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REVIEW ARTICLE

Risk factors for severe perineal lacerations during childbirth

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ABSTRACT

Background: Severe perineal lacerations represent a significant complication of normal labor with a strong impact on quality of life. *Objectives:* To identify factors that lead to the occurrence of severe perineal lacerations. *Search strategy:* We searched MEDLINE, Scopus, ClinicalTrials.gov, the Cochrane Central Register of Controlled Trials, Google Scholar and reference lists from all included studies. *Selection criteria:* We included prospective and retrospective observational studies. *Data collection and analysis:* Predetermined data were collected and analyzed with the Mantel–Haenszel fixed-effects model or the DerSimonian–Laird random-effects model. *Main results:* The meta-analysis included 22 studies (n = 651 934). Women with severe perineal tears were more likely to have had heavier infants (mean difference 192.88 g [95% CI, 139.80–245.96 g]), an episiotomy (OR 3.82 [95% CI, 1.96–7.42]), or an operative vaginal delivery (OR 5.10 [95% CI, 3.33–7.83]). Epidural anesthesia (OR 1.95 [95% CI, 1.63–2.32]), labor induction (OR 1.08 [95% CI, 1.02–1.14]), and labor augmentation (OR 1.95 [95% CI, 1.56–2.44]) were also more common among women with perineal lacerations. *Conclusions:* Various factors contribute to the occurrence of perineal lacerations. Future studies should consistently evaluate all examined parameters to determine their possible interrelation.

1. Introduction

Vaginal birth is occasionally accompanied by complications such as severe perineal lacerations, cervical lacerations, and vaginal tears. Perineal injuries are divided into 4 categories according to the anatomic structures involved. As proposed by the National Institute for Health and Care Excellence, third-degree lacerations involve the anal sphincter complex (including its external and internal components), whereas fourth-degree lacerations extend to the rectal mucosa, exposing the intestinal lumen [1]. The incidence of third- and fourth-degree tears in the USA is 6.4% [2]. The impact of severe perineal tearing on the postoperative quality of life varies. Fitzpatrick et al. [3] reported in a review that up to 25% of women with severe perineal tearing experience transient alterations in fecal continence, and 4% have persistent problems. Careful primary repair is important for the postpartum course, but there is no current evidence to support the superiority of a particular repair technique (overlapping repair versus simple approximation of the anal sphincter) [4].

Since the mid-1990s, numerous studies have examined the effects of fetal and maternal factors and iatrogenic manipulations on the occurrence of perineal tearing. However, the reported results are not always in agreement.

The present meta-analysis assessed a variety of prognostic factors that might lead to the occurrence of severe perineal lacerations.

2. Materials and methods

2.1. Literature search and data collection

MEDLINE (1966–2013), Scopus (2004–2013), ClinicalTrials.gov (1997–2013), the Cochrane Central Register of Controlled Trials (1999–2013), and Google Scholar (2004–2013) were used for the primary search. We aimed to use the lowest number of keywords that enabled us to retrieve eligible studies for hand-searching without having significant article losses. Only human studies were considered.

For MEDLINE, the following search string was used: ("perineum" [MeSH Terms] OR "perineum"[All Fields] OR "perineal"[All Fields]) AND ("lacerations"[MeSH Terms] OR "lacerations"[All Fields]). Scopus was searched using the terms perineum AND perineal AND laceration*. The Cochrane Central Register of Controlled Trials was searched using the terms perineal AND/OR perineum AND laceration*. ClinicalTrials.gov was searched for perineal laceration*. Finally, an extended search string—(perineum AND perineal AND laceration* AND labor AND episiotomy AND operative AND vacuum AND forceps)—was used for Google Scholar.

The reference lists of electronically retrieved articles that were selected for inclusion in the present review were also searched manually to identify articles that might have been missed in the electronic search. All articles that met or were presumed to meet the inclusion criteria were retrieved in full, with 1 exception [5].

Overall, 454 articles were found in MEDLINE and 462 in Scopus. Of these, 36 articles were presumed to be relevant to the topic and were retrieved in full. In addition, 3 articles were retrieved after reviewing the

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Table 1
Maternal and neonatal characteristics.

Date; first author	Total number	Severe tears[a]	Controls[a]	Age, y[b]	BMI before pregnancy[c]	BMI at delivery[c]	Asian ethnicity[a]	Previous cesarean delivery[a]	Primiparity[a]	Pregnancy duration, wk	Birth weight, g
1994; Anthony [11]	43 309	599 (1.4)	42 710 (98.6)	N/A	N/A	N/A	15/599 (2.5) vs 796/42 710 (1.9)	N/A	316/599 (52.8) vs 17 295/42 710 (40.5)	N/A	N/A
1997; Labrecque [25]	6522	1002 (15.4)	5520 (84.6)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1997; Klein [23]	459	75 (16.3)	384 (83.7)	28.8 ± 3.7 vs 27.9 ± 4.1	N/A	N/A	N/A	N/A	N/A	N/A	3552 ± 429 vs 3282 ± 442
1999; Robinson [29]	1942	276 (14.2)	1666 (85.8)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2000; Jones [22]	15 204	131 (0.9)	15 073 (99.1)	N/A	N/A	N/A	N/A	N/A	109/131 (83.2) vs 7032/15 073 (46.7)	N/A	N/A
2000; Samuelsson [30]	2883	95 (3.3)	2788 (96.7)	N/A	N/A	N/A	N/A	N/A	66/95 (69.5) vs 1230/2788 (44.1)	N/A	N/A
2000; Angioli [10]	50 210	1124 (2.2)	49 086 (97.8)	24.3 ± 6.10 vs 25.5 ± 6.36	N/A	N/A	N/A	N/A	892/1460 (61.1) vs 18 468/49 086 (37.6)	N/A	3439 ± 476 vs 3205 ± 600
2001; de Leeuw [15]	28 4783	5528 (1.9)	27 9255 (98.1)	N/A	N/A	N/A	N/A	N/A	3355/5528 (60.7) vs 12 1525/27 9255 (43.5)	N/A	N/A
2001; Jandér [21]	428	214 (50.0)	214 (50.0)	N/A	N/A	N/A	N/A	N/A	177/214 (92.7) vs 104/214 (48.6)	N/A	N/A
2001; Bodner-Adler [13]	1118	37 (3.3)	1081 (96.7)	N/A	N/A	N/A	N/A	N/A	20/37 (54.1) vs 551/1081 (51)	N/A	N/A
2002; Riskin-Mashiah [28]	23 244	1905 (8.2)	21 339 (91.8)	23.5 ± 5.2 vs 24.8 ± 5.8	N/A	N/A	65/1905 (3.4) vs 361/21 339 (1.7)	N/A	1426/1905 (74.9) vs 6948/21 339 (32.6)	N/A	3425 ± 477 vs 3270 ± 560
2004; Macarthur [27]	350	46 (13.1)	304 (86.9)	N/A	N/A	N/A	N/A	N/A	41/46 (89.1) vs 150/304 (49.3)	N/A	N/A
2006; Eogan [16]	100	54 (54)	46 (46.0)	30 vs 31	N/A	N/A	N/A	N/A	N/A	N/A	3755 vs 3504
2005; Hudelist [20]	201	46 (22.9)	155 (77.1)	29 vs 29	N/A	26.2 vs 26.3	N/A	N/A	32/46 (69.6) vs 71/155 (45.8)	40 + 3 vs 40 + 0	3570 vs 3336
2005; Sheiner [31]	98 524	79 (0.1)	98 445 (99.9)	27.0 ± 4.8 vs 27.9 ± 5.8	N/A	N/A	N/A	N/A	36/79 (45.6) vs 22 204/98 445 (22.6)	279.3 ± 8.3 vs 277.8 ± 8.7 [d]	3483 ± 483 vs 3258 ± 430
2006; Aukee [12]	9178	53 (0.6)	9125 (99.4)	29 vs 29	N/A	N/A	N/A	N/A	N/A	279 vs 282 [d]	3577 vs 3833
2007; Dahlen [14]	6595	134 (2)	6461 (98.0)	30.3 vs 30.9	N/A	N/A	35/134 (26.1) vs 1021/6461 (15.8)	N/A	108/134 (80.6) vs 3064/6461 (47.4)	N/A	N/A
2007; Lowder [26]	20 674	2533 (12.3)	18 150 (87.7)	N/A	N/A	N/A	N/A	260/2533 (10.2) vs 1172/18 150 (6.4)	N/A	N/A	N/A
2006; Kudish [24]	33 842	1229 (3.6)	32 613 (96.4)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2010; Hornemann [19]	2967	50 (1.7)	2917 (98.3)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2011; Groutz (a) [17]	300	60 (20)	240 (80)	31.2 ± 4.7 vs 33.5 ± 4.7	21.7 ± 2.9 vs 21.9 ± 3.8	27.2 ± 4.1 vs 27.2 ± 4.1	6/60 (10.0) vs 4/240 (1.7)	3/60 (5.0) vs 18/240 (7.5)	N/A	39.5 ± 1.5 vs 39.4 ± 1.3	3372 ± 463 vs 3229 ± 428
2011; Groutz (b) [18]	38 522	96 (0.3)	38 426 (99.8)	30.5 ± 4.8 vs 31.1 ± 4.7	21.9 ± 3.4 vs 22.1 ± 3.7	27.1 ± 3.5 vs 27.3 ± 3.9	14/96 (14.6) vs 552/38 426 (1.4)	N/A	65/96 (67.7) vs 16 480/38 426 (42.9)	39.6 ± 1.4 vs 39.2 ± 1.5	3369 ± 469 vs 3252 ± 445

Abbreviation: BMI, body mass index.
[a] Values are given as number (percentage).
[b] Values are given as mean ± SD.
[c] Calculated as weight in kilograms divided by the square of height in meters.
[d] Pregnancy duration reported in days.