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Effects of Modified Burger's Exercise on Ankle Rom and Proprioception Pattern in Women Across 2nd And 3rd Trimester of Pregnancy and Postpartum – Pre and Post Study Design

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Abstract

Back Ground: Physiological changes that occur throughout pregnancy can alter both balance and postural control in a pregnant woman. Falling rate is increased especially during 3rd trimester due to a decline in the balancing ability which persists even after 6 to 8 weeks after delivery. Burgers' exercise to drain engorged vessels by using postural changes and stimulated peripheral circulation by modulating gravity and applying muscle contraction for improving the lower extremity perfusion. **Aims and Objectives of the Study:** An analytical study to examine the effect of Modified Burger Exercise in ankle proprioception pattern in women across 2nd and 3rd trimester of pregnant and postpartum. **Data Analysis and Results:** Data analysis and result of this study shows that there is statistically significant improvement in patient with p value < 0.05. There was difference in ankle range of motion and ankle position after the intervention of modified burger exercise with the mean value of ankle range of motion. **Conclusion:** This study can be concluded by the results of this study that there is statistically significant improvement of ankle ROM and ankle position in 2nd trimester and 3rd trimester and postpartum after the intervention of modified burger exercise.

Keywords: Ankle Proprioception, Range of Motion, Modified Burger Exercise, Trimester, Pregnancy.

Introduction

Proprioception is defined as the cumulative neural input to the CNS from specialized nerve ending called mechanoreceptor that are located in the joints, capsules, ligaments, muscles, tendon, skin.^{1,2}

During pregnancy, joint laxity increases owing to hormonal fluctuation relaxin peaks during the 1st trimester and subsequently peripheral joint laxity.^{3,4} Physiological changes that occur throughout pregnancy can alter both balance and postural control in a pregnant woman. The lower trunk has significantly greater rates of changes in weight than all over the body segments during the second and third trimesters of pregnancy.

One of the less investigated but commonly reported changes is related to the foot of a pregnant woman. The structural changes could be due to the accumulation of fluid or fat or both or changes in the ligaments caused by the extra weight gain that is carried during pregnancy or by hormonally induced alterations of the connective tissue in the ligaments.⁵ Pregnant women tend to fall and increased body postural instability namely body sway. This may also affect due to increased muscle work of the plantar flexors during pregnancy as studies have suggested increased postural sway in women in third trimester compared to women in first trimester.⁶

Falling rate is increased especially during 3rd trimester due to a decline in the balancing ability which persists even after 6 to 8 weeks after delivery.^{14, 15} Postural realignments of the spinal curvatures can produce overloads in the main lower limb joints and lead to musculoskeletal discomfort and pain symptoms. It is frequent associated with decrease trimester of pregnancy.^{7,8}

Burger Allen exercise is one of the types of exercise performed to promote lower extremity

perfusion this is promoted by exercise board.⁹ Duration of each position varies in accordance with patient's tolerance and the velocity of colour changes¹⁰⁻¹²

This exercise to drain engorged vessels by using postural changes and stimulated peripheral circulation by modulating gravity and applying muscle contraction for improving the lower extremity perfusion.¹³

The aim of this study was to examine the effect of Modified Burger Exercises in ankle proprioception pattern in women across 2nd and 3rd trimester of pregnant and postpartum and to implement the result to the pregnant and postpartum women in our practice in order to rehabilitate and functionally improve their condition.

2. Materials and Methodology

Study Design

Pre and Post Study Design.

Study Setting

Lakshmana Hospital, Madurai.

Study Duration

12 Months.

Study Sampling

Convenient Sampling.

Study Population

In and around Madurai District.

Study Sample

30 Subjects

Criteria of Selection

Inclusion Criteria

Age: 25-35 years.
Sex: Females.
Second and third trimester of pregnancy
Post-Partum Period
BMI: 20.0 to 30.0

Exclusion Criteria

Hypertensive patient.
Diabetic patient.
Epilepsy patients.
Lumbar disc herniation with Cauda equina syndrome.
Kyphoscoliosis.
Multiple Sclerosis.
Stroke.
Psychological patient.
Non cooperative patient.

Variables

Ankle Reposition Error (Foot Angle).
Ankle Range of Motion.

Intervention

Modified Buerger Exercise.

Materials and Tools:

Pens.
Paper.
Pencil.
Burger Exercise Board.

Procedure

30 patients fulfil the inclusion criteria were recruited during the study period through convenient sampling. Patients' informed consent was taken by signing the consent for this study. Their demographic data and pre-intervention variables of ankle range of motion and foot given to the patients for 30 minutes a session for 10 sessions of 15 repetitions of ankle joint dorsiflexion each spanned out in 2 weeks. Then their post-intervention of foot angle and ankle range of motion were measured and recorded. Data analysis was done on their measurement with suitable statistical method spss 16.0 for windows.

Modified Burger Exercises

Placing the lower extremities in 3 positions:

Position 1:

The patient lies flat in bed with both legs elevated above the heart for 2-3 min.

Position 2:

Position on the edge of the bed with the legs relaxed and dependent, the patient exercises the feet and toes (upward+ downward, inward + outward) for above 3 min.

Position 3:

Patient lies flat with legs at the same level as the heart for about 5 min.

In all 3 positions patients performs ankle dorsi flexion and plantar flexion with 15 repetitions each.

3. Data Analysis and Results

Shapiro Wilk test was used for checking normality distribution of data and paired student t test was used for analysis between variables.

Data analysis and result of this study shows that there is statistically significant improvement in patient with p value < 0.05. There was difference in ankle range of motion and ankle position after the intervention of modified burger exercise with the mean value of ankle range of motion pre intervention of 2nd trimester is 9.95 to post intervention of 13.35 and 3rd trimester of pre intervention of 9.5 to post intervention of 12.9 and post-partum of pre intervention is 10.85 to post intervention of 14.95 and mean value of ankle position pre intervention of 2nd trimester of 3.57 to post intervention of 3 and 3rd trimester of pre intervention of 5 to post intervention of 4.3 and post-partum pre intervention of 4.02 to post intervention of 3.02.

Table 1: Comparison of pre and post intervention values of mean, SD and p value in subjects in 2nd trimester with paired student t test (Source: Author).

No of Subjects	Variables	2 nd trimester		P value
		Pre-Intervention Mean ± SD	Post Intervention Mean ± SD	
30	Ankle Dorsiflexion ROM	9.95 ± 2.16	13.35 ± 3.34	0.00001
	Ankle Plantar Flexion	18.15 ± 3.14	25.25 ± 10.24	0.00001
	Ankle Joint Position	3.57 ± 0.13	3.0 ± 0.17	0.00003

Table 2: Comparison of pre and post intervention values of mean, SD and p value in subjects in 3rd trimester with paired student t test (Source: Author).

No of Subjects	Variables	3 rd trimester		P value
		Pre-Intervention Mean ± SD	Post Intervention Mean ± SD	
30	Ankle Dorsiflexion ROM	9.5 ± 20.95	12.9 ± 35.8	0.00001
	Ankle Plantar Flexion	17.24 ± 12.56	24.46 ± 18.64	0.00003
	Ankle Joint Position	5.0 ± 0.44	4.3 ± 0.30	0.00069

Table 3: Comparison of pre and post intervention values of mean, SD and p value in subjects in Postpartum with paired student t test (Source: Author).

No of Subjects	Variables	Postpartum		P value
		Pre-Intervention Mean ± SD	Post Intervention Mean ± SD	
30	Ankle Dorsiflexion ROM	10.85 ± 1.92	14.95 ± 1.21	0.00001
	Ankle Plantar Flexion	19.24 ± 8.96	26.74 ± 11.26	0.00004
	Ankle Joint Position	4.02 ± 0.1	3.02 ± 0.23	0.00001



Fig. 1: Performing Modified Burger's Exercise (Source: Author).



Fig. 2: Goniometric Measurement of Ankle ROM (Dorsiflexion) and Ankle Position (Source: Author).

4. Discussion

This study explained the effect of modified burger exercise of ankle ROM motion and ankle position of 2nd trimester and 3rd trimester and post-partum of pregnant women. this study recommends that lower limb joint proprioceptive trainingspecially that of ankle joint should be a part of antenatal and postnatal exercises. This may be including as a fall prevention strategy to reduce the rate of falls in pregnant women.

Xuefang Wu, MSc; Han T. YEOH. 2014stated that increased body mass in the lower trunk which causes a shift of the body's COG. This along with the gravitational

movement at the ankle with decreased range of motion of ankle dorsiflexion can lead to initiation of fall risk. It is important to have appropriate detection by proprioceptive receptor of lower joints and its internal processing to prevent falls. But during pregnancy if the ankle proprioception gets affected, the detection, internal processing and the recovery phase of falls also may get affected making the women more prone for falls.¹⁴

This study can be further explored to do in large number of subjects and experimental study design to extract better statistically significant results.

5. Conclusion

This study could be concluded by the results of this study that there is statistically significant improvement of ankle ROM and ankle position in 2nd trimester and 3rd trimester and postpartum after the intervention of modified burger exercise.

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