

# **The Effect of BeBo® Training and EMG-Biofeedback Assistance on Pelvic Floor Muscle Function in Women After Vaginal Delivery and Cesarean Section**

## **Abstract**

Pelvic floor muscles (PFM) play a crucial role in women's health. PFM exercises are recommended both during pregnancy and postpartum as a preventive and therapeutic measure against dysfunction. The use of training programs supported by methods such as EMG-biofeedback can lead to significantly better results with only a slight increase in effort.

## **Objective**

The aim of this study is to evaluate the effectiveness and compare the outcomes of a 6 week training program based on the BeBo® concept with and without an additional 10-minute EMG-biofeedback session on pelvic floor muscles (PFM) in women after vaginal delivery and cesarean section, compared to control groups.

## **Materials and Methods**

The study involved 120 primiparas (aged  $29.01 \pm 1.93$  years) who were 6-8 weeks postpartum after vaginal delivery (VD) (n=60) or cesarean section (CS) (n=60). Participants were randomly assigned to six groups: four training groups following the BeBo® concept and the BeBo® concept with EMG-biofeedback, and two control groups. Assessments were conducted before and after the training interventions. Neuromuscular activity of the pelvic floor muscles, adductors, rectus abdominis, and internal and external obliques was evaluated using surface electromyography (sEMG) with Noraxon G2 TeleMyo 2400 and a vaginal probe. PFM was also assessed using a perineometer and the PERFECT test. Additional evaluations included a voiding diary and standardized questionnaires: UDI-6, IIQ-7, SES, SQoL-F, The King's Health. Lumbar spine pain was measured using the Lehtinen scale.

## **Results**

The conducted research revealed differences in pelvic floor muscle activity compared to control groups, depending on the applied training program. Women who exercised with EMG-biofeedback assistance showed more favorable endurance results ( $p < 0,001$ ,

$\eta^2=0,423$ ) among both those who delivered naturally and via cesarean section compared to control groups and those following the Bebo® training program. In terms of the ability to perform faster contractions ( $p=0,042$ ,  $\eta^2=0,097$ ), improvements were observed in women who delivered both vaginally and by cesarean section with EMG-biofeedback assistance, while in the Bebo® training group, the improvement was only seen in women who delivered vaginally. Both programs reduced lumbar spine pain ( $p=0.002$ ,  $\eta^2=0,110$ ), regardless of the type of delivery, and improved urinary continence control in women after vaginal delivery ( $p<0,001$ ,  $\eta^2=0,209$ ). However, improvements in quality of life, self-esteem, and sexual quality of life compared to control groups were primarily seen in women after vaginal delivery, regardless of the applied training program.

### **Conclusions**

The use of pelvic floor muscle (PFM) training according to the BeBo® concept, especially when supported by EMG-biofeedback, effectively improves neuromuscular activity and parameters such as resting tension, contraction speed, muscle strength, and endurance, particularly in women who delivered vaginally. These trainings also positively impact the activation of the transverse abdominal muscle and reduce back pain. Therefore, it is recommended to include EMG-biofeedback in standard postpartum care, while adjusting the type of exercises to the specifics of the delivery: relaxing exercises for women after cesarean sections and strengthening exercises for those after vaginal delivery.