Association between median episiotomy and severe perineal lacerations in primiparous women

Michel Labrecque,* MD, MSc; Lucie Baillargeon,* MD, MSc; Michel Dallaire,* MD, MSc; Annie Tremblay,* MD; Jean-Jacques Pinault,† MD; Suzanne Gingras,‡ MSc

Abstract

Objective: To evaluate the association between median episiotomy and severe (third- and fourth-degree) perineal lacerations in primiparous women.

Design: Retrospective cohort study.

Setting: University-affiliated hospital providing secondary obstetric care in Quebec City.

Patients: A total of 6522 primiparous women who gave birth vaginally to a single live baby in cephalic position between 1985 and 1993.

Outcome measure: Incidence of third- and fourth-degree perineal lacerations.

Results: Median episiotomy was performed in 4390 women (67.3%). A total of 1002 women (15.4%) had a third- or fourth-degree laceration. The frequency of severe perineal lacerations was 20.6% with episiotomy and 4.5% without episiotomy (relative risk [RR] 4.58, 95% confidence interval [CI] 3.74–5.62). This association persisted after adjustment by stratified analysis for type of delivery and birth weight (RR 3.03, 95% CI 2.52–3.63) and by logistic regression for type of delivery, birth weight, epidural analgesia, shoulder dystocia, baby's head circumference, experience of the physician and year of delivery (odds ratio 3.58, 95% CI 2.84–4.50).

Conclusion: Median episiotomy is strongly associated with third- and fourth-degree perineal lacerations in primiparous women. Reducing the use of this procedure could decrease the occurrence of severe perineal tears.

Résumé

Objectif : Évaluer l'association entre une épisiotomie médiane et des lacérations graves (troisième et quatrième degrés) du périnée chez des femmes primipares.

Conception : Étude de cohorte rétrospective.

Contexte : Hôpital affilié à une université qui fournit des soins obstétricaux secondaires à Québec.

Patientes : Au total, 6522 femmes primipares qui ont accouché par voie vaginale entre 1985 et 1993 et donné naissance à un seul bébé vivant qui s'est présenté en position céphalique.

Mesure des résultats : Incidence de lacérations du périnée du troisième et du quatrième degrés.

Résultats : On a procédé à une épisiotomie médiane chez 4390 femmes (67,3 %). Au total, 1002 femmes (15,4 %) ont subi une lacération du troisième ou du quatrième degré. La fréquence des lacérations graves du périnée a été de 20,6 % avec épisiotomie et de 4,5 % sans épisiotomie (risque relatif [RR] 4,58, intervalle de confiance [IC] à 95 %, 3,74 à 5,62). Cette association a persisté après ajustement par analyse stratifiée pour le type d'accouchement et le poids à la naissance (RR 3,03, IC à 95 %, 2,52 à 3,63) et par régression logistique pour le type d'accouchement, le poids à la naissance, l'analgésie épidurale, la dystocie des épaules, la circonférence du crâne du bébé, l'expérience du médecin et l'année d'accouchement (rapport des cotes 3,58, IC à 95 %, 2,84 à 4,50).

Conclusion : Les lacérations du périnée du troisième et du quatrième degrés sont fortement associées à l'épisiotomie médiane chez les femmes primipares. En réduisant le recours à cette intervention, on pourrait réduire l'incidence de déchirements graves du périnée.

Evidence

Études

From the Departments of *Family Medicine and †Obstetrics and Gynecology, Laval University, Quebec, Que., and the ‡Centre de santé publique de Québec, Quebec, Que.

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Episiotomy was first suggested by Ould in 1742 as an aid in difficult vaginal deliveries. It was not until 1920, following articles published by Delee and Pomeroy, that the routine use of episiotomy became widespread.[1] Prevention of severe perineal tears was advocated as a benefit of routine episiotomy in primiparous women, who are at increased risk for third- and fourth-degree lacerations.[2] These injuries may have short- and long-term sequelae, such as perineal pain, dyspareunia, incontinence of gas or feces, and rectovaginal fistula.[3–7]

In 1948 Kaltreider and Dixon[8] reported a higher frequency of rectal lacerations with median episiotomy and questioned the efficacy of episiotomy as a preventive procedure. It was, however, in the last decade that most studies investigating the relation between episiotomy and severe perineal lacerations were published. None was able to resolve definitively the issue of causality. In most studies involving primiparous women the sample was too small to estimate reliably the effect of episiotomy in light of all the potential confounding variables.[9–12] Some studies involved both primiparous and multiparous women.[13–15] Others included both median and mediolateral episiotomy[14] or included only operative vaginal deliveries.[16,17] Finally, although some authors have recognized the influence of the attending "accoucheur,"[4,12] no study has reported an adjusted estimate of the risk accounting for this potential confounding factor.

We carried out a study to evaluate the effect of median episiotomy on the risk of severe perineal tears in primiparous women, adjusting for several potential confounding variables that have been identified in previous studies.

Methods

A total of 6522 primiparous women who gave birth vaginally to a single live baby in cephalic presentation were included in this retrospective cohort study. All the women gave birth at Hôpital du Saint-Sacrement, Quebec, between Jan. 1, 1985, and May 11, 1993. Women for whom the episiotomy type was unknown (6 cases) and those who had a mediolateral episiotomy (2 cases) were excluded. The hospital is a secondary-level, university-affiliated institution with approximately 2000 deliveries per year. Twenty-five physicians (12 family physicians and 13 obstetrician-gynecologists) have been practising obstetrics at the hospital since 1985.

Since 1985, information about labour and delivery has been collected on a data sheet completed by the attending physician or the resident. One of us (J.-J.P.) enters the data into a computerized database weekly. The following information was extracted from the database: maternal age, gestational age, presence of severe perineal tear (defined as a third-degree [anal sphincter] or a fourth-degree [rectal mucosa and lumen] laceration), use of median episiotomy, type of delivery (spontaneous, forceps or vacuum extraction), use of epidural analgesia, status of attending physician (general practitioner or obstetrician-gynecologist), presence of shoulder dystocia, birth weight, neonate's head circumference and year of delivery. All database records were verified for consistency, and inconsistent data were corrected with the use of the hospital record.

In addition to specialty status, three other variables relating to the attending physician were studied: experience (measured by the number of years of practice [10 years or less, or more than 10 years]), average number of deliveries at the hospital per year during the study period (less than 100, or 100 or more) and belief about an association between median episiotomy and severe perineal lacerations. We measured this last variable using part of a 38-item, 4-point Likert-type questionnaire on physician attitudes toward episiotomy and third- and fourth-degree perineal tears.[18] The questionnaire was completed in May 1992 for the purposes of another trial[19] by 16 of the 17 members of the current medical staff at that time. Two items on the questionnaire probed physicians' beliefs as to whether episiotomy was associated with severe perineal lacerations. The items included the statements "Median episiotomy is a major cause of third- and fourth-degree perineal tears. These tears would be less common if episiotomy was used less frequently" and "If I were to use episiotomy less frequently, I would see more third- and fourth-degree tears." Based on the responses to these items, physicians were classified into 3 categories according to the belief that median episiotomy is associated with third- and fourth-degree perineal lacerations: strong believers (7 physicians), believers (6 physicians) and nonbelievers (3 physicians). These 16 physicians attended 5419 (83.1%) of the births included in the study.

We determined the frequency of severe perineal lacerations (dependent variable) for women with and without median episiotomy (principal independent variable) and calculated the relative risk (RR) of severe perineal lacerations and its 95% confidence interval (CI). We first performed a stratified analysis and calculated the adjusted RR of severe perineal lacerations with median episiotomy using the Mantel–Haenszel method.[20] To adjust simultaneously for multiple confounding factors, an unconditional logistic regression analysis was also performed. All potential confounding factors (variables associated with both severe perineal lacerations and median episiotomy) were entered into the model; the order of entering was based on the importance of the confounding effect, as determined by the stratified analysis. Calculations were done with SAS PC software (version 6.0, SAS Institute, Cary, NC).

Results

Of the 6522 primiparous women 4390 (67.3%) had a median episiotomy and 1002 (15.4%) had severe perineal lacerations. Most of the women had medical interventions during labour and delivery (Table 1): two-thirds had an episiotomy, three-quarters had epidural analgesia and nearly one-half had forceps or vacuum extraction delivery. Most of the births were attended by an obstetrician-gynecologist.

Table 1: Characteristics of deliveries of 6522 primiparous women who had or did not have a median episiotomy

Characteristic	No. (and %) of women		
	Episiotomy *n = 4390*	No episiotomy *n = 2132*	Total *n = 6522*
Type of delivery			
Forceps	1260 (28.7)	90 (4.2)	1350 (20.7)
Vacuum extraction	1257 (28.6)	541 (25.4)	1798 (27.6)
Spontaneous	1873 (42.7)	1501 (70.4)	3374 (51.7)
Epidural analgesia	3347 (76.2)	1465 (68.7)	4812 (73.8)
Birth weight, g			
≥ 4000	313 (7.1)	108 (5.1)	421 (6.4)
3000–3999	3183 (72.5)	1458 (68.4)	4641 (71.2)
< 3000	894 (20.4)	566 (26.5)	1460 (22.4)
Shoulder dystocia	122 (2.8)	27 (1.3)	149 (2.3)
Baby's head circumference	*n = 4248*	*n = 2090*	*n = 6338*
> 35 cm	1345 (31.7)	465 (22.3)	1810 (28.6)
Gestational age, wk			
≥ 41	1279 (29.1)	557 (26.1)	1836 (28.2)
37–40	2943 (67.0)	1468 (68.8)	4411 (67.6)
< 37	168 (3.8)	107 (5.0)	275 (4.2)
Maternal age, yr			
≥ 35	227 (5.2)	94 (4.4)	321 (4.9)
30–34	945 (21.5)	422 (19.8)	1367 (21.0)
25–29	2006 (45.7)	972 (45.6)	2978 (45.7)
20–24	1034 (23.6)	524 (24.6)	1558 (23.9)
< 20	178 (4.0)	120 (5.6)	298 (4.6)
Year of delivery			
1985–87	1680 (38.3)	483 (22.6)	2163 (33.2)
1988–90	1644 (37.4)	817 (38.3)	2461 (37.7)
1991–93	1066 (24.3)	832 (39.0)	1898 (29.1)
Attending physician's characteristics			
Obstetrician-gynecologist	3420 (77.9)	1522 (71.4)	4942 (75.8)
> 10 yr of practice	3532 (80.4)	1813 (85.0)	5345 (82.0)
Average yearly no. of deliveries ≥ 100	3269 (74.5)	1462 (68.6)	4731 (72.5)
Attending physician's belief*			
Strong believer	987 (27.7)	812 (43.8)	1799 (33.2)
Believer	1646 (46.1)	653 (35.3)	2299 (42.4)
Nonbeliever	934 (26.2)	387 (20.9)	1321 (24.4)

*Belief about an association between median episiotomy and severe perineal lacerations for 16 physicians representing 5419 (83.1%) of the deliveries (3567 in the episiotomy group and 1852 in the no episiotomy group).

A higher proportion of the women with episiotomy than without episiotomy had forceps delivery, epidural analgesia, babies of higher birth weight, shoulder dystocia and babies with a head circumference greater than 35 cm, gave birth earlier in the study, and were attended by an obstetrician-gynecologist, a physician with 10 years or less of practice, a physician with a yearly average of 100 deliveries or more, or a physician who did not believe that episiotomy was associated with third- and fourth-degree tears (Table 1). The frequency distributions of women with and without episiotomy by maternal age and gestational age were similar.

Table 2 shows the frequency and RR of severe perineal lacerations according to various factors. Median episiotomy was most strongly associated with severe lacerations: women who had an episiotomy were 4.58 times more likely to experience such tears than women who did not have an episiotomy. Other variables strongly associated with severe lacerations were type of delivery (use of forceps), birth weight and gestational age. Factors less strongly associated with severe tears included type of delivery (use of vacuum extraction), epidural analgesia, shoulder dystocia, maternal age, baby's head circumference, physician's experience and year of delivery. The mean number of deliveries per year per physician, the type of physician and the physician's belief about episiotomy and third- and fourth-degree tears were not associated with severe perineal lacerations.

Table 3 presents the stratified analysis of the risk of severe perineal lacerations with median episiotomy for each potential confounding factor: type of delivery, birth weight, epidural analgesia, shoulder dystocia, head circumference, attending physician's experience and year of delivery. All the variables had a modifying effect on the risk of severe lacerations with median episiotomy. However, only the type of delivery and, to a lesser extent, birth weight proved to be confounding factors when the crude RR (4.58) was compared with the adjusted RR. The confounding bias from the other variables was negligible. The adjusted RR stratified for both type of delivery and birth weight was 3.03 (95% CI 2.52–3.63).

Although many of the variables studied could not be considered to be confounders in the stratified analysis, they may theoretically be associated with third- and fourth-degree perineal lacerations. We thus performed a logistic regression analysis. The crude odds ratio (OR) of severe perineal lacerations with only median episiotomy in the model was 5.52 (95% CI 4.44–6.85). When the variables in Table 3 were added into the model (type of

Table 2: Frequency and relative risk of severe (third- and fourth-degree) perineal lacerations according to various factors

Factor	No. (and %) of women with severe laceration	RR (and 95% CI)*
Median episiotomy		
Yes	906/4390 (20.6)	4.58 (3.74–5.62)
No	96/2132 (4.5)	1.00
Type of delivery		
Forceps	458/1350 (33.9)	3.99 (3.49–4.56)
Vacuum extraction	257/1798 (14.3)	1.68 (1.43–1.97)
Spontaneous	287/3374 (8.5)	1.00
Epidural analgesia		
Yes	810/4812 (16.8)	1.50 (1.29–1.74)
No	192/1710 (11.2)	1.00
Birth weight, g		
≥ 4000	120/421 (28.5)	3.15 (2.53–3.94)
3000–3999	750/4641 (16.2)	1.79 (1.50–2.13)
< 3000	132/1460 (9.0)	1.00
Shoulder dystocia		
Yes	43/149 (28.8)	1.92 (1.48–2.48)
No	959/6373 (15.0)	1.00
Baby's head circumference, cm		
> 35	392/1810 (21.6)	1.68 (1.50–1.89)
≤ 35	584/4528 (12.9)	1.00
Gestational age, wk		
≥ 41	317/1836 (17.3)	2.37 (1.54–3.66)
37–40	665/4411 (15.1)	2.07 (1.35–3.18)
< 37	20/275 (7.3)	1.00
Maternal age, yr		
≥ 35	51/321 (15.9)	1.69 (1.10–2.61)
30–34	247/1367 (18.1)	1.92 (1.33–2.79)
25–29	457/2978 (15.3)	1.63 (1.14–2.35)
20–24	219/1558 (14.0)	1.50 (1.03–2.17)
< 20	28/298 (9.4)	1.00
Year of delivery		
1985–87	373/2163 (17.2)	1.36 (1.17–1.58)
1988–90	389/2461 (15.8)	1.25 (1.08–1.45)
1991–93	240/1898 (12.6)	1.00
Type of physician		
Obstetrician-gynecologist	770/4942 (15.6)	1.06 (0.93–1.22)
Family physician	232/1580 (14.7)	1.00
No. of yr of practice of physician		
≤ 10	219/1177 (18.6)	1.27 (1.11–1.46)
> 10	783/5345 (14.6)	1.00
Average yearly no. of deliveries of physician		
< 100	262/1791 (14.6)	0.94 (0.82–1.07)
≥ 100	740/4731 (15.6)	1.00
Attending physician's belief		
Strong believer	239/1799 (13.3)	0.97 (0.81–1.16)
Believer	357/2299 (15.5)	1.13 (0.96–1.37)
Nonbeliever	181/1321 (13.7)	1.00

*RR = relative risk, CI = confidence interval.

delivery [forceps v. spontaneous, vacuum extraction v. spontaneous], birth weight [continuous], epidural analgesia [yes v. no], shoulder dystocia [yes v. no], head circumference [continuous], number of years of practice of the physician [continuous] and year of delivery [continuous]), we obtained an adjusted OR of 3.58 (95% CI 2.84–4.50). However, of all these variables, only type of delivery had a substantial confounding effect. The model including only median episiotomy and type of delivery yielded an adjusted OR of severe perineal lacerations with median episiotomy of 3.76 (95% CI 3.00–4.70).

Table 3: Relative risk of severe perineal lacerations with median episiotomy according to potential confounding factors

Factor	No. (and %) of women with severe laceration: Episiotomy	No. (and %) of women with severe laceration: No episiotomy	RR (and 95% CI)
Type of delivery			
Forceps	435 (34.5)	23 (25.6)	1.35 (0.94–1.94)
Vacuum extraction	232 (18.4)	25 (4.6)	3.99 (2.68–5.96)
Spontaneous	239 (12.8)	48 (3.2)	3.99 (2.95–5.40)
Adjusted RR*			3.13 (2.61–3.75)
Birth weight, g			
≥ 4000	108 (34.5)	12 (11.1)	3.11 (1.78–5.41)
3000–3999	676 (21.2)	74 (5.1)	4.18 (3.32–5.28)
< 3000	122 (13.6)	10 (1.8)	7.72 (4.09–14.59)
Adjusted RR			4.37 (3.67–5.20)
Epidural analgesia			
Yes	740 (22.1)	69 (4.7)	4.69 (3.70–5.96)
No	164 (15.7)	27 (4.0)	3.88 (2.62–5.77)
Adjusted RR			4.49 (3.76–5.36)
Shoulder dystocia			
Yes	42 (34.4)	1 (3.7)	9.30 (1.34–64.61)
No	864 (20.2)	95 (4.5)	4.49 (3.65–5.51)
Adjusted RR			4.55 (3.81–5.43)
Baby's head circumference, cm			
> 35	371 (27.6)	21 (4.5)	6.11 (3.99–9.36)
≤ 35	512 (17.6)	72 (4.4)	3.98 (3.13–5.06)
Adjusted RR			4.52 (3.77–5.41)
Year of delivery			
1985–87	351 (20.9)	22 (4.6)	4.59 (3.02–6.97)
1988–90	357 (21.7)	32 (3.9)	5.54 (3.90–7.88)
1991–93	198 (18.6)	42 (5.1)	3.68 (2.67–5.07)
Adjusted RR			4.57 (3.82–5.47)
No. of yr of practice of physician			
> 10	704 (19.9)	79 (4.4)	4.57 (3.65–5.73)
≤ 10	202 (23.5)	17 (5.3)	4.42 (2.74–7.13)
Adjusted RR			4.54 (3.81–5.42)

*RR of lacerations with median episiotomy adjusted for the variable of interest by the Mantel–Haenszel method.

Table 4 shows the temporal trend in median episiotomy, forceps delivery, severe perineal lacerations and birth weight at Hôpital du Saint-Sacrement between 1985 and 1993. The reduction in the rate of severe lacerations parallelled the diminishing use of forceps and median episiotomy, whereas birth weight showed a slight increase over the years. A similar picture was observed when only the 3374 spontaneous deliveries were analysed: the episiotomy rate fell from 67.5% in the early years of the study to 44.2% in recent years, and the rate of severe perineal tears decreased from 10.3% to 6.8%.

Discussion

We found that primiparous women who undergo median episiotomy are at greater risk for severe perineal lacerations than those who do not undergo this procedure. Our study differs from previous reports in that we included a large enough cohort to permit calculation of a precise estimate of the relative risk while adjusting for important confounding factors. In a literature review Hordnes and Bergsjo[4] underlined two important problems in assessing the relation between episiotomy and perineal lacerations: unreliable estimation of the risk owing to the relatively low rate of complete tears, and the confounding effect of the indication for episiotomy, which often is fear of rupture. We considered both of these.

A low frequency of severe (complete) perineal tears may be encountered in some European countries where selective use of mediolateral episiotomy is the norm.[2,4,21] This is not the case in North America, where the routine use of median episiotomy, often combined with operative delivery, yields rates of severe perineal tear ranging from 15% to 40%.[6,9–13,16,17,22] The frequency of severe tears in our cohort of primiparous women was high enough to permit a statistically significant estimate of the association between the two factors studied.

The confounding effect of fear of rupture as an indication for episiotomy is more worrisome. If physicians had believed that median episiotomy prevented severe perineal lacerations, their patients who were at high risk for third- or fourth-degree lacerations would have been subjected to more episiotomies, and thus, the association would have been overestimated. Most of the physicians involved in this study believed in 1992 that median episiotomy is a risk factor for severe perineal lacerations. It is therefore doubtful that they used it as a preventive procedure. Their attitude may have been different in the earlier years of the study. Although the incidence of severe perineal tears was higher in the earlier years, the RR of severe tears with episiotomy was relatively stable throughout the study period. Furthermore, adjusting for the attending physicians' beliefs, training and experience did not change the association.

Table 4: Frequency of median episiotomy, forceps delivery and severe perineal lacerations and mean birth weight according to year of delivery

Year	Rate, %			Mean birth weight, g
	Median episiotomy	Forceps delivery	Severe perineal lacerations	
1985–87	77.7	25.0	17.2	3270
1988–90	66.8	19.8	15.8	3303
1991–93	56.2	17.0	12.6	3345

Confounding originating from other known risk factors for severe perineal lacerations[4] was assessed and adjusted for by both stratified analysis (giving the exact adjusted RR) and logistic regression (estimating the adjusted RR by the OR). Two risk factors, race and position at delivery, were not included in our study. Our population was very homogeneous, with less than 1% nonwhite. Position at delivery is not documented in the study database. The vast majority of our patients gave birth with epidural analgesia, in either a dorsal recumbent or semirecumbent position.

We also considered misclassification bias. The association between median episiotomy and severe perineal tears would have been overestimated if some physicians, in the presence of a similar type of perineal injury, systematically diagnosed more severe tears when performing an episiotomy. This could have been the case for physicians who believed that median episiotomy is associated with severe perineal lacerations. Our analysis showed, however, that the risk of third- and fourth- degree tears was similar whatever the attending physician's belief. On the other hand, if misclassification was at random, as it probably was, the strength of the association would have been underestimated.[23]

Do our results provide grounds to conclude that median episiotomy is a cause of severe perineal tears in primiparous women? To our knowledge, only 1 randomized controlled trial comparing liberal versus restricted use of median episiotomy has been reported.[24] In their primary intention-to-treat analysis Klein and associates found no significant difference in the frequency of third- and fourth-degree tears between the 183 women in the liberal-use arm of the trial and the 173 in the restricted-use arm (episiotomy rate 81.4% v. 57.2%, rate of severe tears 12.6% v. 13.9%). These results must be interpreted with caution. Of the 47 women with severe perineal tears, only 1 did not have an episiotomy. The statistical power of their study to detect an absolute difference of 5% between the groups (a difference similar to that observed in our study between 1985–87 and 1991–93) was only 0.29, which indicates a high probability of missing a clinically important difference.

On the other hand, consistently strong associations have been observed in cohort studies, despite variations in the frequency of severe perineal lacerations and of episiotomy across studies. The RR (or estimate of RR by OR) of severe perineal lacerations with median episiotomy, including that in our study, typically ranged from 4 to 8,[6,13–15,17] but several authors,[8–10,12] including Klein and associates[24] in the explanatory analysis of their randomized controlled trial, noted an RR (or OR) as high as 20. No study has ever shown a protective effect of median episiotomy. Even Pomeroy,[25] who promoted its routine use in 1918, recognized that "the only assailable point in the claim for superiority for the median incision is the risk of injury to the sphincter."

Furthermore, our temporal trend analysis showed that the reduction in the rate of severe perineal lacerations parallelled the diminishing use of median episiotomy. The 1995 report of obstetric statistics at Hôpital du Saint-Sacrement[26] showed that this trend has continued. Among 718 primiparous women giving birth vaginally in 1995 the rates of episiotomy and of severe perineal tears fell to 25.1% and 6.9% respectively; the rate for forceps delivery (16.4%) was similar to that in 1991–93. Other authors have reported similar observations. At a university-affiliated hospital in the United States the frequency of severe perineal tears increased from 1% to 17% when median episiotomy replaced the mediolateral procedure in the mid-60s.[22] After implementation of a continuous-quality-improvement program to reduce the use of episiotomy at a university-affiliated hospital in Ontario, the rates of this procedure and of severe perineal lacerations among primiparous women decreased from 57.6% to 46.2% and from 8.3% to 3.7% respectively.[27]

The high frequency of injury associated with combined use of forceps and median episiotomy must also be emphasized. Based on our results and those of previous studies,[16,17] 35% to 40% of women subjected to both these interventions experience a third- or fourth-degree perineal laceration. As found in our study for episiotomy, a secular trend toward a reduction in the use of forceps was associated with a decreased rate of severe perineal tears despite increasing average birth weight over the same period.

Given the available evidence, we believe that median episiotomy in primiparous women may be recognized as a cause of third- and fourth-degree perineal lacerations. These injuries carry the risk of short- and long-term sequelae and must be prevented as much as possible.[3,4,6] Although reducing the use of median episiotomy would not completely eliminate severe perineal tears, it would likely decrease their occurrence.

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Reprint requests to: *Dr Michel Labrecque, Hôpital Saint-François d'Assise, 10, rue de l'Espinay, Québec QC G1L 3L5; fax 418 525-4322; michel.labrecque@mfa.ulaval.ca*