Modalities to Improve the Spinal Column Dysfunctions by using Some Complementary Kinetic Means

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Abstract

Sports medicine more and more often requires the use of complementary kinetic means for the prophylaxis and improvement of different dysfunctions at the spinal column level, but also in order to potentiate sports effectiveness. The present study aims at objectifying, through electronic baropodometry, the efficiency of a complex recovery program using complementary kinetic means (shiatsu, yumeiho, reflexotherapy, qigong) on a female athlete, practitioner of performance aerobic gymnastics, who presents dysfunctions at the spinal column level (scoliosis).

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1. Introduction

Medical scientific community has always avoided admitting that the performance sports practice may cause health-related issues and this because nothing could be said against the physical exercise which is, as we all know, recommendable.

Recent investigations conducted by Australian researchers from the University of Melbourne, who analyzed the evolution of 40 Australian elite athletes performing endurance sports disciplines (marathon, alpine cycling, triathlon etc.), have arrived at the conclusion that exceeding some limits in the performance sports practice has a negative impact on health. The respective research investigated the effort influences that may induce long-term negative alterations in the heart morphology.

Doctor André La Gerche, the main author of this investigation, specifies that the possible implications cannot be extrapolated to all the performance athletes, without asserting that the intense physical exercise should be avoided for health reasons. The research findings suggest that some athletes can be congenitally more susceptible to suffer from cardiac damages after the practice of endurance sports over a long period of time (La Gerche et al., 2011).

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Our interest in this topic is related to the specific effort implications on the spinal column health. Practical reality is supported by data from the specialty literature provided by the physical education, sports and kinesitherapy fields, which presents the impact of the different effort types on the vertebral column (Liebenson, 2002; Liemohn, 2005; Pretince, 2001). Balius et al. (1987) and Martin Recio (2009) classified sports disciplines according to their impact on the vertebral column. In the “sports with a negative impact” category, one of the sports branches nominated by the authors was gymnastics, with all its component disciplines, and this aspect determined us to use, as subject of our study, a female athlete practicing performance aerobic gymnastics.

In performance gymnastics, the sports activity interruption, particularly for medical reasons, has a negative impact on the performance capacity, that is why we should implement a complex recovery and rehabilitation program which allows the athletes to restart as soon as possible their specific activity and also to maintain an optimum health condition.

The program conceived for our female gymnast includes the following complementary kinetic means: shiatsu, yumeiho, reflexotherapy and qigong.

**Shiatsu** is a complementary kinetic means specific to the Japanese traditional medicine, which synthesizes and associates the occidental scientific-medical knowledge to the oriental millenary wisdom of medicine. It consists of pressure application with thumb or palm to certain points called “tsubos”, for the health condition maintaining and enhancement. Its contribution allows the improvement of some imbalances and the activation of the body self-healing capacity, with no side effects (Shigeru, 1998).

This technique, which aims at making the “Qi” vital energy re-circulate in the body zones where this is either missing or in excess, is practiced by exerting a stronger or a less strong pressure with fingertips, but also with fists, elbows, knees and feet over some precise points located along the energetic meridians corresponding to a specific organ or function.

**Yumeiho** is a Japanese manual technique for the global rehabilitation and equilibration, which aims at correcting the imbalanced center of gravity, in order to obtain the correct energy flux movement and to stimulate all the important processes in the human body.

Yumeiho, used for prophylactic and therapeutic purposes, consists of: osteoarticular maneuver techniques, passive myo-articular gymnastics, special massage procedures and stretching elements (stretches, elongations), which can be added the special gymnastics called Yumeiho Taiso, accompanied by breathing techniques and muscular relaxation methods (Saioanji, 1994).

**Reflexotherapy** is a very old complementary technique originating from Ancient Egypt, India and China, which is used to diagnose, prevent and treat different disorders. It consists of pressure application to certain reflex points located on sole, hand, spine etc., their stimulation releasing toxins from the body, these substances having a negative influence on our health condition (Oxenford, 1998).

**Qigong**, an ancient Chinese technique for the cultivation of health, vitality and longevity, is based on the Taoist classical principles. It aims at equilibrating the vital energy (Qi) by activating and capturing the subtle energies through slow movements, a correct breathing and concentration. Regularly practiced, it contributes to the maintaining of a good health condition, reinforces the immune system, prolongs life and prevents from diseases (Réquéna, 1996).

2. Purpose and hypothesis

We assume that the improvement of different spine dysfunctions can be achieved by using a complex recovery program based on complementary kinetic means and that it can be objectified through electronic baropodometry.

Therefore, the present study aims at objectifying, through electronic baropodometry, the efficiency of a complex recovery program that uses complementary kinetic means (shiatsu, yumeiho, reflexotherapy, qigong) on a female athlete, practitioner of performance aerobic gymnastics, who presents dysfunctions at the spinal column level (scoliosis).
3. Material and method

The methods used in our research were the following: theoretical documentation method, experimental method, case study method, comparative analysis method and graphical method.

For the evaluation of our subject, we used the Footscan System baropodometer produced by the Belgian Company “RSscan International” and based on the Footscan Software 7.97 Gait 2nd Generation, in order to determine the plantar pressure distributions in the bipodal static position and during the gait support phase.

Footscan System baropodometer displays graphical data about the static podogram and the dynamic estimation of the gait support phase.

Static podogram is achieved while the subject is standing on both feet on the electronic platform, the computer monitor displaying the picture of his plantar pressure prints.

At the dynamic estimation of the gait support phase, the baropodometer software analyzes: foot balance, forefoot balance, medial forefoot balance, heel rotation, hallux stiffness and metatarsal loading.

Finally, the software also provides a global data analysis.

The subject of our study was a girl athlete aged 14 years old, a multiple national champion presenting dysfunctions at the vertebral column level (“S-shaped” scoliosis).

The particular results obtained by this gifted athlete in different national and international competitions was the basic criterion for the selection of the subject of our study. We also mention that the athlete uses an orthopedic corset and she risks to intrerrupt her competitive activity because the medical visa can be refused to her.

The athlete was initially evaluated through electronic baropodometry, before the implementation of a complex recovery program with a 45-minute duration, by using the previously mentioned means. Then, we performed once again the evaluation through electronic baropodometry, in order to notice if some alterations have occurred.

The research was conducted on 21.11.2012, at “Dr. Nicolae Robănescu” National Medical Center for Children’s Neuro-Psycho-Motor Rehabilitation of Bucharest.

4. Results of the research

The objective data provided by electronic baropodometry were analyzed through the comparative method.

In figure 1, we present the static podogram before and after the implementation of the recovery program based on complementary kinetic means.
Fig. 1. a. Static podogram before the recovery program implementation, b. Static podogram after the recovery program implementation.

The static podogram analysis performed before the recovery program implementation shows that the left foot exerts a greater pressure (respectively, left forefoot 29% and left rear-foot 27%) than the right foot (respectively, right forefoot 25% and right rear-foot 20%). This occurs because the dorsal spine has a frontal deviation to the right and the lumbar spine to the left, which determines the left foot to exert on the ground a greater pressure than the right foot.

The static podogram analysis performed immediately after the recovery program implementation shows that an equilibration between the forefoot and the rear-foot has occurred. The left foot values are: left forefoot 25% and left rear-foot 26%, and the right foot values are: right forefoot 26% and right rear-foot 23%. This can be explained by the utilization of complementary kinetic means, due to which the vertebral structure and the pelvis bones have aligned, fact that is proved by their equilibration in the 4 plantar pressure sections.

In figure 2, we present the graphs and the result interpretation for the foot balance before and after the implementation of the recovery program based on complementary kinetic means.
Analysis of the foot balance graph before the recovery program implementation shows that the pressure centreline directional axis of the right foot has, at the contact with heel, a higher pronation amplitude, as compared to the left foot.

Analysis of the foot balance graph after the recovery program implementation shows a modification of the pressure centreline directional axis of the left foot, which consists in the stabilization of the left foot that was in pronation. In figure 3, we present a comparative analysis between static podogram and gait analysis before and after the implementation of the recovery program based on complementary kinetic means.
a. At the comparative analysis between static podogram and gait analysis before the implementation of the recovery program based on complementary kinetic means, we can notice the quantification of an imbalance (respectively 36-33), which represents an unequal distribution of the body weight due to the plantar pressure and to the gait support phase at the right foot level (36), as compared to the left foot (33).

b. At the comparative analysis between static podogram and gait analysis before the implementation of the recovery program based on complementary kinetic means, we can notice an equilibration (respectively 35-35), which represents a balanced distribution of the body weight due to the plantar pressure and to the gait support phase at the right foot level (35), as compared to the left foot (35), by validating thus the hypothesis of our research.

5. Conclusions

By analyzing the results objectified through electronic baropodometry, we can assert that complementary kinetic means represent an efficient and quick modality of recovery in the prophylaxis and the improvement of different dysfunctions at the spinal column level.

The static podogram analysis and the comparative analysis performed after the recovery program implementation indicate a balanced distribution of the body weight in the 4 sections of the podogram and in the gait support phase, by validating thus the hypothesis of our research and demonstrate the efficiency of this complementary kinethic means.

The electronic baropodometry utilization in performance athletes will allow the implementation of a preventive intervention. At the same time, electronic baropodometry can be used as a modality to predict some sports-related injuries.

References


