



Evaluation of a policy of restrictive episiotomy on the incidence of perineal tears among women with spontaneous vaginal delivery: A ten-year retrospective study

Pauline Blanc-Petitjean, Géraldine Meunier, Jeanne Sibiude, Laurent Mandelbrot

► To cite this version:

Pauline Blanc-Petitjean, Géraldine Meunier, Jeanne Sibiude, Laurent Mandelbrot. Evaluation of a policy of restrictive episiotomy on the incidence of perineal tears among women with spontaneous vaginal delivery: A ten-year retrospective study. *Journal of Gynecology Obstetrics and Human Reproduction*, 2020, 49 (8), pp.101870. 10.1016/j.jogoh.2020.101870 . hal-03266826

HAL Id: hal-03266826

<https://hal.inrae.fr/hal-03266826>

Submitted on 17 Oct 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial 4.0 International License

Title

Evaluation of a policy of restrictive episiotomy on the incidence of perineal tears among women with spontaneous vaginal delivery: a ten-year retrospective study

Authors

Pauline Blanc-Petitjean^{a,b}, Géraldine Meunier^{a,b}, Jeanne Sibiude^{b,c}, Laurent Mandelbrot^{b,c}

Affiliations

^a Université de Paris, CRESS, INSERM, INRA, F-75004 Paris, France

^b AP-HP, Louis Mourier Hospital, Department of Obstetrics and Gynecology, DHU Risks in pregnancy, Paris Diderot University, F-92700, Colombes, France

^c Université de Paris, IAME, INSERM, F-75018 Paris, France

Corresponding author: Pauline Blanc-Petitjean

Louis Mourier Hospital

178, rue des Renouillers 92700 COLOMBES - FRANCE

Tel: 01.47.60.63.53

E-mail: pauline.blanc-petitjean@inserm.fr

Declarations of interest: none

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Abstract

Evaluation of a policy of restrictive episiotomy on the incidence of perineal tears among women with spontaneous vaginal delivery: a ten-year retrospective study

Introduction: Routine episiotomy is no longer recommended to limit obstetrical anal sphincter injuries (OASIs). We aimed to evaluate the effect of a restrictive policy of episiotomy on the risk of OASIs during spontaneous vaginal deliveries.

Material and methods: We performed a retrospective single-center observational study among women with a term singleton cephalic fetus, with spontaneous vaginal delivery. The occurrence of episiotomy, intact perineum, first, second, third or fourth-degree (OASIs) perineal tears were compared before (period A, from 01/01/2006 to 12/31/2008) and after (period B, from 01/01/2012 to 12/31/2016) implementation of the restrictive policy. Odds of perineal tear were estimated using multivariable logistic regression models, stratified by parity.

Results: From 2006 to 2016, the rate of episiotomy decreased, from 14.9% (n/N=200/1141) to 4.7% (94/1912). In period B (N=8984) vs A (N=8984), the rates of episiotomy were, 12.9 vs 26.6 % for nulliparas ($p<0.01$) and 2.3 vs 6.8% for multiparas ($p<0.01$). Odds of OASIs were not different in period B vs A, both for nulliparas (0.9 vs 0.8%, AOR=0.88(0.38-2.05)) and multiparas (0.4 vs 0.2%, AOR=2.28(0.63-8.29). Odds of second-degree tear were higher in period B vs A, both for nulliparas (39.8 vs 17.4%, AOR=2.55(2.11-3.08) and multiparas (26.2 vs 12.8%, AOR=2.26(1.95-2.66)); and odds of intact perineum were lower (for nulliparas, 15.8 vs 24.9%, AOR=0.61(0.42-0.90) and for multiparas, 47.1 vs 56.0%, AOR=0.61(0.49-0.76)). No difference was observed for first-degree tears.

23 **Conclusion:** The progressive implementation of a restrictive policy of episiotomy during
24 spontaneous vaginal delivery was not associated with an increased risk of OASIs over a ten-
25 year period.

26 **Key words:** episiotomy, OASIs, perineal tear, spontaneous vaginal delivery

27

28 **Introduction**

29 Among women giving birth vaginally, it is estimated that 35% to 75% will suffer from a
30 perineal tear.¹⁻³ These tears of the perineum may have short, medium- or long-term
31 consequences, the importance of which depends on their severity. Obstetrical anal sphincter
32 injuries (OASIs) are the most severe and they affect from 0.8 to 5.9% of women with vaginal
33 delivery.¹⁻⁶ OASIs are associated with greater perineal pain, urinary or anal incontinence,
34 sexual disorder, and may have a major impact in women quality of life.⁷⁻⁹ The principal risk
35 factor of OASIS is instrumental vaginal delivery. In case of spontaneous vaginal delivery,
36 nulliparity, macrosomia, obesity, persistent occiput-posterior position have been
37 demonstrated to be associated with the occurrence of OASIS.^{2-5, 10-12}

38 The benefit of episiotomy to limit the occurrence of severe perineal tears has been
39 controversial. In the 90's, episiotomy was a frequent obstetric intervention, concerning
40 nearly half of women giving birth vaginally in high income country.^{13, 14} Since then, robust
41 evidence has shown that a policy of systematic episiotomy was not relevant. Compared to a
42 selective policy, it was not protective against severe perineal tear or maternal and neonatal
43 morbidity.¹⁵ Moreover, episiotomy could also be associated with postpartum hemorrhage,
44 perineal pain and sexual disorder.¹⁶⁻¹⁸ A restrictive practice of episiotomy has therefore
45 been promoted and its use has decreased in many countries.^{1, 19} World Health Organization
46 considers a 10% episiotomy rate a reasonable target.²⁰

47 In France, the practice of systematic episiotomy is also no longer recommended.^{21, 22} In
48 accordance with these recommendations, a sharp reduction in the episiotomy rate was
49 observed between 1998 and 2016, from 71.3% to 34.9% of deliveries in nulliparas and from
50 36.2% to 9.8% of deliveries in multiparas¹⁰.

Our objectives were to describe episiotomy rate over a 10-year period following the French recommendations on a restrictive policy of episiotomy and to evaluate the effect of the progressive implementation of a policy of restrictive episiotomy on the risk of severe perineal tears among women with spontaneous vaginal delivery.

Material and methods

We performed a single-center comparative retrospective observational study. The study took place at a level III, university maternity unit. All women with spontaneous vaginal delivery and a term singleton cephalic fetus were included over a 10-year period, from 2006 to 2016. Women with medically indicated termination of pregnancy or stillbirth were excluded.

Data were collected retrospectively, from women's medical record completed by the midwives or obstetricians in charge of the women during pregnancy, labor, delivery and immediate post-partum period.

In French practices, episiotomy is usually medio-lateral. The indication of episiotomy was left to the practitioner's discretion during pushing in the second stage of labor. In our center, midwives attend autonomously spontaneous vaginal deliveries. Hands-on perineal protection and use of lubricating oil during delivery have been usual practices throughout the study periods. We implemented a policy of restrictive episiotomy during spontaneous vaginal delivery progressively since 2009. The first incentives to reduce the number of episiotomies were provided following the annual review of obstetric practices that usually takes place in January. To encourage the restrictive policy, the indication of episiotomy was systematically discussed during the daily obstetrical staff, the rates of episiotomy were regularly reported to the team and peer training in perineal protection was offered to young

midwives. Each year, we dedicated a team meeting to the analysis of episiotomy rates and the team was strongly encouraged to continue the restrictive policy. The first round lasted 2 years, after which the positive results led us to maintain our efforts.

Perineal tears were classified according to the four-degree classification described by Sultan et al.²³ Third and fourth-degree tear, i.e. OASIs (obstetrical anal sphincter injuries), involving the anal sphincter complex were clinically diagnosed by the midwives and systematically ascertained by an obstetrician. During the 10-year period, there was no change of the diagnostic process of severe perineal tear.

Annual rates of episiotomy were described over the 10-year period, for the whole population and stratified by parity (nulliparas, multiparas). To evaluate the effect of implementing a policy of restrictive episiotomy, we performed comparative analyses between two time periods. Before (years 2006 to 2008: period A) and after the implementation of the policy (years 2012 to 2016: period B). Because the evolution of practices was gradual, we respected a washout period of three years without evaluation.

Study population characteristics and perineal status (i.e. intact perineum, without any tears or episiotomy; first-degree perineal tear; second degree-perineal tear; third or fourth-degree perineal tear) were compared between the two periods. Univariate analyses were performed using Chi2 test, Student t-test or Mann-Whitney test (non-normal distribution), as appropriate. Independent association between the period and perineal status was estimated using multivariable logistic regression models. Analyses were stratified according to parity (nulliparas, multiparas). Associations were adjusted for potential confounding variables, i.e. associated in literature both to practice of episiotomy and risk of OASIs: maternal age, country of birth (European, North African, sub-Saharan African, Asian or

other), body mass index (BMI), neonatal weight, maternal position at delivery (lithotomy, adapted lithotomy, i.e. with a foot-rest allowing moderate flexion of the legs, lateral position, or other as squatting, crawling or standing positions) , persistent occiput-posterior (OP) position and epidural analgesia. Continuous variables showed no deviation from log-linearity when compared to fractional polynomials modelling.

Sensitivity analyses were performed to select a population of low-risk women, among : (1) nulliparas with spontaneous labor, the selected population corresponding thus to Robson group 1; (2) women without fetal heart rate anomalies during the active second stage of labor (FHRA), as they are the only indication for episiotomy in the French Recommendations.²²

Significance was set at 0.05. Statistical analyses were performed with Stata software, version 12.1.

Missing data

Complete case analyses were performed because less than 4% of data was missing for each variable, and less than 1% for the main criteria (episiotomy , N=21 (0.2%) and perineal status, N=23 (0.2%)). In multivariable models, fewer than 8% of women were excluded from analyses because of missing data for one of the variables considered.

Ethical approval: The local Institutional Review Board, CEERB Paris Nord (IRB 00006477) of HUPNVS, Paris 7 University, AP-HP (N ° 2019-0044), approved the research project. The CNIL approved data collection for this study (n°2216439 v 0).

Results

Over the 10-year period, episiotomy rates decreased gradually, from 14.9% to 4.7% for all women ($p<0.001$); from 28.4% to 9.8% for nulliparas ($p<0.001$); and from 7.6% to 2.2% for multiparas ($p<0.001$). (Figure 1).

Respectively 3978 and 8984 women were included in period A and period B (Figure 2). Study population characteristics and obstetric practices changed over time. In period B, there was significantly more multiparas, from non-European country of birth, with advanced maternal age and higher BMI (Table 2). For both nulliparas and multiparas, there was also more induction of labor and epidural analgesia, and women gave birth more frequently in an adapted lithotomy position (vs classical lithotomy). For nulliparas, the duration of active second stage of labor was longer in period B. For multiparas, fewer persistent OP position was observed in period B. Rates of episiotomy were lower in period B, both for nulliparas (12.9% in period B vs 26.6% in period A, $P<0.01$) and multiparas (2.3 vs 6.8%, $P<0.01$).

For nulliparas, period B was not significantly associated with a higher risk of third or fourth-degree perineal tear (0.8 in period B vs 0.9% in period A; adjusted odds ratio, AOR; 95% confidence interval, CI 0.88(0.38-2.05) (Table 3). Period B was significantly associated with more second-degree perineal tear (39.8% vs 17.4% in period A, $AOR=2.55(2.11-3.08)$) and fewer intact perineia (15.8% vs 24.9%, $AOR=0.61(0.42-0.90)$). No difference was observed for first-degree perineal tear.

The same results were observed for multiparas. In particular, no association was found between the period and the risk of OASIs (0.4 vs 0.2%, respectively in period B and A; $AOR=2.28(0.63-8.29)$). Period B was also significantly associated with more second-degree perineal tear (26.2% vs 12.8%, $AOR=2.26(1.95-2.66)$) and fewer intact perineia (47.1% vs 56.0%, $AOR=0.61(0.59-0.76)$).

The results of sensitivity analyses were consistent with those of the principal analysis. Among nulliparas in spontaneous labor (N=2836), no association was found between the period and the risk of OASIs (0.6 vs 0.9%, respectively in period B and A; AOR=1.36 (0.48-3.85)). (Table A1) Similar results were observed excluding women with FHRA during active second stage of labor (Table A2).

Discussion

Principal findings

After the progressive implementation of a restrictive policy of episiotomy, the rate of episiotomy during spontaneous delivery globally decreased, from 14.9 to 4.7%. There were more second-degree perineal tears and fewer intact perineia in the period following the restrictive policy. The rate of OASIs was less than 1% and no difference was observed between the periods.

Strengths and limitations

The retrospective before-after design of our study limits its capacity to establish a causal pathway between the policy of restrictive episiotomy and the differences observed between the two periods. Being a single-center study can be considered as a limit, but also as a strength because we are confident that practices of perineal protection were homogeneous over each of the study periods. Moreover, the rates of cesarean section and instrumental delivery in our birth center have not changed much over time (respectively for cesarean and instrumental delivery, period A versus B : 17.1 vs 17.4% and 15.5 vs 17.0%). Yet, other obstetric practices have changed over time that may have an impact on our principal finding. We found less OP positions in period B because the practices evolved favouring to attempt manual rotation, as early as possible during the first stage of labor and systematically at the

beginning of the second stage of labor. This is the practice recommended to reduce operative delivery.^{24, 25} As OP positions are associated with severe perineal tears, we adjusted on that factor.^{26, 27} Maternal position during active second stage of labor also evolved, favouring adapted-lithotomy position instead of lithotomy position with the legs resting in the stirrups. Lateral positions were also less frequent. That adapted lithotomy position is supposed to decrease the degree of flexion of the legs, in order to limit the stretching of the posterior perineum. Although efficacy of maternal positioning to reduce perineal tears has never been evaluated, we adjusted on it.²⁵ Another limitation could be the under-screening and reporting of OASIs. If the midwives suspect OASIs, they systematically call the obstetrician for a perineal examination. The contributing factors are sought but the midwife is never charged. We have no information whereas a rectal examination was systematically performed for non-superficial tear. However, the frequency of OASIs we found was the same as the one estimated in a recent French national survey.¹ It is unlikely that the under-screening was different between the periods and that it biased the results toward the null.

Interpretation

This study adds new evidence regarding the effect of a restrictive policy of episiotomy on perineal status. There was already evidence that a liberal policy of episiotomy is not protective against severe perineal tear.¹⁵ Most of the randomised controlled trials (RCT) were conducted in units performing median episiotomies, and not medio-lateral as in French practice. To our knowledge, only one pilot RCT compared restrictive versus routine use of mediolateral episiotomy and found no difference in the risk of third-or fourth degree perineal tears (OASIs).²⁸ In French cohort studies evaluating selective policy of medio-lateral episiotomy, results were consistent with our study. However, neither the study of Chehab et

al., nor the one of Koskas et al. stratified the results among operative and non-operative vaginal delivery.^{29, 30} Moreover, our maternity unit seems to have a very low level of episiotomy rate for women with non-operative vaginal delivery compared to the national level. It was estimated at 14.1% in 2014 in a population-based study *versus* 6% in our maternity.³¹

We observed that the frequency of intact perineum decreased between the two periods, contrary to what we expected. In the study of Chehab et al., implementing a restrictive policy of episiotomy permitted to decrease the rate of episiotomy from 18.8% to 1.3%, all vaginal delivery included, and to increase the rate of intact perineum from 28.2% to 37.5%.²⁹ Both the rates of first and second degree perineal tears increased in their study. This result may be explained by an evolution in the way of reporting the tears in the medical file by the midwives in our unit, tending to report more frequently intact perineum instead of first-degree tear in period A than in period B for tears not requiring any suture. This hypothesis is supported by the fact that the rate of first-degree tears remained unchanged over time. Another hypothesis is that the trend may have been related to midwives having less seniority in period B. Educational strategies dealing with perineal protection, particularly among younger midwives, and companionship could help decreasing the occurrence of perineal tears.^{6, 32} Other techniques, such as perineal massage or warm compress application should be further evaluated to limit perineal tear, as evidence is still limited to recommend them^{21, 33 34}.

We had no data about medium and long-term outcomes. In the meta-analysis of Jiang et al. it seemed that restrictive policy was associated with lower immediate postpartum perineal

211 pain, but the evidence was very low.¹⁵ The risks of later perineal pain, urinary or anal
212 incontinence, dyspareunia and genital prolapse were not different.

213 **Conclusion**

214 The progressive implementation of a restrictive policy of episiotomy for women with
215 spontaneous vaginal delivery was not associated with an increased risk of obstetrical anal
216 sphincter injuries over a ten-year period. Initial and continuous training on perineal
217 protection, specifically among young midwives, should be reinforced to increase the chance
218 of intact perineum.

219

220

221

222 **Supporting information:** Additional tables A1 and A2

223 Table A1: Multivariable association between the period and perineal status: sensitivity
224 analysis among nulliparas with spontaneous labor.

225 Table A2: Multivariable association between the period and perineal status: sensitivity
226 analysis excluding women with fetal heart rate abnormalities during active second stage of
227 labor, stratified by parity.

228 **Declarations of interest:** none

229 **Funding:** This research did not receive any specific grant from funding agencies in the public,
230 commercial, or not-for-profit sectors

231 **Contribution to authorship:** All authors have made substantial contributions to the
232 manuscript and approved the final manuscript as submitted. LM, PB and GM conceived the
233 study and contributed to the acquisition of data. PB, LM, GM and JS contributed to its
234 design, conducted the analyses, performed the study, drafted the original manuscript,
235 reviewed and revised the manuscript.

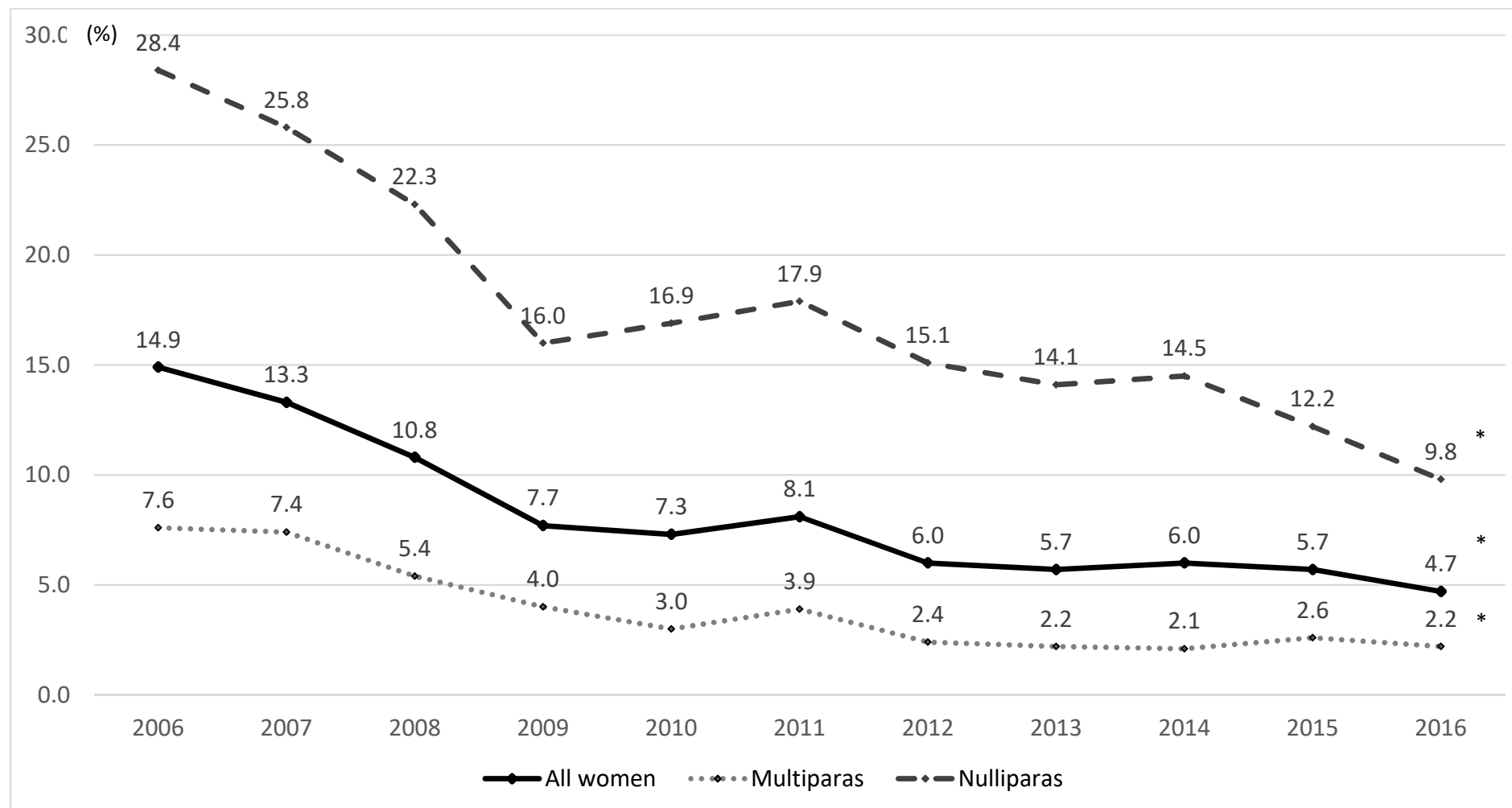
References

1. Blondel B, Coulm B, Bonnet C, Goffinet F, Le Ray C, National Coordination Group of the National Perinatal S. Trends in perinatal health in metropolitan France from 1995 to 2016: Results from the French National Perinatal Surveys. *J Gynecol Obstet Hum Reprod.* 2017;46(10):701-713.
2. Vale de Castro Monteiro M, Pereira GM, Aguiar RA, Azevedo RL, Correia-Junior MD, Reis ZS. Risk factors for severe obstetric perineal lacerations. *Int Urogynecol J.* 2016;27(1):61-67.
3. Smith LA, Price N, Simonite V, Burns EE. Incidence of and risk factors for perineal trauma: a prospective observational study. *BMC Pregnancy Childbirth.* 2013;13:59.
4. Ampt AJ, Ford JB, Roberts CL, Morris JM. Trends in obstetric anal sphincter injuries and associated risk factors for vaginal singleton term births in New South Wales 2001-2009. *Aust N Z J Obstet Gynaecol.* 2013;53(1):9-16.
5. Gurol-Urganci I, Cromwell DA, Edozien LC, Mahmood TA, Adams EJ, Richmond DH, et al. Third- and fourth-degree perineal tears among primiparous women in England between 2000 and 2012: time trends and risk factors. *BJOG.* 2013;120(12):1516-1525.
6. Laine K, Skjeldestad FE, Sandvik L, Staff AC. Incidence of obstetric anal sphincter injuries after training to protect the perineum: cohort study. *BMJ Open.* 2012;2(5).
7. Jango H, Langhoff-Roos J, Rosthoj S, Saske A. Long-term anal incontinence after obstetric anal sphincter injury-does grade of tear matter? *Am J Obstet Gynecol.* 2018;218(2):232 e231-232 e210.
8. LaCross A, Groff M, Smaldone A. Obstetric anal sphincter injury and anal incontinence following vaginal birth: a systematic review and meta-analysis. *J Midwifery Womens Health.* 2015;60(1):37-47.
9. Signorello LB, Harlow BL, Chekos AK, Repke JT. Postpartum sexual functioning and its relationship to perineal trauma: a retrospective cohort study of primiparous women. *Am J Obstet Gynecol.* 2001;184(5):881-888; discussion 888-890.
10. Chuilon AL, Le Ray C, Prunet C, Blondel B. [Episiotomy in France in 2010: Variations according to obstetrical context and place of birth]. *J Gynecol Obstet Biol Reprod (Paris).* 2016;45(7):691-700.

11. Pergialiotis V, Vlachos D, Protopapas A, Pappa K, Vlachos G. Risk factors for severe perineal lacerations during childbirth. *Int J Gynaecol Obstet*. 2014;125(1):6-14.
12. Schmitz T, Alberti C, Andriess B, Moutafoff C, Oury JF, Sibony O. Identification of women at high risk for severe perineal lacerations. *Eur J Obstet Gynecol Reprod Biol*. 2014;182:11-15.
13. Blondel B, Lelong N, Kermarrec M, Goffinet F, Coordination nationale des Enquetes Nationales P. [Trends in perinatal health in France between 1995 and 2010: Results from the National Perinatal Surveys]. *J Gynecol Obstet Biol Reprod (Paris)*. 2012;41(2):151-166.
14. Weber AM, Meyn L. Episiotomy use in the United States, 1979-1997. *Obstet Gynecol*. 2002;100(6):1177-1182.
15. Jiang H, Qian X, Carroli G, Garner P. Selective versus routine use of episiotomy for vaginal birth. *Cochrane Database Syst Rev*. 2017;2:CD000081.
16. Dogan B, Gun I, Ozdamar O, Yilmaz A, Muhcu M. Long-term impacts of vaginal birth with mediolateral episiotomy on sexual and pelvic dysfunction and perineal pain. *J Matern Fetal Neonatal Med*. 2017;30(4):457-460.
17. Langer B, Minetti A. [Immediate and long term complications of episiotomy]. *J Gynecol Obstet Biol Reprod (Paris)*. 2006;35(1 Suppl):1S59-51S67.
18. Shmueli A, Gabbay Benziv R, Hirsch L, Ashwal E, Aviram R, Yogev Y, et al. Episiotomy - risk factors and outcomes(). *J Matern Fetal Neonatal Med*. 2017;30(3):251-256.
19. Euro-Peristat Project with SCPE and EUROCAT, European perinatal health report, Health and Care of Pregnant Women and Babies in Europe in 2010 2013 [Available from: <http://www.europeristat.com/reports/european-perinatal-health-report-2010.html>].
20. Care in normal birth: a practical guide. Technical Working Group, World Health Organization. *Birth*. 1997;24(2):121-123.
21. Ducarme G, Pizzoferrato AC, de Tayrac R, Schantz C, Thubert T, Le Ray C, et al. Perineal prevention and protection in obstetrics: CNGOF clinical practice guidelines. *J Gynecol Obstet Hum Reprod*. 2019;48(7):455-460.
22. Cngof. [Episiotomy: recommendations of the CNGOF for clinical practice (December 2005)]. *Gynecol Obstet Fertil*. 2006;34(3):275-279.
23. Sultan A, Thakar R, Fenner DE. Perineal and anal sphincter trauma. Diagnosis and clinical management. London: Springer-Verlag; 2007.

24. Le Ray C, Deneux-Tharaux C, Khireddine I, Dreyfus M, Vardon D, Goffinet F. Manual rotation to decrease operative delivery in posterior or transverse positions. *Obstet Gynecol.* 2013;122(3):634-640.
25. Le Ray C, Pizzagalli F. [Which interventions during labour to decrease the risk of perineal tears? CNGOF Perineal Prevention and Protection in Obstetrics Guidelines]. *Gynecol Obstet Fertil Senol.* 2018;46(12):928-936.
26. Cheng YW, Shaffer BL, Caughey AB. Associated factors and outcomes of persistent occiput posterior position: A retrospective cohort study from 1976 to 2001. *J Matern Fetal Neonatal Med.* 2006;19(9):563-568.
27. Hirsch E, Elue R, Wagner A, Jr., Nelson K, Silver RK, Zhou Y, et al. Severe perineal laceration during operative vaginal delivery: the impact of occiput posterior position. *J Perinatol.* 2014;34(12):898-900.
28. Murphy DJ, Macleod M, Bahl R, Goyder K, Howarth L, Strachan B. A randomised controlled trial of routine versus restrictive use of episiotomy at operative vaginal delivery: a multicentre pilot study. *BJOG.* 2008;115(13):1695-1702; discussion 1702-1693.
29. Chehab M, Courjon M, Eckman-Lacroix A, Ramanah R, Maillet R, Riethmuller D. [Impact of a major decrease in the use of episiotomy on perineal tears in a level III maternity ward]. *J Gynecol Obstet Biol Reprod (Paris).* 2014;43(6):463-469.
30. Koskas M, Caillod AL, Fauconnier A, Bader G. [Maternal and neonatal consequences induced by the French recommendations for episiotomy practice. Monocentric study about 5409 vaginal deliveries]. *Gynecol Obstet Fertil.* 2009;37(9):697-702.
31. Goueslard K, Cottenet J, Roussot A, Clesse C, Sagot P, Quantin C. How did episiotomy rates change from 2007 to 2014? Population-based study in France. *BMC Pregnancy Childbirth.* 2018;18(1):208.
32. Marko EK, Fausett MB, Deering S, Staat BC, Stormes S, Freund E, et al. Reducing Perineal Lacerations Through Team-Based Simulation. *Simul Healthc.* 2019;14(3):182-187.
33. Magoga G, Saccone G, Al-Kouatly HB, Dahlen GH, Thornton C, Akbarzadeh M, et al. Warm perineal compresses during the second stage of labor for reducing perineal trauma: A meta-analysis. *Eur J Obstet Gynecol Reprod Biol.* 2019;240:93-98.
34. Aasheim V, Nilsen ABV, Reinart LM, Lukasse M. Perineal techniques during the second stage of labour for reducing perineal trauma. *Cochrane Database Syst Rev.* 2017;6:CD006672.

Figure 1: Episiotomy rate over a 10-year period among women with spontaneous vaginal delivery (%)



**P* for trend < 0.001

Figure 2: Flowchart of study population

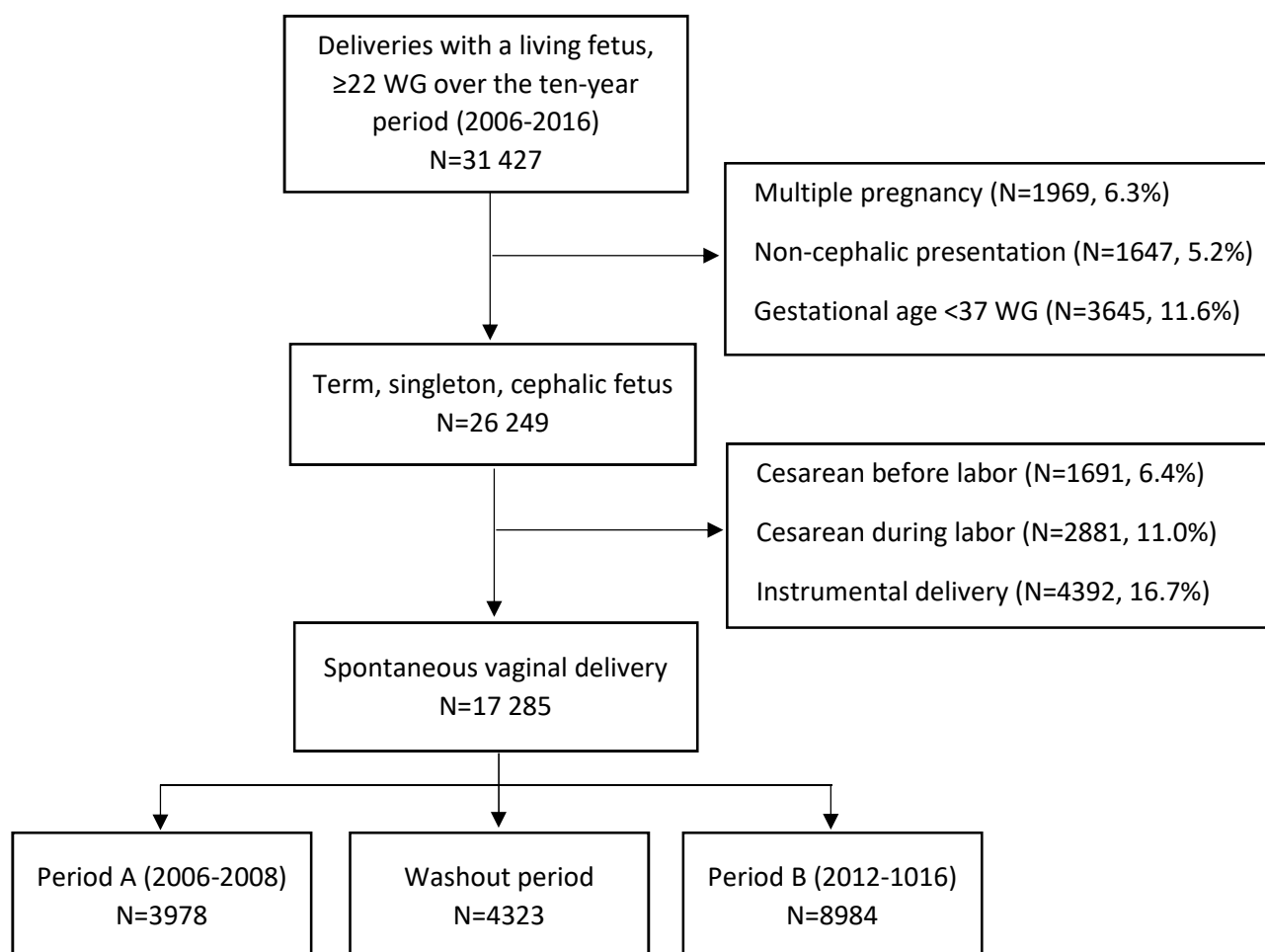


Table 1: Characteristics of study population before (period A) and after (period B) implementation of a restrictive policy of episiotomy

Characteristics of study population	Period A N=3978	Period B N=8984	<i>P</i> *
Country of birth			<0.01
Europe	1653 (42.2)	3275 (36.9)	
North Africa	1408 (36.0)	3678 (41.4)	
Sub-saharan Africa	594 (15.2)	1353 (15.2)	
Asia	130 (3.3)	249 (2.8)	
Other	129 (3.3)	327 (3.7)	
Maternal age, y	30.4 (5.4)	31.1 (5.2)	<0.01
BMI, kg/m²	23 [21-27]	24 [21-27]	0.01
Weight gain during pregnancy, kg	12 [8-15]	12 [7-15]	1.0
Nulliparity	1316 (33.1)	2787 (31.0)	0.02
History of C-section			0.21
No	3799 (95.6)	8520 (94.9)	
Yes, with history of vaginal delivery	93 (2.3)	255 (2.8)	
Yes, without history of vaginal delivery	84 (2.1)	207 (2.3)	
Gestational age, WG	39.7 (1.1)	39.7 (1.1)	0.28
Neonatal weight, g	3352 (462)	3361 (435)	0.29
Midwife's seniority, y^a			<0.01
< 1	80 (11.6)	765 (10.5)	
[1-3[298 (43.1)	2516 (34.5)	
[3-5[131 (18.9)	2026 (27.8)	
≥5	183 (26.5)	1993 (27.3)	

Data are expressed as n(%) or mean(sd) or med(Q1-Q3). *Chi², Student t-test or Mann-Whitney test,

^a 22.7% of data were missing in period A and 5.7% in period B.

Table 2: Comparison of labor and delivery characteristics before (period A) and after (period B) implementation of a selective policy of episiotomy

Labor and delivery characteristics	Nulliparas			Multiparas		
	Period A ^a N=1316	Period B ^a N=2787	P*	Period A ^a N=2262	Period B ^a N=6197	P*
Induction of labor	337 (25.8)	922 (33.1)	<0.01	538 (20.3)	1807 (29.2)	<0.01
Peridural analgesia	1162 (88.3)	2576 (92.4)	<0.01	1913 (71.9)	4991 (80.5)	<0.01
Augmentation of labor	864 (65.6)	1389 (49.8)	<0.01	1144 (43.0)	1726 (27.9)	<0.01
Total duration of labor, h	7 [5-9]	8 [6-10]	<0.01	5 [3-6]	5 [3-6]	0.03
Duration of active second stage of labor, min	20 [13-30]	21 [13-33]	<0.01	10 [5-15]	9 [5-15]	1.0
Persistent OP position at delivery	11 (0.8)	17 (0.6)	0.4	48 (1.8)	64 (1.0)	<0.01
FHRA during active second stage of labor	208 (15.8)	679 (24.4)	<0.01	309 (11.6)	1052 (17.0)	<0.01
Meconium-stained AF	319 (24.7)	727 (26.2)	0.29	561 (21.4)	1379 (22.5)	0.26
Maternal position at delivery			<0.01			<0.01
Lithotomy position	505 (43.4)	249 (8.9)		980 (40.8)	515 (8.4)	
Adapted lithotomy position**	557 (47.8)	2378 (85.4)		1012 (42.1)	4518 (74.4)	
Lateral position	44 (3.8)	49 (1.8)		185 (7.7)	218 (3.5)	
Other***	59 (5.1)	109 (3.9)		228 (9.5)	902 (14.7)	
Episiotomy	337 (26.6)	360 (12.9)	<0.01	181 (6.8)	142 (2.3)	<0.01

Data are expressed as n(%) or mean(sd) or med(Q1-Q3). *Chi2, Student t-test or Mann-Whitney test

with foot-rest *squatting, crawling or standing; WG, weeks of gestation ; OP, occipito-posterior; FHRA, fetal heart rate abnormalities; AF, amniotic fluid.

Table 3: Multivariable association between the period and perineal status, stratified by parity

	Nulliparas			Multiparas		
Perineal status	Period A N=1316 (Reference)	Period B N=2787	AOR*(95% CI)	Period A N=2662 (Reference)	Period B N=6197	AOR*(95% CI)
Intact perineum	326 (24.9)	440 (15.8)	0.61 (0.42-0.90)	1166 (56.0)	2918 (47.1)	0.61 (0.49-0.76)
First degree perineal tear	448 (34.2)	925 (33.2)	1.11 (0.94-1.31)	661 (25.0)	1518 (24.5)	1.05 (0.92-1.19)
Second degree perineal tear	228 (17.4)	1110 (39.8)	2.55 (2.11-3.08)	339 (12.8)	1623 (26.2)	2.26 (1.95-2.66)
Third- or fourth-degree perineal tear	10 (0.8)	25 (0.9)	0.88 (0.38-2.05)	5 (0.2)	24 (0.4)	2.28 (0.63-8.29)

Data are expressed as n(%) ; AOR, adjusted odds ratio ; CI, confidence interval; *all models adjusted for maternal age, country of birth, body mass index, induction of labor, neonatal weight, persistent OP position, maternal position at delivery and epidural analgesia.

Table A1: Multivariable association between the period and perineal status: sensitivity analysis among nulliparas with spontaneous labor

Perineal status	Period A (Reference) N=971	Period B N=1865	AOR*(95% CI)
Intact perineum	224 (23.1)	285 (15.3)	0.52 (0.41-0.66)
First degree perineal tear	341 (35.1)	627 (33.6)	1.05 (0.86-1.27)
Second degree perineal tear	179 (18.4)	745 (40.0)	2.49 (2.00-3.10)
Third- or fourth-degree perineal tear	6 (0.6)	17 (0.9)	1.36 (0.48-3.85)

Data are expressed as n(%) ; AOR, adjusted odds ratio ; CI, confidence interval; *all models adjusted for maternal age, country of birth, body mass index, neonatal weight, maternal position at delivery and epidural analgesia.

Table A2: Multivariable association between the period and perineal status: sensitivity analysis excluding women with fetal heart rate abnormalities during active second stage of labor, stratified by parity.

	Nulliparas			Multiparas		
Perineal status	Period A N=1108 (Reference)	Period B N=2108	AOR*(95% CI)	Period A ^a N=2353 (Reference)	Period B ^a N=5145	AOR*(95% CI)
Intact perineum	279 (25.3)	327 (15.5)	0.50 (0.41-0.62)	1305 (55.8)	2441 (47.5)	0.67 (0.60-0.75)
First degree perineal tear	383 (34.8)	720 (34.2)	1.06 (0.89-1.28)	594 (25.4)	1294 (25.2)	1.03 (0.91-1.18)
Second degree perineal tear	195 (17.7)	842 (39.9)	2.60 (2.12-3.18)	305 (13.0)	1325 (26.8)	2.19 (1.88-2.56)
Third- or fourth-degree perineal tear	6 (0.5)	20 (1.0)	1.86 (0.67-5.2)	4 (0.2)	17 (0.3)	2.00 (0.45-8.81)

Data are expressed as n(%) ; AOR, adjusted odds ratio ; CI, confidence interval; *all models adjusted for maternal age, country of birth, body mass index, neonatal weight, induction of labor, maternal position at delivery and epidural analgesia.