



# Case Report of Spontaneous Skull Fracture in a Newborn With Cesarean Birth for Persistent Occiput Posterior Position

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**ABSTRACT:** Spontaneous newborn skull fracture is rarely cited in nursing literature as a potential outcome of persistent fetal occiput posterior position. Although most newborns seem unaffected by the condition initially, some may show symptoms several hours after the birth, when nursing assessments are less frequent. This case report illustrates delayed newborn symptoms that led to an unexpected diagnosis of spontaneous skull fracture.

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## Introduction

Three types of skull fractures can occur in newborns: linear, depressed (“ping-pong” fractures), and occipital osteodiastasis (Doumouchtis & Arulkumaran, 2006). Most skull fractures are linear, nondisplaced fractures resulting from a traumatic birth or use of instrumentation (Reichard, 2008). These often require no treatment and often heal

spontaneously without intervention (Reichard, 2008). Depressed (ping-pong) fractures are also most commonly seen after a traumatic birth or use of instrumentation. However, they may also occur spontaneously in an uncomplicated vaginal birth.

When intracranial pathology occurs, it is more likely to be associated with a depressed fracture than with a

## CLINICAL IMPLICATIONS

- Spontaneous, depressed fetal skull fracture is a potentially serious birth trauma related to persistent occiput posterior position.
- Maternal risks of persistent fetal malposition include greater rates of cesarean birth, prolonged labor, oxytocin use, and other interventions.
- Potential neonatal outcomes related to persistent fetal malposition include lower 1-minute Apgar scores, acidemic cord blood gases, meconium-stained fluid, birth trauma (including skull fractures), NICU admissions, and longer hospital stays.
- Although labor nurses and other clinicians are aware of the importance of helping a fetus in occiput posterior position change position to avoid a difficult vaginal birth and/or cesarean birth, the rare but serious risk of spontaneous fetal skull fracture should also be considered.
- Persistent occiput posterior position at birth should be included in the shift-to-shift report, and a low index of suspicion for possible seizures should be maintained.



linear fracture (Reichard, 2008). Spontaneous, depressed fetal skull fracture is a potentially serious birth trauma related to persistent occiput posterior position (Cheng, Shaffer, & Caughey, 2006). Fortunately, these fractures are rare events, especially when the neonate is born via cesarean.

Ping-pong fractures are not actual fractures of the bone. They involve the inward buckling of the skull bones, forming a depression that resembles a spoon or compressed Ping-Pong ball (Escalade Sports, Evansville, IN). In Western countries, the frequency of this condition has been estimated to be 1 in 10,000 births (Mastrapa, Fernandez, Alvarez, Stors, & Flores-Urueta, 2007; Zalatimo, Ranasinghe, Dias, & Iantosca, 2012). Some experts have suggested the real incidence of skull fractures in the newborn could be greater than reported in the literature because it is difficult to determine the presence of incomplete fractures in minimally ossified newborn skulls (Oh & Yoon, 2010). As a result, a significant number of newborn brain lesions with no known cause could be related to skull injuries sustained during birth (Oh & Yoon, 2010).

Persistent occiput posterior position is the most common malposition at birth (Blasi et al., 2010; Yancey, Zhang, Schweitzer, Schwarz, & Klebanoff, 2001). This position can prevent the fetus from rotating within the pelvis. Although spontaneous skull fracture is a rarely cited outcome of the occiput posterior position, health care providers must be aware of the potential for fetal morbidities.

To inform nurses of this possible outcome, this article briefly describes the forces of labor that contribute to fetal skull fracture and includes a condensed case report of

## Persistent occiput posterior position is the most common malposition during childbirth

newborn symptoms that led to an unexpected diagnosis of spontaneous skull fracture.

### Labor Factors

The process of navigation through the birth canal has been referred to as a form of trauma (Basaldella, Marton, Bekelis, & Longatti, 2011). It is thought that during labor, a brief delay in electrical impulses from one side of the uterus to the other during the second stage causes a twisting motion, or torque, on the fetus (Miftahof & Nam, 2011). This force is relentless, perhaps up to 50 mm Hg or more (as measured by an intrauterine pressure catheter) every 2 to 3 minutes for several hours. The force of 50 mm Hg can be converted to 0.96 psi, or nearly 1 pound per square inch (Cornell University, 2000). If the fetal position does not allow the fetus to rotate in response to the contractions, a spontaneous skull fracture can occur.

Overall, 75% of depressed newborn skull fractures occur over the thin bones of the frontoparietal region (Qureshi & Harsh, 2017). The damage is thought to be a result of compression of the fetal skull against the mother's unyielding bone structures such as the sacral promontory (Qureshi & Harsh, 2017), fifth lumbar vertebra, symphysis pubis, ischial spines, and/or contracted pelvis (Arifin, Gill, Anwar, Djuwantono, & Faried, 2013; Basaldella et al., 2011; Oh & Yoon, 2010).

### Newborn Clinical Management

Management and treatment of depressed skull fractures, along with neonatal outcomes, may vary based on clinical

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