# Retention of Vaginal Breech Delivery Skills Taught in Simulation

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## Abstract

**Objective:** The optimal frequency of conducting simulation training for high-acuity, low-frequency events in obstetrics and gynaecology residency programs is unknown. This study evaluated retention over time of vaginal breech delivery skills taught in simulation, by comparing junior and senior residents. In addition, the residents' subjective comfort level to perform this skill clinically was assessed.

**Methods:** This prospective cohort study included 22 obstetrics and gynaecology residents in a Canadian residency training program. Digital recordings were completed for pre-training, immediate post-training, and delayed (10–26 weeks later) post-training intervals of a vaginal breech delivery simulation, with skill assessment by a blinded observer using a binary checklist. Residents also completed questionnaires to assess their subjective comfort level at each interval.

**Results:** Junior and senior residents had significant improvements in vaginal breech delivery skills from the pre-training assessment to both the immediate post-training assessment (junior, $P < 0.001$; senior, $P < 0.001$) and the delayed post-training assessment ($P < 0.001$ and $P = 0.001$, respectively). There was a significant decline in skills between the immediate and delayed post-training sessions for junior and senior residents ($P = 0.003$ and $P < 0.001$, respectively). Both junior and senior residents gained more comfort immediately after the training ($P < 0.001$ and $P < 0.001$, respectively), without a significant change between immediate post-training and delayed post-training comfort levels ($P = 0.19$ and $P = 0.11$, respectively).

**Conclusion:** Residents retained vaginal breech delivery skills taught in simulation 10–26 weeks later, although a decline in skills occurred over this time period. Comfort level was positively affected and retained. These results will aid in determining the frequency of simulation teaching for high-acuity, low-frequency events in a residency simulation curriculum.

**Key Words:** Simulation, obstetrics, medical education, breech presentation, residency

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## Résumé

**Objectif :** On ignore quelle est la fréquence optimale de répétition de la formation par simulation sur les problèmes obstétricaux et gynécologiques graves, mais peu fréquents, dans le cadre des programmes de résidence. Cette étude a comparé des résidents juniors et seniors afin d'évaluer leur degré de rétention, au fil du temps, des compétences acquises durant une simulation sur l'accouchement par le siège. Leur degré d'aisance par rapport à la mise en pratique de ces compétences en contexte clinique a également été évalué.

**Méthodologie :** Nous avons mené une étude de cohorte prospective portant sur 22 résidents canadiens en obstétrique et gynécologie. Des enregistrements numériques ont été réalisés avant et immédiatement après la formation sur l'accouchement par le siège, ainsi qu'après un certain temps (de 10 à 26 semaines plus tard), et une évaluation des compétences a été effectuée à l'insu avec une liste de vérification dichotomique. Les résidents ont répondu à un questionnaire visant à évaluer leur degré d'aisance à chaque étape.

**Résultats :** Une amélioration significative des compétences des résidents a été observée, tant chez les juniors que chez les seniors, entre les évaluations menées avant et immédiatement après la formation (juniors, $P < 0{,}001$; seniors, $P < 0{,}001$) et entre celles menées avant et un certain temps après la formation ($P < 0{,}001$ et $P = 0{,}001$, respectivement). Une perte significative des compétences des résidents juniors et seniors a été observée entre les deux évaluations suivant la formation ($P = 0{,}003$ et $P < 0{,}001$, respectivement). Le degré d'aisance des résidents juniors et seniors était plus élevé immédiatement après la formation ($P < 0{,}001$ et $P < 0{,}001$, respectivement), et aucun changement significatif n'a été rapporté entre les deux évaluations suivant la formation ($P = 0{,}19$ et $P = 0{,}11$, respectivement).

**Conclusion :** Dans une évaluation de 10 à 26 semaines après la simulation, les résidents ont maintenu leurs compétences en accouchement par le siège, et ce, même si une perte a été observée au fil du temps. Le degré d'aisance a augmenté après la formation, puis s'est maintenu par la suite. Ces résultats aideront à déterminer à quelle fréquence les formations par simulation sur les problèmes obstétricaux et gynécologiques graves, mais peu fréquents, devraient avoir lieu dans le cadre des programmes de résidence.



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## INTRODUCTION

In 2000, the Term Breech Trial changed the way we viewed vaginal breech deliveries.[1] The trial investigators showed that CS was safer than vaginal delivery for a breech presentation at term.[1] In subsequent years, there was a significant decline in the number of vaginal breech deliveries, thus making CS the preferred mode of delivery.[2] The incidence of breech presentation at term is 3% to 4%,[3,4] and CS for this indication has reached 94%.[5] Following the Term Breech Trial, the Présentation et Mode d'Accouchement (Presentation and Mode of Delivery; PREMODA) trial demonstrated that with strict antepartum selection, vaginal breech is as safe as CS.[6] This finding is further supported by the SOGC guideline.[7] Mirroring the results of landmark papers and guidelines, vaginal breech delivery at term gestation has increased in Canada, from 2.7% in 2003 to 3.9% in 2011.[8]

The use of simulation in medical education provides the advantage of teaching and assessing infrequently used but essential skills, such as vaginal breech delivery, in a safe environment. Every obstetrician requires the skills to deliver a woman arriving with a fetus in breech presentation in advanced stages of labour. Thus teaching obstetrics and gynaecology (Obs/Gyn) residents this skill is vital. Deering et al.[9] demonstrated that teaching vaginal breech delivery in simulation was effective, with retention of skills 2 weeks after the initial simulation. Long-term retention assessment was not completed.

Several studies have assessed various simulation-taught skills and have shown retention rates from 1 month to 2 years.[10–19] However, the frequency of use of the skill in question is likely more prevalent than vaginal breech delivery. In addition, the choice of assessment tool, such as multiple-choice questionnaires,[14,20] is not relatable to performance in clinical practice. It demonstrates only knowledge acquisition, not knowledge translation or the ability to maintain technical skills. What is left unknown is whether simulation training is an effective training method for retention of important skills with low frequency and high acuity, such as vaginal breech delivery. It is not feasible to test retention of this set of skills in clinical practice because of the rarity of the event. Retesting using a high contextual fidelity simulation in a simulation environment could provide an answer to this question.

## OBJECTIVE

The objective was to assess the retention of skills over time with vaginal breech delivery simulation training in Obs/Gyn junior residents (years 1 and 2) and senior residents (years 3–5) at Dalhousie University in Halifax, as well as the residents' perceived comfort level in performing this task clinically.

## METHODS

This was a prospective cohort study, with data collection from August 2015 to May 2016. Research approval was obtained from the IWK Health Centre Research Ethics Board (approval no. 1019064). The study group comprised 22 Dalhousie University Obs/Gyn residents, resident years 1 through 5 (R 1–5). All residents were invited to participate; one resident declined. Eleven participants were junior residents, and 11 were senior residents. Exclusion criteria included any resident on leave or away on elective for the duration of the study, as well as the primary investigator. Consent was obtained before the research simulation sessions. All participants had the option to withdraw from the study at any point after initial consent had been given. Residents were unaware of which of their regularly scheduled simulation sessions was the research simulation. Details of the specific scenario, singleton vaginal breech delivery, were not provided in advance. The scenario was piloted to assess timing and flow, availability of equipment, and video camera positioning to capture the movements and voice of study participants.

Residents were individually scheduled for each session. The IWK Health Centre simulation room was set up as a labour and delivery room. The simulation started with the resident reading the scenario, to prepare the resident for an imminent vaginal breech delivery (Appendix 1). A continuous fetal heart rate tracing was running using the monitor from the high-fidelity Noelle simulator (Gaumard Scientific, Miami, FL), and it could be heard and seen simultaneously at a normal rate of 140 beats/min with accelerations and no decelerations. A hybrid model was used, consisting of an actor for the patient, played by the simulation coordinator (K.J.), along with the Prompt birthing simulator (Laerdal Medical, Toronto, ON) (Figure). A physician acting as a confederate nurse, the co-investigator of this study (C.C.), was available to assist in a nursing role if the resident requested her assistance. The delivery included spontaneous vaginal breech delivery, the use of Piper forceps, and manoeuvres for reduction of nuchal arms and extended arms. The simulation ended once the resident performed all of these interventions.

Once finished, the co-investigator (C.C.) completed a training session with the resident. This involved instruction about the technical skills of singleton vaginal breech delivery and the rationale behind manoeuvres, by emphasizing skills done well and correcting those that required improvement. At the