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# Koincydencja zablokowań stawów krzyżowo-biodrowych w bocznym skrzywieniu kręgosłupa oraz wpływ ich terapii na wartość skoliozy

*Block coincidence of sacroiliac joints in lateral curvature of the spine as well as the effect of the therapy on the size of scoliosis*

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## Streszczenie:

W wystąpieniu autorzy przedstawiają próbę określenia zależności między występowaniem skrzywienia bocznego kręgosłupa a dysfunkcją stawów krzyżowo-biodrowych pod postacią zablokowania. Zwrócono uwagę, że skolioza obserwowana jest zjawiskiem w organizmie człowieka. Samo ułożenie dziecka jak i przebieg porodu mogą doprowadzić do różnego rodzaju zaburzeń napięcia mięśniowego i asymetrii ułożeniowej między innymi w wyniku uszkodzenia ciągłości powięziowej noworodka w trakcie samego porodu lub okresu okołoporodowego. Należy przypuszczać, że patologia okresu rozwoju embrionalnego a następnie noworodkowego może stanowić genezę zaburzeń statyki kolumny kręgosłupa oraz przeciążeń stawów krzyżowo-biodrowych, pod postacią ich zablokowań. Skutkiem wtórnym dysfunkcji stawów krzyżowo-biodrowych może być asymetryczne ustawienie kości biodrowych względem siebie, co w dalszym przebiegu warunkuje asymetryczne ustawienie kości krzyżowej i mobilną skoliozę kompensującą (określenie A.Sadowskiego).

Podkreślono ważną rolę dysfunkcji stawu krzyżowo-biodrowego - najsilniejszego proprioceptora stawowego ustroju - w powstawaniu dysfunkcji innych stawów w organizmie ludzkim, często znacznie oddalonych od miednicy, jak i w powstawaniu zaburzeń równowagi napięć (dysbalansu) mięśniowych.

Autorzy opisali tu następujące zjawiska:

- 1) zależność występowania zablokowania stawów krzyżowo-biodrowych (SKB) z asymetrią ustawienia miednicy
- 2) związek wielkości bocznego skrzywienia i rotacji kręgosłupa z zablokowaniem SKB

W grupie badanych dzieci ze skoliozą niedużego stopnia (do 5 stopni rotacji) stwierdzano w dużym procencie, jednocześnie współwystępowanie dysfunkcji stawów krzyżowo-biodrowych i asymetryczne ustawienie miednicy. Po przeprowadzonej terapii zablokowań stawów krzyżowo-biodrowych stwierdzono znamienne i istotną statystycznie poprawę w zakresie symetrii miednicy jak i znamienne zmniejszenie stopnia skoliozy i - związanej z nią - zjawiska rotacji kręgosłupa.

## Słowa kluczowe:

staw krzyżowo-biodrowy, terapia manualna, skolioza, zablokowanie

## Abstract

In the presentation the authors try to estimate dependencies between lateral curvature of the spine occurrence and the dysfunction of sacroiliac joints as blocks. It was pointed out that scoliosis as a phenomenon can be widely observed in a human body. The position itself as well as the course of the delivery may lead to different types of muscle tone disorders and positional asymmetry in effect of fascia continuity damaging of the neonate during the delivery or perinatal period.

It may be assumed that the pathology of embryonic development and later in neonatal period can be the origin of the spine statics disorder, and consequently cause overloads of sacroiliac joints manifested in blocks. The secondary effect of the dysfunction of sacroiliac joints may be an asymmetric arrangement of hip bones, and this could lead to asymmetric position of the sacrum and compensatory scoliosis (the term coined by the authors).

Authors underline the important role of the dysfunction of the sacroiliac joint - the strongest proprioceptor in the joint system - in causing other joints to dysfunction, even those which are distant to the pelvis as well as causing muscle tone disorders.

The authors described the following phenomena:

- 1) how occurrence of sacroiliac joints blocks correlate with the asymmetry of the pelvis position,
- 2) the relation of lateral curvature of the spine size with the rotation of the spine with a sacroiliac joint block.

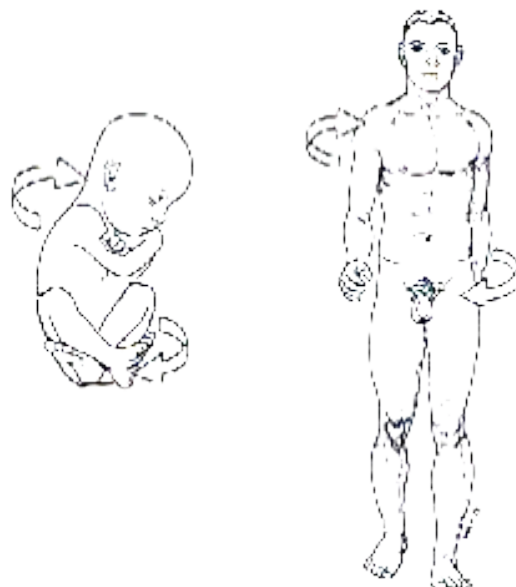
In the group of tested children with the scoliosis of a little degree (up to 5 degrees of the rotation) it was noticed that there was a high percentage of the sacroiliac joint dysfunction going with the asymmetric pelvis position. After the therapy of sacroiliac joints blocks there was a statistically substantial improvement in the position of the pelvis as well as the decrease in the scoliosis degree (with connected to it vertebra rotation) was observed.

## Key words:

sacroiliac joint, manual therapy, scoliosis, block

### Introduction

This paper presents the scoliosis condition and its relation to the concurrent SIJ (Sacroiliac Joint) blockage. Scoliosis itself, which is the spine's lateral curvature in the coronal plane disorder – is the humans only phenomenon.



**Fig. 1. Child position in mother womb / source: R. Louis Schultz, Rosemary Feitis, The Endless Web: Fascial Anatomy and Physical Reality. Warsaw 2011, 3rd edition**

The child's position in the mother womb, insufficient space for the fetus, large pregnancy, various mother's illnesses during the pregnancy – all are a potential threat for the child's life and for his/her physical condition. Similarly, the birth process, the delivery position of the infant, may cause various position disorders, which in turn may disturb the proper development process of a newborn infant and a young child. A neonatal infant symmetry development is very important, especially at the very beginning – even though during the first quarter of the baby's life it cannot keep up the symmetry of the body. The baby, who is lying down on its stomach or on its back, positions the head on one of the cheeks. When lying down on the back, the child usually puts more weight on the shoulder and torso on the side of the face, while raising the shoulder on the occipital side. This asymmetry during the first weeks of life comes from the fact, that the baby is born with the increased extension of the neck, the cervical spine slightly bent backwards and with the backward tilt of the pelvis. It is impossible to place the baby's head symmetrically on the occipital bone – also because of the raised occiput condition.

The cervical spine curvature restricts the free head turn sideways. Turn of the head to one side tugs along the opposite shoulder, and causes it to raise upwards. This occurs, because at this age there is no rotation mobility between the spinal segments, it is limited at this development phase by the excessive curvatures in the sagittal plane. The spine, highly compressed, like a tight chain follows the head turn and rotates, spiral-like, with the



protuberance towards the side, where the face is. Turn of the face changes the torso protuberance and causes the tilted pelvis position; on one side, or on the the other, higher up. This is the cause of the neonatal asymmetric position. This asymmetric position of the child, in the first 6 weeks of his/her life, is a physiological symptom, if not established and if the baby alternates the sides.

We know, that the hand which is visible for the child develops quicker than the one remaining beyond the eyes control, so at this age the dominance of the tension of one group of muscles over the opposite group – should alternate.

The process of the spine extension and the straightening of its curvature is gradual – it goes from the head towards the coccyx. Lying on the stomach, the infant can only turn the head sideways, just above a surface. The baby cannot raise its head any higher, and will not do so, unless supported on the forearms. Attempts to support himself on the fists causes the increased tension of neck muscles. The excessive tension of the neck and the back muscles may be one of the symptoms of further symmetry development disorders. To raise a head, there is a cooperation required of the chest, shoulders, upper limbs, stomach, back and iliolumbar muscles – this is the so called support-straightening mechanism. In infants, the cervical and lumbar sections are in the hyperlordosis position. Towards the end of the one fourth of its length, the spine is already quite straight. The pelvis, initially retroverted, within the third month changes its inclination, and the three months old baby – when lying on its back – is able to lie down its hips, which means straightening of the lower limbs towards the surface. The child, who with the time passing, still cannot support himself symmetrically and would not hold a solid position – usually demonstrates the substitute behavioral patterns, which disturb the muscle tension:

- falls to a side, in some case – the same side everytime,
- reels on the elbow losing the balance,
- finds it difficult to support the body weight, the hands are running backwards, the so called "swimming".

In development of those irregularities participate the following factors:

- intensified tension of the neck and the back muscles,
- insufficiently straight spine,
- blocked movements in the sternoclavicular articulations.

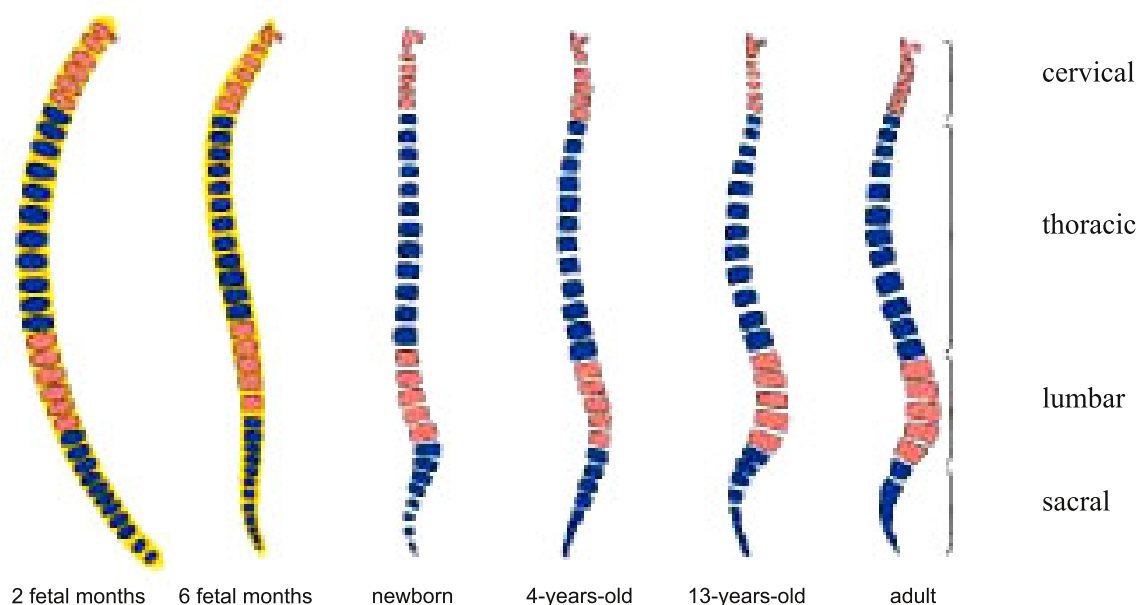
Those children who do not properly progress, are fated to use substitute patterns also at a later time. The substitute patterns are an anomaly and their multiple repetition causes their "recording" in the motor cortex of the brain. This way, the disorders in a child's development and motor skills are being preserved. The motor disability causes disturbances in the baby's own-body perception and the incorrect muscle tensions within its body – which at a later time may contribute to the child's posture disorders.

The next, important stage of the baby's development, is its ability to crawl – to move its body weight using its palms and knees. This is the next stage of the alternate movement (follows up creeping), which helps to strengthen the paraspinal muscles,

enough to form a muscle corset stabilizing the vertebrae against each other. The crawling and sitting in turns – does improve the baby's torso straightening process and helps to press the whole back thigh areas against the surface. The procedure of the premature sitting up of the six months old baby, in a corner of a bed and supporting it with pillows – prompts the forced vertical position of the spine. The baby – not being able to stabilize the position – either falls down forward, wriggling the spine in a hook, or falls to the sides, situating the spine asymmetrically, which may pose a threat to its posture in a future. At the present time, we observe increase in the number of children with the infant postural asymmetry – over 70% of the elementary school pupils show the posture or the flat feet disorders. When a baby adopts the higher up position on its own, it means that it is already prepared to do so. It indicates, that the baby's locomotor system: bones, muscles, ligaments and joints – are ready to take on the new loads. So the whole crawling period seems like the raising of capital of the physical health – to be used in the future. Any attempts by the parents to hasten the natural development stages, utilizing numerous carriers and baby walkers – pose an actual threat to the proper development of a child. The more a baby progresses in accordance with the movement patterns, at each stage of its development, the less probable are the future flat feet, club feet, posture disorders and scoliosis.

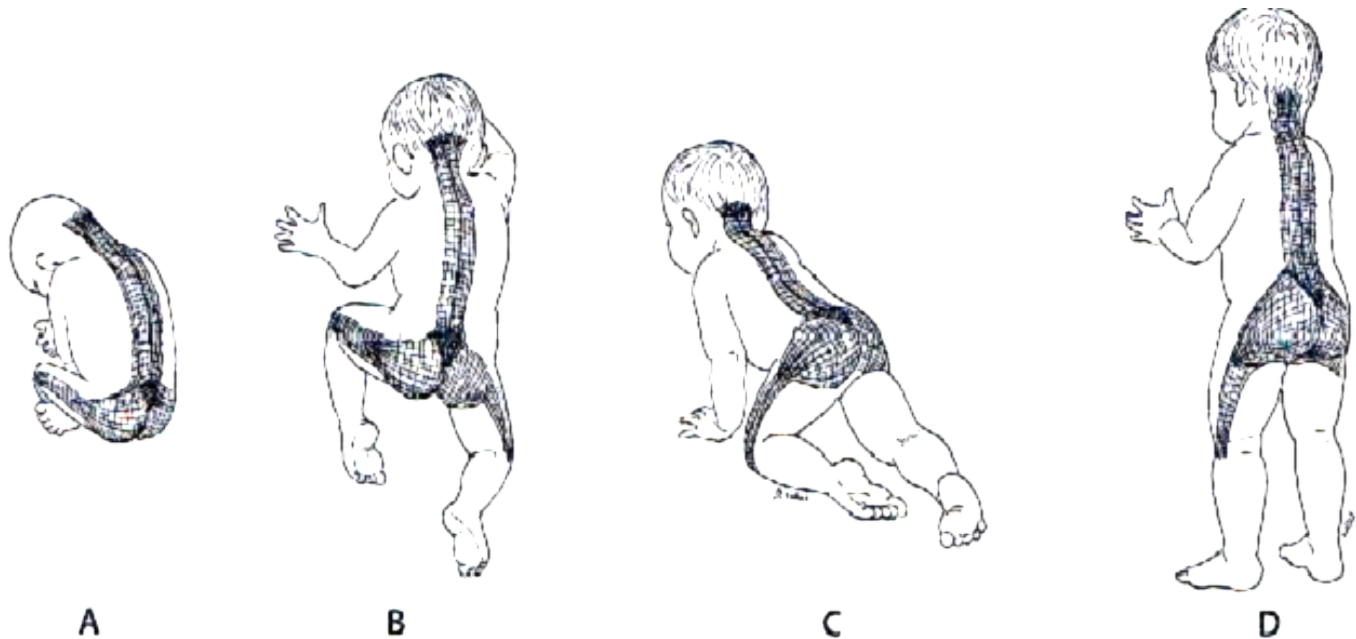
The drawing below presents how the spine is positioned at different stages of the human life.

- A) back of the infant in the mother womb is bent into a C shape (the embryonic C opens up at birth),
- B) as the time passes and the baby discovers, and learns, to stretch and to extend its body,
- C) finally, there is a change in the spinal curvature, creating its mature, vertical form.



**Fig. 2 Spinal curvature development / source: google images**

The below drawing shows the movement development sequence of the paraspinal muscles and ligaments, which contribute to the proper development and stabilization of the spine and the pelvis. A position in uterus, B alternate creeping, C crawling, D standing position.



**Fig. 3. Movement development sequence of muscles and ligaments/ source: R. Louis Schultz, Rosemary Feitis, The Endless Web: Fascial Anatomy and Physical Reality. Warsaw, published in 2011. 3rd edition**

Continuity of the ligament and fascia elements is of great importance for the development of the correct body posture. During the early childhood, an important bond is being established between the spine curvature and the related plexuses in the Central Nervous System.

According to Bonnie Bainbridge Cohen and Leon Chaitow, if any of those sequences–bonds had been disturbed in childhood, it would have an impact on the posture and its functions development at a later stage. One of the most common errors made by parents, is to hold the baby by its feet, with its head down. Sometimes an accompanying crack of the spine can be heard. The above procedure disturbs the embryonic sense of security. The baby's position, hanging with its head skewed and the lumbar spine bent backwards – exposes the child to the traumatic subluxations and causes damages to the fascia system. At this stage begins the process of the fascia tension balancing, and – if disturbed – it may contribute to the asymmetry dysfunctions in the further development of a child [1, 2, 3, 4, 5].



**Fig. 4. Pathological patterns during development process / source: R. Louis Schultz, Rosemary Feitis, The Endless Web: Fascial Anatomy and Physical Reality. Warsaw, published in 2011. 3rd edition**

### Materials and Research Methods

We do emphasize here the role of the sacroiliac joint as the strongest joint system proprioceptor, which has a major impact on: 1/ creation of dysfunctions of other, sometimes distant, joints of a human body 2/ creation of muscle tensions disbalance. We have also paid attention to the paraspinal and other muscles, which contribute to:

- a/ holding the spine in line with the physiological axis or – in case of the muscles dysfunction – creation and "monitoring" of the spine scoliosis, and
- b/ creation of the asymmetric pelvis – as the possible response to the reversible (blockage) dysfunction of the sacroiliac joints

### Phenomena described

- 1) coexistence/correlation between the scoliosis and the SIJ blockage
- 2) relation between the SIJ blockage and the degree of the spinal rotation in scoliosis
- 3) impact of the sacroiliac joint blockage on the pelvis configuration

Because of many possible alignment types between the lumbar bone and the hip bones, and between the latter bones themselves – we have restricted our research and considered only the two, commonly occurring, pathologic pelvis alignments:

- a) "SKEWED PELVIS" – asymmetric pelvis position in the coronal plane, caused by the lower limb being shorter for either structural or functional reasons, resulting in the pelvis tilt with the concurrent shift of the gravity center line – which physiologically goes between the hip joints, along the posterior rugae and symmetrically between the heel bones – towards the shorter lower limb, accompanied by the concurrent flexion of the lumbar section of the spine in the same direction
- b) "CROOKED PELVIS" (PELVIC DISTORTION) – asymmetric, three-plane position of the pelvis,

characterized by the contrary (against each other) inclined hip bones, while the side edges of the iliac crests remain on the roughly same level. During palpation of the protruding pelvic bones, one observes the apparent divergence in the lateral position level of the anterior superior iliac spines and the reverse position of the posterior superior iliac spines.

We have examined the total number of 66 children, 28 boys (42%) and 38 girls (58%), 4 to 14 years old (4 years old – 7 persons 11%, 5 years old – 7 persons 11%, 6 years old – 6 persons 9%, 7 years old – 10 persons 15%, 8 years old – 7 persons 11%, 9 years old – 7 persons 11%, 10 years old – 7 persons 11%, 11 years old – 3 persons 4%, 12 years old – 6 persons 9%, 13 years old – 1 person 1%, 14 years old – 5 persons 7%) with the diagnosed scoliosis.

During the examination we have evaluated:

a/ scoliosis rotation degree

b/ SIJ mobility

c/ symmetry of the pelvis position – its skewness and distortion

For the vertebral column evaluation we have used a scoliometer. The examination had been performed in the standing position, in strictly specified posture, and with the feet identically astride.

To evaluate the functioning of the sacroiliac joints we have used the following tests:

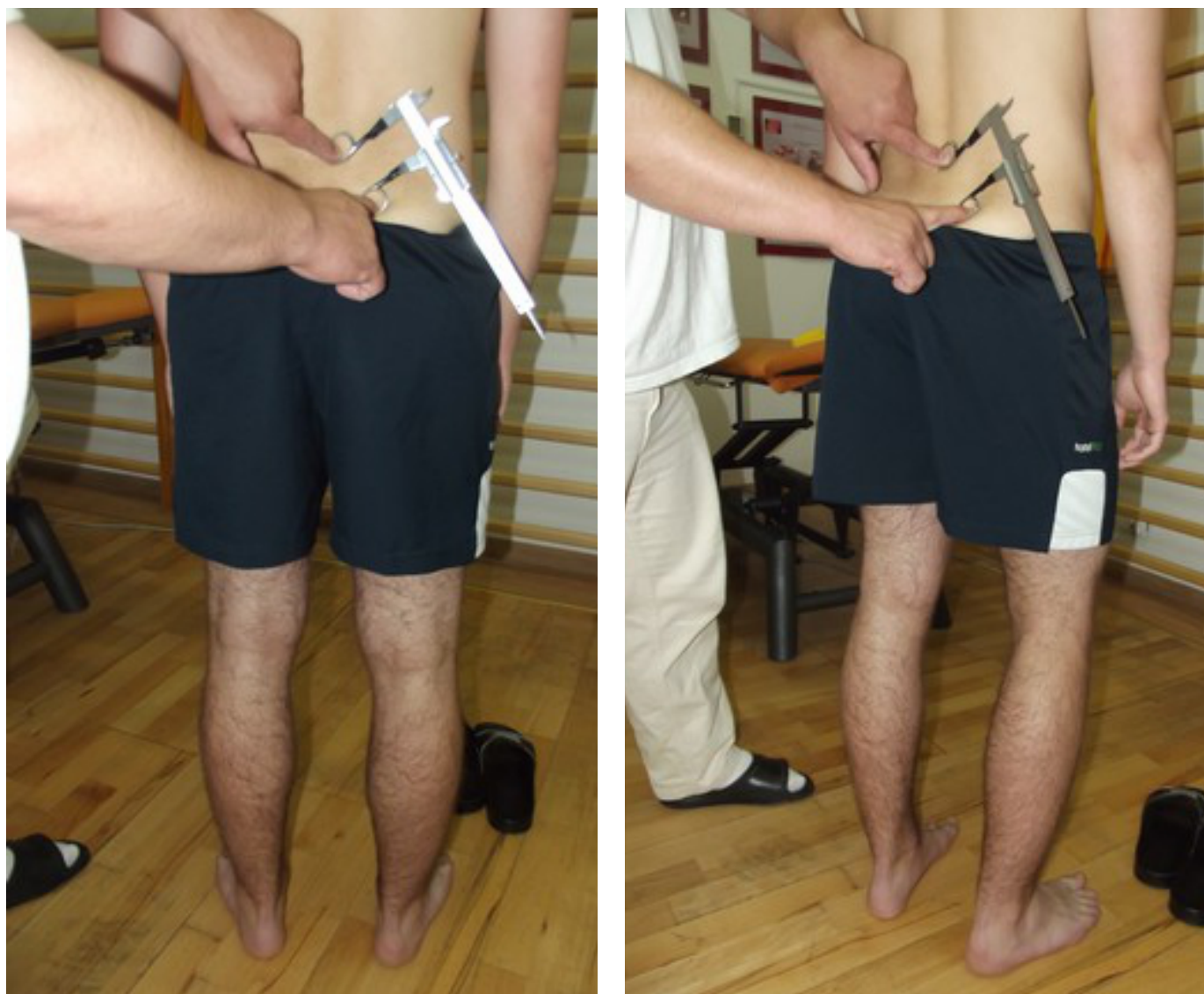
1) SIGN SPINE TEST – The Vertebra Drift Test (Lewit) – in which we have utilized a caliper for the measurements.



**Fig. 5. Sign Spine Test – Position of the caliper before test / source: own materials**



The examiner stands or sits behind the standing patient. Palpating, we locate the L5 (or alternatively the L4) spinous process and place one of our fingers on its top – on the side of the joint being examined, then we locate the anterior superior iliac spine and hook our second hand's finger just below it. The lower limbs of a patient should be completely straight.



**Fig. 6. Sign Spine Test – SIJ mobility evaluation with the concurrent measurement of the distance / source: personal contact with K. Lewit, educational materials A. Sadowski**

Next, we commend the patient to put his/her leg, on the side of the examined SIJ, in the "at ease" position – the leg slightly bent, yet without raising the heel. Interpretation: if the distance between the measurement points does not change, it means that the joint is blocked (Fig. 7).

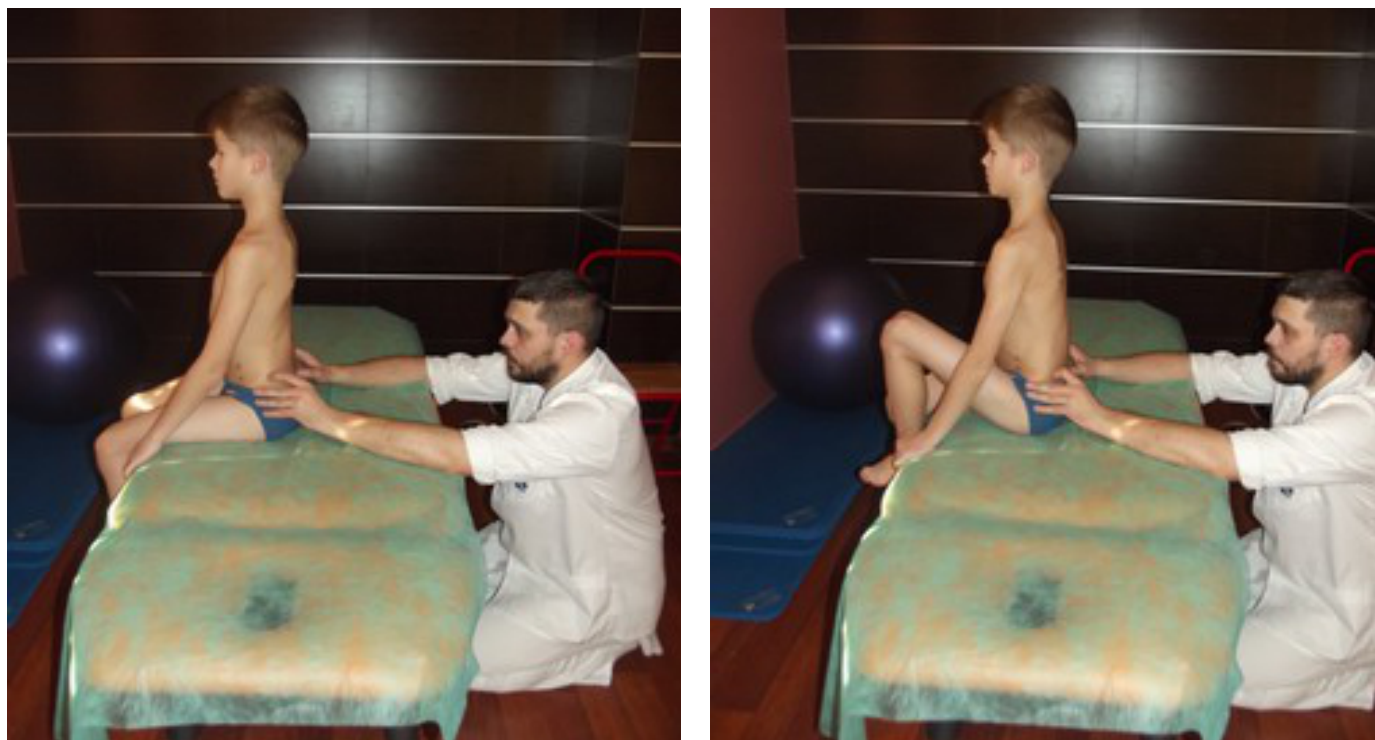


**Fig. 7. Overtake symptom – Evaluation of SIJ mobility in standing position / source: own materials**

The examiner sits behind the patient hooking his thumbs under the anterior superior iliac spines. The patient bends slowly forward.

In this move, the iliac spines should remain on the same level. If one of the iliac spines moves quicker than the other (overtakes), it means the blocked SIJ on the side of the quicker move (Fig. 7).

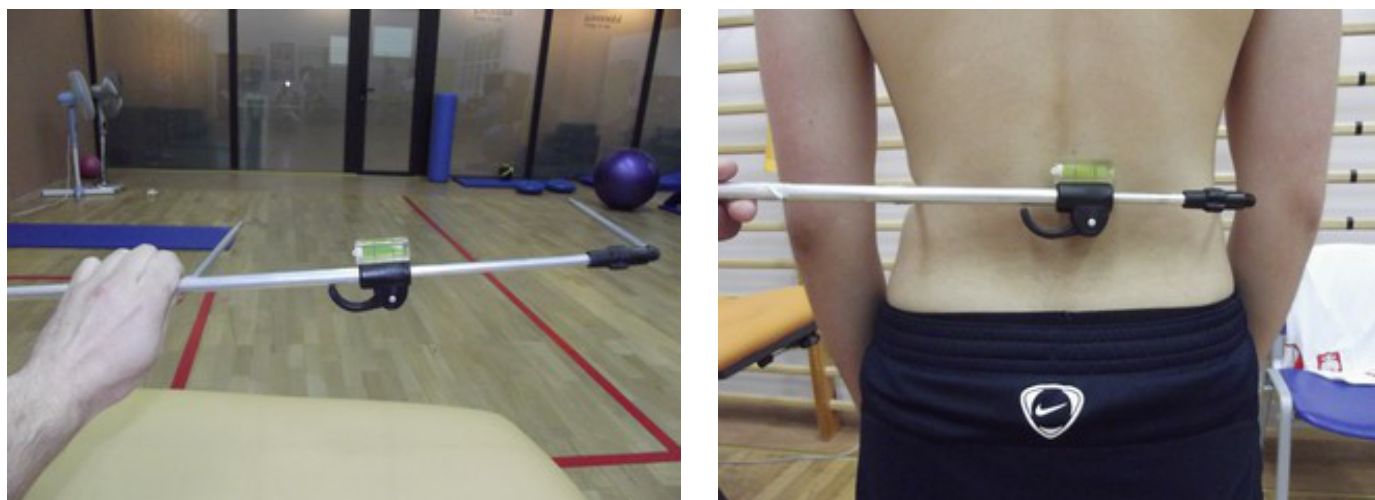
Praca ta przedstawia zjawisko bocznego skrzywienia kręgosłupa 3) GILLET TEST



**Fig. 8. Gillet Test – Evaluation of SIJ mobility in sitting position / source: own materials**

The examiner sits behind the patient, placing his thumbs on the anterior superior iliac spines, and commands the patient to draw to the chest one leg first, and then the other. Properly, the iliac spine should significantly move down. If the iliac spine does not go down, it means that the SIJ is blocked on this side (Fig. 8).

For the evaluation of the symmetry of the wings of ilium, to set the reference points we have used a measurement device, built specifically for the research, which has helped to assess the level and the spatial position of the wings (Fig. 9).



**Fig. 9. Measurement of the height of the wings of ilium, using a level device / source: own materials**



To objectively assess the pelvis asymmetry, the authors (Olędzki, Sajko, Sadowski) have developed, specifically for the research, the pelvis measurement test, which they have named the PELVIS CIRCULAR TEST (Fig.10).



**Fig.10. Measurements in the Pelvis Circular Test / source: own materials**

The examiner sits behind the standing patient. We palpate to find the top of the anterior superior iliac spine and push the start of a measuring tape to its paracentral edge, then we unwind the measuring tape with the other hand, along a straight line, and find the posterior superior iliac spine of the other wing. We take the same measurements on both sides of the pelvis and compare the results. If the distances measured are not symmetrically equal, then we have the case of the asymmetrical pelvis position.

After the above examination, the sacroiliac joints therapy had been applied. For the therapy, the authors chose the Lumbopelvic Manipulation technique, also called the Thrust, Maneuver or the Mobilization with Impulse. It is the structural joints technique, which is applied to restore the proper



functioning and position of the blocked joint. The technique features the fast movement with the low amplitude, aiming to particularly stimulate the joint's moveability barrier.

**Option 1 – HIP BONE ROTATED BACKWARDS**  
(blocked SIJ with the RETROVERTED HIP BONE)

The patient lies on his/her side with the head on a pillow. The couch's headrest is raised, to get the lateral spine flexion in the area of the lumbodorsal fascia. The lower limb, on which the patient lies, should be positioned along the long axis of the spine, and the other limb – with the hip and knee joints bent at the 90° degrees angle. The therapist holds one hand on the upper part of the patient's chest, very close to the shoulder joint, and the other hand is placed between the L5 and S1 vertebrae. Using the patient's arm, the therapist rotates the patient's torso to the point, when he can feel rotation in the L5-S1 segment – to lock the spine, then he places his palm on the lower part of the anterior superior iliac spine. The therapist's hand on the upper part of the patient's torso create a stabilizer, the other hand makes a thrusting move towards the therapist [6, 7].



**Fig. 11. Lumbopelvic Manipulation in blockage with retroverted hip bone / source: own materials**

**Option 2 – HIP BONE ROTATED FORWARD**  
(blocked SIJ with the ANTEVERTED HIP BONE)

The patient lies on his/her back on the couch. The therapist moves the patient's pelvis towards the therapist's side, and the patient's shoulders and lower limbs in the opposite direction, (so called "croissant") – which positions the patient in in the bent over posture. Then the patient interweaves his/her fingers behind the head. The therapist places his/her palm on the posterior superior iliac spine and the other hand on the back side, below the same side shoulder. Next, the therapist rotates the patient's torso towards himself. The hand placed on the patient's shoulder stabilizes the upper part of the torso, while the other hand – situated in front of the wing of ilium – makes a thrusting movement along a curved path towards the couch [6].



**Fig. 12. Lumbopelvic Manipulation in blockage with anteverted hip bone / source: own materials**

PHOTOGRAPHS OF CHILDREN BEFORE AND AFTER  
UNBLOCKING OF THE SIJ

**BEFORE**



**AFTER**



Fig. 13. Child's posture after unblocking of SIJ / source: own materials



**BEFORE**



**AFTER**



**Fig. 14. Child's posture after unblocking of SIJ / source: own materials**

**Research Results**

In all cases with the diagnosed blockage/blockages of the SIJ, one could observe the asymmetry in the pelvis position and its minor misalignments with the long axis of the vertebral column, in the coronal plane.

Within the study population, the pelvis skewness had occurred in 40 cases (61%), of which in 25 cases the pelvis had been skewed on the left side (38%) and in 15 cases on the right side (23%). The pelvic distortion had occurred 26 times (39%).

The spinal rotation degree measurement, in the examined children, had shown the results within the range of 2 to 50. Within the population studied, there were 12 cases with 20 of the spinal rotation (18%), 24 examined patients had shown 30 of the spinal rotation (36%), in 25 cases there were 40 of the spinal rotation (38%) and in 5 cases 50 of the spinal rotation (8%) had been found. In majority of the examined children, at the early stage of scoliosis, the measurement would not usually exceed 40 of the spinal rotation, at the maximum flexion point.



Our research has shown, that there is a direct link between the SIJ blockage and the scoliosis. For the 66 patients palpated during the Vertebral Drift Test, Gillet and Overtake tests – 100% had at least one of the SIJ's blocked. 28 children had their L[left] SIJ blocked (42% of the study population), in 25 cases it had been the R[right] SIJ blocked (38%), and in 13 cases there had been both SIJs blocked (20%).

Analysis of the Pelvis Circular Test measurements shows, that the whole study population, all the 66 children (100%), had shown the difference in perimeters between the iliac spines. The difference varied from 3 mm to 13 mm (3 mm – 3 persons  $\approx$  5%, 4 mm – 1 person  $\approx$  1%, 5 mm – 40 persons  $\approx$  61%, 6 mm – 1 person  $\approx$  1%, 7 mm – 3 persons  $\approx$  5%, 8 mm – 3 persons  $\approx$  5 %, 10 mm – 14 persons  $\approx$  21%, 13 mm – 1 person  $\approx$  1%).

After the procedure with the manipulation techniques, the final examination of the sacroiliac joints had been performed – to confirm their proper mobility, to evaluate the correct (or incorrect) pelvis position and to take the comparative measurements of the spinal rotation degree. The unblocking of the sacroiliac joint had decreased the spinal rotation degree in the majority of children, in as many as 33 cases (50% of the study population) by 3°, in 20 cases (30%) by 2°, in 7 cases (11%) by 1°, in 5 cases (8%) the rotation degree had decreased by as much as 4°. In one case, there had been no change.

In 65 cases, the proper mobility of the previously blocked SIJs had been found, as well as the improved symmetry in the pelvis position, including, i.a. elimination of the pelvis skewness and its distortion, and the decrease of the spinal rotation.

### Conclusions

We have found that the scoliosis is concomitant with the SIJ blockage and with the different types of the pelvis asymmetry (skewness/distortion). The unblocking of the SIJ, almost in every case allows to decrease the spinal rotation in the minor degree of curvature. Within the study population, which had undergone the therapy including the manipulation techniques influenced by the maneuvers performed, the spinal rotation decreased in 65 children.

In the majority of cases, after unblocking of the sacroiliac joints, there has been a correction of the pelvis position and, in case of the minor scoliosis, also correction of the vertebral column position. As the result, occurred the correction of an early stage of the compensated scoliosis. In our study we have omitted the cases, where the palpation had shown blockages of the joints within the scoliotic spine segments.

### Discussion

In the presented research, we have used the in-house designed Pelvis Circular Test. It must be said though, that the described and utilized test is of the indicative screening nature. Still – since it is based on the strict measurement – it does contribute to the objective evaluation of the asymmetry of the pelvis position, and helps to fulfill the requirements of the Evidence-Based Medicine.

Regarding the impact of the sacroiliac joints dysfunction on the extend of the concomitant scoliosis, one should pay attention not only to the biomechanical correlation of the phenomenon, but also – what many researches point out – to the chain reaction phenomenon. It must be concluded, that both, the sacroiliac joints and the spine's mobile sections, especially the thoracolumbar and lumbar-sacral sections – as the so called key points – are interconnected with the neurophysiological reflex arc (Lewit, Neumann, Vele) [7, 8, 9]. Based on our research results, it must be said, that the described impact on the restoration of the proper functions of the sacroiliac joints is of particular importance in cases of the concomitant, so called, "compensated" scoliosis (term introduced by A. Sadowski). For the scoliosis with the higher curvature degrees, and with the different etiology, the therapeutic impact of the manual treatment in the area of the sacroiliac joints – requires further research.

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