



# Selective Episiotomy: Indications, Technique, and Association with Severe Perineal Lacerations

## *Episiotomia seletiva nos dias atuais: indicações, técnica e associação com lacerações perineais graves*

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### Abstract

**Introduction** Episiotomy is a controversial procedure, especially because the discussion that surrounds it has gone beyond the field of scientific debate, being adopted as an indicator of the “humanization of childbirth”. The scientific literature indicates that episiotomy should not be performed routinely, but selectively.

**Objectives** To review the literature in order to assess whether the implementation of selective episiotomy protects against severe perineal lacerations, the indications for the procedure, and the best technique to perform it.

**Methods** A literature search was performed in PubMed using the terms *episiotomy* or *perineal lacerations*, and the filter *clinical trial*. The articles concerning the risk of severe perineal lacerations with or without episiotomy, perineal protection, or episiotomy techniques were selected.

**Results** A total of 141 articles were identified, and 24 of them were included in the review. Out of the 13 studies that evaluated the risk of severe lacerations with and without episiotomy, 5 demonstrated a protective role of selective episiotomy, and 4 showed no significant differences between the groups. Three small studies confirmed the finding that episiotomy should be performed selectively and not routinely, and one study showed that midline episiotomy increased the risk of severe lacerations. The most cited indications were primiparity, fetal weight greater than 4 kg, prolonged second stage, operative delivery, and shoulder dystocia. As for the surgical technique, episiotomies performed with wider angles (> 40°) and earlier in the second stage (before “crowning”) appeared to be more protective.

**Conclusions** Selective episiotomy decreases the risk of severe lacerations when compared with the non-performance or the performance of routine episiotomy. The use of a proper surgical technique is fundamental to obtain better results, especially in relation to

### Keywords

- ▶ episiotomy
- ▶ perineal lacerations
- ▶ obstetrical delivery

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the angle of incision, the distance from the vaginal introitus, and the correct timing for performing the procedure. Not performing the episiotomy when indicated or not applying the correct technique may increase the risk of severe perineal lacerations.

## Resumo

**Introdução** A episiotomia é um procedimento controverso, devido, em parte, à discussão sobre sua realização ter ultrapassado o campo do debate científico, sendo adotada como indicador associado com a “humanização do parto.” A literatura mostra que a episiotomia não deve ser realizada rotineiramente, mas de forma seletiva. Questões relativas à sua indicação, técnica de realização e associação com lacerações perineais graves são objeto de amplo debate e pesquisa.

**Objetivos** Revisar a literatura para avaliar se a realização da episiotomia seletiva protege contra lacerações perineais graves, quais são suas indicações, e qual a melhor técnica para realizar este procedimento.

**Método** Foi realizada busca no PubMed com os termos *episiotomy* ou *perineal lacerations* utilizando o filtro *clinical trial*. Foram selecionados os artigos que tratavam do risco de lacerações perineais graves com e sem episiotomia, ou de técnicas de proteção perineal ou de episiotomia.

**Resultados** Foram identificados 141 artigos, dos quais 24 foram incluídos na revisão. Dos 13 estudos que avaliaram o risco de lacerações graves com e sem episiotomia, 5 demonstraram o papel protetor da episiotomia seletiva, e 4 não mostraram diferenças significativas entre os grupos. Três pequenos estudos confirmaram o achado de que a episiotomia deve ser realizada seletiva e não rotineiramente, e um estudo mostrou que a episiotomia mediana aumenta o risco de lacerações graves. Quanto às indicações, as mais citadas foram a primiparidade, peso fetal maior do que 4kg, período expulsivo prolongado, parto operatório e distícia de ombro. Quanto à técnica, episiotomias realizadas com ângulos mais abertos ( $> 40^\circ$ ) e mais precocemente no período expulsivo (antes do “coroamento”) parecem ser mais protetoras.

**Conclusões** Episiotomias seletivas reduzem o risco de lacerações graves comparativamente à não realização de episiotomia ou à realização de episiotomia rotineira. Para esse resultado, é fundamental a utilização de técnica operatória correta, principalmente em relação ao ângulo de inclinação e distância da fúrcula vaginal, além do momento de sua realização. Deixar de realizar a episiotomia, com a técnica correta e quando bem indicada, pode aumentar o risco de lacerações perineais graves.

## Palavras-chave

- ▶ episiotomia
- ▶ lacerações perineais
- ▶ parto obstétrico

## Introduction

Few medical procedures have been the object of such controversy in recent years as episiotomy. Described in the 18th century, episiotomy is a surgical incision in the perineal region to widen the birth canal in its final portion, facilitating the exit of the fetal head.<sup>1</sup>

Historically, episiotomy began to be extensively used after a publication by DeLee<sup>2</sup> in 1920, in which he defended not only the routine use of episiotomy, but also the application of prophylactic relief forceps. As DeLee<sup>2</sup> was one of the most influential obstetricians of his time, such practice was expanded during the greater part of the twentieth century, until 1983, when two American epidemiologists, Stephen Thacker and David Banta,<sup>1</sup> published a review pointing out that there was no evidence supporting the benefits or risks of episiotomy. After this observation, several studies were performed worldwide, culminating in a meta-analysis by

the Cochrane Library<sup>3</sup> published in 2009. This publication, which initially included seven studies (another was added subsequently), showed that the selective use of episiotomy was preferable to the routine use, since the group that was subjected to routine episiotomy had a greater incidence of lacerations of the posterior wall (odds ratio, OR: 0.88; confidence interval, CI: 0.84–0.92) and severe perineal lacerations (third- and fourth-degree) (OR: 0.67 CI: 0.49–0.91), with no benefits with regards to other aspects such as decrease in low Apgar score (► **Table 1**).

After the publication of this review, the rates of episiotomies decreased dramatically worldwide. Goldberg et al<sup>4</sup> reported a decrease from 69.3% in 1983 to 19.4% in 2000 in the US. In the United Kingdom, the rates decreased from 19.1% in 2000 to 15.1% in 2012.<sup>5</sup>

On the other hand in places where the decrease in episiotomy rates was very significant, there was an increase in the occurrence of severe perineal lacerations. Räisänen et

al<sup>6</sup> evaluated 384,638 births and demonstrated that the decrease in episiotomy rates in Finland from 56.7% to 45.5% resulted in a 1.3% to 1.7% increase in severe perineal lacerations, while GuroI-Uganci et al<sup>5</sup> also demonstrated that serious lacerations tripled in the United Kingdom (1.8% to 5.9%) associated with the decrease in the number of episiotomies performed.

Severe perineal lacerations affect the anal sphincter (third-degree) and the rectal mucosa (fourth-degree), and have the potential to cause important sequelae in patients. Up to 10% of patients with severe perineal lacerations will develop fecal incontinence. Flatus incontinence may occur in 29% to 53% of these women, and many can also present internal anal sphincter gaps.<sup>7</sup>

Given the increasing rates of potentially severe complications during the assistance of vaginal delivery, and since it has already been demonstrated that the use of selective episiotomy is preferred over the routine use, the objectives of this review were as follows: to review the most recent literature to evaluate the relationship between severe perineal lacerations and episiotomy; to identify the risk factors for severe perineal lacerations at childbirth; to assess whether the implementation of selective episiotomy protects against severe perineal lacerations; and to identify the best technical guidelines for performing episiotomy.

**Methods**

A search was performed in the PubMed database using the terms *episiotomy* or *perineal lacerations*, and using the filter *clinical trial*, from studies published between 2005 and 2015. A total of 141 articles were identified that fitted the criteria. All abstracts were reviewed, and 24 were selected that dealt with the risk of severe perineal lacerations with or without episiotomy, perineal protection techniques, or episiotomy. The bibliographic references of the selected studies were also reviewed to search for articles of interest that did not appear in the initial literature search.

**Results**

**Selective Episiotomy and Severe Perineal Lacerations**

In an attempt to fulfill the first objective (whether selective episiotomy protects against serious perineal lacerations), the

studies listed in **Table 2**<sup>8-12,16,19-25</sup> were analyzed. We can observe that there were contradictory results, but some studies pointed out that the selective use of episiotomy might reduce the rate of severe lacerations.

**Indications for Episiotomy**

To evaluate the indications for episiotomy, we reviewed the selected studies to identify risk factors for severe lacerations. The findings are summarized in **Table 3**.<sup>8-18</sup>

Among the most often cited risk factors were primiparity, fetal weight higher than 4 kg, prolonged second stage, operative delivery, and shoulder dystocia. Fetal suffering could not be properly assessed because all the randomized studies on the subject, as well as the observational studies that followed, considered fetal distress an indication for episiotomy.<sup>3</sup>

**Episiotomy Technique**

In regards to the best surgical technique for episiotomy, we assumed that medio-lateral episiotomy was superior to midline episiotomy, as already demonstrated in previous studies. Therefore, we analyzed only those studies that assessed the technical aspects of medio-lateral episiotomy.

Andrews et al<sup>26</sup> performed a prospective study that evaluated 254 patients. Of these, 98 (41%) required episiotomy. Given that the correct incision angle for medio-lateral episiotomy suggested in the literature is between 40 and 60 degrees, the authors observed that only 22% of physicians and no midwife actually performed medio-lateral episiotomy. The average angle of episiotomy adopted by obstetricians was of 27 degrees and of 20 degrees by midwives.

In 2006, Eogan et al<sup>27</sup> performed a case-control study assessing 54 patients with anal laceration and 46 control women who had undergone vaginal delivery 3 months previously. The authors observed that the angle of the episiotomy incision was significantly smaller in the patient group when compared with the control group (30 degrees versus 38 degrees, *p* < 0.001). They also observed that the risk of serious injury decreased progressively with the increase of the angle of episiotomy, being of 0.05% when the angle was above 45 degrees, and of 10% at angles smaller than 25 degrees (OR: 9.7). They concluded that to improve the degree of protection of medio-lateral episiotomy, incisions should always be made at angles greater than 45 degrees.<sup>27</sup>

**Table 1** Main findings of the meta-analysis comparing selective versus routine episiotomy

Condition assessed	N	OR	CI
Occurrence of any subsequent laceration	2,079	0.88	0.84–0.92
Severe perineal laceration	4,404	0.67	0.49–0.91
Occurrence of any previous laceration	4,896	1.84	1.61–2.10
Perineal pain at discharge	2,422	0.72	0.65–0.81
First minute APGAR score < 7	3,908	1.04	0.76–1.43

Abbreviations: CI, confidence interval; N, number of patients included in the analysis; OR, odds ratio.

**Table 2** Studies included in the evaluation of the relationship between performance of episiotomy and occurrence of perineal lacerations

Study	N	Method	Result
Revicky et al <sup>8</sup>	10,314	Cross-sectional study of 10,314 patients submitted to vaginal delivery in England	The rate of third and fourth-degree lacerations was 3.2%, and not performing episiotomy was a risk factor: OR: 1.4; CI: 1.21–1.98
Landy et al <sup>9</sup>	82,267	Analysis of electronic medical charts of 19 hospitals in 7 years	The rate of third- and fourth-degree lacerations was of 5.8% in primiparous, and of 0.6% in multiparous women; 78% were midline episiotomies. The episiotomy was a risk factor both in nulliparous (OR; 2.4; CI: 2.1–2.7) and multiparous women (OR: 4.4; CI: 3.3–5.8)
Aukee et al <sup>10</sup>	9,178	Retrospective analysis of 9,178 births in Finland	The rate of third- and fourth-degree lacerations was of 1.0%, and the episiotomy was a protective factor (OR: 0.37; CI: 0.20–0.70)
Moini et al <sup>11</sup>	283	Patients randomized for selective or routine episiotomy in Iran	The routine episiotomy group presented a higher rate of third- and fourth-degree lacerations: 13.14% versus 2.05%
Eskandar and Shet <sup>12</sup>	3,038	Review of records of 3,038 vaginal births that occurred in a 2-year period in England	The rate of third and fourth-degree lacerations was of 1.58%, and the medio-lateral episiotomy showed a non-significant trend to protection: OR: 0.35; CI: 0.08–1.4
Räisänen et al <sup>16</sup>	303,758	Assessment of Finnish medical records	The rate of serious perineal lacerations ranged from 0.2% in multiparous women to up to 2.3% in primiparous women. The episiotomy was a protective factor in primiparous women (OR: 0.77; CI: 0.69–0.86), and a risk factor in multiparous women (OR: 1.61; CI: 1.14–2.29)
Fritel et al <sup>19</sup>	627	Comparison between patients attending two French hospitals. The first with a policy of selective, and the second, routine episiotomy	With no differences in urinary incontinence four years after delivery. Fecal incontinence higher in the routine episiotomy group
Murphy et al <sup>20</sup>	317	Routine versus selective episiotomy in patients with operative deliveries	With no differences in serious lacerations, fecal or urinary incontinence six weeks postpartum
Macleod et al <sup>21</sup>	1,360	Routine versus selective episiotomy in patients with operative deliveries	With no differences in serious lacerations or shoulder dystocia. Episiotomy associated with increase in infections and neonatal trauma
de Leeuw et al <sup>22</sup>	21,254	Patients with operative deliveries in Holland	The medio-lateral episiotomy strongly protected against third- and fourth-degree lacerations in patients submitted to vacuum extractor (OR: 0.11; CI: 0.09–0.13) and forceps (OR: 0.08; CI: 0.07–0.11)
Islam et al <sup>23</sup>	200	A randomized study comparing routine and selective episiotomy (abstract only)	Most common serious lacerations in the routine episiotomy group
Sulaiman et al <sup>24</sup>	171	Patients randomized for selective or routine episiotomy in Malaysia (abstract only)	Serious lacerations were more common in the routine episiotomy group (3.7%) than in the selective episiotomy group (1.1%)
Hauck et al <sup>25</sup>	10,408	Retrospective analysis of medical records in an Australian hospital (abstract only)	The rate of serious perineal laceration was of 3%. The episiotomy was a protective factor in primiparous women (OR: 0.54; CI: 0.39–0.74), and a risk factor in multiparous women (OR: 2.01; CI: 1.18–3.45)

Kalis et al<sup>28</sup> prospectively evaluated 50 patients and observed that there was a decrease of 15 degrees of the incision angle on average, and this decrease was greater when the episiotomy was performed when the head was crowning. In this case, the angle of the suture line was

decreased by 20 degrees. In other words, when the episiotomy was performed at an angle of 45 degrees during the final phase of the second stage, at the time of suture, the angle observed was of 25 degrees. They attributed this change to the birth canal being three-

**Table 3** Risk factors for severe perineal laceration

Risk Factor	Number of studies	Lesser OR or RR	Higher OR or RR
Maternal age > 35 years	2 <sup>8,9</sup>	1.6 (1.2–2.0)	2.84 (1.69–4.76)
Primiparity	5 <sup>10–15</sup>	3.2 (2.5–4.1)	8.34 (3.98–17.48)
Gestational age ≥ 42 weeks	1 <sup>11</sup>	3.62 (1.28–10.21)	–
Weight ≥ 3,500 g	1 <sup>9</sup>	3.8(2.5–5.9)	–
Weight ≥ 4,000 g	5 <sup>8–10,14–16</sup>	2.12 (1.64–2.72)	12.92 (2.77–60.11)
Weight ≥ 4,500 g	3 <sup>9,11,17</sup>	4.42 (2.68–7.27)	10.5 (5.4–20.6)
Duration of the second stage ≥ 60 minutes	2 <sup>9,14,16</sup>	1.32 (1.18–1.47)	1.52 (1.11–2.10)
Duration of the second stage ≥ 90 minutes	1 <sup>11</sup>	2.95 (1.39–6.27)	–
Duration of the second stage ≥ 120 minutes	1 <sup>9,16</sup>	1.42 (1.11–1.82)	1.7 (1.5–2.0)
Duration of the second stage ≥ 180 minutes	1 <sup>9</sup>	2.0 (1.7–2.4)	–
Vacuum extractor	8 <sup>5,8–11,16–18</sup>	1.68 (1.50–1.87)	5.22(2.69–10.13)
Forceps	6 <sup>5,8,9,13,16,17</sup>	1.95 (1.39–2.75)	6.3(5.57–7.64)
Lithotomy position	1 <sup>14</sup>	2.02 (1.58–2.59)	–
Squatting position	1 <sup>14</sup>	2.05 (1.09–3.82)	–
Variety of OP presentation	2 <sup>12,18</sup>	1.34 (1.22–1.46)	69.8 (14–84)
Head circumference > 35 cm	1 <sup>14</sup>	1.57 (1.23–1.99)	–
Shoulder dystocia	4 <sup>5,8,17,18</sup>	1.33(1.16–1.53)	1.98(1.11–3.54)

Abbreviations: OP, occipito-pubic; OR, odds ratio; RR, relative risk.

dimensional, causing distention in all directions, and suggested that the angles of the episiotomy should be greater, approaching 60 degrees.<sup>28</sup>

A Norwegian study<sup>29</sup> evaluated 37 cases of laceration of the anal sphincter and 37 controls, and observed that episiotomy was associated with a lower risk of laceration when the final angles were between 30 and 60 degrees, the length was greater than 17 mm, had a depth of more than 16 mm from the midline (perineal raphe), and the incision point began 9 mm further from the posterior fourchette (→ Fig. 1).

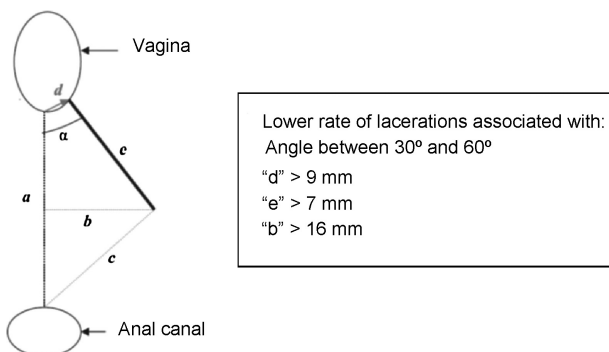
In an article published in 2013,<sup>30</sup> a Spanish group reviewed 72 cases of operative delivery in which the patients

underwent episiotomy (36 with laceration of the sphincter and 36 without laceration). It was observed that the episiotomy with an angle greater than 20 degrees was a protective factor, decreasing the risk of serious injury by 87% (OR: 0.13 CI: 0.03–0.58). An episiotomy smaller than 15 mm and the distance from the edge of the episiotomy to the anus below 15 mm were risk factors.

Regarding the ideal timing for performing the episiotomy, we found there were no specific studies assessing this specific aspect, although a computational model study performed in 2010 with the objective of evaluating the forces to which the pelvic floor musculature was subjected during the passage of the fetal head indicated that the forces were progressively larger with the lowering of the head, reaching the maximum stretching point when the + 3 plane of DeLee was reached (+ 4 cm).<sup>31</sup>

### Discussion

There is no doubt in the literature that episiotomy should be performed in a selective manner, not routinely. This observation has already been confirmed by several randomized and controlled studies, and is not discussed in this review. The issue is that the incorrect interpretation of such data has led some clinicians to believe that not performing episiotomy in any patient would be better than performing the procedure only selectively, with precise indications and the correct technique. Unfortunately, not performing episiotomy became, equivocally, a required element in what is called



**Fig. 1** Schematic view of the angulation in the episiotomy and the frequency of associated laceration.<sup>29</sup>

“naturalization” of childbirth, since this would require lower rates of intervention. The degree of misinformation about episiotomy has reached such a point that serious organizations have begun to consider its implementation as a form of “obstetric violence”.<sup>32</sup>

What many ignore is that just like any medical procedure, episiotomy has indications and surgical techniques that, when followed correctly, effectively protect women against serious lacerations that can lead to important sequelae such as anal incontinence. In our understanding, it is not possible to classify as violence a procedure that prevents severe sequelae when it is performed following the proper indications and techniques.

This review aimed to retrieve from the literature evidences about the protection of episiotomy against third- and fourth-degree perineal lacerations, in addition to seeking the best indications and techniques.

The protection of selective medio-lateral episiotomy against serious lacerations had already been previously demonstrated in large observational studies such as one by De Leeuw<sup>33</sup> that, after evaluating 284,783 deliveries in the Netherlands, concluded that this procedure strongly protected against third and fourth-degree lacerations (OR: 0.21; CI: 0.20–0.23), while midline episiotomy was a risk factor.

In the review of the literature of the past 10 years we observed that of the 13 studies included in the analysis, five<sup>8,10,16,22,25</sup> reported the protective role of selective episiotomy, especially when performed during an operative delivery. Three small studies<sup>11,23,24</sup> confirmed the findings of the meta-analysis of the Cochrane Library that selective episiotomy has more benefits than routine episiotomy, and four studies reported no significant differences between the groups with or without episiotomy.<sup>12,19–21</sup> It is worth emphasizing that these last four studies presented a much smaller sample size than the first five (354,912 versus 5,342 patients). Episiotomy was a risk factor for severe lacerations in only one of the studies assessed,<sup>9</sup> but in this study the rate of midline episiotomy was of 78%, confirming what was already present in the literature, that midline episiotomy is a risk and not a protective factor.

As for the risk factors for severe perineal lacerations, an operative delivery (either using a forceps or a vacuum extractor), fetal weight above 4 kg, a prolonged second stage, and shoulder dystocia were the main risks, and appear to be the most important indications for episiotomy. Acute fetal distress was not evaluated, as it is considered a formal indication in all studies and should, therefore, be included in the list of indications. The variety of occipito-sacral positions was assessed by only two studies, but in our view this should also be an indication to be considered as it increases the detachment diameter, and the need of instrumental deliveries.

Primiparity, although being one of the most cited risk factors, should not be an absolute indication for episiotomy, otherwise we would return to the dilemma of routine versus selective episiotomy. We should, however, be more attentive to the need of an episiotomy procedure in these patients because they will have a higher risk of lacerations.

In a final analysis, the professionals who attend the delivery are the ones who should evaluate the degree of distensibility of the perineum and the need to perform episiotomy. Future studies should focus on ways to assess the strength and distensibility of the perineal structures before and during labor to try to improve the accuracy in predicting lesions. In addition, a more accurate evaluation should be performed during the pre-natal period, to assess the perineal muscles, their tonus, and the need for professional help for a better preparation for childbirth.

Another relevant aspect of the discussion on episiotomy is the technique. As observed, many obstetricians and midwives, in an attempt to execute the medio-lateral episiotomy, end up performing an almost midline episiotomy, thus increasing the risks for the patient.<sup>26–28</sup>

We believe that many of the risks attributed to episiotomy are, in fact, related to the use of an incorrect technique. McLennan et al<sup>34</sup> performed an interesting study by sending out questionnaires to all residents in the final year of Gynecology and Obstetrics training in the US. Of the respondents, 60% had never attended a theoretical class on episiotomy, and 59% had never attended a class on the pelvic floor. However, the most impressive finding was that 40% of them had already sutured over 20 third-degree lacerations and 7% over 20 fourth-degree lacerations, and only 28% of the sutures had been supervised. There is no way to expect that a procedure may achieve the maximum possible benefit if the people who execute it have no theoretical knowledge, nor practical supervision.

Still on the importance of experience in the performance of episiotomy, Shiono et al<sup>35</sup> evaluated 27,300 deliveries performed in a large multicenter study in the US between 1959 and 1966. In this study, 38.4% of births were performed by interns, 32.4% by residents, 17.8% by students, and 8.5% by obstetricians. The medio-lateral episiotomy was a protective factor against third- and fourth-degree lacerations (OR: 0.4 CI: 0.2–0.9), while the midline episiotomy was a risk factor (OR: 4.2 CI: 1.8–10.0). However, it is interesting that there were no cases of severe perineal laceration in the group of patients cared for by more experienced obstetricians when medio-lateral episiotomy was performed, while only one case with midline episiotomy was observed.

The final technical aspect that is worth mentioning is the timing of the episiotomy. The literature<sup>36</sup> tells us that this should be performed in the plane + 2 of DeLee before the fetal head completely stretches the birth canal. Unfortunately, none of the assessed studies addressed this issue however, one study simulating the damage caused by the fetal head on the pelvic floor seems to confirm that to avoid the maximum stretching of the muscles, we should perform episiotomy earlier.

It is interesting to observe that Woolley,<sup>37</sup> in a 1995 review article analyzing the study by Shiono et al,<sup>35</sup> mentions variations in the technique, such as its more precocious implementation (in the plane + 2 of DeLee), as one of the possible causes of the protective effect of episiotomy.

## Conclusions

This is a descriptive review and presents all the biases of this type of analysis. Unfortunately, the heterogeneity of the studies published in the literature does not allow the application of a systematic review on the theme. However, the evaluated data allow us to conclude that a well-justified episiotomy performed with a correct technique protects against severe perineal lacerations, preventing the occurrence of important sequelae such as fecal incontinence. If performing episiotomy in all patients is not beneficial, the failure to perform episiotomy when there is an indication may be just as detrimental.

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