

# ENHANCING POSTURAL CONTROL BY MULTICOMPONENT BALANCE EXERCISES AND FUNCTIONAL SOMATOSENSORY FOOT MOBILIZATION IN PATIENTS AFTER BRAIN TUMOR SURGERY

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## Background and Aims

Patients who have undergone brain tumor surgery often experience postural instability. Our pilot study investigated the effects of multicomponent balance exercises (MBE) and sensorimotor mobilization with foot muscle strengthening (SMFE) on postural control in these patients. We assessed their postural stability using the Balance Error Scoring System (BESS), which consists of 20-second tasks performed with closed eyes and hands on hips on both hard and soft surfaces.

## Methods

Twenty postoperative patients participated in a randomized clinical study, divided into two groups: the MBE group (6 women and four men, average age 30.2) and the SMFE group (6 women and four men, average age 34.5). All patients who underwent WHO grade 1 parasagittal meningioma surgery followed the postoperative instructions. They scored at least 25 on the Mini-Mental State Exam (MMSE) and a minimum of 30 on the Berg Balance Scale (BBS). Balance was evaluated using the Balance Error Scoring System (BESS) on the third postoperative day and before discharge. The average length of hospitalization was 10 days.

## Results

Both patient groups showed significant improvements ( $p < 0.05$ ) in maintaining an upright posture after the BESS test. In the MBE group, 80% of patients achieved a clinically significant change of 10 points in postural stability, while 100% of patients in the SMFE group did so. Additionally, the SMFE group demonstrated even more significant improvements ( $p < 0.01$ ) in balance tasks performed on both hard and soft surfaces. These tasks included maintaining an upright posture with feet together, standing on one leg, and tandem standing.

## Conclusion

Patients improved static balance after the BESS test at discharge. The SMFE group showed enhanced functional balance and confidence through sensorimotor mobilization and foot arch strengthening. We recommend this approach for early rehabilitation, though more research is needed.

**Keywords:** Surgery, Posture, MBE, SMFE, BESS