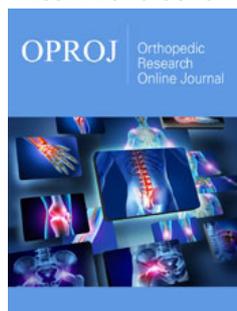


Clinical and Psychological Symptoms of Minimal Brain Dysfunction (MBD). Causes. Children and Adults. Examples of Pathology. Methods of Therapy

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Summary

All orthopedic and psychological observations are based on material from the years 1995 - 2022: 1565 children and youths in the age between 2 and 18 years and adults in age 20 - 70. All patients were examined and treated because of orthopedic disorders in feet, knees, hips, spine - in result of Minimal Brain Dysfunction [MBD]. Clinically there were: valgus deformity of the feet, hyperextension of the knees, anterior tilt of the pelvis, hyperlordosis of the lumbar spine, back pain syndromes in adults. These symptoms are a result of asymmetrical spasticity or sub - spasticity of the opposite groups of muscles. At the same time, we observe in this group of patients the "laxity of joints" and this is a result of the changes in the properties of collagen. Repeated examination of these patients has shown also the psychological disorders - typical like symptoms in Attention Deficit & Hyperactivity Disorder (ADHD). These symptoms observed in children can very often persist in the adulthood and this problem is presented in a special subchapter. It is very important to introduce the therapy of disorders of locomotors system and therapy of psychological "aberration of behavior" early in the childhood.

Keyword: Deformations; Illnesses; Orthopedics; Neurology; Psychological problems; Examples of pathology in locomotors system; Therapy

Introduction

In both authors' orthopedic and rehabilitation activity from 1961 (T. Karski) and from 1988 (J. Karski) till now - patient's pathology can be classified in following groups [1-19]:

- a) Patients with symptoms of congenital disorders,
- b) Patients with disorders connected with the Syndrome of Contractures and Deformities according to Prof. Hans Mau and Lublin observations,
- c) Patients with disorders as a result of changes in Central Nerve System (CNS) in cases with Minimal Brain Dysfunction (MBD).

This third problem is the subject of this paper. In the last years of 20th Century and in beginning of 21st Century the number of patients with MBD has increased. Patients with MBD symptoms have deformities in feet, knees, in position of pelvis, changes in axis of spine - because of sub-spasticity of various group of muscles - and in result - imbalance of extensors and flexors group of muscles.

Simultaneously - in these patients we can observe the "laxity of joints". Various groups of doctors - also in our country - perceive this "laxity" as a "low tension of muscles". We explain - no - it is a result of changes of properties of collagen. The common recommendation to "do strengthening exercises" to obtain "strong muscles" is a mistake of diagnosis and a mistake of therapy.

Causes of Minimal Brain Dysfunction (MBD) - gynecological point of view [20,21]

According to obstetrics and gynecologists, also in orthopedics observations - the causes of Minimal Brain Dysfunction (MBD) in children are because of:

- a) Anemia at women in gravidity period,
- b) Hypertension or hypotension of blood circulation of mother in gravidity period,
- c) Permanent stress- here we have many examples. In stress the blood circulation is disordered, capillaries are closed - as a result, insufficiency of blood circulation from placenta to fetus occurs. Asphyxia of the fetal Central Nervous System is the cause of Minimal Brain Dysfunction.
- d) Noise - similar influence like stress,
- e) Chronic inefficiency of placenta at mother - because of congenital or acquired illnesses,
- f) Infection of the urinary tract,
- g) Intrauterine limitations of fetus growth because of known and unknown causes,
- h) Oligohydramnion (limited intrauterine water),
- i) Spotting or hemorrhage during pregnancy,
- j) Uterus contractions in early stages of pregnancy - that is - prematurely,
- k) Excessively intense action of uterus during delivery as well as uterine tetanus,
- l) Overdoses or improper medication during delivery,
- m) Improper "hand maneuver" of doctor during delivery,
- n) Mellitus - of the newborn - bigger than normal - frequent and important cause of MBD or even Cerebral Palsy described by Prof. Harald Thom (Heidelberg, Rummelsberg by Nürnberg - my - T. Karski - cooperation with Professor Thom - in my scholarship time of DAAD - in Heidelberg [1972 - 1973] and in next years in Rummelsberg.

The "pathological status" of such cases of asphyxia has a particular influence on the Central Nervous System (CNS). Therefore, the time of pregnancy or / and delivery is crucial for a child - and - if asphyxia occurred - we diagnose the pathology called Minimal Brain Dysfunction (MBD) and in very serious cases even Cerebral Palsy. In the case of the MBD - after years - we observe secondary changes in the locomotors systems also at older people. So, the time of pregnancy - should be for women a safe, nice and "blessed period of life". The women need from the family, from friends, from colleagues - love, care and pleasant affection during all nine months of the pregnancy.

Material from 1995 - 2022

The observations are based on the material of 1565 children and youths in the ages of 2 to 18 years and adults 20 - 70 years from the years 1995 - 2022. These patients were treated in Pediatric

Orthopedic and Rehabilitation Department of Medical University in Lublin in 1995 - 2009 (in this time Professor T. Karski was the Head of this Department) and in Out - Patients Clinic by both authors in the years 2009 - 2022 [1-18].

Symptoms in locomotors system in children with Minimal Brain Dysfunction (MBD) [6-37]

A. Limited abduction of hips in newborns and babies. Hip dysplasia [5-18]; (Figure 1a & 1b). The pathology of hips appears because of three specific conditions:



Figure 1a & 1b: (A). Child, 6 months old. In anamnesis not proper pregnancy and delivery. Limited abduction of both hips. Sub-spasticity of the adductors muscles (arrows). (B) Treatment of hips and wry neck right side. For hips abduction nursing of child necessary over a long time. For wry neck - rotation position to right (!).

a) Dysplasia can be in "Syndrome of Contractures and Deformities" (SofCD) according H. Mau, T. Karski & J. Karski. The SofCD can appear theoretically in 85% - 90% of all newborn in Poland - but developed cases - we see in our patients group in 7% - 12%. In clinical examination it is limited abduction of the hip. The dysplasia develops slowly and in sonography examination can be "overlooked". Prof. B. Klisic from Beograd called this type of hip disorder as Developmental Dysplasia of the Hip (DDH) [22-25].

b) Dysplasia of the hips can be in the situation of general laxity of the joints - 10% - 15% of all dysplasia cases in Poland and is connected with the MBD - opinion shared by Professor Tibor Vizkelety - Hungary [26,27]. Here we repeat - the laxity is caused by changed properties of collagen and not because of "weak muscles" - what is a popular, but not correct opinion of many doctors.

c) Dysplasia can develop also in situations of spastic or sub-spastic contractures of adductor muscles of the hip or hips in children with MBD (Figure 1b).

Therapy & prophylaxis: Children need from first days of life, till the age of one, two or three - permanent abduction and flexion position of the hips. It is important to carry newborn and children in a proper way (Figure 1b). The best is to nurse the child immediately

from first days after birth "face to face" with gentle pressure on the pelvis. When the newborn is directed to mother with maximal abducted and flexed 90 - 100 degree their hips - will never develop "hips dislocation" [10-16].

Older children should sit in proper position - similar - like in karate: "butterfly sitting" - knees flexed 90 or more degrees, feet in contact, hips in maximal abduction. Every other position of sitting is improper and fully incorrect for hips and knees - is the cause of bigger than normal Antetorsion (AT) of femoral neck, develop dysplasia of hips and make valgus deformity of knees and their

instability.

B. Extension contracture of the trunk / of the spine (Figure 2a, 2b). In many children with Minimal Brain Dysfunctions the trunk is in extension position because of spastic tension and - later - contracture with fixed shortened extensor muscles, fascia of spine. In some children - during examination - on laying position of child - it is to observe "opisthotonus" symptoms - its mean "maximal extension contracture of trunk" often with hyperextension of the neck.

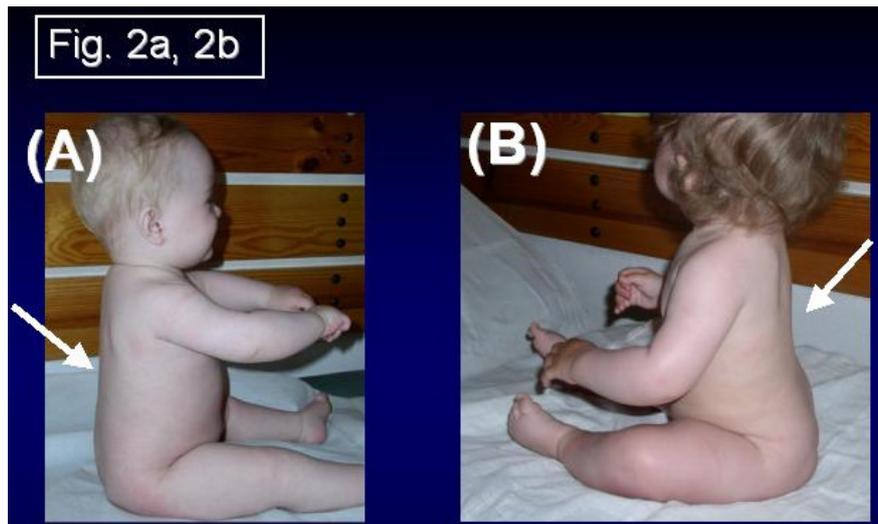


Figure 2a & 2b: (A) (B). Two children in age 10 month (A) and in age 12 month (B). In anamnesis not proper pregnancy and delivery. In both children - extension contracture of the trunk. The straight position of the spine because of sub-spasticity of the extensors muscles (arrows).

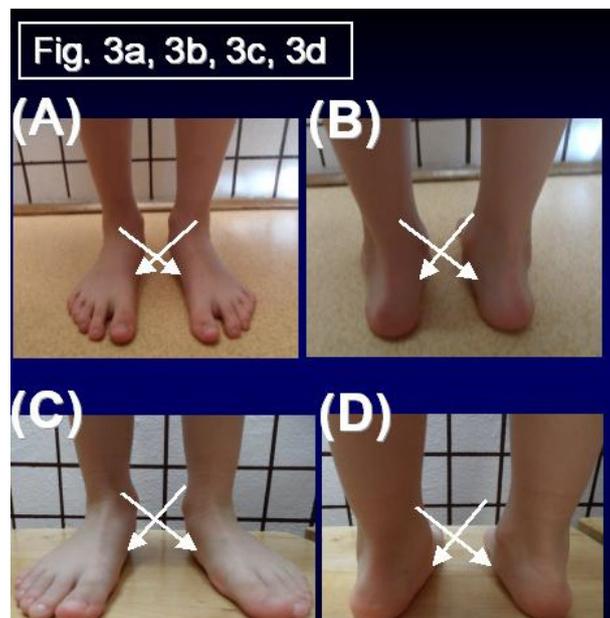


Figure 3a-3d: (A) (B) Child, 10 years old. Minimal Brain Dysfunction (MBD). Shorted Achilles tendons and m. triceps surae. Laxity of joints. Planus - valgus deformity of feet. (C) (D) Child 8 y. old. Planus - valgus deformity of feet. Walking with whole surface of feet but in prone position. After years fixed deformity.

C. Feet - valgus or plane valgus deformity (Figure 3a-3d)

Very often in children with MBD there is a shortening (contracture) of the Achilles tendon, of m. triceps surae and other flexors of the feet because of spastic or sub-spastic contracture. If at the same time there is "laxity of joints" valgus deformity of the feet can develop. Such deformity of feet appears in 15% - 18% of children in Poland.

Below, we give the explanation of the development of the feet valgus deformity in points. The first to observe and describe such causes of feet deformity was Prof. Jean Meary from Paris:

- a) During walking by every step, we need dorsal flexion of feet 10 - 15 - 20 degrees - depending on the length of the step,
- b) If Achilles tendon and m. triceps surae are shortened, and there is an accompanying laxity of joints, the needed dorsal

flexion happens in the "prone position of the feet",

c) Repeated "dorsal flexion in prone position", caused after years the "full fixed valgus, or plane - valgus deformity" of the feet.

Therapy: In treatment important are stretching exercises to lengthen m. triceps surae and Achilles tendons. Inserts for shoes are also a part of the therapy. Untreated valgus deformity of feet in the childhood causes big problems in adults - pain, difficulties in walking, limping.

D. Recurvation of the knees as a symptom of MBD. Hyperextension of the knees (Figure 4a, 4b) is very often accompanying symptom to the valgus deformity of the feet. This deformity of the knees is also the effect of a shortening of the Achilles tendon and m. triceps surae. Recurvation of knees is the compensatory deformation.

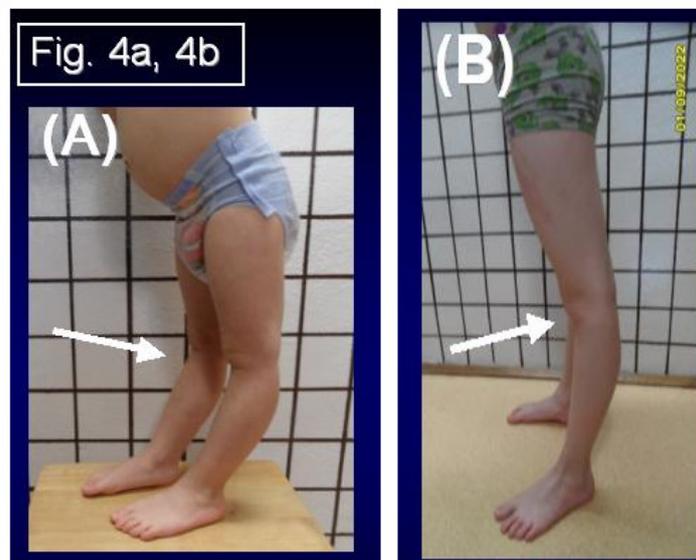


Figure 4a & 4b: (A) Child, 4 years old. Mother - problems during pregnancy and delivery. Typical changes for Minimal Brain Dysfunction (MBD). Recurvation deformity of the knees (arrow). Shortening of the Achilles tendons and m. triceps surae on both sides and development of deformity through compensatory function. (B) Child 10 years old. Mother - problems during pregnancy. Typical changes for Minimal Brain Dysfunction (MBD). Recurvation deformity of the knees (arrow). The deformity is caused by the shortened Achilles tendons and m. triceps surae on both sides and development through function of „walking”.

Explanation:

- a) Limitation of the dorsal flexion of the feet because of shortened m. triceps surae and Achilles tendon,
- b) During walking, the moment when the foot is in full contact with the floor - such way of walking is more frequent than walking on the toes - hyperextension of the knees as compensatory position appears automatically.
- c) After years, recurvatum is fixed and the knee obtain the status "genu recurvatum (Latin) - recurvatum deformity".

Therapy: such deformity requires early stretching exercises similar to the ones for valgus feet deformities. Additionally - the child should sit in "butterfly" position.

E. Anterior tilt of the pelvis and hiperlordosis of the lumbar spine (Figure 5a, 5b)

In children with Minimal Brain Dysfunctions (MBD) independently from the valgus deformity of the feet and recurvatum of the knees, we very often observe an anterior tilt of the pelvis with hiperlordosis of the lumbar spine. In the cases of MBD - m. rectus - part of m. quadriceps - it is spastic or only sub-spastic very frequently, and in result - it is too short and causes the "flexion contracture of the hips" - and in result hiperlordosis of the lumbar spine. This deformity appears in 15% - 18% of people in Poland. If hiperlordosis of lumbar spine is not successfully treated in the childhood it can result in a very serious problem of "low back pain" in adults.

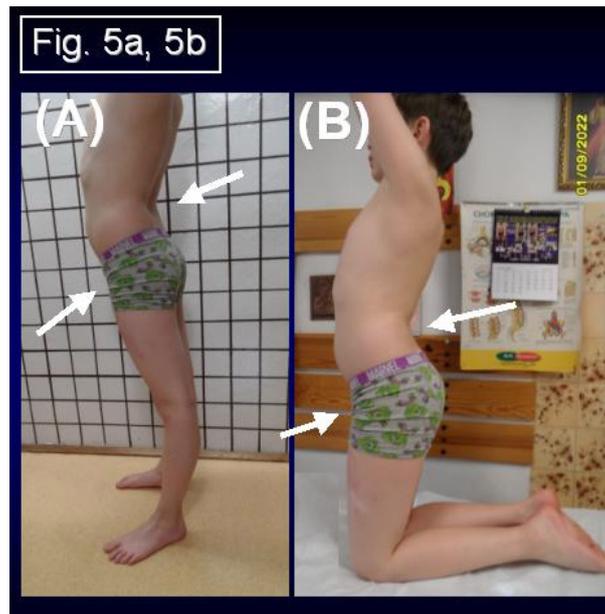


Figure 5a & 5b: (A) (B). Child, 10 years old. The same child on both pictures. Mother - problems during pregnancy. Typical changes for Minimal Brain Dysfunction (MBD). Anterior tilt of pelvis because of hips flexors contracture (arrow). As result - hiperlordosis of lumbar spine (arrow). (B) Kneeing test - maximal expressed hiperlordosis of lumbar spine.

F. Laxity of joints, common symptom of MBD (Figure 6a, 6b). These abnormalities concern all joints of the body. Here I repeat - the laxity of joints is not caused by "weak muscles" but by changed properties of collagen. It is very common in Poland and in other countries - rehabilitation doctors, physiotherapists diagnose "weak

muscles" and recommend "strengthening exercises as therapy". Their diagnosis is not proper, therapy is not either. Unfortunately, the laxity of joints is not possible to cure. With age, the laxity can "diminish a little", but it occurs only at the age of 60, 70 or 80.

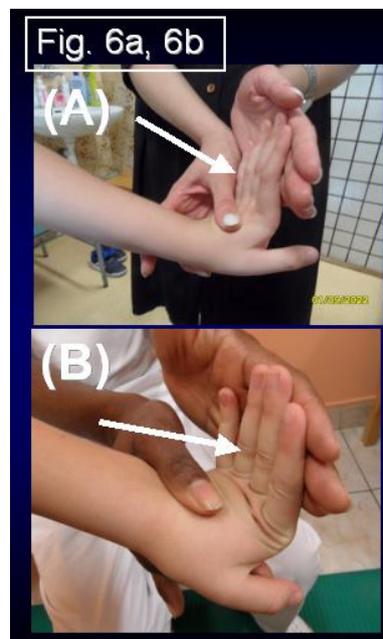


Figure 6a & 6b: (A). Child, 10. Gravity - stress, noise, lower RR, child - pre-newborn. All symptoms of Minimal Brain Dysfunction. 1/ Deformity of feet - plane - valgus, 2/ Anterior tilt of pelvis as a result of contracture of flexors of hips, 3/ Hyperextension of knees (recurvation), 4/ Hiperlordosis of lumbar spine, 5/ Laxity of joints as a result of changes of properties of collagen (arrow). (B) Child, 5 years old. Gravity and delivery with complications. Symptoms of MBD. On the picture - one of ten symptoms of „general laxity of joints” according to Wynne Davies (arrow).

Therapy of orthopedic disorders (Figure 7a, 7b)

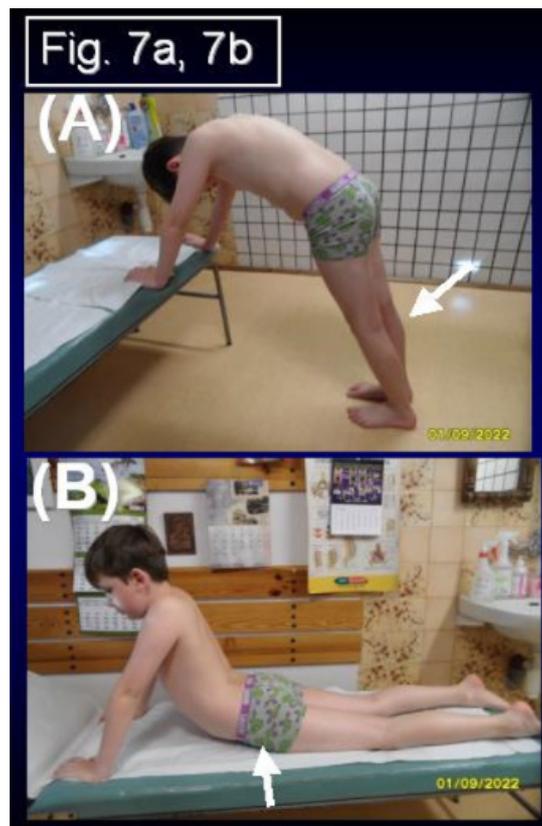


Figure 7a & 7b: (A) (B). Child, 10 years old. Born 15.05.2012. Gravidity - stress, noise, lower RR, pre-newborn. Symptoms of MBD:

1/ Deformity of feet - plane - valgus, 2/ Anterior tilt of pelvis as a result of contracture of flexors of hips, 3/ Hyperextension of knees (recurvation), 4/ Hiperlordosis of lumbar spine, 5/ Laxity of joints as result of changes of properties of collagen, 6/ Difficulties of walking - pain, 7/ Psychological changes - relation of mother. In the pictures:

(A) Stretching exercises for lengthening of flexors of knees and feet.

(B) Exercise typical for karate to lengthening of hips flexors. Aim - proper position of pelvis and proper axis of the spine.

All the symptoms of MBD - in feet, in knees, in position of pelvis and in spine - need an early and long-lasting therapy in the childhood, through stretching exercises or "special stretching positions" - to lengthen the shortened, contracted soft tissues - muscles, tendons, capsules, fascias. We should see such early treatment as "prophylaxis program for adults".

The aim of the therapy of "anterior tilt of pelvis" and "hiperlordosis of lumbar spine" is to stretch the flexors of the hips. The exercises are similar or the same as in karate, taekwondo, aikido or yoga. Through therapy of children, we prevent the "low back syndromes" at adults.

Psychological symptoms in children with MBD

All the orthopedic disorders of MBD described above are connected additional with psychological symptoms. Children affected by MBD are often very nervous, they shout, cry without any clear reason, they refuse to talk with their parents, answer parents' questions or listen to their explanations, they are stubborn.

At the same time, they look for close contact with their mother, farther or grandparents, or sister or brother. They expect and they need - the love from parents and the whole family. Our experience confirms - "the love given to the child" is an important point in the program of orthopedic therapy.

Other psychological symptom is hyperactivity. So, the other descriptions of MBD are ADHD - Attention-Deficit & Hyperactivity Disorder. One of the forms of hyperactivity is permanent jumping down from various high objects such as chairs, sofas, window-sills, staircases, stairways, tree branches and other objects in the child's environment. The jumping repeated for many times, for example 20 - 30 - 40 times per day can cause the Legg - Waldenström - Calve - Perthes disease. About the Perthes disease we have published an article in International Journal of Orthopedic Research USA, Kansas in 2021 [16].

Psychologically symptoms - adults

The patients with the symptoms of MBD consist of 15 % - 18 % of suffering persons - not only children but also adult with

disorders of locomotors system and psychological symptoms too. Discussion with the older patients confirms - that they are nervous, they have problems in family, with other persons at home. Such patients report "low back pain", knee pain, feet pain symptoms. Such "nervous behavior" confirms the ADHD - "hyperactivity disorders", and the symptoms are the same as in MBD.

Discussion

According to ours and many authors long time observations of various locomotors system disorders [1-37] - also can appear the variable behavior of many patients with symptoms of Minimal Brain Dysfunctions [1-19]. This "psychological variability" is connected also with two other conditions and influences.

- a) The first are genetically influences - connected with difficult social and political situation of the people in many generations - in many countries. When life in some countries over years or even centuries is burdensome and demanding - people start to protest. This protest first concerns the opinion, next it is verbally expressed, then transform into "aggressive acts". The general and total negation - in time - "over generation" - can be "genetically fixed".
- b) The next causes of improper psychological behavior of many people are - because of - improper education in home, in school and is connected also with "the tendency in the television and the radio to give negative education / information".
- c) The last causes of "improper behavior" and "negative attitude" concern the persons with Minimal Brain Dysfunctions (MBD) - what is subject of the paper.

The people with symptoms of MBD - independently from clinical disorders - have also psychological changes - and it requires therapy. We can recognize such persons - through orthopedic disorders - recurvation of knees, hiperlordosis of lumbar spine, a specific manner and way of walking - more on toes and - and what is especially easy to recognize - laxity of joints.

Children and older persons suffering because of MBD need physiotherapy and "psychological therapy" - not drugs. The most important thing is to recognize psychological symptoms of MBD in children - and treat them completely and fully - and see such therapy as a "prophylaxis for adults". In the therapy - the best are the far-east martial arts like karate, taekwondo, aikido, kung fu, yoga, music therapy and occupation therapy are also important.

Conclusion

1. In our clinical material there are - children and adults - ca 18% - patients with symptoms of Minimal Brain Dysfunctions (MBD).
2. The clinical symptoms of MBD are valgus deformity of feet, recurvation of knees, anterior tilt of pelvis and hiperlordosis of lumbar spine, general laxity of joints, very often - "pain syndromes", insufficiency in walking, in daily activity, at work, in sports.

3. Incorrect psychological behavior of children and adults is a frequent symptom typical for patients with MBD.

4. The described "incorrect psychological behavior" is also connected with "genetically conditions" and "negative and tendency education" in families, in school, in television, in radio et cetera.

5. Orthopedic surgeons, neurologists, pediatricians, general doctors should be familiarized with MBD, diagnose the "neurological & orthopedic" disorders and introduce early therapy in children.

6. The proper therapy is based on two directions / ways - a/ physiotherapy with kinesiotherapy and b/ psychological therapy.

7. In physiotherapy - it is important to cure the shortened and "contracted" soft tissues - tendons, fascias, capsules, muscles to receive full and symmetrical movement of joints and proper position of the parts of the body and thanks this - enable proper loading, efficient walking and proper sitting and standing.

8. In children and in adults - the therapy should be - "friendly and nice" and recommendations should be understandable for patients.

9. As prophylaxis and prevention of the MBD at children - we should remember about a proper behavior towards pregnant women - and perceive this period of their life' as blessed. It is the best prophylaxis of Minimal Brain Dysfunction in children.

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