

# ÚDAJNÁ IDIOPATICKÁ SKOLIÓZA. BIOMECHANICKÁ ETIOLOGIE. NOVÁ KLASIFIKACE. SO-CALLED IDIOPATHIC SCOLIOSIS. BIOMECHANICAL AETIOLOGY. NEW CLASSIFICATION. TREATMENT AND PROPHYLAXIS: A REPORT

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## SUMMARY

The biomechanical aetiology of so-called idiopathic scoliosis is based on material and observations from 1984 (scholarship one month of T. Karski in Invalid Foundation Hospital in Helsinki / Finland – operator of scoliosis Dr Olai Snellman) and on material of Paediatric Orthopaedic and Rehabilitation Department of Medical University in Lublin in the years 1984 – 2007/2014.

We found three group and four types of scoliosis. With the type of scoliosis is connected the method of treatment and possibility of causal prophylaxis.

All strengthened exercises of extensor muscles in therapy should be reject from the program of treatment. These exercises fortify mainly contracted paravertebral muscles and magnify curves of scoliosis. Only the stretching exercises are proper. The causal prophylaxis should be introduced to all patients in all countries.

**Key words:** idiopathic scoliosis, biomechanical causes, treatment, stretching exercises.

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## INTRODUCTION

The biomechanical aetiology of so-called idiopathic scoliosis called AIS is described in Polish, English, German and in Spanish Journals in years 1995–2007 (T. Karski) and presented since 1995 in many Congresses and Symposia in Poland and abroad.

## MATERIAL

In 2012 the whole material gathered 1950 cases. Patients were 2 to 60 years old.

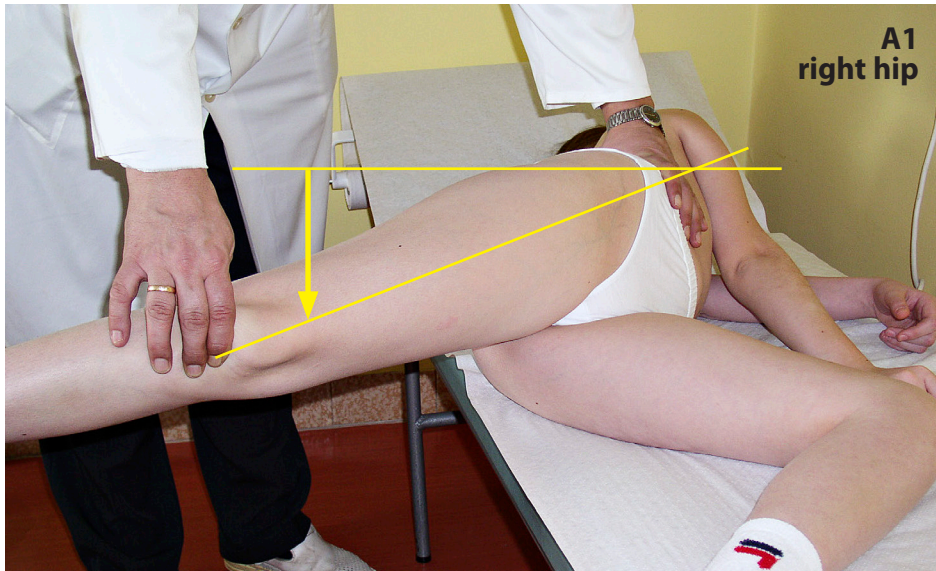
### Explanation of biomechanical aetiology of scoliosis in points

The spine deformity called adolescent idiopathic scoliosis (AIS) develop under the influence of biomechanical factors. This biomechanical factors / causes are: (A) permanent standing 'at ease' on the right leg and (B) influence appearing during gait. These both causal influences are based on (C) asymmetry of time standing – more on the right leg and on asymmetry left / right side of loading of body during walking.

To understand these asymmetries we provide this explanation in points as follow:

1. "Syndrome of contractures" [SofC] (Siebenersyndrom) according to Prof. Hans Mau is the cause of asymmetries. In 2006 we add to this "Syndrome od Contractures" the varus deformity of shank and we called it "Syndrome of Contractures and Deformities" (SofCD – T. Karski and J. Karski). So, to the seven contractures according Prof. Hans Mau we added the extensive varus deformity of shank connected with the "inconvenient foetus position" – that's mean insufficient space in uterus for the child especially in three last months of gravidity [1, 2, 3, 11, 12, 13, 14].
2. Asymmetry in movement of hips is connected with SofCD. In all scoliosis children the adduction of right hip is limited – is smaller than in left hip (see **Fig. 1**). To check this asymmetry the examination should be perform in straight position of hip joint. Please here to notice – that the checking in this position is similar / is the same like in "standing" and also similar in "stand phase of walking". In some children there is even abduction contracture of right hip, plus external rotation and flexion contracture (see later – in I epg).
3. Pathological influence on spine as mentioned above is coming by walking (gait) and because of habit of permanent standing 'at ease' on the right leg.
4. There are various types of scoliosis – some connected with "walking", other connected with "standing". The new classification is described in next chapter.
5. Every type of scoliosis start to develop in 2–3 year of life of children.

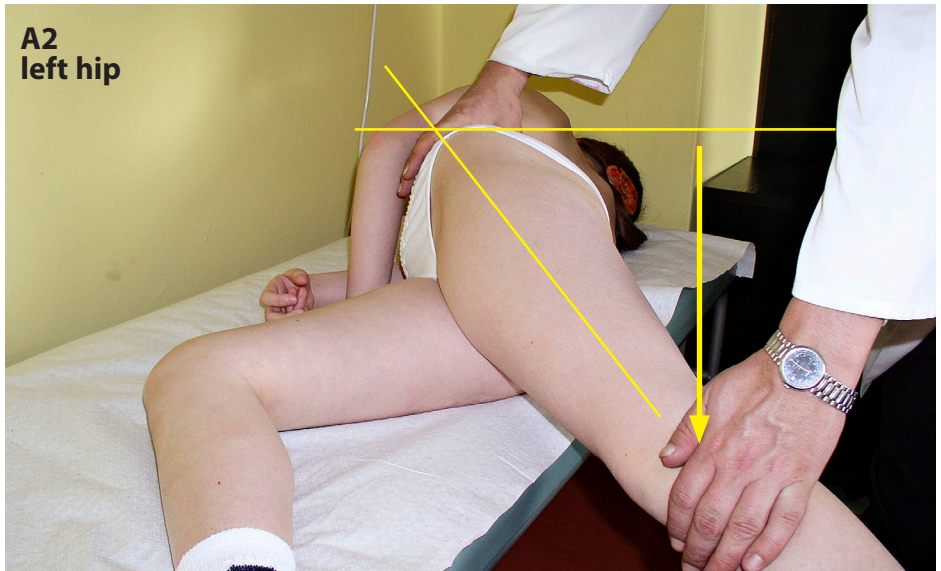
Difference of adduction of both hips – typical for 1<sup>st</sup> epg / contracture of the right hip



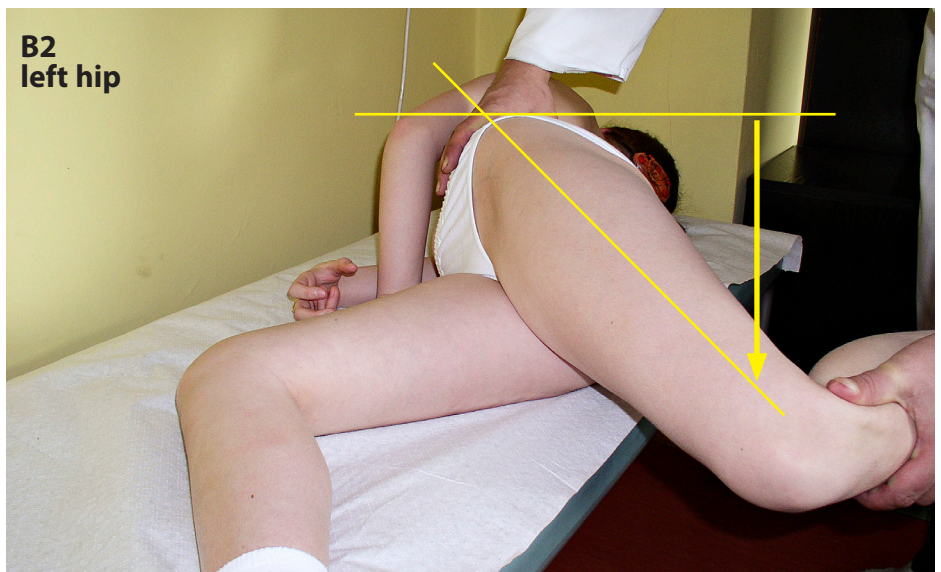
Test of adduction of hips (similar to upper test). One child. Two method of examination.  
(test is more sensible).



(0 degree adduction). Because of this – right leg is chosen for permanent standing.



Examination in „extension position of hips”. A1, A2 by extended knee. B1, B2 in flexed knee.



**Figure 1.** Examination of hip adduction



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**New classification as important information for physiotherapy [4, 5, 6, 7, 8, 9, 10].** There are three groups and four types of scoliosis (T. Karski 2001–2004).

To understand the biomechanical pathological influence in development of scoliosis we present also the child from control group without scoliosis to show the “physiological model of movement of hips” protecting before so-called idiopathic scoliosis (**Fig. 2**).

- 1) “S” I etiopathological (epg) scoliosis (**Fig. 3**). Double curves. Influenced by the “gait” and the permanent “standing at ease on the right leg”. Stiff spine. 3D. Progression.
- 2A) “C” II/A epg scoliosis (**Fig. 4a**). Influenced by the permanent “standing at ease on the right leg”. One curve. Flexible spine. 1D. No or slight progression.
- 2B) “S” II/B epg scoliosis (**Fig. 4b**). Influenced by the permanent “standing at ease on the right leg”, plus – laxity of joints or/and incorrect exercises in previous treatment. Flexible spine. 2D or mix. Moderate progression.
- 3) “I” III epg scoliosis (**Fig. 5**). Influenced by the “gait” only. Stiff spine. No curves or small. No progression. No included till now to scoliosis.

## PHYSIOTHERAPY

All previous extensions, its mean “muscles strengthening exercises” were incorrect / harmful and caused only bigger curves and made the spine more stiff.

Because of this the orthopaedic surgeon used to speak about “Natural History of Scoliosis” to explain the parents wrong result of therapy.

Instead of such therapy – all stretching exercises for spine and hips are proper for treatment and for prophylaxis. These exercises lead to symmetry of movements and symmetry of function and therefore protect before scoliosis.

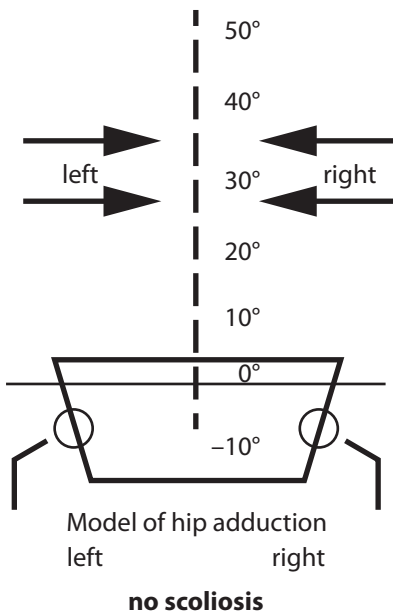
## CONCLUSIONS

- 1) All scientists and all Institutions engaged with scoliosis should learn about biomechanical reasons in development of so-called idiopathic scoliosis.
- 2) All orthopaedic surgeons, rehabilitations and physiotherapies should introduce the new conception of treatment and the causal prophylaxis in children with so-called idiopathic scoliosis, checking on own material the new point of view to the scoliosis.

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**Healthy child. Physiological model of hips movements. Proper Adams test. Normal axis of spine. The same level of lumbar and thoracic part of spine.**



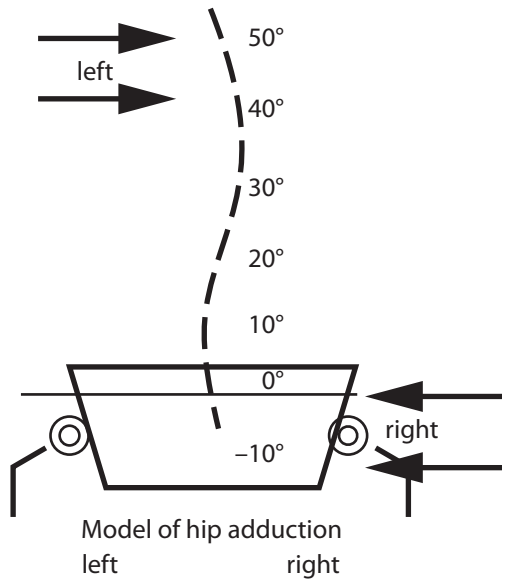
By proper model of hips movements there is symmetry of loading during gait and symmetry in the time of standing on left / right leg. Never develop the so-called idiopathic scoliosis.

**Figure 2** Physiological model of hips movements – no so-called idiopathic scoliosis.

**New classification: I epg. "S" scoliosis**

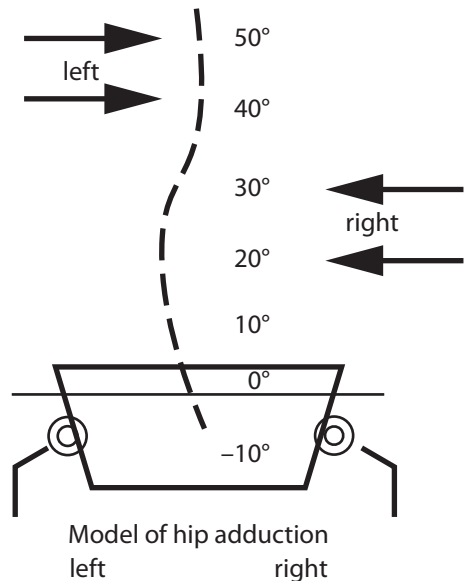


„S" scoliosis in I epg (3D). Primary double curves – connected with gait & standing 'at ease' on right leg. First rotation deformity, next curves. Stiffness of spine.



**Figure 3** I epg deformity - "S" scoliosis connected with specific model of hips movements. Two curves. Stiff spine. 3D. Causal influence: "gait" and "standing 'at ease' on the right leg". Progression.

**New classification: II/A epg."C" scoliosis**

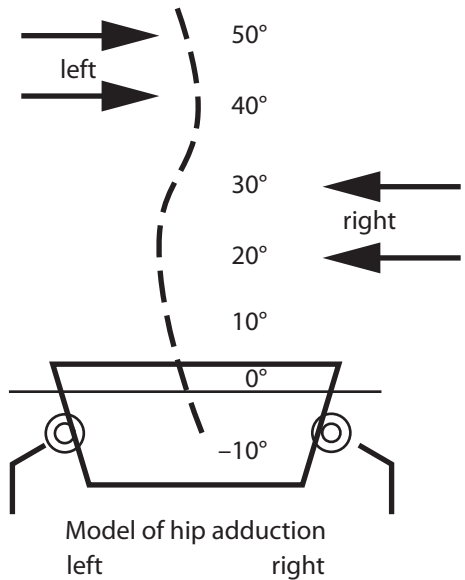


Scoliosis in II/A epg "C" shaped. 1D. In II/A epg flexible spine. Causative factor: standing 'at ease' on the right leg. Beginning of scoliosis 2<sup>nd</sup> year of life. After 6 or 8 years of such standing – it's mean in 10<sup>th</sup> or 12<sup>th</sup> year of life the curve on x-ray is visible.

**Figure 4a** II/a epg deformity - "C" scoliosis connected with specific model of hips movements. One curve. Flexible spine. 1D. Causal influence: permanent "standing 'at ease' on the right leg". No progression.



**New classification: II/B epg „S” scoliosis**



Scoliosis in II/B epg „S” shaped. 2D or mix. In II/B epg flexible spine. Thoracic curve secondary. Causative factor: standing 'at ease' on the right leg and additionally laxity of joints and / or wrong exercises in therapy. In this case wrong therapy 5 years.

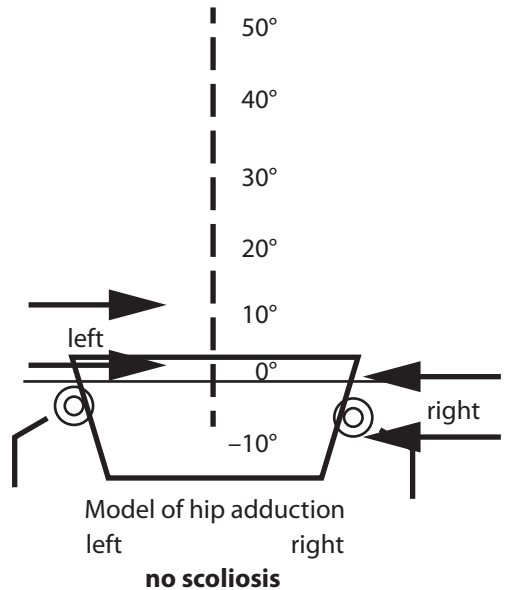
**Figure 4b** III/b epg deformity - “S” scoliosis connected with specific model of hips movements. Two curves. – thoracic secondary. 2D or mix. Causal influence: permanent “standing ‘at ease’ on the right leg” and flaccidity of joints. No progression, or small.

**New classification: III epg. "I" scoliosis Stiff spine / no curves or small curves**



In the case (A) wrong exercises were performed in 7 y. To the mother was spoken all the time - the wrong result of the therapy is typical for „natural history of scoliosis“.

Scoliosis in III epg „I“ shaped, connected with gait only. 2D or mix. Stiffness of spine. Small curves or no curves. In adulthood – pain.



**Figure 5** – III epg deformity – “I” scoliosis connected with specific model of hips movements. No curves or small. Stiff spine. 2D or mix. Causal influence: “gait”. No progression. Till now not included to scoliosis. Explanation: Epg – ethio-patho-genesis

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We found three group and four types of scoliosis. With the type of scoliosis is connected the method of treatment and possibility of causal prophylaxis.

All strengthened exercises in therapy should be reject from the program of treatment. Only the stretching exercises are proper. The causal prophylaxis should be introduced to all patients in all countries.

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