

## Review Article

# Improving Labor Progression in Women with Epidural Anesthesia with the Use of the Peanut Ball: A Recent Review

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**Abstract**

Epidural anesthesia has been the most effective form of pain relief from vaginal deliveries; however, it may slow the progression of labor. The assumption that epidurals lead to increased cesarean sections is of current debate. By using a holistic approach with the use of a peanut birthing ball, it decreases laboring times and may decrease the rate of cesarean sections as well. These peanut birthing balls aim to increase pelvic outlet opening, which facilitate laboring. Our aim is to highlight the recent literature of the peanut birthing ball and its use in improving quality and outcomes of vaginal deliveries in those with epidurals.

**INTRODUCTION**

Many women opt for epidural anesthesia to reduce the pain of labor. In 2008, the United States Department of Health and Human Services reported that 61% of women with singleton birth vaginal deliveries received epidural anesthesia in the United States [1]. According to the American College of Obstetricians and Gynecologists, epidural anesthesia is the most effective form of pain relief for vaginal deliveries [2]. Women who receive an epidural experience less pain and have more satisfaction with their pain relief than those who do not [3].

Although epidural anesthesia has been shown to significantly reduce pain during labor, it has also been hypothesized to slow the progression of labor and increase the rate of vacuum and forceps delivery [2]. Women who receive epidurals have decreased ability to ambulate. Increased ambulation results in a shorter first stage of labor compared to women who are left in the recumbent position [4]. The most common clinical indication for cesarean section deliveries is failure to progress during labor [5]. In full term, low-risk pregnancies, planned cesarean sections have been shown to have increased risk of severe maternal morbidities compared to planned vaginal deliveries 2.7% versus 0.9% [6]. Liu et al., defined severe maternal morbidities as hemorrhage requiring hysterectomy or transfusion, uterine rupture, anesthesia complications, shock, cardiac arrest, acute renal failure, assisted ventilation, venous thromboembolism, major infection, or in-hospital wound disruption or hematoma.

Regardless of analgesia use, it has been found that ambulation and positional changes decrease duration of labor. A Cochrane Library Meta-analysis found that women who ambulate and sit upright have shorter durations of labor without negative

outcomes for mother and baby [4]. It has been proposed that maternal positioning changes during labor helps the baby progress through the pelvis and opens the birthing canal. In women who receive an epidural, repositioning techniques have been shown to decrease the risk of complications. The use of birthing balls has been shown to quicken the progression of labor, theoretically reducing cesarean sections. With the main aim of decreasing labor times is to decrease cesarean sections, decreased times are beneficial to the mother, babies, and medical staffing. A birthing ball is an inflatable plastic exercise ball that can be used by women to support various laboring positions. Birthing balls are proposed to open the pelvic outlet, therefore hastening the birthing process [7]. A new specialized birthing ball, the peanut ball, has exemplified many of the same benefits.

The purpose of this review is to highlight the use of a holistic approach with the peanut ball, to improve outcomes of vaginal deliveries with epidural anesthesia. The peanut ball has been found to improve the progression of labor.

**The peanut ball**

Peanut balls are peanut shell-shaped plastic exercise balls (Figure 1). The unique shape of peanut balls allows for easier placement between the patients legs during labor than other variants of birthing balls. Peanut balls come in several sizes and can be inflated to different pressures to better accommodate different sized patients. Peanut balls come in latex free versions that are burst resistant. Women who receive an epidural are often placed in the left lateral position to decrease compression on the inferior vena cava and improve fetal circulation. Peanut balls are especially helpful in the lateral position by helping to open the pelvis and by allowing for easy placement between the



**Figure 1** Peanut Ball.

legs [8]. It is recommended that women change position every 20 to 60 minutes to improve circulation and help with labor progression [7].

### Clinical application

Peanut balls are an inexpensive and noninvasive intervention. The durable plastic of the ball allows for multiple uses. Sterilization between patients can easily be performed with hospital-grade wipes. The prices range from ten to fifteen dollars making it likely a cost effective process.

In women who receive epidural anesthesia, the shortened duration of labor found by Tussey and Roth could result in fewer cesarean deliveries [8-10]. Further studies are needed to see if the use of a peanut ball directly results in a decreased rate of cesarean sections. Since vaginal deliveries are deemed safer than cesarean sections with fewer side effects, the peanut ball may directly improve maternal and fetal outcomes. Hospitals may reduce labor cost by requiring less staff due to shorter labor durations. To our knowledge, none of the studies assessing peanut balls have reported any adverse side effects associated with the peanut balls.

### Labor progression with epidural anesthesia

Epidural anesthesia has been linked to a prolonged second stage of labor. In a multicenter retrospective study of 62,415 nulliparous women, the 95<sup>th</sup> percentiles of the second stage of labor for women who received epidural analgesia and those who did not were 3.6 and 2.8 hours, respectively [11]. Similarly, a retrospective cohort study of 42,268 nulliparous women found a second stage of labor to be 197 minutes in women without epidural anesthesia compared to 336 minutes in women with an epidural [12].

A Cochrane review of maternal position during the second stage of labor without an epidural demonstrated a decrease in instrumental assisted vaginal deliveries in upright sitting parturients. However, the quality of the trials was poor. The recent BUMPES trial examined spontaneous vaginal births in nulliparous women with epidurals when in the upright compared to lying down position. The trial involved almost 3100 nulliparous women all in the second stage of labor with epidurals. It was concluded that those lying down were more likely to undergo

spontaneous vaginal births compared to sitting upright. This study does not pertain to multiparous women in labor with an epidural [13].

### Peanut ball effects on progression of labor

In women who receive epidural anesthesia, the use of a peanut ball appears to result in a shorter duration of first and second stages of labor. Tussey first showed how the use of a peanut ball (PB) reduces the duration of labor in women who receive an epidural [9]. In a randomized controlled trial of two hundred women, there was a ninety-minute reduction in first stage of labor time in women who used a peanut ball compared to those who did not. Other findings include a reduction in second stage of labor by 22.3 minutes reduction in vacuum use by 3%, and a reduction in forceps usage by 0.3%. Of those 200 involved, 107 had the peanut ball, and 93 were used as controls without the ball. Although the control was not equal in numbers with those using the peanut ball, the effect of the peanut ball was still clinically evident. In a follow-up study in 2015, Tussey et al., performed a randomized controlled trial of 198 women who received an epidural. Compared to women who did not use a peanut ball, women who used the peanut ball had a shorter first stage of labor by twenty-nine minutes and second stage of labor by eleven minutes. Additionally, use of the peanut ball resulted in less cesarean section deliveries [10]. Just like in the first trial by Tussey, the second trial demonstrated unequal randomized groups with more participants using the peanut ball (107 vs 94). However, although the randomization resulted in differences in the parity and cervical dilation between the two groups, additional analyses demonstrated that the peanut ball intervention is still a significant predictor for nulliparous women.

Despite the numerous studies showing shorter duration of active labor with peanut ball use, Mercier et al., did not find a statistically significant reduction in the rates of cervical dilation or length of labor with peanut ball use [14]. Women who used the peanut ball were found to have a shorter duration of active labor (315 minutes vs. 387 minutes), but the difference was not statistically significant. In the subgroup that had labor arrest, fewer patients using the peanut ball experienced arrest of dilation. It approached, but did not reach statistical significance. However, only 96 patients were involved in the study. A larger study could be conducted to validate the use of the peanut ball.

Nulliparous women tend to have longer durations of labor than multiparous women. As a result, interventions like the peanut ball may be more dramatic in nulliparous women. In a randomized control trial of two hundred patients, Roth et al., demonstrated a statistically significant reduction in the duration of the first stage of labor in nulliparous women who received elective induction with epidural anesthesia [8].

### CONCLUSION

With the BUMPES trial, patients in the second stage of labor progressed more quickly in the recumbent position. With the use of the peanut ball, patients are more likely to be in the laying down position as they are physically limited due to the effects of the epidural. This could alter the interpretation of the effectiveness of the peanut ball intervention. However, clinically

there was an appreciable time difference in those with the peanut ball compared to the control groups. Larger studies would be necessary to isolate the effectiveness of the peanut ball. Given the ease, cost effectiveness, and minimal to nil side effects of using the ball the peanut ball can be used as a holistic device to improve the quality of labor.

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