present.
An assessment of the inherent motion (IM): is the sensation of a motion which is being generated unconsciously, within the body (Goodrige 1986). IM occurs at a cellar or sub cellular level and to be of biochemical origin. It could be caused by the occurrence of multiple electrical patterns of activity, or it may be the combined result of circulatory and electrical activities in the body. Involuntary motion has been described as exhibiting different cyclical patterns, which occurs in the body simultaneously but are measured at different rates per minute. Sutherland (1990) described this involuntary activity in the body as the action of primary respiratory mechanism which occurs independently from the heartbeat and the respiration. The clinical assessment of IM includes palpatory findings such as an alteration of the quality, the amplitude and direction of inherent motion. IM can be palpated in relation to all tissues of the body. This includes structures of the body, such as the vault, the cranium, the face, the viscera, and the rest of the body including the spine, trunk and extremities.

THE MUSCULOSKELETAL ASSESSMENT

When looking to assess the musculoskeletal system, it's needed to differentiate whether the youngster's symptoms are caused by a neurological, pathological, orthopedic, or musculoskeletal condition, or whether they are benign in origin. Common causes of musculoskeletal pain and movement dysfunction are:
Inflammation (local or systemic)
Growing pains
Somatic
Trauma
Joint pathology (Perthes, slipped capital epiphyses, inflammatory or infectious disease)
Referred pain (nerve root, joint pathology, visceral)
Infection (osteomyelitis, progenitor arthritis)
Tumor, cyst (benign, malignant, or metastatic)
Hematological disorders (hemophilia)

Immunodeficiency pies
Cystic fibrosis
Psychological (family stress, abuse, abnormally symbiotic parent-child relationship)
Neuropathy (cerebral palsy, hypotonia)
Myopathy (myasthenia gravis)
If a youngster displays aberrant patterns of movement, it should be determined whether at a protective reaction to pain, or whether is evidence of any neurological dysfunction.

The musculoskeletal examination of the child includes an orthopedic assessment as well as an osteopathic evaluation of the biomechanical function of the body. Diagnose any structural asymmetry, as well as assessing the youngster for any restrictions of motion. Start by observing the child's active movements and postural habits. Continue the examination by evaluating local regions of the body, including the range of motion and restrictions of individual joints.

The routine examination of the musculoskeletal system of the child includes
Assessment of gait of anatomical landmarks for symmetry and position.
Dynamic assessment of individual segmental mobility.
Assessment of somatic dysfunction as a contributing factor.
Evaluation of pain and discomfort suffered by the child orthopedic tests.
Referral for further investigation including blood tests and imaging such as X-Ray, MRI and ultrasound or specialist referral.
It's needed to be noticed that this musculoskeletal examination it should be performed as an integrated part of the medical and neurodevelopmental assessment of the child.

ORTHOPEDICS AND OSTEOPATHY

Common Orthopedics Conditions

Babies and young children are often presented on account of asymmetries of the head (plagiocephaly), the neck (torticollis) and the body (such as scoliosis). In small children these asymmetries may cause immediate symptoms. This can predispose to the development of other postural abnormalities or scoliosis with its known damaging effects. As a general rule, osteopathic treatment can be beneficial here, and guard the child from late sequelae.
In more severe cases as craniosynostosis and hip dysplasia, osteopathy will improve both the general health and bring positive changes in the tissues of the problematical area.
Older children are often presented because of malposition of the spine, pelvis, knee or feet. At this time, these deviations from the normal position are often, although not always, asymptomatic. But if left untreated can lead to muscular pain and premature osteoarthrosis. Osteopathy treatments are successfully used to treat functional disturbances of the spine, abut they can also be of help in pathological conditions.

Often children with lower extremities disorders are brought to the osteopath, because the importance of properly functioning legs are a prerequisite for normal walking, running, hopping and jumping, or even for more demanding movements as dancing gymnastics exercises or sporting activities. When treating the legs, the body´s proprioceptive system is also addressed. The feet, the interosseous membrane of the lower leg and the lumbar fascia deserve special mention here as they are particularly rich in proprioceptors. Normalization of these tissues usually reduces atypical feedback mechanisms, which could worsen any functional disorder of the lower extremities still further.

Worried parents often ask us to examine their children's feet because of a pigeon-toed or flat feet. This has a developmental psychological stage origin, and normally don't need treatment, but in some cases, examination uncover delayed development of the normal axial changes of the legs, or in the development of the plantar arches. Osteopathic treatment can be very helpful in functional problems. Early and consistent treatment can then prevent the child developing structural deformities during growth. But even in pathological conditions, osteopathic treatments can often considerably lessen deformity.
Children with disorders such as Perthes disease, slipped capital femoral epiphysis or juvenile rheumatoid arthritis are less often brought to osteopathic treatment. This is not easy to treat, it might be more of a part of a more comprehensive plan of treatment. Therefore it´s important to work along with orthopedic consultants and doctors. To say is that two therapeutic approaches are particularly useful for children with orthopedic conditions: intraosseous work (Intraosseous strains) and treatment of the blood vessels.

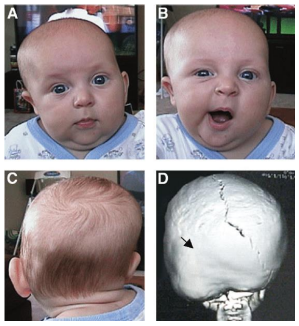
Intraosseous treatment

To decompress an intraosseous lesson pattern, one must place oneself inside the interior of the bone; that is, inside the bone marrow and the bone matrix. To achieve it may be helpful to bring to mind how bone has come into being.

The principle of this type of treatment is lighter the touch, the deeper the contact. Hold the bone quite gently. If The work is forcefully, the bone will probably be itself to protect itself from e practitioner. With children is generally possible to obtain a decompression of the bone by being very gentle. Lesion will resolve spontaneously. In some cases, however, a greater expenditure of effort is required, appropriate to the tissue tension in the relevant case.

Treatment of the blood vessels
For Dr. Still, treatment of the blood vessels was special concern (1910). One of his favorites mottoes was: The rule of e artery is supreme. Osteopathic treatment of the blood vessels is one way to improve blood supply. It can definitely benefit many orthopedic conditions. Blood vessels are large muscular structures with an enormous vital potential. They are no more difficult to palpate than the pituitary through the bony cranium, during palpating, one has only to concentrate consciously on the blood vessel and to turn one's attention away from other structures.

PLAGIOCEPHALY
The name Plagiocephaly comes from the Greek and means crooked head (from Plagios =crooked and kephale=head). In Plagiocephaly the two parts of the cranium visibly differ from each other, and the cranium is often completely asymmetrical, with flattening and bulging areas.



ETHIOLOGY AND PATHOGENESIS
In some cases, is caused by the strong molding of an asymmetric uterus. A deformation of the child's head can also ensue from a difficult labor, especially if delivery is with the aid of ventouse or forceps. A marked asymmetry may occur when the child's ability to self correct his cranium is restricted because a difficult delivery. A normal birth does not, result in Plagiocephaly.
In premature births the risk of deformity to the child's head increases because the bones will be still very soft and malleable at the time of birth. Also, these Babies can develop Plagiocephaly postnatally, from not having their position alternated enough. As premature babies are usually moved as little as possible, especially in the intensive unit care, the head often stays in the same position for a long period of time.
Another cause that is connected with intrauterine position is craniosynostosis, as well the supine position, to decrease the risk of sudden infant death can arise as a mild Plagiocephaly, a typical flattening occiput is found.

CLINICAL SIGNS AND SYMPTOMS

Inspection of the cranial values is very much flattened whereas another part has an unusual bulge. The cranium shows the typical parallelogram head, an asymmetric head shape viewed from above. The position of eyes and ears can differ greatly from one side to another.

In craniosynostosis it can be found a protuberance of the affected cranial suture or abnormal hair growth. Plagiocephaly can also be found in older children with idiopathic scoliosis, it can be possibly have been a cause of this form of scoliosis.

DIAGNOSIS

Includes inspection and palpate on of the cranial bones with reference to their position, and palpating of the cranial sutures and fontanelles. To rule out craniosynostosis or torticollis, a careful, examination of the head, cranial sutures, neck and specially the sternocleidomastoid muscle is needed.

OSTEOPATHIC EXAMINATION

It includes palpation of the head with the aid of involuntary motion. Special attention to intraosseous restrictions and strain patterns of the cranial base.

TREATMENT

Allopathic medical treatment

Helmet therapy is being used. As with osteopathic treatment the results are best if it is started before the age of 6 months and applied within the first 12 months of life.in extreme cases combination of both therapies may be useful.

OSTEOPATHIC TREATMENT

PRIMARY PLAGIOCEPHALY

Intrauterine molding and extreme forces in labor as in an especially lengthy birth, above all if it was ended with forceps or ventouse, are primarily the cause of Plagiocephaly. Fluid field may be distributed by the difficult labor, and distortions occur at the cranial base.

SECONDARY PLAGIOCEPHALY

This is a secondary cranial asymmetry which has other underlying causes. It generally develops more slowly and therefore often does not appear for some weeks or months. Here the causative factors must always be treated and eliminated as far as possible. For instance, one reason could be a lesion in C1 fixing the head in a unilateral rotation, leading to a corresponding malformation of the head.

Problems in the area of sternocleidomastoid muscle, like torticollis, can lead to secondary Plagiocephaly.

With positional flattening of the occiput, it is important to point out that the prone position promotes the development of the arm and legs muscles but also completes the shaping of the occipital bone through the increased use of the erector spinae muscles.

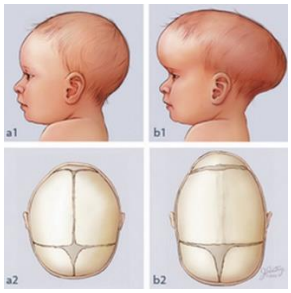
PROGNOSIS

Depends on several factors, the severity of the pathology, the cause and the time treatment begin. The results are better if treatment starts as soon as possible and in the first months of life. Especially if it is suspected that changes in head shape is caused by the position in Utero.

In mild and moderate cases a satisfactory resolution can be expected with osteopathic treatment. The course of treatment may last between 12 and 18 months, after that it's recommended 6 monthly check ups until the situation is stabilized. At every visit the whole spine most be examined to rule out a secondary scoliosis.

CRANIOSYNOSTOSIS

Craniosynostosis is the premature closure of the cranial sutures and fontanelles, leading to abnormal head shapes, depending on the site affected.



ETIOLOGY AND PATHOGENESIS
Genetic causes play an important role in some types of craniosynostosis if it's found as part of a syndrome. Most genetic forms are dominant, an affected person has a 50% cancer to heritage this to his or her children.
One of the external (non genetic) causes is compassion of the child's cranium in Utero, as in multiple pregnancies or if the mother has myomas. Carreiro (2004) regards strain patterns in the cranial base as causative, leading to abnormal mechanical stretching forces on the vault. In her opinion, the premature ossification of the sutures arises from these powerful stretching forces, not from a compression in the reducing of the suture. Certain diseases, such as hyperthyroidism, thalassemia or sickle cell anemia, are associated with the increased risk of craniosynostosis.

CLINICAL SIGNS AND SYMPTOMS
From a medical point of view, the main concern is that a premature fusion of the cranial sutures will not allow sufficient space for the growing brain. The result can be an increase in intracranial pressure with severe neurological consequences.
The most obvious clinical finding is a change in the shape of the head. Normally is the growth of the brain at determines the shape of the head. Growth takes place at an angle of 90 degrees to the direction of he suture. If the suture fused prematurely this growth is not possible.
Therefore the premature fusion of the Sagittal suture will prevent the width ways growth of the cranium. This is the most common, occurring in about 55% of cases and more affected the boys. The second most common, at about 20%, is a synostosis of the coronal suture, which prevents cranial growth lengthwise. Therefore the cranium grows width ways and a brachycephaly occurs (short or broad head). Bilateral coronal suture synostosis is more common in Crouzon and Apert syndromes.

If only part of sutures fuses this can lead to an asymmetrical cranial shape, Plagiocephaly.

DIAGNOSIS

With any asymmetry, the sutures are carefully palpated to fell for any ridge like thickening and to ascertain the size of the fontanelles. The head circumference is measured at regular intervals to see whether head growth is lagging.

In an allopathic diagnosis X-rays are done to ascertain where the sutures have fused prematurely, and a CCT is carried out to rule out Brain abnormalities.

OSTEOPATHIC EXAMINATION

Palpation with e aid if involuntary motion often Reveals marked local intraosseous lesions or generalized global compression patterns. The extent of premature fusion determined whether osteopathic treatment is given first or whether an operation is necessary.

TREATMENT

Allopathic medical treatment, it is usual to wait and observe the growth of the head. If craniosynostosis associated with plagiocephaly, helmet therapy may be suggested.

If there is a risk of elevated pressure on the brain, an operation is usually done in the 1st year of life. The ossified sutures are removed, retaining the dura mater, and the cranial bones remodelled.

OSTEOPATHIC TREATMENT

In milder forms of craniosynostosis, where no operation is needed, osteopathic treatment may be very useful.

On the cranium the work is, both the head and the body, (lesions of the reciprocal tension membrane, of the vault and of the cranial base are treated) and also on the affected suture.

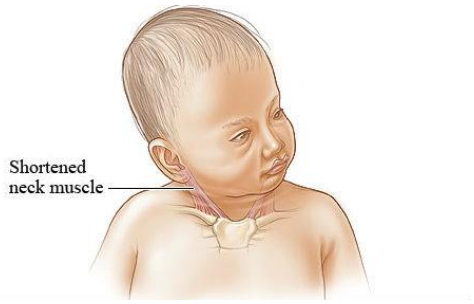
Even though the cranial base is often a problem zone, the pathological suture must be treated directly. Doing the de-molding of the bones by using shaping techniques, for example, with the parietal bones by placing the fingertips around the parietal eminence and encouraging the bones expand. During the cycle of treatment, one must in every case document cranial growth (this can of curse be done by the pediatrician) and watch carefully to see whether the child develops normally.

PROGNOSIS

Frequent and regular treatment over a fairy long period of time is often appropriate. If one can restore function and mobility in the region of the premature sutural fusion, a favorable change in the shape of the head follows.

TORTICOLLIS

Muscular torticollis (muscular wry neck) is a widespread fixed malposition of the head. It leads to an inclination towards the affected side and rotation of the head towards the other side.
Plagiocephaly and a faulty development of the cervical spine or viscerocranium may ensue.
If the torticollis is caused by a spasm or contracture without pathological changes in the muscle tissue it is termed a functional torticollis.



ETHIOLOGY AND PATHOGENESIS
Muscular torticollis arises from a shortening of the connective tissue in the sternocleidomastoid muscle. The causes may be:
*Genetic factors, malformations
*Injuries to the muscle from stretching, strain or rupture of the belly of the muscle with hematoma formation and subsequent scarring. This can be originated from a difficult labor, for instance, if the child´s head move forward well in the birth canal but the shoulders were stuck (the opposing forces of the emerging head and the wedged shoulders may the lead to a muscular rupture) or from the pulling in a birth finished with the help of forceps or ventouse.
*A prolonged intrauterine forced posture of the head and neck, in which the scalene musculature may also be involved.

CLINICAL SIGNS AND SYMPTOMS
In mild cases of torticollis the affected child prefers to turn his head in one direction but can also turn in the other.
In more severe cases the child shows the typical head posture and cannot turn his head in both directions, the mobility of the cervical spine is restricted. In babies, nursing at the at the breast in the direction in which the child does not like to turn his head can be more difficult. In addition, a C-shaped curvature of the body may also be present.
In older children, in whom this condition has been present for a longer time, adaptive asymmetries have often already developed in the cranium and body, such as scoliosis of the viscerocranium, the cervical or the whole spine.
Sometimes a swelling about the size of a cherry is palpable in the distal sternocleidomastoid muscle from the 2nd week of life, later on the muscle is thick and stringy both on inspection and palpation.

DIFFERENTIAL DIAGNOSIS

The differential diagnoses to be considered are:

*Acute wry neck, which is produced by a lesion in the cervical spine. In adolescents this can also occur as psychogenic torticollis with emotional stress. This is attributable toa a well-compensated dysfunctional area in the cervical spine. If there is increased tension in the region of the mediastinum or the diaphragm (for emotional reasons), the cervical spine decompensates.

*Bony malformations, as in Klippel-Feil syndrome (congenital fusion of two cervical vertebrae), Sprengel deformity (congenital elevation/ upward displacement of the scapula), atlas assimilation or a unilateral cervical rib.

*Ocular causes, such as a unilateral paresis of the superior oblique muscle and consequent squinting to avoid seeing double.

*Otogenic causes.

*Benign tumor in the muscle.

*Secondary to an infection of the nasopharyngeal space.

DIAGNOSIS

First inspect the face, cranium, neck, and the whole-body posture. Observe the spontaneous, active movements. How far the child moves his head in each direction? Palpate the sternocleidomastoid muscle and the scalene muscles and passive movement test of all neck muscles.

In functional torticollis the muscle is in spasm, but the belly of the muscle shows no abnormalities. Usually, the head can be turned in both directions by gentle passive movement. In torticollis due to muscle rupture one can palpate a hardening in the belly of the muscle which stems from a hematoma. In the first weeks after birth, it is possible to feel something hard and gel-like in the area of the injury. The ability to rotate to the side opposite the injury is severely restricted.

If a tumor is the cause of torticollis, a nodule can be palpated. On passive movements towards the opposite side will be a great resistance. If a nodule is palpated the patient must be referred to a specialist.

ALLOPATIC DIAGNOSTIC PROCEDURES

To rule out a Klippel-Feil syndrome or a Sprengel deformity, a detailed investigation, ultrasound and Xrays are required.

TREATMENT

ALLOPATHIC MEDICAL TREATMENT

In functional torticollis and torticollis caused by a hematoma the advice is to position the baby so that he looks at his preferred position and therefore as an incentive to turn actively in the direction of the optical and acoustic stimuli. Physiotherapy is recommended.

If conservative treatment is unsuccessful, of the deformity progresses despite treatment, an operation is advised, if possible, at 12 months: a caudal sternoclavicular tenotomy of the sternocleidomastoid muscle followed by plaster cast in overcorrection.

If the torticollis originated from a tumor, the tumor is removed surgically.

OSTEOPATHIC TREATMENT

It is important to treat this disorder as early as possible, if there is no improvement soon, the wry neck can lead to the development of plagiocephaly or functional restrictions of the cervical spine. The diagnosis determines the type of osteopathic treatment.

FUNCTIONAL TORTICOLLIS

Is treated by addressing present lesions, particularly in the cranial vault and base, in the neck, the upper thorax including the ribs and the scapulae, and of course everything the ribs and the scapulae, and of curse all that is relevant. Forces or treatment can be directed to the accessory nerve and the other nerves supplying the neck muscles. As this type of torticollis can originate from molding in utero, a global approach to the treatment is needed.

The muscles deform the cranium by constant traction, if the muscle itself has not been injured, a complete restoration of tis function is possible. The emphasis of treatment is on breaking down the neuromuscular reflexes which are causing the wry neck.

It is handy if the parents get their child to look towards the affected area as many times as possible, this counteracts the tendency to turn the head away from the affected side.

TORTICOLLIS CUSED BY MUSCULAR TEAR

If a muscular tear is the cause or the torticollis, this is a problem from a different nature. The muscular forces will here again tend to deform the cranium. As, the muscle is weakened by this acute injury, cranial deformation will not occur at al if the child is treated soon after the injury. A hematoma which has not been completely absorbed can lead to scarring. In this case, fluid drive techniques along the muscle and regular osteopathic treatment are recommended, until the situation has normalized. Hematomas are sometimes very difficult to treat.

Alongside the local treatment, the entire body must be treated, to keep the risk of adaptive changes in posture as low as possible.

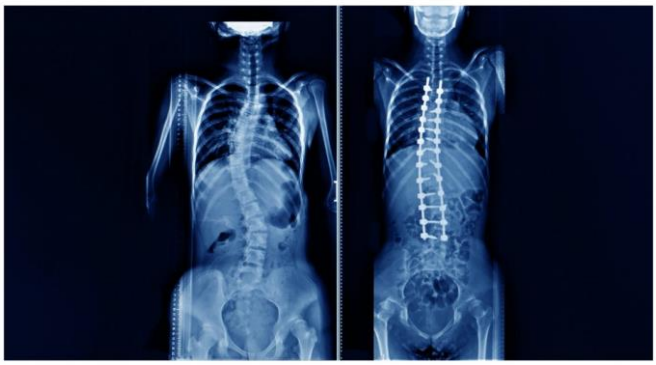
PROGNOSIS

The treatment of functional torticollis is relatively uncomplicated. The torticollis should have resolved completely after the treatment has been completed. And then recommendation is a check up every 3 to 6 months in the first year after treatment, so that one can be certain that the situation has stabilized.

In torticollis due to the muscle rupture osteopathic treatment ca be used as a supportive measure to treat scarring and strictures within the muscle. Complete restoration is not always possible, but osteopathic treatment will help the belly of the muscle to regain as much elasticity as possible.

SCOLIOSIS

DEFINITION
Scoliosis is defined as a lateral curvature of the spine in the frontal plane.
A functional scoliosis can be corrected fully, or at least toa a great extent, by active muscular effort, for instance by bending forward, or by elimination of the cause, unless it has been present for so long that structural changes have already followed. So, a functional scoliosis is usually reversible and shows no vertebral rotation.
A structural scoliosis is a permanent deformity, which cannot be corrected actively or passively. It involves a rotation of the vertebral bodies with the ribs following this movement: at the convex side of the curvature the vertebral bodies are rotated forwards and protrude, while on the concave side the opposite is the case.



ETHIOLOGY AND PATHOGENESIS
FUNCTIONAL SCOLIOSIS

There often seem to be no obvious, visible underlying structural anomalies in functional scoliosis. The causes of a functional scoliosis may be:
*Poor posture
*Compensatory processes in static problems, such as a pelvic tilt, different leg length, abductor or adductor contracture of a hip joint or ptosis.
*a forced posture due to pain, as a sciatica.
Infantile scoliosis is congenital or develops in the 1st year of life. There are no structural changes in the spine. It is probably the consequence of a dissonance in neuromotor development in the fetal period with unilateral contracture of the muscle so the trunk. Often it is associated with plagiocephaly, a torticollis without shortening of the sternocleidomastoid muscle and occasionally with club foot, hip dysplasia, congenital heart defects or a developmental disorder which affects postural function.

STRUCTURAL SCOLIOSIS
In only about 10% of all structural scoliosis is there a known cause
*Congenital scoliosis, caused by congenital skeletal malformations of individual vertebrae, larger parts of the spine or of the ribs like hemivertebrae, wedge vertebrae, absence of segmentation, schisis, fusion of several vertebrae or ribs defects
*Myopathic scoliosis, the result of muscular disorders or defects such as myasthenia gravis, muscular dystrophy or arthrogryposis.
*Neuropathic scoliosis as a consequence of a weakened, imbalanced musculoskeletal system due to neurological disorders, such as neuropathy, a flaccid paralysis as after poliomyelitis, after viral myelitis, meningomyelocele, spinal muscular atrophy,

syringomyelia or spinal tumors. With cerebral palsy scoliosis often develops, because of paralysis or spinal or other muscles.
Carreiro (2004) suspects a connection between idiopathic scoliosis, vestibular dysfunctions, and abnormal postural reflexes, such as the righting reflex or proprioceptive reactions.
The degree of spinal curvature appears to correlate with the amount of equilibrium disturbance. Three forms are distinguished: infantile, juvenile and adolescent idiopathic scoliosis.

TYPE	AGE	SEX RATIO	FORM	INCIDENCE	PROGRESSSION
Infantile	0-3	mostly boys	left convex, Thoracic	rare (2-3%) often additional Malformation	90% severe progression
Juvenile	4-9	mostly girls	right convex, Thoracic but Also lumbar	rare (10-15%)	70% severe progression
Adolescent	> 10	mostly girls	right convex, Thoracic	common (approx. 85%)	10% severe

CLINICAL SIGNS AND SYMPTOMS
Idiopathic scoliosis is discovered by chance at the age of 10-12 years.
Scoliosis with a lateral curvature of up to 10°, which is detectable on Xray as a slight rotation within the body and no deformity of the ribcage. The patient is mostly pain-free. Severe scoliosis can cause a deformity of the whole body, but especially of the ribcage. The function of the internal organs can be considerably restricted. Among the possible serious consequences is a restricted vital capacity with shortness of breath and pulmonary heart disease.

DIAGNOSIS
When inspecting the standing child, check the level of the shoulders (for shoulder elevation), waist triangles (for asymmetry), the level of the pelvis (for tilt, level of gluteal folds), note any skin changes (neurofibromatosis) and whether the spine is perpendicular (plumb line falling from the spinous process of C7, which ends in scoliosis not at the anal cleft but next to it.
Then the child is asked to sit at the treatment couch. If the abnormal inclination disappears, this points to a functional scoliosis, which is secondary to a difference in leg lengths. If the scoliosis persists while sitting, the child is asked to do forward bending test, in which he clasps his hands behind his neck in order to keep the shoulder girdle as balanced and stabilized as possible, and then bends forward. if the scoliosis disappears during the forward bending, this indicates good mobility and a postural and functional origin. If the scoliosis persists, or if a rib hump or a lumbar bulge appears, this points to a structural scoliosis. It can be found to be both functional and structural scoliosis.

ALLOPATHIC DIAGNOSTIC PROCEDURES
Anteroposterior Xrays of the entire spines in a standing position.
*Side: right convex, left convex.

*Level of the apex vertebra- thoracic, thoracolumbar, lumbar, thoracic and lumbar
*Shape of curvature – C shaped, S shaped, double curve
*Sagittal profile- lordosis, kyphosis
Ascertaining the angle of scoliosis (degree of deviation from the axis) is done by the Cobb method of measurement; a parallel line is drawn in relation to the superior surface (upper edge) of the superior neutral vertebra (this being the most strongly inclined towards the horizontal and the least wedge-shaped) and to the inferior surface intersection of these two lines is the angel of scoliosis (Cobb angle). The apex vertebra is the vertebral body with the most lateral wedge-shaped deformity.
The larger the Cobb angle the more severe the scoliosis. Curvatures below 25° are graded mild, up to 40° as moderate and over 40° are severe scoliosis. An annual radiological examination gives information about the progression of the scoliotic change. Also document the success of the treatment.
To assess the rate of growth, the stage of ossification of the iliac apophysis can be evaluated. Ossification begins laterally at the iliac apophysis, and its timing coincides with the pubertal growth spurt. When the apophyses are completely closed growth is complete.

TREATMENT
ALLOPATIC MEDICAL TREATMENT
The aims of treatment are:
*To arrest progression
*Correct existing curvature
*Maintain the result of correction and thus prevent long term consequences.

Patients are checked every 6 to 12 months and in puberty every 3 months. The available modes of treatment are physiotherapy, bracing and surgery.

With lumbar scoliotic angle of up to 15° or a thoracic angle of up to 20°, physiotherapy is recommended to strengthen the muscles, improve posture, and improve lung function. With a lumbar scoliosis angle of 15-35°, thoracic of 20-50° or if there is rapid deterioration a brace is supplied with adjunctive physiotherapy. It is scientifically proven that bracing can slow the progression of deterioration. Boston, Cheneau and Milwaukee corrective braces are used.
If the lumbar scoliosis angle is greater than 35° and in a thoracic angle greater than 50° surgery is indicated, because research has shown that this scoliosis cannot be arrested in any other way. The action of gravity on the postural muscles is so great that the curvature deteriorates very quickly. Therefore, an operation can stabilize the curvature and prevent further structural damage and deterioration. Correcting procedures done with metal implants classified as ventral compressing and de-rotating (Dwyer, Zielke) purely dorsal (Harrington, Luque, Cotrel-Dubousset) and combined procedures.

OSTEOPHATIC TREATMENT
Becker says (1997) “There are always three factors to consider every time a patient enters your office: the patient´s ideas and beliefs of what he considers his problem to be; the physician’s concepts of what he considers the patient´s problem to be; and finally, what the anatomical-physiological wholeness of the patient´s body knows the problem to be”. All patients, regardless of the type of scoliosis, need a treatment which is adapted to their individual needs. Both types of scoliosis, show a number of pints in

common, in both cases, the axial skeleton, that is pelvis, spine, ribs and the cranium as a whole, must be brought back to correct functioning, oriented towards the midline.
Not infrequently it´s found the sphenobasilar synchondrosis (SBS) in an extension phase so that movement in the flexion phase is greatly reduced. It seems compressed; in some cases, both the base and vault of the cranium are affected by the scoliosis. The sacrum and iliac bones can also be restricted in their function. Often the iliac bones are in an extension situation and appear to be rotated inwardly while the sacrum is pulled cranially and is suspended between the iliac bones with its base tipped anteriorly and its apex posteriorly. The hip joints are also frequently rotates inwards, causing the knee to rotate into a knock kneed position.
It is important to look at the anterior body wall, there are osteopathic lesions at the anterior end of the ribs at the sternum and manubrium. This also needs to be treated. Sometimes muscles of the abdominal wall and their attachments to the pubic bone must be normalized on the umbilical area.
A focal lesion can occur during embryogenesis. All three geminal layers (endoderm, ectoderm, and mesoderm) may be more or less affected, ranging from an obvious pathological lesion toa a more functional disturbance (osteopathic lesion). Such changes in the germinal layers can be felted. In a structural scoliosis there are often be associated skin lesion s such as hyperpigmentation and hair tufts, and organ malformation such as ventral septal defects, this shows that usually all three germinal embryonic layers are affected.
In functional scoliosis, though there are not obvious pathological changes of the spine, osteopathic lesions may be detected on osteopathic palpation in all three germinal layers. That´s why it is important to diagnose and evaluate all three germinal layers as part of the osteopathic examination and treatment of scoliosis. The vertebrae and associated tissues which belong to a such affected embryological segment often show viscerosomatic or somatovisceral lesions. Also, the associated support structures around organs, such as the pericardium.
Rib lesions can be present as well, and other tissues such as spinal ligaments can be affected.
The intervertebral disc material can also suffer lesions, and osteopathic work on disc and notochord is often useful.
Osteopathic treatment has the potential to preserve the condition of a C or S shaped curvature from deterioration.

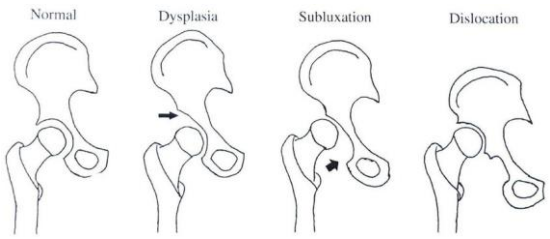
After an operation the treatment of shock occupies prime position within the framework of osteopathic treatment. Shock can be notices in the form of oscillations or vibrations, which occur in a cycle of about 40 times per minute in the body fluids. Without help shock persist in the system for years, where it slowly burns in and causes complete exhaustion at a deep neuronal level. Selye (1984) was the first to describe this phenomenon in his book The stress of life. Several treatments might be necessary to remove shock completely from the tissues. It supports the healing process by increasing the rate of epinephrine catabolism in the body, and reduces the risk of sympathetic reflex dystrophy
Functional and cranial work according to the principles of Sutherland on scars and traumatized areas supports a further process of healing. Gentle fluid drives in the areas strengthened with metal and bone grafts help the body to overcome the effects of these foreign bodies.
Later, regular treatment at 6 to 12 monthly intervals helps to maintain the inner balance and adaptation of the body to the operation; growth will then be as symmetrical as

possible. A good fluid exchange and optimum elasticity of the tissues are the most important factors.

PROGNOSIS
Depends on the progression, prognosis is more severe:
*If the child is very young at the onset
*The higher the curvature lies
*The greater the curvature.
Normally scoliosis stabilizes after puberty. In some cases, however, the condition deteriorates by about 1° per year if this process cannot be halted by treatment.
Children with mild curvatures receiving treatment mostly after 3 months and 6 to 10 treatments they correct to almost disappear the scoliosis.
With curvatures of 15-40° and more, the battle is against growth and gravity effects. At first an interval of treatment once per week is recommended, later treatment once a month is sufficient. During growth or shock or after illnesses it is necessary to give treatment at shorter intervals in order to stabilize the curvatures, because these factors as a general rule cause the angle of scoliosis to deteriorate.
Osteopathic treatment normally strengthens the child's health considerably, lessens the curvature of the spine and improves its functionality.

DISORDERS OF MATURATION OF THE HIP, HIP DYSPLASIA AND DISLOCTION, AND SUBLUXATION OF THE HIP.

DEFINITION
A disorder of maturation of the hip is a disturbance of ossification in the cartilaginous acetabulum and leads to hip dysplasia with a steeply sloping and shallow acetabulum, which is protracted cranially. As a result, part of the acetabular roof over the head of femur is missing. Hip dysplasia is generally associated with coxa valga, an abnormally steep rising femoral neck, and lax ligaments.
In subluxation of the hip the femoral head is sited on the acetabular rim but does not quite leave the acetabulum. The margin of the acetabulum and its convexity are deformed and protracted. Mostly the femoral head slips back into the acetabulum if the hip joint is brought into flexion and abduction and subluxate on extension and adduction of the hip joint. In dislocation of the hip the femoral head comes out of the dysplastic acetabulum completely but still lies within the stretches joint capsule. At birth only the dysplasia is present which is the prerequisite for the dislocation; the actual dislocation, mostly takes place post-partum. Congenital-developmental hip dysplasia is quite common. It can be unilateral or bilateral.



ETIOLOGY AND PATHOGENESIS
*Genetic- consistent sex ratio, 6:1 girls to boys, bilateral in about 40% of cases
*Hormonal- post – partum hormonal imbalance with consequently weak ligaments.
*Mechanical – lack of space in utero, higher incidence with breech births because of the extreme flexion of the femur, in oligohydramnios or twin births.

If the hip dysplasia is not diagnosed and untreated, there will be no stimuli for further development of hip joint; this leads to changes in acetabulum, femoral head, joint capsule, and muscles, and in long term, a secondary osteoarthrosis of the hip.

CLINICAL SIGNS AND SYMPTOMS
In neonates and infants, asymmetries of the folds in the upper thigh, the buttocks, the groin, and adductors can be a clue. From the 2nd month of life reduced abduction may show, owing to the increased tension in the adductors with off center hips (normal neonates is 80.90°, from the 2nd month 65°, definitely pathological is reduced abduction of 45° or less). A shortening of leg length becomes visible if the knees are at different heights on flexion at right angles, this is not with bilateral dislocation. The affected leg lies in increased external rotation and its lack of movement is striking. When the child begins to walk, he shows a limping gait, if the pathology is bilateral, a type of waddling gait.

DIFFERENT DIAGNOSIS
A paralytic dislocation should be considered, associated with cerebral palsy, meningomyelocele, after poliomyelitis, a subluxation caused by coxitis or a dislocation detectable right from birth, as in congenital arthrogryposis multiplex.

DIAGNOSIS
During history taking, ask about abnormalities during pregnancy and labor (breech birth, caesarean section, premature birth) hip disorders in the family and other anomalies in the child (club foot, metatarsus adductus, torticollis, spinal deformity). The Ortolani sign, a palpable and audible click, is the most important sign of instability in subluxation or dislocation of the femoral head and is sometimes detectable only in the first days of life.

ALLOPATIC DIAGNOSTIC PROCEDURES
Ultrasound examination assesses boner and cartilage morphology
Xrays are needed for early diagnosis. However, it is recommended to monitor the treatment. This is an aid for documenting the joint development.

OSTEOPATHIC EXAMINATION
At the age of 2 years or older the affected person may show the following characteristics in a:
*Unilateral subluxation: lumbar scoliosis with contracture of the quadratus lumborum muscle and a palpable mass in the upper region of the acetabulum
*Bilateral subluxation: palpable mass in the upper region of the acetabulum or above, no scoliosis, no crawling, late walking or walking absolutely impossible.
A late diagnosis is quite devastating, allopathically the solution treatment is operation, opening the capsule, partial reconstruction of the acetabulum and/or adjustment of the angle of inclination of the femoral neck. An early onset osteoarthrosis of the hip, d usually necessitating an artificial hip replacement as early as 20 years old.

TREATMENT

ALLOPATHIC MEDICAL TREATMENT

The aim is reposition and retention, with centering of the femoral head in the acetabulum for later maturation and formation of a normal acetabulum. This necessitates flexion and a position of abduction at the hip. The younger the child the less needs to be done, and the earlier treatment begins, the better the prognosis.

The child uses an abduction brace to obtain abduction at the hip joints; this allows flexion and kicking movements but prevents extension. This restricts the freedom of movement of the legs. The duration of treatment varies from 6 toa 8 weeks to up to 6 months. If the hip is very unstable a plaster cast or splints are used. If treated early is very effective, but neither the cast nor the abduction braces can correct the causative asymmetrical pattern in the hip joints.

In dislocation the femoral head s gently and slowly repositioned into the acetabulum. Suitable reposition procedures include a Pavlik harness and overhead extension procedures. The subsequent treatment are splints, abductions braces and bandages or plaster casts.

If a dislocated hip cannot be adjusted, or if there is a pseudarthrosis with the iliac bone, an operation is indicated. Depending on the extent of the acetabular dysplasia, various pelvic osteotomies and corrective osteotomies are appropriate to correct the malposition.

OSTEOPATHIC TREATMENT.

Osteopathic palpation gives the sensation that the body is still trying to cope with a strain. This is important to treat, even if the hip dysplasia has been successfully treated by allopathic medicine. As this persisting asymmetrical pattern opposes the unrestricted function and full healthy of the body.

The secret of success al most lies in the treatment of the three parts of the acetabulum and of the femoral head, with the aid of the capitis femoris ligament as a vector to restore the normal orientation function of the hip joint re

Through an intraosseous treatment of the iliac, the ischial and pubic bones, a reorganization of the acetabulum takes place. The shear through the cartilaginous part of the joint is reduced and the blood supply improved. The use of a fluid drive or similar technique sin the same direction as the ligament of head of femur may also contribute to a repositioning of the femoral head.

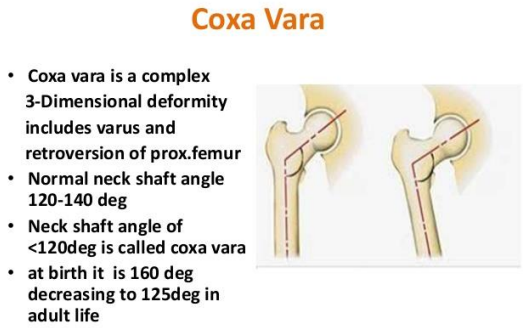
A spasm or contraction of the psoas major must be released in some circumstances. The psoas and the other muscles of the hip with the aid of a typical protective spasm, in order to keep the bone immobile while it grows together. A chronic contracture can remain and not be able to release itself on its own.

PROGNOSIS

With early diagnosis and treatment, healing generally takes place without negative consequences. The danger of necrosis of the femoral head with poor prognosis is remote with adequate treatment. In case of subluxation, the prospects of an osteopathic treatment succeeding are really good; but the patient must be monitored by an orthopedic doctor at regular intervals. Osteopathic treatment treatment must be part of the child's overall care and treatment. The acetabulum can improve its orientation and the femoral head can and will return to its position on its own. With weekly intervals at the beginning, then monthly appointment is needed. If ere is a true dislocation, osteopathy cannot, on its own and without other measures, enable the femoral head to return to its position.

COXA VARA

DEFINITION
In coxa vara the angle between femoral neck and shaft is reduced, with shortening and thickening of the femoral neck. In extreme cases this can lead to deformity of the femur, the angle between the neck and the shaft of the femur is normally about 150° in neonates and 125°-130° in adults. This can be unilateral or bilateral.



ETIOLOGY AND PATHOGENESIS
Three distinct forms, the term depends on the causation:
*If it is present right from birth, the term is congenital coxa vara (primary form); this prenatal defect may have been induced by teratogens.
*If bending of the femur occurs with defective ossification of the femoral neck under muscular traction ant stress, there is a hypo-plastic growth of the epiphysial joint cartilage, the name is coxa vara (secondary form).
*Symptomatic coxa vara, this is a systemic disorder of the skeleton, mostly as stress deformity as in Rickets, Perthes disease, slipped capital femoral epiphysis, osteomalacia, chondrodystrophy (achondroplasia), tumors, osteomyelitis or hip Fractures.

CLINICAL SIGNS AND SYMPTOMS
Unilateral coxa vara is manifested as high standing greater trochanter and a shortening of leg length on the affected side. If the child is already walking, probably the gait is a limp; the Trendelemburg is positive, the ability of the hip to adult reduced. In addition, the affected hip shows an increased internal rotation.
In a bilateral coxa vara there is a forward tilted pelvis and also lumbar lordosis, this leads to s waddling gait.

DIAGNOSIS
ALLOPATHIC DIAGNOSTIC PROCEDURES
The X-ray, of a general view of the pelvis, gives information about the severity of the disorder and shows a reduced angle between femoral neck and shaft, spotted zones of lucency in the femoral neck, a widened and steeply rising epiphysial joint, and in adolescents, a deformation of the femoral end of the hip joint.

OSTEOPATHIC EXAMINATION
Besides a local examination of the musculoskeletal system, and also of other systems, to ascertain how the child is compensating for this pathology and how the expression of health in the body can best be supported.

On local examinations, besides palpation of the various tissues and testing of active and passive range of motion, an evaluation with the help of expression of primary respiration is helpful.

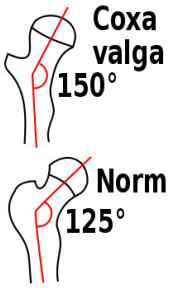
TREATMENT
ALLOPATHICMEDICSL TREATMENT
In infants with slight virus deformity a conservative treatment can be done, to observe if spontaneously de defect corrects itself or if is necessary an orthosis. In general, an intertrochanteric valgus-producing osteotomy is done as early as possible.
Physiotherapy is recommended.

OSTEOPATHIC TREATMENT
In small children the bones can be molded with the aid of intraosseous fluid drives and molding techniques. The spinal axis and the anterior body should be evaluated in detail. The three parts of the hip bone and the femoral head with reference to its relative internal or external rotation reorganized.
The leg must be evaluated as its entirety and treat as far down as the plantar aponeurosis.
If a Perthes disorder or osteomyelitis is present, this must be treated as a priority. The aim is to assist normal immune function, for example by techniques to support lymphatic circulation. In children from 8 years or age a CV4 can be used at the occiput, in small children this can be done from the sacrum. A good arterial circulation is needed to be addressed.

PROGNOSIS
The severity of the disorder, the individual and precipitating factors determine the prospects for healing. Osteopathic treatment is helpful in many cases, it may take several months or years, before a real change sets in.

COXA VALGA

DEFINITION
This is an abnormally steep angle of inclination of the femoral neck, with an angled between the neck and shaft of 140° in adults, and >155° in a 2-year-old child. The angle between the neck and the shaft of the femur decreases physiologically during growth. Coxa valga is frequently bilateral.



ETHIOLOGY AND PATHOGENESIS
Congenital coxa valga has an unknown etiology, a genetic predisposition is possible, because there seems to be a higher incidence of this disorder in some families.
Various pathological processes may underline an acquire secondary coxa valga, such as muscle imbalance in flaccid or spastic paralysis, caused for cerebral palsy, myopathy, or meningomyelocele. Mostly is bilateral; hemiplegia, however a unilateral malposition is possible.
A unilateral coxa valga may be due to damage to the epiphysis at the femoral neck or greater trochanter for example from an injury, inflammation (osteomyelitis) or tumor. Even a poorly healed fracture in this region can led to the development of a unilateral coxa valga. Over the course of time the problems and symptoms become more and more pressing as more and more demands are made on the body's adaptative mechanisms. The unilateral secondary form of coxa valga, above all, often leads to a secondary arthrosis of the hip later.

CLINICAL SIGNS AND SYMPTOMS
In a bilateral coxa valga the child often is asymptomatic for a long time or never refer any problems. In some circumstances the child becomes more tired quicker when walking and standing and has groin pain dependent on weight bearing. In some cases the hip abduction is limited or the Trendelemburg sign is positive.
In secondary coxa valga the symptoms of underlying disorder are more evident. Abduction on the affected side night be restricted, or the Trendelenburg sing positive.

A coxa valga is often combined with an increased femoral antetorsion.

DIGANOSIS
ALLOPATHIC DIGANOSTIC PROCEDURES
An X ray with a general view of the pelvis, confirms the diagnosis

OSTEOPATHIC EXAMINATION
Besides of the examination of the hip joint, including a complete evaluation of the musculoskeletal and body systems, is to find how the child compensates this pathology, how the biomechanical forces are distributed int the body and how the expression of health in the body can best be supported. A passive and active range of motion is also needed, and an evaluation with the help of the expression of primary respiration is also informative.

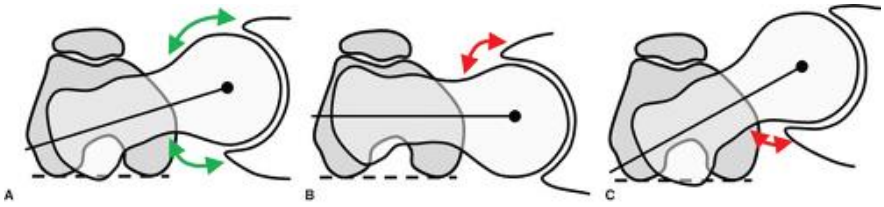
TREATMENT
ALLOPATHIC MEDICAL TREATMENT
An isolated congenital coxa valga normally requires no treatment, as in most cases there are no symptoms and later consequences in the form of arthrosis are not expected. It also be considered an operation for the reduction of the angle between the femoral neck and shaft, repositioning the femoral head (intertrochanteric varus producing osteotomy).
In secondary coxa valga the causative systemic disorder is treated, as well considered the surgical correction.
Physiotherapy is recommended with hip muscle insufficiency (Trendelenburg sing positive).

OSTEOPATHIC TREATMENT
The approach is the same of the coxa vara.

PROGNOSIS
The femur of an adult is a very pliable bone, it is said that the bone can be bent by many degrees before braking. So, in children is suspected that this potential for flexion must be several times grater. The state of this bone is in constant remodelling state. Osteopathic treatment can support this process of reshaping and modelling. If an abnormal stress on the bone disappears by optimizing the distribution of biomechanical forces, there is certainly a possibility that the bone will find its own way back to its genetically predetermined norm.

FEMORAL ANTETORSION

DEFINITION
There is an increased AT-angle (antetorsion angle), which describes the positionof the femoral head an neck in relation to the shaft of the femur in the transverse plane. That means that the femoral head and femoral neck are inclined further forward than normal. This disorder is usually bilateral.
A decrease in the antetorsion angle is one of the physiological changes in the axes of the lower limb which occur in the course of normal growth. In children up to 2 years of age a femoral antetorsion is present if the antetorsion angle is >40°, in a 12-year-old >30° and in an adult >20° (Jager and Wirth 1986)



ETIOLOGY AND PATHOGENESIS
A genetic predisposition is demonstrable. Normally, a femoral antetorsion develops when the normal physiological processes which cause the ATangle to change are slowed. A post-traumatic etiology is also possible. An anteverted hip is seen mostg often at the age of 2 to 4 years. The condition may deteriorate if the child usually sits between his lower legs (in a W position), when playing on the floor.

CLINICAL SIGNS AND SYMPTOMS
An intoeing gait (pigeon-toed gait) is typical of femoral antetorsion, the child easily trip over his or her own feet. It is pain-free and seems to have no problems wit walking, running. After weight bearing there might be pain in the hips and the area of the thighs. Femoral antetorsion is often combined with a coxa valga.

DIFFERENTIAL DIAGNOSIS
To be considered are pseudo femoral antetorsion in club foot or pes adductus, a torsion problem in the lower leg, in example on the tibia, movement disorders of cerebral origin, a post traumatic rotation problem, or coxa valga with femoral antetorsion in congenital dislocation of the hip.

DIAGNOSIS
A femoral antetorsion is usually detectable on inspection (leg, axis, gait). When testing movement on both extended hips in the prone position, the internal rotation is increased (up to 90°) and the external rotation restricted.

ALLOPATHIC DIAGNOSTIC PROCEDURES
This is done with the aid of Xrays

OSTEOPATHIC EXAMINATION
As with every osteopathic examination, a complete musculoskeletal system and other relevant areas is carried out.

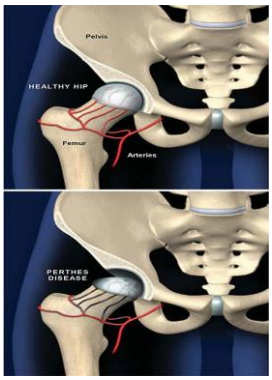
TREATMENT
ALLOPATHIC MEDICAL TREATMENT
The normal course is to wait to see whether the angle has reduced by itself at the end of growth. Parents are instructed to watch over that the child doesn't sit between the legs when playing, as this posture favours the internal rotation of the hips.
If the increased femoral antetorsion has not regressed sufficiently once growth is complete, and if the adolescent is suffering pain with weight bearing, surgical correction (intertrochanteric derotation osteotomy) is recommended.

OSTEOPATHIC TREATMENT
The approach is the same as in coxa vara and coxa valga. Osteopathic treatment can usually contribute considerably to accelerating the normalization of the angle of femoral antetorsion.

PROGNOSIS
If a significant change in the tissues has set in after one cycle of treatment and the system is stable, the child most be seen once a month. A complete recovery is expected within 1 year treatment. However, this can be a shorter period of time if the problem is due to poor posture only. Is advisable to work closely with the doctor in charge or a hospital for regular Xray monitoring.

PERTHES DISEASE

DEFINITION
This is spontaneous, acquired aseptic bony necrosis, of ischemic origin, of the epiphysis of the femoral head, frequently including the epiphyseal joint. First described by Perthes in 1910. This disorder usually occurs from the 3rd to 12th year, with a peak at 5th to 6th year, lasts for 2 to 4 years, is bilateral in 10-20%, and has a boy to girl ratio of 4:1



ETIOLOGY AND PATHOGENESIS
The cause is not clear. Congenital vascular anomalies at the proximal end of the femur and a hormonal dysregulation are discussed.
A circulatory impairment may lead to necrosis of the bone nucleus of the epiphysis in the femora head. Remodelling processes follow, which can last for 2 to 4 years, with breakdown and rebuilding of the necrotic bone. During this time the epiphysis should bear less weight because of the risk of deformity. If the epiphyseal joint is involved, the result may be a significant impairment of growth.
With the onset of puberty, the blood supply routes to the epiphysis and metaphysis in the femur unite; until then the supply to the femoral head can be impeded a lot easier. Therefore, at this point in time spontaneous healing frequently occurs.

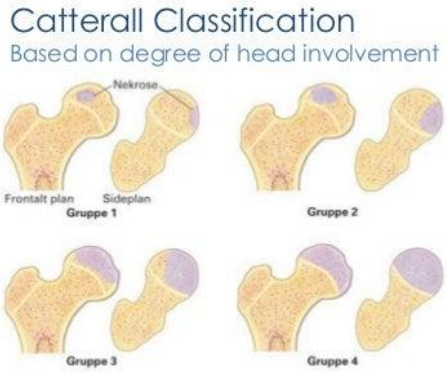
CLINICAL SIGNS AND SYMPTOMS
As diagnosis by Xray will only later be positive, it is important to pay attention to the early clinical signs. Pain is only on weight bearing in the hip, and pain in the knees. After walking or playing for longer time, there is an increasing pain related limp, can be unilateral or bilateral. The child gets tired after walking and some report pain in the hip and knee, smaller children complaint of abdominal pain. Symptoms can be intermittent, and sometimes even disappear for weeks on end. Knee pain may therefore pint to a primary serios hip disorder.

DIFFERENTIAL DIAGNOSIS
One must rule out other forms of coxitis which are usually associated with fever and malaise. Consideration should be given to coxitis fugax, slipped head of femoral epiphysis, tumors, rheumatic fever, septic arthritis, juvenile rheumatoid arthritis and hypothyroidism.

DIAGNOSIS
The pathology in the early stages, the testing of movement in the hip joint during an examination in the prone position will generally show a restricted abduction and

internal rotation. The child my complain of pain at the extreme point of the range of movement.
At a more advanced stage the child suffers from an atrophy of the gluteal and femoral muscles. A flexion contracture may develop and lead to a shortening of leg length. The Trendelemburg sign may be positive.
If both sides are affected, the progression is often not simultaneous on both sides, so that an asymmetry may nevertheless be seen.

ALLOPATHIC DIAGNOSTIC PROCEDURES
Xrays with a general view of the pelvis and axial film, Lauenstein method; confirm the diagnosis and make a prognosis possible, from the extent of the necrosis (Catteral stages, Salter-Thompson classification) The Herring classification evaluates the involvement of the lateral pillar of the femoral head. Radiologically risk signs, whose appearance means a poorer prognosis, are:
*Foci of calcification lateral to the epiphysis
*Lateralization (subluxation) of the femoral head
*Metaphyseal involvement
*Horizontal position of the epiphyseal plate
*Hinge abduction



In some cases, further diagnostic procedures are:
*Ultrasound, to assess whether there is an effusion
*Magnetic resonance imaging (MRI), for early diagnosis and to determine the extent of necrosis of the head of the hip
*Bone scintigram, in exceptional cases, for differential diagnosis

OSTEOPATHIC EXAMINATION
Includes palpation of the tissue and motion testing. Additional information is obtained from a precise evaluation of primary respiration. This area might suffer some trauma. The examination will also offer information from the areas that may contribute to preparing the ground for a necrotic disease in the hip region.

TREATMENT
ALLOPATHIC MEDICAL TREATMENT
The aim is to rebuild the femoral head in a normal shape with the fullest possible roofing for the femoral head and good mobility of the hip joint.

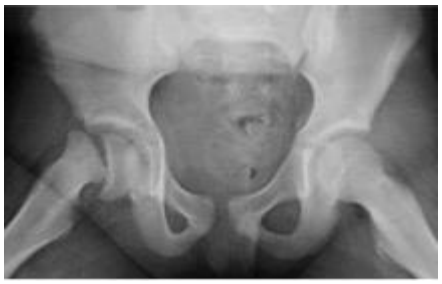
In early stages is mostly conservative (bed rest, analgesia), physiotherapy is instituted, swimming is supportive, and avoid weight bearing activities as jumping. In some cases the use of an orthosis as with the Thomas splint may be useful to take the load off the joint.
To improve the roofing of the femoral head, and operation (varus osteotomy or pelvic osteotomy) which improves centering in the acetabulum may be necessary.

OSTEOPATHIC TREATMENT
The importance of taking account of the child´s individual condition. A local intraosseous osteopathic treatment of the bones and surrounding tissues supports both the circulation and the cellular fluid exchange. A fluid drive along the capitis femoris ligament can be useful because the blood supply to the femoral head runs trough the artery enclosed by this ligament.
The arteries supplying the region around the femoral head originate from the external an internal iliac artery. Osteopathic lesioning may occur at any site in the arterial plexus above the femoral artery and in the circle of arteries that supply the soft tissues and bones in this area, the lateral and medial circumflex arteries. This osteopathic lesion must be treated. It can be found that the lesion extends into the aorta, so that the entire circulation is impaired. An improvement in venous drainage can also contribute to treatment, as this promotes drainage from the arterioles. Naming Dr. Still maxim "The rule of the artery is supreme"

PROGNOSIS
If the pathology makes its appearance before the 7^{th} year of life, the prospects for cure are normally better than when it appears later. The fundamental principle is that the larger the affected area, the worse the prognosis.
Around 5% of coxarthrosis cases are attributable to Perthes disease, which is a very aggressive pathology.

SLIPPED CAPITAL FEMORAL EPIPHYSIS

DEFINITION
This is an atraumatic disorder during pre-puberty, in which the epiphysis of the femoral head becomes detached from the femoral neck at the epiphyseal plate and slips, mostly posteriorly an inferiorly.
There is an incidence in some families, in boys appears between the 12^{th} and 16^{th} year of life, in girls between the 10^{th} and 14^{th} year, and shows a boy to girl ratio of 2:1 to 3:1. In girls appears before the onset of menstruation. In up to 80% is bilateral.
Is a rare disorder, but in must cases it is associated with a secondary osteoarthrosis in later years, it should never remain untreated. The following forms occur:
*Chronic form (more frequent), slow slippage or tilting of the capital femoral epiphysis over weeks and months
*Acute form (rare), acute detachment of the capital femoral epiphysis.



ETIOLOGY AND PAHTOGENESIS
Is multifactorial. Overweight, excessive height and gonadal underdevelopment are often present at the same time, which suggests a possible hormonal dysregulation in the pre pubertal growth spurt.
The mechanical triggers under consideration are a reduced anteversion plate, whose anatomical location in any case already exposes it to heavy loads from shearing forces.
In the chronic form there is a gradual loosening of the epiphyseal plate without a known reason or trauma. The resulting deformity of the hip joint causes pain and leads to restriction of movement.
The slippage may stop at any stage but can also suddenly convert to an acute slippage, where there is the risk of destruction of the epiphyseal vessels, which then lead to necrosis of the femoral head.
The process can last from 8 months to years. The end of the growth phase and the fusion of the epiphyseal plate can give an assurance that the process has indeed ben halted. Until then the chronic form can become an acute any time.

CLINICAL SIGNS AND SYMPTOMS
There is always relation with stature and obesity.
In chronic form symptoms initially are slight; knee pain may be the first symptom, also backache, groin, or thigh pain. The adolescent gets tired from walking and limps pain free, the preferred position for the leg is in external rotation. The acute form is associated with severe hip pain and a sudden inability to bear weight on the hip, inability to walk and stand. The leg is in external rotation.

DIAGNOSIS
The range of mobility, the striking features are an increased external rotation and limited painful internal rotation and abduction. In guided flexion of the externally rotated leg the hip deviates into forced abduction (positive Drehmann´s sign).

ALLOPATHIC DIAGNOSITC PROCEDURES
Xrays with a general view of the pelvis and Lauenstein´s axial image, confirm the diagnosis. This shows a widening of the epiphyseal plate, an apparent narrowing of the epiphysis and the tilting or angle of tilt of the epiphysis.

OSTEOPATHIC EXAMINATION
This is the same for hip disorders

THERAPY
ALLOPATHIC MEDICAL THERAPY
Therapy is always surgical. This depends on the extent of the tilt. If the epiphyseal plate is still open, a prophylactic stabilization of the other hip is always undertaken.

In the acute form strict bed rest is necessary, and weight bearing in that hip is not allowed. The operation is performed as soon as possible.

OSTEOPATHIC TREATMENT
This is and adjunct to surgical treatment of the hip joint. The approach is similar as for the hip dysplasia. However, a slipped capital femoral epiphysis dos does not appear until shortly before or after puberty, this is a body that has been exposed to forces and stresses for many years.
The treatment aids to minimize all the factors which negatively influence the child´s health. As there is always a considerable risk of developing osteoarthrosis of the hip later. The aim is to optimize the biomechanical forces so that potential negative consequences later are largely eliminated.

PROGNOSIS
This depends on the degree of the tilt. It is good with early diagnosis and correct surgical treatment. With angles of slippage >30° and the occurrence of necrosis of the femoral head, the early development of secondary osteoarthrosis is a threat.
Osteopathy treatment helps in reducing the risk of coxarthrosis. Prepares the child´s hip for surgery and promotes postoperative recovery.

GENU VARUM

DEFINITION
Unilateral or bilateral misalignment of the leg axis, in which the leg is bent outwards at the knee

ETIOLOGY AND PATHOGENESIS
Bowlegs are quite common in children. In the first moths of life a mild from is physiological, and it corrects itself later. In few cases there is an underlying disorder. If the axis is not corrected, the deformity will increase from the raised pressure of weight bearing; the ligaments may loosen as a result and degenerative changes are more likely (varus arthrosis of the knee)

PHYSIOLOGICAL GENU VARUM
The leg axes change during the infant´s development from a lying position to crawling and walking. A baby has physiological vow legs, with both the femur and the tibia

contributing to this form. The legs assume a straight form little by little, and a genu varum is not termed pathological until after the 2nd year of life. A physiological genu valgum very often develops very often develops during the 3rd year (knock-knees). At the age of 5 to 6 years the child´s legs should have made the transition to a relatively straight leg form by themselves. Physiological changes in the leg axes in the course of childhood growth are:
*At birth the normal alignment of the knee is around 10-15° varus deviation
*Neutral femur tibia position during the 12th-14thmonth life
*Maximum valgus position of 10-15°at the age of 3-3 and a half years
*Physiological valgus deviation in adulthood of 5-7°

PATHOLOGICAL GENU VARUM
It is quite rare and occurs mostly secondary to another disorder. Causes of such leg alignment may be:
*Unilateral, idiopathic, inflammations, tumours paralyses, Blount´s disease, lesions of the epiphyseal plate, post-traumatic
*Bilateral, metabolic disorders (rickets, phosphate diabetes), achondroplasia, osteogenesis imperfecta.

Blount´s disease is a deforming osteochondrosis of the medial tibial epiphysis. With early onset, both sides are generally affected; later onset commonly is unilateral. Excess weight and early walking seem to be etiological factors. A secondary compensatory hypertrophy of the medial femoral condyle leads to the typical bowlegs. Bowlegs occurring after the second year of life are often attributable to biomechanical strain patterns. The body may not be able to self correct local intraosseous strains which are the result of molding processes in utero or forces at birth.
In some cases, the entire leg (that is, also including the foot and hip), is in molding pattern in which the hip joint is in external rotation. The fibula may be pulled inferiorly in relation to its normal position with reference to the tibia

CLINICAL SIGNS AND SYMPTOMS
Symptoms are rare. There is often a pes planovalgus, caused by compensatory processes
DIAGNOSIS
Inspection generally shows that both legs are bowed. The leg axes are precisely measured, assessing the gap between the knee condyles and between the malleoli. Testing of movement shows free motion of the joint, in older child there is often an internal rotation of the tibia.

ALLOPATHIC DIAGNOSTIC PROCEDURES
Xrays of legs standing, show the extent of the deformity, the site of the greatest axial deviation and the configuration of the epiphyseal plates. Monitored can be doing outline drawings on a large sheet of paper of the child legs in a supine position, or by making photographs. To rule out rickets, the phosphate, alkaline phosphatase, and calcium levels in the blood are measured.

OSTEOPATHIC EXAMINATION
The child´s entire body is carefully examined to ascertain which biomechanical strain patterns may influence the situation at the knee. Besides testing movement in all the joints of the lower extremities, a careful analysis is made of the intraosseous condition of the affected bones, with the help of the expression of primary respiration.

THERAPY

ALLOPATHIC MEDICAL THERAPY

The aim to prevent a later osteoarthritis of the knee by correcting the physiological leg axis.

The classical medical approach is to wait and see how much the bowlegs self-correct. In rickets especially, there is a great tendency to spontaneous correction. Raising the outer edge of the shoe or appropriate orthoses are recommended for correction. In case of excess weight, a reduction may be helpful.

If the deformation does not tend to improve, surgical correction is advised, corrective osteotomy, temporary epiphysiodesis in the Blount procedure between the 10^{th} and 13^{th} year.

OSTEOPATHIC TREATMENT

If there is no pathological cause, the axial deviation is often due to a molding process in utero or at birth. The advice normally is that with growth this will correct, but there are some cases that persist until adulthood.

Therefore the recommendation is to always treat the deformation. All the tissues in the leg area need support to find their way back to the normal state. An intraosseous decompression treatment for all the bones in the lower extremities, including the feet, is recommended.

The fascia must be derotated, this includes the interosseous membrane of the lower leg and the iliotibial tract. Biomechanical strain patterns throughout the body which influence the leg are of course treated.

The importance of osteopathic treatment is that the child with genu varum always has problems with walking because his biomechanics are disturbed.

Children with tibial torsion do indeed trip and fall quite often, and so have difficulties not just with sport but also with ordinary activities. And because balance and intensive use of the legs is crucial for sensory input, which drives forward the appropriate cross-linking and integration of the sensory and motor systems.

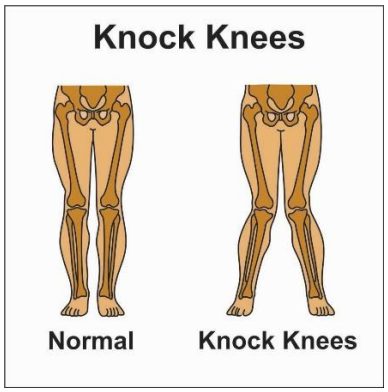
PROGNOSIS

Depends on the cause, the extent, and the progression of misalignment in each case.

If the intraosseous strains are principally in the tibial region, correction of the varus position is possible. However, if the entire leg is involved, regular treatment can be required for more than 2 years to correct the existing strain pattern. With consistent osteopathic treatment of the mechanical axes an improvement in function sets in, which counteracts the development of osteoarthrosis of the knee in later years.

GENU VALGUM

DEFINITION
A unilateral or bilateral axial misalignment of the leg, in which the leg is bent inwards (knock knees). If both legs are affected the knees are close together and the ankles are wide apart.



ETIOLOGY AND PATHOGENESIS
If the axis is not corrected, the deformity increases from the pressure of increased weight bearing, the ligaments will become looser as a result and degenerative changes may ensue later on in life (valgus osteoarthritis of the knee)

PHYSIOLOGICAL GENU VALGA
The leg axes shift in the course of the child´s growth. A physiological genu valgum very often develops during the 3rd year of life. At the age of 5 to 6 years the child´s legs should have made the transition to the normal adult leg form by themselves.

PHATOLOGICAL GENU VALGUM
Rarer cases of this leg misalignments may be:
*Unilateral, idiopathic, inflammations, tumors, paralyses, Blount´s disease, epiphyseal lesions, coxa valga, adduction contracture of the hip, valgus position of the foot, post traumatic, inhibition malformation even with hip dysplasia.
*Bilateral, metabolic disorders as rickets, phosphate diabetes, endocrine disturbances as pituitary and Marfan syndrome.
Biochemical weight bearing patterns and/or a connective tissue weakness are more often the reason why the physiological valgus position does not correct itself by 7 years of age.
The knee is a universal joint between hip and foot. As such it must compensate for stains coming both from above and from below, in motion and at rest. If the biomechanical forces are too great or not centered, the knee may not be able to compensate the strain and so shifts into a knock-kneed stance. Not infrequently, internally rotated hip joints are the triggers for a functional adaptation of this kind in the knees. The hips in their turn can be put under pressure by an inflexible sphenobasilar synchondrosis, especially if the pelvis and sacrum are also restricted by osteopathic lesions. This scenario is similar as scoliosis, except that here the hip-joints and knee are affected and not the spine.

CLINICAL SIGNS AND SYMPTOMS

Symptoms are rare, often pes planovalgus is present as compensatory mechanism due to the usually weak muscle tone. The child has a tendency to malposition of the patella an early degenerative change in the patellar joint. Knee pain may be felt in the anterior part of the knee.

In some circumstances the child has developed a compensatory gait, in which the two legs are each swung rather more outwards to prevent the knees from meeting and rubbing against each other (circumduction gait). The child may therefore tired more quickly when walking or running or try to avoid running fast.

A child with knock knees may also fall more frequently, and this can produce additional strains in the body and cranium and worsen the situation.

DIAGNOSIS

Inspection generally shows that both legs are knock kneed. In walking children, the shoes has a heavy wear at the medial areas of the shoes. The leg axes are precisely measured by assessing the distance between the condyles and between the malleoli.

ALLOPATHIC DIAGNOSTIC PROCEDURES

Xrays with leg axis in a standing position, show the extent of the deformity, the site of the greatest axial deviation and the configuration of the epiphyseal plates. Progression can be with leg drawings in supination position or photographs. To rule out rickets, phosphate, alkaline phosphatase, and calcium level in the blood are measured.

OSTEOPHATIC EXAMINATION

This includes motion testing of all the joint of the lower extremity, feet, ankles, knees and hips. Possible intraosseous restrictions can be obtained by observing the tissues of the lower extremities with the expression of primary respiration.

The child´s entire body is examined to ascertain which biomechanical strain patterns may influence the situation in the knee. This allows to discover primary disfunctions leading to compensatory genu valga.

THERAPY

ALLOPATHIC MEDICAL THERAPY

The aim is to correct the physiological leg axis to prevent later osteoarthrosis of the knee.

Classical approach is to wait and see if there is a self correction. With rickets there is a tendency to spontaneous correction. Orthopedic support or appropriate orthoses are recommended for correction. In the case of excess weight, a reduction of it can be helpful.

If the deformity is not improving surgical correction may be advised.

OSTEOPATHIC TREATMENT

An examination of all the body´s structures, from the cranium and SBS down to the foot is recommended. If a dysfunction of the spinal mechanics it must be treated first, as even the smallest dysfunctions in the biomechanical system led to restricted function in the entire body.

As soon as the vertebral axis is working well, which can mean 6 months of work, the hips can be treated. The hip position must be corrected; whether the problem is an increased internal rotation or external rotation does not matter. Frequently one hip joint is also internally rotated and the other externally rotated.

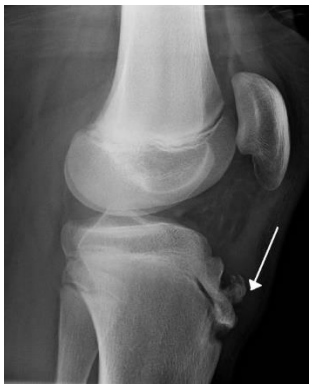
At this point the knee is not being treated, because its dysfunction is caused by compensatory mechanisms. It is treated later when the correction of the bodily structures as a whole has already progressed further. An osteopathic lesion of the knee is much easier to treat later when the problems at the upper and lower end of the leg have already been eliminated. So first treat the hips and the spine, and then then correct the mechanics of the feet. It is important to treat all the foot specially the subtalar joint between the talus and calcaneus, as this often plays a quite special role in correct weight distribution. Often the navicular drifts medially and inferiorly in rotation, and the tarsal and metatarsal joints are greatly compressed. This part of the treatment may take 6 months and may need to be repeated frequently while the growth of the child to obtain stability in the foot area. The use of arch supports is recommended. These must be very stable in form and correctly adapted. While good therapeutic results may be obtained with all this aids, the ligaments can adapt better.
When treating the feet, the fibula and the interosseous membrane of the lower leg must also be addressed. The correct alignment is very important because the entire neurovascular supply to the foot runs across the interosseous membrane. The fibula also has a close relationship to the knee. Check the degree of rotation of the tibia in relation to the femur. For this use one hand to stabilize the femur at the distal end and the other hand to clasp the tibia at the distal end to induce, first, an internal rotation and then an external rotation of the tibia. And also, to test the position of the patella.
When the mechanical disturbances are corrected, the knee generally self corrects. Then the arch supports are no longer needed. Its not necessary to use them after a complete self-correction.

However, sometimes is better to wait until the end of the growing phase, before removing them because the arch supports stabilize and support the ligaments. This gives protection from an excessive biomechanical load in the growing body. Regular monitoring into late adolescence is important because treating the biomechanical structures in the child´s body is a lengthy work.
Sometimes it takes years to correct the disturbed pattern. Even if the knock-knee is only unilateral and attributable to a pathological cause, osteopathic treatment can still be worthwhile and optimize the child´s chances.

PROGNOSIS
Depends on the cause in the individual case, and the extent and progression of eh malposition.
Both on genu valga and genu vara intensify osteopathic treatment can do much good. If the malposition as to be corrected surgically, is better to postpone as much as it can and meanwhile treat osteopathically. A treatment of 3 months before the operation can make the tissues more flexible and make the work of the orthopedic specialist much easier.

OSGOOD-SCHLATTER DISEASE

DEFINITION
Is an aseptic necrosis (juvenile osteochondrosis) of the tibial apophysis. It most often appears during the mayor growth spurt in boys from 10 to 14 years of age who do a lot of sport, but girls, specially if athletic, may also be affected.



ETIOLOGY AND PATHOGENESIS
The precipitating event is probably the imbalance between growth and development at the attachment of the patellar ligament to the tibial tuberosity, associated with increased traction on the patellar ligament from overuse in sport or other activities. A local disturbance in the process of ossification may lead to the tibial tuberosity developing a more prominent form.
An imbalance in the leg muscles often underlies this process, such as the muscles being too tense in the thigh ventrally or dorsally; or there is a faulty tension in the calf are. Mostly the quadriceps femoris muscle and its tendons are shortened. The strain in the muscles produce microfractures in the fibrous cartilage where the patellar ligament attaches to the tibial tuberosity. Often where the patellar tendon attaches is inflamed. An avulsion, with aseptic necrosis of bone or cartilage fragments, occurs only rarely. Then the fragments lying below the patellar ligament are usually still palpable and cause a further local irritation.

CLINICAL SIGNS AND SYMPTOMS
As the aseptic necrosis of the bone mostly occurs at a very active phase in the child´s life, it can cause considerable problems.
A notable feature is swelling, tender to pressure, over the tibial tuberosity; on extension of the knee against resistance the pain is more severe. Pain in the region of the tibial tuberosity mostly occurs with activity such as walking, especially climbing stairs, and is worse with fast running or heavy strain. Sometimes those affected also complain of slight pain at rest,

DIAGNOSIS
The site of origin and the nature of the pain are typical. Signs of local inflammation over the tibial tuberosity and tenderness to pressure on palpation are unequivocal indications. The pain is increased on extending the knee against resistance.

ALLOPATHIC DIAGNOSTIC PROCEDURES

Xrays of the knee confirm diagnosis; they show a fragmentation of the tibial apophysis. It can be also detected an enlargement of the tibial head that is a manifestation of a progressive healing reaction, sometimes also an avulsion of the tendon with a piece of dependent cartilage.

OSTEOPATHIC EXAMINATION

Special attention will be given to the distribution of muscular tensions in the leg region. An examination of the biomechanics of the entire body can indicate whether the overstrain of the quadriceps femoris muscle is due solely to the increase in sporting activity, or whether this muscle also has to work harder than normal to compensate for a postural weakness.

THERAPY

ALLOPATHIC MEDICAL TREATMENT

This disorder generally heals without problems, partial abstention form sports (specially jumping disciplines) and if necessary, resting the knee are enough. A swollen knee is treated here by elevating the entire leg in an extended position. Never lie a pillow under the knee, as this may cause venous thrombosis. The most effective is a slatted frame raised at the foot. Ice packs asl o relieve the symptoms, about 20 to 30 minutes every 3 to 4 hours for 2 to 3 days until the pain disappears. Anti-inflammatory creams may also be prescribed as an adjunct. Physiotherapy can be helpful. Surgical intervention to remove the avulsed fragments of bone is only very rarely needed. And should be done after the growth is completed.

OSTEOPATHIC TREATMENT

Its important not to move the knee unnecessarily, so as not t se off any further inflammatory reactions. Fluid drives and lateral fluctuations around the epiphyseal plate work well, this helps to reduce inflammation.

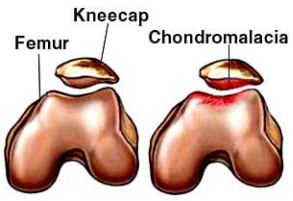
In severe cases fluid drives along the quadriceps femoris muscle can be helpful. As soon as the inflammation reduces, the cause must be treated. In many cases there is a muscular imbalance in the leg, often a shortened quadriceps femoris tendon.

PROGNOSIS

Mostly, the disorder heals by itself without problems. However, this can last for about 6 to 24 months after the appearance of the symptoms. An osteopathic treatment of the causes underlying the muscular imbalance considerably accelerates the healing process. The prominence of the tibial tuberosity may remain even after the symptoms have disappear.

CHONDROMALACIA PATELLAE

DEFINITION
Chondromalacia patellae is a softening of the cartilage on the posterior aspect of the patella, with varying degrees of severity. Adolescent girls and women are more often affected than boys and men.



A view of the knee joints from below

ETIOLOGY AND PATHOGENESIS
The cause is multifactorial. It is probably precipitated by a discrepancy between the load and the ability to bear the load, an excessive or asymmetrical pressure from:
*Muscular imbalance, which leads to an abnormal direction of force on the knee. The vastus lateralis and the vastus medialis muscles are often not balanced. The vastus lateralis may be more powerful than the vastus medialis and thus cause a lateral displacement of the patella when the quadriceps femoris muscle contract and the knee is extended. This in turn leads to an excessive pressure on the lateral joint surface. If the patella is not correctly centered in the midline, it encounters the femur in an abnormal fashion, which probably increases the softening and destruction of the cartilage.
*Bony abnormalities, variation in form of the patella, genu valga (knock knees). Any valgus position of the knee will usually intensify during a growth spurt, thus widening the angle between the thigh and the patellar tendon, so that every flexion of the knee increases the risk of a patellar dislocation. The pressure on the lateral joint surface of the patella is too great.
*Ligamentus laxity
*Overuse (microtrauma)
*Cartilage contusion (macrotrauma)
In teenagers there is a phase in which the articular cartilage of the patella has not yet been worn away, so that the condition is still reversible. This stage should correctly be termed anterior knee pain or femoropatellar pain syndrome.
In fact, in most teenagers the pain comes and goes for years until growth is complete. In most patients the pain vanishes completely after the end of the growth phase, while in others the pain intensifies over the years; the articular cartilage of the patella is destroyed and a true chondromalacia patellae develops. Osteopathic treatment can do much to prevent such a scenario.
Tall, knock-kneed teenagers, especially girls, with very taut vastus lateralis muscles are at increased risk of this disorder.

CLINICAL SIGNS AND SYMPTOMS
Affected teenagers mostly complain about bilateral spontaneous pain in the patellar area at or after long periods of knee flexion, or when going downstairs or downhill. Not uncommonly the pain also radiates into the posterior aspect of the knee. On extending

the leg, often have the sensation that something is grinding inside as there is something blocking the knee.

DIAGNOSIS

Many young people affected show a light lateralization of the patella, which no longer lies in line with the femur (patellar subluxation). The knee may be tender to palpation and slightly swollen. On moving the joint a grating is usually palpable in the patella.

TESTING PASSIVE MOVEMENT OF KNEE AND PATELLA

The movement of the tibia is palpated in relation to the femur, and that of the patella while the leg is being extended. The adolescent sits on the treatment table and lets the legs dangle. Sit in front and place the middle finger, index finger and thumb of one hand on the femur, middle of the patella and tibial tuberosity of the flexed knee. On flexion these three points are normally in line. With your other hand now extend the knee and observe the movement of the patella. Normally, the patella moves superiorly on extension and inferiorly on flexion. During extension the tibia also rotates externally, on account of the medial condyle of the femur being bigger and longer as a result, the tibial tuberosity moves laterally in relation to the patella when the leg is extended.
A further passive movement test of the patella is to lay the outstretched leg on your thigh and to manually test the mobility of the patella, cranially, caudally, medially and laterally.

ACTIVE MOVEMENT TESTING (PATELLA TRACKING TEST)

If there is a suspected femoropatellar pain syndrome, palpation of the course of the patella (tracking) while the child actively extends the leg; this is, contracts the quadriceps femoris muscle. The test is positive if the patella moves laterally. While extending the knee the patient may feel a grinding under the patella. While extending the knee the patient may feel a grinding under the patella.

PATELLA COMPRESSION TEST

The adolescent lies supine, with knees extended. Hold the patella caudally and the patient tense the quadriceps femoris muscle. This can cause pain (caution; sometimes quite violent). If the patient cannot cooperate, the patella can be also being pushed cranially and caudally and compress while doing so. (McRae 1983).

ALLOPATHIC DIAGNOSTIC PROCEDURES

The Xrays are normally unremarkable. A patellar deviation laterally or medially may indicate pathology. An axial film of the patella possibly shows variants on form, subluxations, and signs of arthrosis in the femoropatellar articulation. The affected anterior cartilaginous area is not visible on Xray but can be evaluated with an MRI.

OSTEOPATHIC EXAMINATION

Besides the orthopedic examinations, a general osteopathic examination can give an indication of adaptative mechanisms in the biomechanics of the body, which may have led to imbalance in the muscular system.

THERAPY
PREVENTIVE MEASURES IN SPORTING ACTIVITY
The importance of telling the adolescents that a warming and stretching, especially of the quadriceps femoris and ischiocrural muscles, considerably reduce the risk of chondromalacia patellae. And its better to alternate different sporting activities. Susceptible adolescents should avoid squats, kneeling and hill or mountain runs.

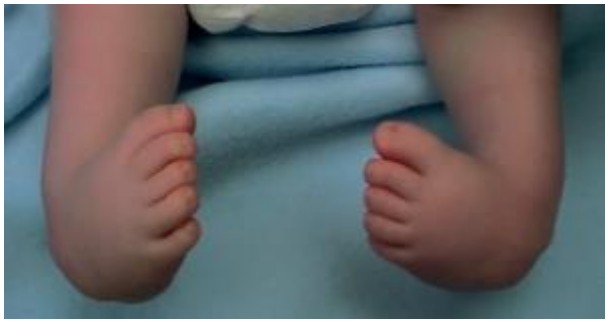
ALLOPATHIC MEDICAL THERAPY
Initially the treatment is conservative. Resting the knee and avoiding long terms of sitting with flexed knees, squatting and overuse from sport. Until the pain is fully gone, the advice is to abstain from strenuous activities, antiinflamatory can also be helpful, physiotherapy with strengthening the quadriceps femoris and especially the weaker vastus medialis, stretching of the ischiocrural muscles and patellar tendon stretching can bring relief.

OSTEOPATHIC TREATMENT
Stretching of the patellar ligament has proved extremely effective. Normally the child´s condition improves if is treated once weekly for a month. During this period resting is mandatory. A simple patellar stretching or a soft-tissue massage is effective.

PROGNOSIS
The rate of spontaneous heling in adolescents is high. Both patellofemoral pain syndrome and chondromalacia patellae respond well to osteopathic treatment. The success rate is around 95%.

CONGENITAL CLUB FOOT

DEFINITION
Is a complex foot deformity, which cannot be passively corrected, with contractures of the joint capsules and tendon shortenings of varying degrees. The following components are present: pes equinus, inversion of the foot, adduction, and supination of forefoot and hindfoot in relation to each other, and pes cavus (hollow foot), hence the term pes equinovarus.
It is twice as common in boys and both feet are affected in 50% of cases. Congenital club foot is one of the most common congenital developmental disorders.



ETIOLOGY AND PATHOGENESIS

Causes are under discussion, chromosomal or embryonic defects; the embryonic skeletal anlage not developing further than an early developmental stage; and a mechanical impairment of the foot development in the embryonic period. The functional equilibrium is disturbed by a predominance of the supinator (tibialis anterior and posterior) and flexor muscles (triceps surae, toe flexors) and anomalies of the muscle attachments. Errors in bone growth, contractures in the subtalar joint complex with tendon shortenings and deformities of numerous bones in the skeleton of the foot (talus, calcaneus)

Club foot may also occur in neuromuscular disorders, such as spina bifida, cerebral palsy, muscular dystrophy, congenital arthrogryposis multiplex, and sacral dysgenesis.

CLINICAL SIGNS AND SYMPTOMS

The deformity is impossible to overlook. The typical components are unecquivocally verifiable.; the examinations are done in the supine position with the knee and hip at 90° flexion:

*Pes equinovarus, contracted triceps surae muscle with the entire foot fixed in plantarflexion, the shortened Achilles tendon being palpable as a hard cord

*Varus of the hindfoot

*Adduction of the midfoot and forefoot

*Pes cavus (hollow foot), with deepening of the longitudinal arch

The calf shows signs of atrophy of the triceps surae muscle. An investigation for another malformations of deformities, such as hip dysplasia, spina bifida occulta, congenital arthrogryposis multiplex and neurological defects, must be performed.

DIAGNOSIS

The clinical picture is sufficient for diagnosis. Only a harmless club foot posture, which can be fully corrected manually, can be differentiated from congenital club foot.

ALLOPATHIC EXAMINATION

Xrays are suitable for monitoring development, they are not relevant before the 3rd month of life.

OTEOPATHIC EXAMINATION

This will include a thorough examination of the lower leg and the foot. The practitioner tests the mobility of all the foot joints and, with the aid of primary respiration, the intraosseous situation in all the bones in the foot and lower leg.

THERAPY

ALLOPATHIC MEDICAL THERAPY

The treatment must star immediately after birth and to continue with this consistently until growth is complete. The aims are correct anatomical axial relations, normal position and weight bearing of the foot, muscular valance and freely mobile foot before walking begins.

A patient step by step manual correction is done and consolidated with a plaster cast which is frequently changed. Physiotherapy is given supportively. After the plaster casts splint treatment is used. First the adduction and varus position are eliminated and finally the pes equinus is carefully corrected, if conservative treatment is inadequate, the remaining misalignments are treated surgically (arthrolysis, tendon lengthening, tendon transposition, osteotomy).

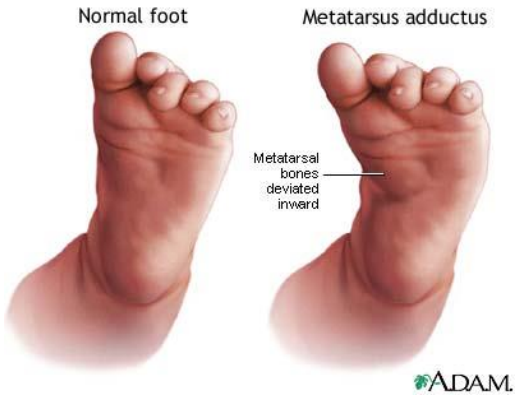
OSTEOPATHIC TREATMENT
This should be given as an adjunct to orthopedic care. In a good communication it can be arranged to remove the cast, do treatment that day and then have the new cast put on, since the plaster cast need to be changed.
All the structure of the body, from cranium and cranial base down to the foot are examined and, if necessary, treated to optimize the ability of the foot to self correct. Important is to treat the relation between tibia and fibula and especially the interosseous membrane of the lower leg to normalize as far as possible the muscular and fascial components of all the muscles which have their origin in this are. All the joints in the feet are treated using a balanced ligamentous tension approach. (BLT)

PROGNOSIS
Lack of treatment or poor treatment leads to progressive deformity. With early treatment satisfactory results are obtained. The treatment should be given at least every 14 days, in some circumstances even every week, so to exploit the window of opportunity of early development to the full. After 6 months the treatment intervals can be lengthened.

INTOEING (METATARSUS ADDUCTUS)

NORMAL INTRAUTERINE DEVELOPMENT OF THE FEET
On the 27th to 28th day the lower limb bud appears, originating at the level of the lumbar and upper sacral segments. At the start of the 5th week the mesenchymal skeletal anlage appears, then at the end of that week the entire nuclei appear. At the end of the following week the entire skeleton of the extremities is laid down as cartilage. In the first days of the 7th week the anlagen grow ventrally. Towards the end of the embryonic period the legs rotate 90° medially, the extensors now being at the front. The arm buds rotate 90° laterally, the arm extensors now being at the back. In the 3rd month the fetus has his thighs in flexion, abduction, the soles of the feet pointing towards the child´s abdomen. As the fetus gradually develops, the thighs derotate inwards; the feet gradually rotate outwards and position themselves against the wall of the uterus. It is possible that this normal development can be altered, and the child is born with his feet in a plantarflexion and equinovarus position.
The foot is positioned as it still was in utero, the forefoot is adducted in relation to the hindfoot, the sole of the foot is slightly supinated, and the foot tends to be in plantarflexion. The physiological supination and adduction position, however, should disappear with kicking and be easy to correct passively.

DEFINITION
Toeing in, pigeon-toeing, metatarsus varus.
The forefoot is adducted and pints inward, the metatarsal bones are angled medially. The outer edge of the foot is bent convexly, the arc of the convexity being greatest at the base of the fifth metatarsal bone. The hindfoot is in valgus position. Approximately 70% of the cases are boys and often bilateral.



ETIOLOGY AND PATHOGENESIS
Intoeing is commonly found in babies and children, from birth up to the age of 18 months. It is accompanied by an internal rotation of the tibia.in neonates and babies this phenomenon is normal. A metatarsus aductus which persists after this time, however, will hamper the child´s walking. The child may fall over more often because of it. Possible causes are delayed derotation of the foot from its normal intrauterine position, or a persisting adaptation to the intrauterine lie. In severe cases, an impaired development of the leg anlage may be the cause. The adduction position is on his front. Carreiro distinguishes three types, depending on the mobility of the forefoot.
*Type 1: self corrects on active movement (child kicking). Prognosis is good, the disorder self corrects
*Type 2: can be corrected with passive movement (foot positioning). Prognosis is good
*Type 3: cannot be corrected even by passive movement. The most severe form.
In a severe case, the deformity tends to lie in the joint area between the cuneiform and metatarsal bones, or even rather more within the metatarsal bones, at their base. This is also the are where the surgical correction takes place by base wedge osteotomy.

CLINICAL SIGNS AND SYMPTOMS
The forefoot is in adduction position. All the metatarsal bones are angled medially. The outer side of the foot has a convex curvature, with the inward curve being most marked at the base of the fifth metatarsal bone. The hindfoot is in the valgus position, the longitudinal arch of the foot is flattened.
With a severe deformity, painful calluses may appear on exposed sites from the pressure of shoes.
If the child can already walk, he shows a marked intoeing gait, pigeon-toed gait.

DIFFERENTIAL DIAGNOSIS
The ones that must be considered are tibial torsion, functional malposition of the hip joint with increased internal rotation, club foot (in which the heel is in the varus position) or femoral antetorsion.

DIAGNOSIS
Inspection clearly shows the clinical signs. Observe the baby to see whether he can compensate for the intoeing when kicking, (active movement test). Other movements tests are:
*Stroke the lateral margin of the foot lightly. At this, the peroneal muscle contracts, and if the intoeing is only functional this will correct it (type 1)

*If the intoeing has not corrected itself in this way, try to get the foot to assume the correcto form passively. If this can be done, then it is a Type 2; if it is impossible, a Type 3.
*All the normal foot movement components are tested plantarflexion, dorsiflexion, supination and pronation. No pes equinus position is found, and when the foot is dorsiflexed, there in no limitation as there is with club foot.

ALLOPATHIC DIAGNOSTIC PROCEDURES
To confirm the diagnosis, Xrays can also be made. They show the adduction of the metatarsal bones, the first inclined the most and the fifth the least.

OSTEOPATHIC EXAMINATION
Especial attention is in the lower extremities. Besides the mobility of the foot, the position of the hip joint, knee, tibia and fibula are of special interest. In intoeing one will often find an external rotation of the femur with a compensatory internal rotation of the tibia. Look for internal intraosseous restrictions of the feet, tibia and fibula, which may be a result of the position in utero.

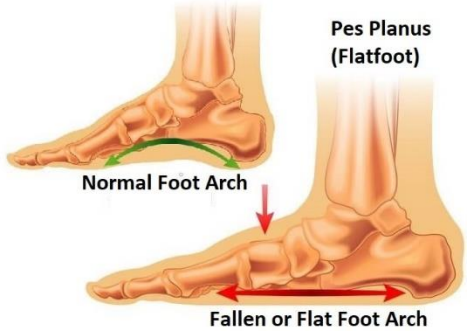
THERAPY
ALLOPATHIC MEDICAL THERAPY
Manual remedial work is done immediately after birth. Mild forms, types 1 and 2, often self corrects. It may be enough if parents following precise instructions, stimulates the lateral margin of the foot by stroking it, antivarus shoes also may prove helpful.
Where there is a resistance to therapy or type 3, remedial plaster casts, and then splints and orthoses, are used. Rarely is a surgical correction needed. (Capsulotomy, serial metatarsal osteotomy).

OSTEOPATHIC TREATMENT
In Type 1 the self correction can be supported by osteopathic treatment, and osteopathy is also useful in a Type 2.
In a Type 3 osteopathic treatment will be used only as an adjunct to a remedial plaster cast.
Recommended to examine all feet and leg axes of every baby brought to the practice and to judge whether the child´s development is age-appropriate in this respect. If the normal development and changes in legs and feet lag, one can encourage the physiological developmental process with osteopathy.
Sutherland approach to the body as a whole (BLT) has proved very helpful both normalizing the leg axes and for local foot treatment. Intraosseous treatment of the foot may also be required. Often a good intraosseous change can be achieved by treatment with the BLT approach, but it can also be necessary to work with fluid drives, for instance.

PROGNOSIS
It depends on the severity of the malposition. In types 1 and 2 a full correction can be expected. Type 3 requires long-term treatment to obtain the best possible function of the foot.

FLAT FOOT (PES PLANUS)

DEFINITION
Congenital flat foot (talus verticalis or congenital pes planus, rocker-bottom foot) is a foot deformity with a vertical position of the talus, contracted valgus position of the heel, a high heel, abduction, and pronation of the forefoot and flattening of the longitudinal arch of the foot.
Flat foot acquired in childhood (pes planus ifantum) is a common and mostly harmless condition of the foot in which the heel is in a valgus position (pes valgus) and the longitudinal arch of the foot is flattened (pes planus), and thus comes into contact with the floor. In some people the arch of the foot never develops. Another component may also be present, a splay foot (pes transversus); the transverse arch of the foot is lowered, so that the heads of the metatarsal bones II-IV stand lower.



ETIOLOGY AND PATHOGENESIS
Congenital flat foot is probably hereditary, and in 50% of cases it is combined with other additional malformations. It is generally unilateral. Possible causses can be intrauterine lie, an inhibition malformation, neuropathies and muscular imbalances with a contraction of triceps surae, peroneus and extensor muscle of the foot.
In babies and in young children, flat feet are normal, because the longitudinal arch of the foot has not yet developed. The longitudinal and transverse arches developed at age of 3 years and the transverse arch at the age of 6 years. If the flat feet persist, this is regarded as a normal variant in most cases
Flat foot acquired in childhood (pes planus infantum) develops when walking begins. The longitudinal arch of the foot does not develop properly or disappears again. The foot is nevertheless mobile, on standing the arch is not detectable, but if the child raises the big toe or stands on tiptoe the arch becomes visible. Hence pes planum infantum is also called mobile flat foot. In children with mobile flat feet the medial margin of the foot is often lowered. The toes pint inward so that the foot can be kept in balance.
Causes of flat foot acquired in childhood may be:
*Hypermobility of the joints, this is caused by weak ligaments and muscles. Predisposing factors are constant walking and standing on hard and smooth floors and on paved streets. Child doesn't want to walk
*Reduce flexibility, shortened Achilles tendon. Which contracts the muscles at the back of the leg and forces the foot into lowering its medial margin to compensate.
*A persistent medial tibial rotation, this may force the foot into a compensatory pronation, so that the foot points forward. According to Caillet (1987) about 10% of all 5-year-old children and 5% of all teenagers still have an internally rotated tibia.
*Excess weight

*Genu valga or vara, which can lead to compensatory flat foot.
*Flaccid and spastic paralyses

A splay foot can develop from a flat foot. This is a consequence of compensatory supination of the forefoot, which overextends the transverse metatarsal ligament and the interosseous muscles. The heads of the metatarsal bones II-IV stand lower and must therefore bear a part of the body weight.
A synostosis in the region of the tarsal bones can also be the cause of painful flat foot in children. This is a fusion of two or more tarsal bones, which leads to a limitation of movement and often to the development of a flat foot.

CLINICAL SIGNS AND SYMPTOMS
In congenital flat foot the entire foot is rigid and cannot alter its shape on walking. Fluid movements are not possible. The longitudinal arch has a downward pointing convex curvature, the feet are rotated externally on walking. In the early years the child is still asymptomatic, but pain often begins in adolescence.
Flat foot acquired in childhood generally causes no symptoms in childhood. It is usually the worried parents who seek advice. But at advanced age the feet may lose their mobility and pain can occur. Predisposing factor are tense foot muscles and long periods of standing (adolescent flat foot). If a mobile flat foot causes pain even in a young child there is usually another underlying problem, such as repeated ankle sprains or constricting footwear.
Splay feet are often painful, especially in walking and standing, the pain is caused by the lowered heads of metatarsal bones II-IV, which are not designed to bear weight.

DIAGNOSIS
The gait will show up any paralyses if they are present. Congenital flat foot is evident from the convexly curved sole of the foot. Pronation of the heel and pronation and abduction of the forefoot. The entire foot is immobile. The longitudinal arch of the foot is not visible, even when the child stands on tiptoe.
In flat foot acquired the medial margin of the foot is lowered; the longitudinal arch of the foot is not visible. The navicular is lowered, and the calcaneus stands in pronation. If the child stands on tiptoe the longitudinal arch reappears (flexible flat foot in contrast to the contracted congenital flat foot). Alternatively, you can get the child to raise his big toe while lying supine, and the arch of the foot will again appear. The hindfoot is often in the valgus position, the tibia can stand in internal rotation. The ankles are mobile, sometimes are hypermobile. The loss of the longitudinal arch and the intoeing gait greatly accelerates wear on the soles of the feet. If the shoes are placed side by side, they will look as if they lean towards each other.
In splay foot there is an obvious spreading of the forefoot and a lowering of the transverse arch. The heads of the metatarsals are tender to pressure. Corns have usually formed on the sole of the foot at the level of the heads of the metatarsals.

ALLOPATHIC DIAGNOSTIC PROCEDURES
In congenital flat foot an Xray shows the axis of the talus almost as an extension of the tibia, the navicular being dorsally dislocated onto the head of the talus.
Radiography is only required for congenital flat foot or if there are symptoms in acquired flat feet. The hindfoot may then appear in the valgus position, the forefoot in abduction and pronation.

In splay foot the Xray shows that metatarsal I deviates medially, the angle between metatarsals I and II is widened. The other metatarsals are splayed, the bit toe frequently adducted being a hallux valgus.

OSTEOPATHIC EXAMINATION

A complete examination of the whole body can give important clues as to whether biomechanical factors are impairing the development of the arch of the foot.

THERAPY

ALLOPATHIC MEDICAL THERAPY

Congenital flat foot is treated immediately after birth with corrective plaster casts. In older children there is an option of surgical correction with the reposition of the talus and navicular, but there is a risk that a talar necrosis will develop. Surgical subtalar arthrodesis after the end of the growth phase may al so be considered.
Doctors usually be conservative with the mobile flat feet, by the careful choice of appropriate shoes, and if there is pain, by prescribing arch supports. Walking barefoot and foot exercises to strengthen the flexor digitorum muscles will help (griping exercises for the toes, standing on tiptoe).
In a contracted flat foot, the precipitating factors must be treated. If the cause is a synostosis in the tarsal region, the fusion of the affected bones can be eliminated surgically. In a more advanced stage or in older patients and osteotomy may be advised, with repositioning of the bones and a fusion of the tarsals. In less severe cases supportive treatment with anti-inflammatory and splints or arch supports may be sufficient.

OSTEOPATHIC TREATMENT

Flat feet are not always a pathological problem, not every foot has to have a pronounced arch, a less marked arch can function well, whereas a very pronounced arch can be as stiff as a board. When examining the feet, mobility and elasticity are the deciding factors.
Correcting the plantar arch with the aid of osteopathy is a lengthy but straightforward undertaking if you bring the necessary patience to the task. Start with the cranium and the sphenobasilar synchondrosis (SBS) because a compression will be found here in many cases.
It is important to treat the entire spine and the pelvis before starting work on the feet. The fibula, tibia and interosseous membrane of the legs are treated to balance put the foot muscles and their fascia, which have their attachments in this are, as far as possible. In the foot the attention is on navicular bone first and foremost, this is often rotated medially. To restore the plantar arch, the navicular must be raised and rotated externally as in the treatment of the transversal tarsal joint. All the foot joints must be mobile and correctly located. Plantar aponeurosis must be normalized, because contractions in the foot depend to a considerable extent on the fascial components. Often the bones are in odd positions, determined by the connective tissue.
The feet are constructed that it can bear four times its own body weight during running and jumping. Consequently, in treatment the fascial tissue of the foot needs to be matching the required tone to treat it. Insoles can support the process of osteopathic treatment but should be abandoned once it is certain that the foot can again bear the body´s weight independently.

PROGNOSIS

Whether the flat foot is functional or pathological in nature is largely immaterial to the mode of approach in osteopathic treatment because this is similar in both cases. However, the prognosis are different, the more fixed and pathological the process is, the more long-term the planning for the treatment.

CONCLUSION

As mentioned earlier, children's bones go through a maturing process throughout childhood and puberty. A Pediatric Orthopedic doctor and a Pediatric Osteopath, understands the timeline of bone growth as well as the implications behind what different types of fractures and bone injuries can mean on long term growth and functional use of that bone or limb.
They will also know the timeline for growth spurts and will keep this in mind when customizing a treatment plan. A child may be suffering from growing pains, or these pains may be a sign that they may be experiencing a more serious condition. A Pediatric Orthopedic doctor and Osteopath will be able to clearly identify the key differences and accurately diagnosis the problem.
Pediatric Orthopedics are well accustomed to what children may complain about and how these complaints may give clues, or even answers, to what is happening. They are excellent in diagnostic, which comes in handy when the child may not clearly be able to communicate what they are experiencing.

This is why a close work with both specialists in child´s body development is very necessary to succeed in any case if an abnormal growing pattern is detected in the child.

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