

The Effects of a Maternity Support Binder on Gait and Balance in Women during the Third Trimester of Pregnancy

Joashly Calingacion, SPT; Anne Havenga, SPT; Christine Leszczewicz, SPT; Megan Mink, SPT; Stacie Bertram, PhD, PT

BACKGROUND

- During pregnancy, there are many changes to the body including laxity in the ligaments and joints, weight gain, changes in spinal curvature and a shift of the center of gravity that can contribute to instability.¹ Pregnant women in their third trimester are at higher risk of falls and have decreased balance than those in other trimesters.² In a large cohort study, researchers found that 26.8% of pregnant women experienced falls during pregnancy.³
- Falling is dangerous for pregnant women because it can have detrimental effects on either the fetus or the pregnant mother herself. Falls can result in trauma to the abdomen, gravid uterus, head and neck injuries, respiratory failure, hypovolemic shock, preterm labor, placental abruption, fetal distress and fetal hypoxia.⁴⁻⁵
- Research has found that compression garments may improve balance, postural sway and proprioception with balance-intensive tasks, particularly when proprioception is compromised such as during pregnancy.⁶ Maternity support binders (MSB) are compression garments worn around the pelvis and abdomen that decrease pelvic mobility and increase core stability.⁷⁻⁸
- MSBs are generally prescribed for pregnant women with LBP. Studies have found conflicting evidence on the impact of MSBs on balance measures and fall risk.⁹⁻¹⁰
- In 2019, students in Bradley's Doctor of Physical Therapy conducted a study of the effects of wearing a maternity support binder on balance and gait in young, healthy nonpregnant women. They found that participants demonstrated significantly decreased postural sway during the eyes closed/flat surface condition of the mCTSIB and were able to reach significantly farther during the FR.¹¹ The present study is a continuation of this study using pregnant women as opposed to nonpregnant women as subjects.

PURPOSE

The purpose of this study is to determine the effects of a maternity support binder on gait and balance in pregnant women in the 3rd trimester of pregnancy.

Research question: Does wearing a maternity support binder improve gait characteristics and balance in women in the third trimester of pregnancy?

MATERIALS AND METHODS

Participants

A total of 8 women in their third trimester of pregnancy participated in this study. Inclusion criteria include being in the third trimester of pregnancy during data collection, between the ages of 18 and 40 years. Exclusion criteria include having any pregnancy related complications, activity limitations or restrictions, uncorrected vision problems, a history of balance problems prior to pregnancy or inability to ambulate without an assistive device.

Study Design

This study is a repeated measures study. Participants will complete the balance tasks with and without the maternity support binder and data will be recorded each time.

Procedures

After providing informed consent and completing the General Health Questionnaire, participants in this study completed four tasks: the Functional Reach Test (FRT), the Modified Clinical Test of Sensory Interaction in Balance (mCTSIB), a three meter walk, and a Timed Up and Go Test (TUG). Participants completed one trial of the mCTSIB and three trials of the FRT, three meter walk, and TUG. Averages of measures for each task with three trials were used for data analysis. Each test was performed for the stated number of trials by each participant with and without the maternity support binder. The Stork S'port® Maternity Support was used for this study. This support is positioned under the abdomen to promote correct posture and support the low back, pelvis, and abdomen as seen in Figure 1.. Each testing procedure was recorded by the VirtuSense Motion Analysis System™ (VS) which uses a single remote camera to collect data and quantify movement without having to apply surface reflectors to the subject. Data collection sessions took place in Olin Hall at Bradley University. Each session took approximately 30 minutes.

- For the FRT, participants stood with shoulders at a 90 degree angle, elbows completely straight, and hands making a fist with knuckles aligned to the 0" marker on the yardstick adhered to the wall parallel to the floor and at participant's shoulder height. The participant was then told to reach straight forward as far as she can while keeping her feet flat on the floor.
- For the mCTSIB, postural sway was measured using the VirtuSense™ while completing the test. The 4 parameters of the test include 1) standing with feet together, eyes open on a firm surface, 2) standing with feet together, eyes open on a 3-inch foam surface, 3) & 4) repeating the previous parameters with eyes closed. The participant was required to maintain each position for 30 seconds for one trial in each condition. Testing position for the eyes open on foam surface can be seen in Figure 1.
- The three meter walk was used to measure gait velocity, base of support, postural sway, and forward lean using the VirtuSense™. Participants were instructed to walk forward on level surface towards the VirtuSense™ camera at their normal speed.
- For the TUG, the time it took for the participant to rise from a chair, walk a 3 meter distance, walk back 3 meters, and sit down in the chair was measured.



Figure 1. Testing Eyes Open on Foam Testing Position for mCTSIB

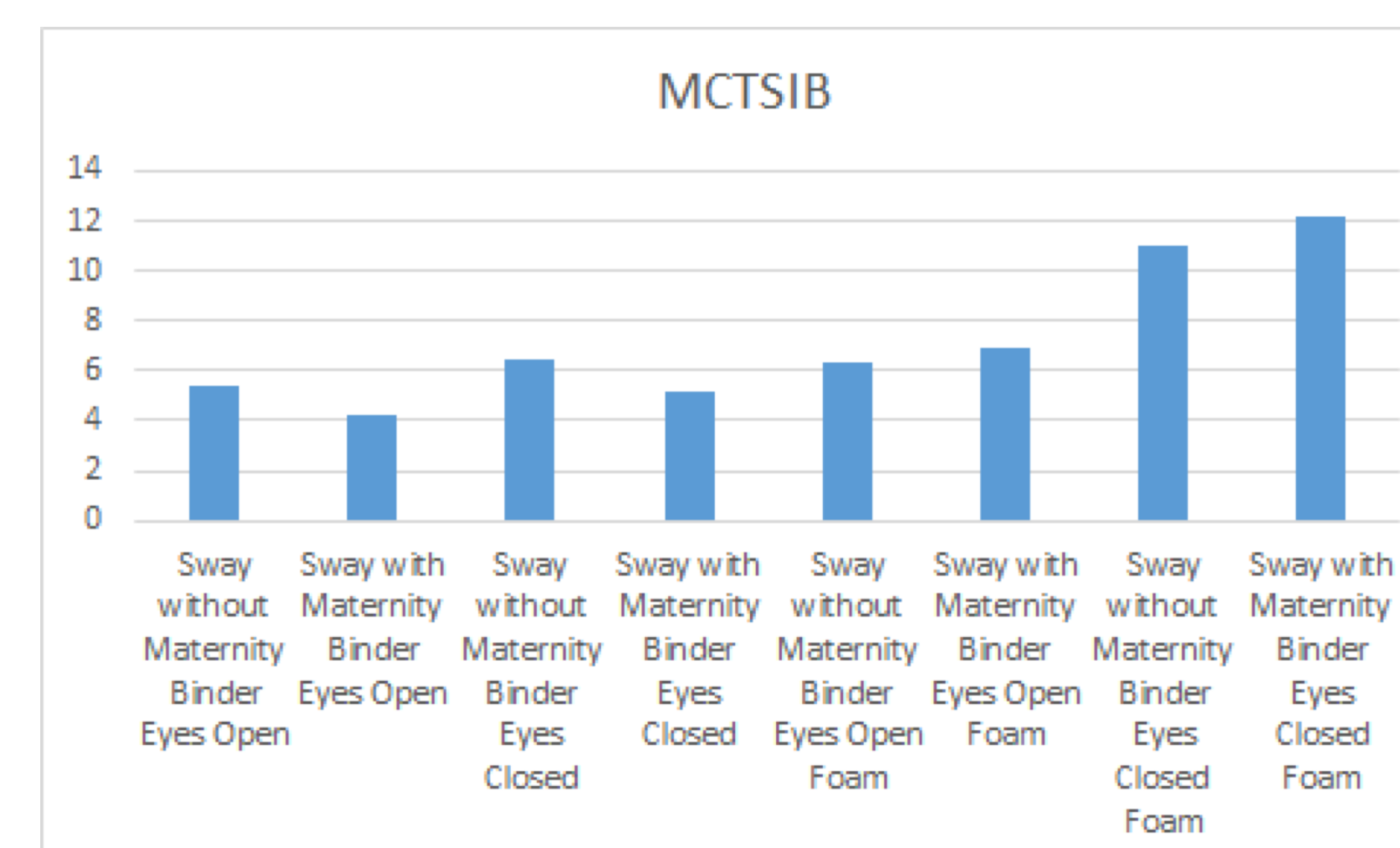


Figure 2. Average Sway (in.) during mCTSIB

RESULTS

- The average sway during gait decreased about 0.92 cm while wearing the maternity support binder.
- Results of the TUG test showed a small difference in average velocity (0.09 sec.), indicating that wearing the support binder may increase velocity during this task.
- For the mCTSIB, participants, on average, demonstrated an decreased sway of 1.14 in. during the eyes open position and 1.31 in. during the eyes closed position when wearing the maternity support binder. Participants, on average, demonstrated an increased sway of 0.53 in. during the eyes open on foam position and 1.18 in. during the eyes closed on foam position when wearing the maternity support binder.
- The average distance achieved during the Functional Reach test showed no differences with or without the binder.

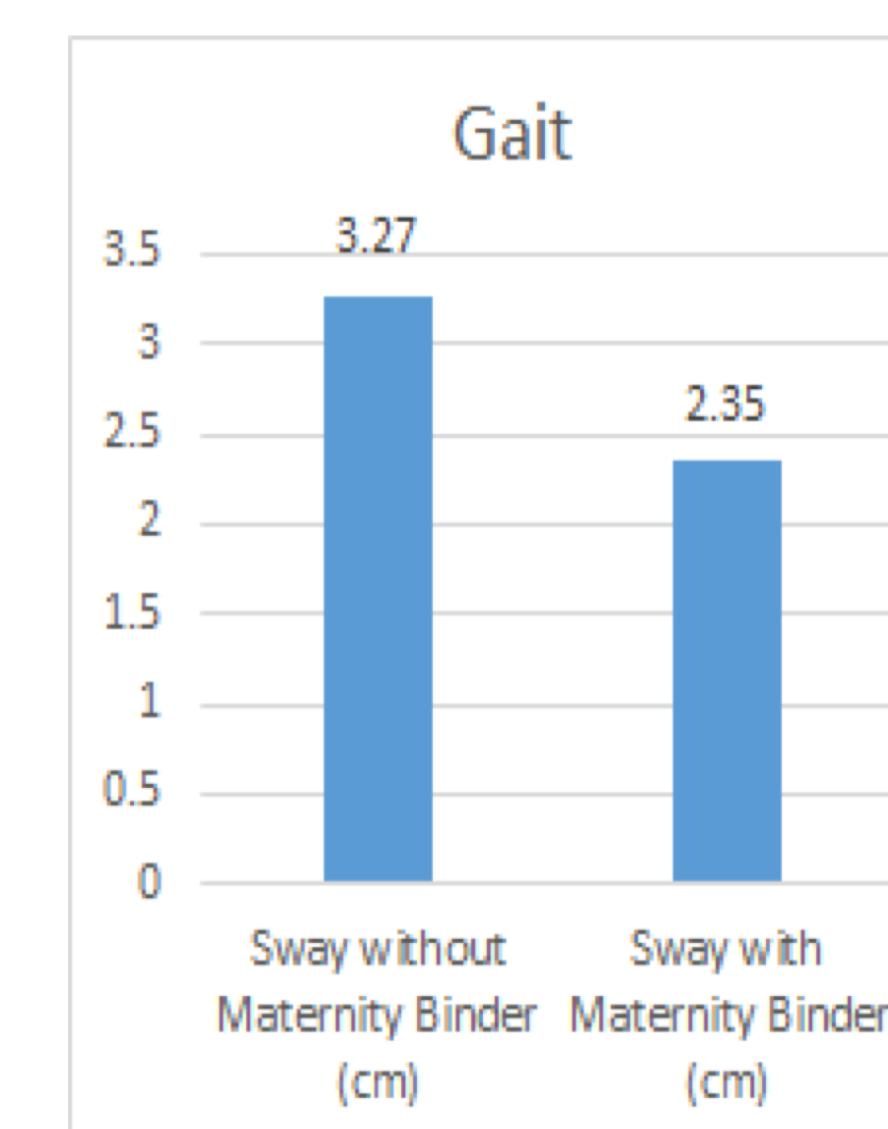


Figure 3. Average Sway during Gait

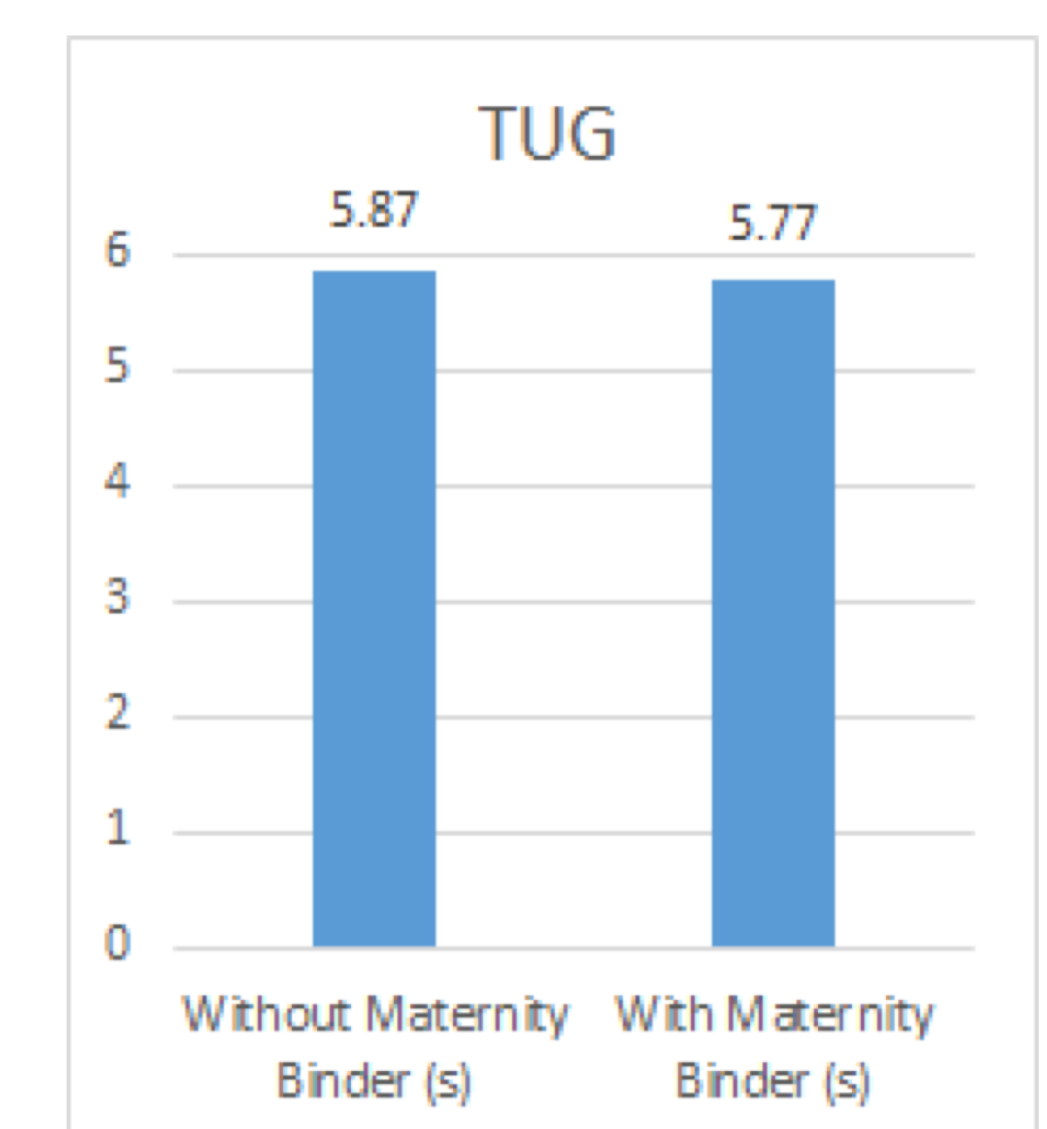


Figure 4. Average Time to Complete TUG

CONCLUSIONS

- Results showed small improvements in gait sway, TUG, and mCTSIB sway on noncompliant surfaces while wearing a maternity binder, which may be important.
- More research needs to be conducted with larger sample sizes of pregnant women to determine if the addition of a maternity support binder significantly affects balance and safety during functional activities that require dynamic stability and coordination such as getting up from a chair or walking.

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