

Opinion Article

Why Orthotics Fail to Eliminate Deformations

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The medical statistics of recent years clearly indicates that orthotics do not solve problems of feet arches correction as well as joints and spinal cord correction. But without this correction the restoration of the entire human organism is not possible. Analyzing the reasons for existing situation, we provide for your consideration analysis of two methods for orthotics manufacturing. Their object must be the correction of all the elements of locomotor system.

Such approach is defined and dictated by human physiology. It states that for cellular metabolism the skeleton muscles are responsible. But as contemporary orthopaedics is not setting this task, the negative effect on possible normalization of entire organism functioning takes place.

The conclusions presented here summarize the practical experience of leading specialists in Germany, Russia, Ukraine spanning last 50 years.

Although the individual orthotics are called *orthopaedic* orthotics, they are not considered as medical purposes products. Individual orthotics are not viewed from the position of how they affect blood circulation and lymph circulation in the human organism. And they really could not be “individual” taking into account the methods of their manufacturing (analysis of these methods follows). These orthotics do not reflect the reality of existing problems with the loaded feet arches, and consequently they do not eliminate the underlying reasons for deformations (*external load* provides the force of body weight). Notice that here something else is very important – not only feet deformations are not considered and not served, but the deformations of the joints and of the spine as well (spinal cord is supported by feet arches).

The diagram shows sequence of manufacturing operations for both methods in comparison. On the left there is traditional method that is used worldwide. On the right is technology devised by my father as far as 1971 and developed farther in the last 25 years. Green arrows indicate operations that are necessary to perform and that are performed while podocorrectors are manufactured (but these operations are absent in traditional technologies).

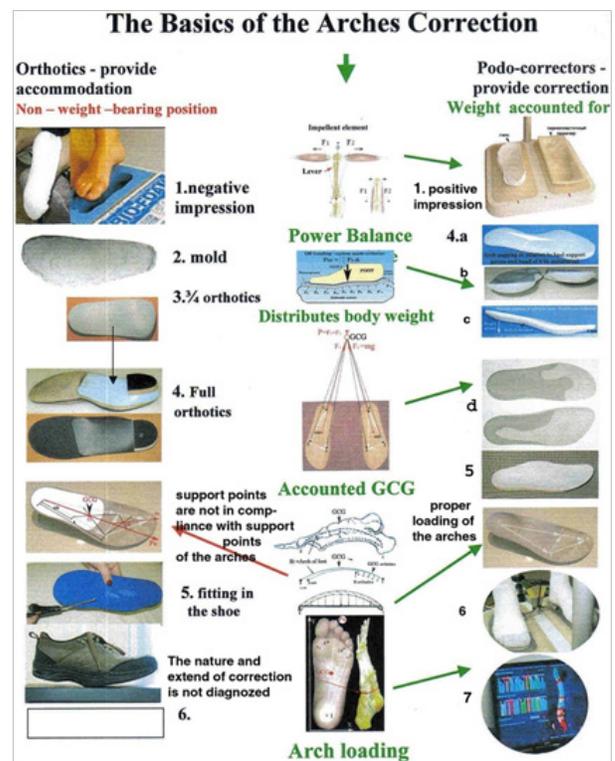


Figure 1

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Let us investigate whether our statements are that revolutionary when we say that the existing traditional orthotics do not solve any problem of feet correction and body's locomotor system correction, and therefore they do harm to the human organism.

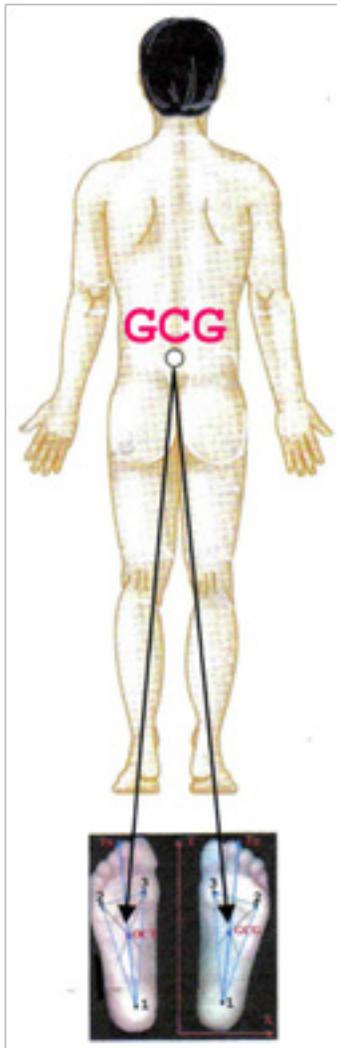


Figure 2

We state that:

- the traditional feet correction and traditional methods of orthotics production are not based on the knowledge of feet biomechanics. The support feet arches, namely transversal and lateral longitudinal (external) arch are not diagnosed and not corrected by orthotics. Important issues of entire body stability and displacement of GCG (General Centre of Gravity) are not taken into account. Imprints are produced in sitting position or in recumbent (reclining) position, but unfortunately not in standing position;
- there are no such methods of diagnostics that constitute the base for

manufacturing and quality control of orthotics, as well as for feet arches correction. There is no connection between what is diagnosed for concrete patient and manufacturing routine for this patient's orthotics;

- the shape of plaster imprints is not the base for producing the correcting individual orthotics. These imprints are done without taking into account position of body's GCG and anatomical difference in lower limbs' lengths;
- the individual rigid orthotics deprive the inner feet arch of capability to amortize or pronate, to extinguish the velocity of foot transfer when it takes stand on the base;
- the support points of orthotics do not correspond to support points of feet arches;

There is still a long list of what is not properly done in the process of feet and spine correction. There is no sense in going farther along this list: if even one of above-mentioned conditions is not fulfilled, then the remaining conditions could not be implemented. Consequently, the integrity and functionality of feet and of entire body skeletal-muscular system is upset. Exactly in this fact lies the serious lack of understanding what harm could be done to entire human organism by orthotics that are not properly manufactured. We do understand this and that is why we stop branding orthotics as *individual* orthotics.

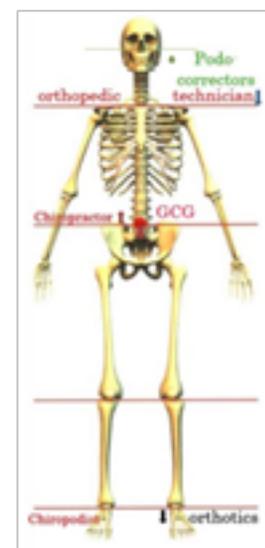


Figure 3

The displayed diagram permits to visually estimate and compare the two methods. **In the first option** (left side) we consider the activity of the feet specialist, whose range of influence is stipulated for his status and is limited by the zone up to the knee.

In the second option (right side), the *hydrostatic* feet correction envelopes all structures of locomotor system, including the head zone (vestibular

apparatus). Notice that exactly with bringing the head into vertical position that all processes of curvature of spine are connected, namely shaping the spinal column into C-shaped or S-shaped forms.

Everything said and done, let us consider as the axioms the main goals that have to be reached when deformations must be eliminated:

Restoration of Contractile Pump Function of Skeleton Muscles

This restoration and rebuilding has to be considered as the main goal that could not be reached with the help of any medicine and surgery intrusion. It reflects the physiological essence of muscles working and the entire human organism functioning. And exactly on restoration of muscles' pump function all the efforts of orthopaedics must be directed, particularly the activities in feet and spinal column correction. It means that it is not possible with whatever means – rigid orthotics, special footwear or surgical methods to put the foot arch skeleton into desired position (and exactly this the “specialists” try to achieve nowadays in practice, and the trying is without success). It is obligatory that the muscles could contract and thus shift the skeleton elements from the neutral position into mutually-opposite directions in which double muscles are operating.

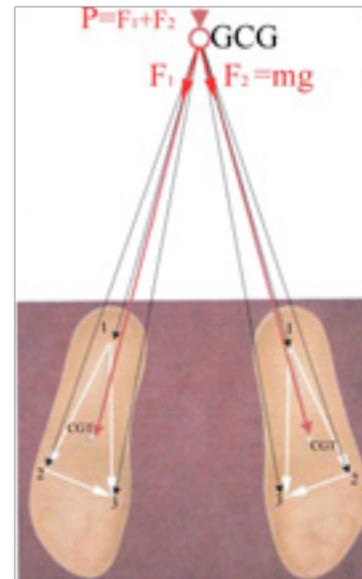
Displacement of Body's GCG in the Direction of CG

(for feet support triangle) for reaching their coincidence with each other. Only in this way it is possible to provide the proper loading of feet arches and lower extremities joints, and to give the body the stable symmetrical position. This in turn leads to restoration of kinematics of every joint movement. As a result the patient could prevent the deterioration of cartilage layer (on the surfaces of conjugating joints bones). Therefore the onset and development of arthroses and arthritis could be prevented. Besides, all these stages must be also viewed from the position of elimination of the spine deformations (there is strong interconnection of deformations of feet support arches and spinal column deformations).

Bringing the Skeleton into Middle-Balanced (Neutral) Position

This is one of the key conditions for restoration of contraction function for “paired” muscles. The neutral position of the skeleton corresponds to its stable position, when muscles demonstrate their maximum productiveness and efficiency (muscles that sustain lymph and blood circulation). When the skeleton is shifted from the middle position under the influence of external forces, the upsetting of this balance takes place. If the external forces stop to act, but the skeleton is not returning to initial neutral position, then exactly this corresponds to deformation. In any case it is worth to remember that the main load on the body's skeleton-muscles carcass is the mass of all parts of the body, brought to its GCG. Other loading factors are forces of inertia that emerge as the result of movement (parts of the body create inertia forces while moving, as well as

GCG itself). Incorrect gait, improper footwear, the habits to sit in wrong position – all this forms specific movements, positions of parts of the body, specific posture.



Figure

All three defined conditions are interconnected and all of them reflect one serious problem named the deformation of skeletal-muscles carcass. The key moment of this interconnection is the deep understanding of the fact that it is not possible to restore the muscles' pump function without bringing the skeleton into neutral position. Yet in its turn neutrality of position can only be gained by bringing body's GCG to coincide with CG of feet support triangle.

In other words, correction is the implementation of all three interconnected conditions. Their essence constitutes: main component of deformation appears to be the external load, the point of its application (i.e. the position of body's GCG), that muscles accept and compensate. These are exactly the parameters that are considered in designing and calculations of details for artificial limbs and prosthetic appliances (orthotics are attributed to this group). Orthotics must assist and contribute to restoration of feet arches functionality – the pump function of the muscles.

Obviously, in case when the specialist who is engaged in feet correction, is taking into account the condition of skeleton structures only up to the knees and not above them, then he is not able to fulfill these conditions. He has no possibility to consider the spine deformations that had been already formed. That is why one of the two lower extremities, one foot would be always loaded to the greater extent. On this extremity deformations would appear first – varicoses, swelling and so on. Patients often notice this and they use to ask, why one lower extremity has all this problems and the other one has not.



Figures

In this situation the utmost important is to correct the spine. It is necessary to begin the process of feet correction from correction of spinal column, as the first stage. And only then, only afterwards to perform relaxation of feet muscles (to rebuild the muscles cellular structure) and to make imprints. Manufacturing and adjustment of orthotics follow, but notice very important moment – orthotics are adjusted while compensation of functional and anatomical difference in legs' lengths takes place.

I feel and understand my readers' doubts: who and where is correcting the spine? It takes years and with no results in view, is it not? And all this is because there is no understanding of the underlying reasons. Spine deformation is connected with position of pelvic bones that serve as the support for spinal column. In its turn, pelvic bones' position depends on difference in legs' lengths. Inclination of pelvic bones leads to shifting of body's GCG and to bending the head aside. Immediately vestibular apparatus is reacting and CNS (Central Nervous System) tends to bring the head back to vertical line. Abnormal inclination of pelvic bones is not that harmless as it seems from the first glance. The shape of the birth foramen is distorted, and in this fact the specialists see the reason for high percent of birth trauma. We note that more than 65% of population possess the muscle hypertone as the result of birth trauma of the newborn's brain.

To sustain the body's stability and even more important – to secure vertical position of the head, CNS changes the muscles tone by bending spinal column in different directions. On the plain (2D) X-ray image it looks like S-shape or C-shape details.

Using these 2D images, the specialists are just measuring the angles of volumetric twisting of vertebrae, and afterwards they list the patient for surgery procedures.

It is quite clear, that feet deformations could not be eliminated because GCG is displaced, and to repair the spinal column is impossible before you succeed in eliminating feet deformations and in compensation of difference in legs' lengths. The real vicious circle. To break it, new methods are needed as well as different type of the specialists' training.

Not the orthopaedic doctor but orthopaedic technician must be able to perform and control all these interconnected procedures as one indivisible integral process. Orthopaedic technician has to possess knowledge of biomechanics, has to excel in movements kinematics and in muscles' cellular structures and methods of cellular restoration. But the doctor never produced the orthotics, neither did he adjust them before handling to the patient. But for some reasons it is the doctor who is branded as the specialist in the procedure.



Consider the case: for five years in a row the development of scoliosis was under observation for two girls. At 16 they were recommended for the surgery as the only possible cure. But before surgery they were well advised to go through muscles relaxation and through compensation of difference in legs' lengths – and for one of them after a month time, and for the other girl after a week, their vertebral columns occupied the normal positions. Besides, after such procedures the functioning of body's internal organs is normalized as well. The face and body pimples and pustules disappear, you forget about constipation and heartburn, protruding veins of lower limbs are hiding, the blood sugar comes to normal levels. Thus how the self-regulation of human organism works. All these results and the fact that orthopaedics correction is the base of any therapy, is entirely confirmed by blood analysis and by results of computer testing for organism's functional condition. Consequently, the correction process becomes being controlled, and possible subjectivity in estimations of specialists is excluded.



Figures