

Explanation of biomechanical aetiology of the so-called idiopathic scoliosis. Physiotherapy in treatment and in prophylaxis

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Summary

The biomechanical aetiology of so-called idiopathic scoliosis is based on material and observations from 1984 (T. Karski - scholarship one month in Invalid Foundation Hospital in Helsinki / Finland – cooperation with operator of scoliosis - Dr Olai Snellman) and on material of Paediatric Orthopaedic and Rehabilitation Department of Medical University in Lublin in the years 1984–2009. Next (2009–2014) based on material of Out Patients Clinic of both authors.

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

The aim for physiotherapy is to remove the contracture on right hip, on pelvis (to cure the anterior tilt of pelvis), to remove the contracture on concave side of curves. Very important is to remember all patents with scoliosis about standing – only standing ‘at ease’ on the left leg is proper and prevent scoliosis.

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

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. 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.

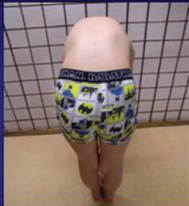


New classification as important information for physiotherapy [4, 5, 6, 7, 8, 9, 10]

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 (Tab. 1).


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 (Tab. 3a). Influenced by the permanent “standing at ease on the right leg”.

Tab. 1		
Model of hips movement	Character of spine	Never scoliosis
<p>Right hip Full adduction – examination in straight position of joint. Full internal rotation. Full extension.</p>		
<p>Left hip Full adduction – examination in straight position of joint. Full internal rotation. Full extension.</p>	<p>Full flexibility of spine Normal axis Normal level in lumbar and in thoracic region of spine</p>	


Tab. 1 Physiological model of hips movements – never so-called idiopathic scoliosis.

(1) “S” I etiopathological (epg) scoliosis (Tab. 2).

Tab. 2		
Model of hips movement	Character of scoliosis	Time of appearance of scoliosis
<p>Right hip Adduction in straight position of joint (-5), (-10) or 0 degree. Limited internal rotation or external rotation contracture. Flexion contracture</p>		<p>Beginning of development 2nd year of life Influences factor: Standing on free on the right leg and walking</p>
<p>Left hip Adduction in straight position of joint 30 or 40 or 50 degree. Full internal rotation. Can be flexion contracture</p>	<p>Scoliosis „S” I epg Two curves Lumbar left convex Thoracic right convex Stiffness of spine 3D. Progression</p>	<p>Time when scoliosis is visible 5th or 6th year of life</p>

Tab. 2 – 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.


Tab. 3a

Model of hips movement	Character of scoliosis	Time of appearance of scoliosis
<p>Right hip Adduction in straight position of joint 15 or 20 or 25 degree. Sometimes flexion contracture</p>		<p>Beginning of development 2nd year of life Influences factor: Standing on free on the right leg</p>
<p>Left hip Adduction in straight position of joint 35 or 40 or 50 degree. Full internal rotation. Sometimes flexion contracture</p>		<p>Scoliosis „C” II/A epg. One curve - lumbar left convex. No stiffness of spine. 2D. No progression</p>

Tab. 3a – 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. No included till now to scoliosis.

One curve. Flexible spine. 1D. No or slight progression.
(2B) “S” II/B epg scoliosis (Tab. 3b).

Tab. 3b


Model of hips movement	Character of scoliosis	Time of appearance of scoliosis
<p>Right hip Adduction in straight position of joint 15 or 20 or 25 degree. Sometimes flexion contracture</p>		<p>Beginning of development 2nd year of life Influences factor: Standing on free on the right leg + laxity of joints</p>
<p>Left hip Adduction in straight position of joint 35 or 40 or 50 degree. Full internal rotation. Sometimes flexion contracture</p>		<p>Scoliosis „S” II/A epg. Two curves - lumbar left convex. Thoracic right convex. No stiffness of spine. 2D or mix. Slight progression</p>

Tab. 3b – II/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.

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 (Tab. 4).

of spine. Very important is to remember all patents with scoliosis about standing – only standing ‘at ease’ on the left leg is proper and prevent scoliosis.

Tab. 4		
Model of hips movement	Character of scoliosis	Time of appearance of scoliosis
<p>Right hip Adduction in straight position of joint (-5), (-10) or 0 degree. Limited internal rotation or external rotation contracture. Flexion contracture</p>		<p>Beginning of development 2nd year of life Influences factor: Walking</p>
<p>Left hip Adduction in straight position of joint 5 or 10 or 20 degree. Limited internal rotation. Can be flexion contracture</p>		<p>Scoliosis „I” III epg No curves or small. Stiffness of spine. 2D or mix. No progression</p>

Tab.4 – 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.

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 to 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.

The prophylactic exercises should be introduced in age of 3 – 5 years. Very important task is to send the children to karate or taekwondo, or aikido just in age 4 – 5. The details aim for physiotherapy is to remove the contracture on right hip – abduction, external rotation and flexion, on pelvis (to cure the anterior tilt of pelvis), to remove the contracture on concave side of curves. In first plan of such new therapy – even in very small children – in age of 3 – 4 – 5 years - is to remove the stiffness

Conclusions

- (1) All scientists and all Institutions engaged with scoliosis should learn about biomechanical reasons in development of so-called idiopathic scoliosis.
- (2) The teaching of students in all medical universities should take into consideration the “biomechanical aetiology of so – called idiopathic scoliosis”
- (3) 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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Acknowledgment: Many thanks to MA Katarzyna Karska for her help in preparing the text in English.