PREGNANCY-RELATED ADJUSTMENTS IN THE WALKING PATTERN AND LIFESTYLE - a follow up case study

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Introduction

From a biomechanical perspective, progressive alterations in the body shape and weight distribution may have an effect on pregnant woman's gait pattern. One can assume that the background of these changes is the ability of our species to adjust the function of the control system to a constantly changing external and internal environmental needs. Furthermore, during pregnancy body composition, diet and level of physical activity, which are potential factors affecting the manner of walking, may change.

That is why, the purpose of the present study was to monitor the alterations of gait of the expectant mother on the base of selected biomechanical parameters as well as to observe her diet and level of physical activity during the whole pregnancy period.

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Methods

The study was carried out in Biomechanics Laboratory at University of Physical Education in Krakow. The subject was a pregnant female (34 yrs) who gave a written consent to participate in the study. Three experimental sessions were arranged at the end of each trimester of pregnancy according to the same protocol. At first the following anthropometric measures were taken: body weight, body height, sitting height, biacromial, biiliocristal and bispinosus diameters, arm, forearm, chest, waist, hip, thigh and calf circumferences and six skinfold thicknesses: subscapular, abdominal, suprailiac, triceps, biceps and calf. Then, walking at a self-selected speed across the 15 m long walkway measurements of feet loading pattern using force platform (FreeMED Platform, Sensor Medica, Italy) were taken. At the same time the spatio-temporal parameters and the mobility of the pelvis were registered with Vicon 250 (Oxford Metrics Ltd.; Oxford, UK). We registered 15 gait cycles for each leg (30 steps). The parameters analyzed were averaged over all trials. Finally, the subject was asked to fill out the questionnaires on pain and physical activity (PPAQ). Besides, the diet was assessed on the basis of a 3-day food recall and using questionnaire of dietary behaviors of pregnant women.

Results

In terms of structural adaptations the results of anthropometric measurements show a slight decrease of longitudinal body sizes, ie. body height and sitting height, an increase of body weight, breadth sizes, ie. biacromial, biiliocristal and bispinosus diameters as well as a growth in circumferences of trunk and lower extremities.

Overall, the results did not reveal changes in gait kinematics during pregnancy. The mobility of the pelvis in all three planes were only slightly altered which allowed to avoid back pain during pregnancy. The dynamic base of support width increased due to the distance measured between the fifth metatarso-phalangeal joints during double support phase. However, considering the distance between ankles which reflects the relation between morphological structure (pelvic width) and functional aspect (step width) remained unchanged. Worth of mentioning as pregnan-

cy progressed, was a flattening of the medial longitudinal arch of the left foot which was manifested in the increasing value of the longitudinal arch index (AI). Interestingly, for the right foot no change in the AI between 1st and 2nd trimester of pregnancy was observed, while in the trimester 3rd a slightly lower level of AI was noted. In terms of the lifestyle we noticed that appropriate diet evaluated in the context of analysis of selected eating behavior. The majority of food products recommended for pregnant women were included in the daily diet. The frequency of consumption of cereal products in each trimester was at a high level as well as the intake of fruit, milk and dairy products. Correct number of meals, proper techniques of culinary throughout the duration of pregnancy and adequate intake of fluids was also observed. Supplementation of the diet with essential vitamins and minerals was recognized as the properly selected for pregnant women. Considering the average level of the total physical activity, in the entire gestation period was 331,12 MET hour/week. In the 1st and in 3rd trimester of the gestation the level of the total physical activity was slightly lower than in 2nd trimester, respectively: 313,65 MET hour /week and 325,65 MET hour /week; 354,075 MET hour /week.

Discussion and conclusions

Due to numerous changes in the functioning of the body related to pregnancy women must confront more postural challenges and organism requirements. The results of the study did not show significant changes in gait kinematics during pregnancy. Possibly, this was the reason why the subject of the study did not suffer from any pain during the whole pregnancy period. Another reason may be very conscious approach of the subject to the pregnancy period (proper diet, high level of physical activity, control of pelvic position). Our observations revealed that pregnancy encourages safe behaviors both, in terms of movements and lifestyle. Based on the analysis of questionnaires during each trimester of pregnancy, the diet of the participant was considered as correct. Furthermore, the nutritional irregularities which have been observed during the analysis (i.e. low consumption of vegetables, intake of fast-food

products) were eliminated and the subject positively referred to the suggested changes in the diet and a positive attitude to the suggested changes was observed.

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