

Training effect on performance of mediolateral episiotomies for obstetricians and midwives

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Research article

Keywords: episiotomy, incision angle, midwives, obstetric anal sphincter injuries, training

Posted Date: January 3rd, 2020

DOI: <https://doi.org/10.21203/rs.2.20044/v1>

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Abstract

Background

To evaluate the training effect among variant practitioners, accompany with their knowledge and accuracy of cutting a mediolateral episiotomy (MLE) before and after the training. Methods 82 participants were recruited at three different obstetric centers, included 35 obstetricians and 47 midwives. A 30 minutes training course were given to all participants by one senior obstetrician. Special paper pads simulating perineum at crowning were used to cut a MLE before and after the course, and a questionnaire about their occupation characteristics was given before the course. Parameters of the MLE were analyzed and compared between some subgroups before and after the course.

Results

After the course, the mean values of three parameters were significantly increased from 3.146 cm in length, 48 degrees in angle and 0.909 cm in distance to 3.429cm, 50.622degrees and 1.082cm respectively. And doctors had increased angle degrees significantly ($P=0.022$), while midwives had increased the length and distance significantly ($p=0.001$ and $p=0.004$). Only senior participants had increased the length and distance of incisions significantly ($P=0.010$, $P=0.020$), the accuracy of these two parameters also improved significantly ($P=0.020$, $P=0.031$). In subgroups of midwives and seniors, the accuracy of the length and distance also showed significantly increased after the course.

Conclusions

Training course can improve the knowledge of MLE. The angle, length and distance of incisions all increased and the accuracy of the length and distance significantly improved after course, and the senior participants profited more from the training course.

Background

Obstetric anal sphincter injuries (OASIS) are associated with numerous consequences as anal fecal incontinence, fecal urgency, dyspareunia and psychological effects for women. A meta-analysis found that 30%-50% of women were symptomatic one year after OASIS, even with repaired[1, 2]. And it could result in as high as 53%-80% of longer-term anal incontinence and urgency[3, 4], affecting women's quality of life. The purpose of episiotomy is to expedite delivery for fetal distress, increase the vaginal outlet of instrumental deliveries or shoulder dystocia, or to reduce the risk of OASIS[5]. Episiotomy as the most important preventative measure to reduce third-and fourth-degree or OASIS is used worldwide, despite the confliction of the protective effect[6, 7]. Episiotomy technique usually contains three main parameters: the length of the incision, the incision angle, and the distance between the start point and the posterior fourchette. Several episiotomies were described, the midline episiotomy is associated with high rates of OASIS[8–10], compared with mediolateral episiotomy (MLE), there was no significant difference in pain, dyspareunia and infection rates[11].

The WHO recommends restrictive use of episiotomy, and states that episiotomy should be considered as following: complicated vaginal delivery (breech, shoulder dystocia, forceps or vacuum extraction), scarring from female genital mutilation or poor healed third-or fourth-tears, fetal distress. Restrictive episiotomy resulted in less OASIS and fewer healing complications compared to routine episiotomy[12]. The use of episiotomy is restrictive, rather than routine, and left MLE is considered standard practice in China.

The internationally accepted standardized definition or categorization of episiotomy is still on the way, the National institute of Health and Care Excellence (NICE 2007) guideline for intrapartum care recommended that a MLE should perform originating at the vaginal fourchette and the angle to the vertical axis should be between 45 and 60 degrees. Dharmesh et al. found that perineal distension of 170% in the transverse direction and 40% in the vertical direction at crowning, there are 15–30 degree between episiotomy incision angles and suture angles, suture angles of 40–60 degrees are in the safe

zone[9]. Performing a MLE at least 60 degree from midline may in fact protect against OASIS[13], and there is a U-shaped association between suture angles and risk of OASIS, 30–60 degrees are the safe zone[14]. When suture angle was 25 degrees, there was a 10% incidence of OASIS and each additional 6 degrees away from midline reduced half of this risk, the incidence was only 0.5% at the suture angle of 45 degrees[15–17]. The revised Royal College of Obstetricians and Gynecologists (RCOG) (Green-top guideline 2015 NO.29) recommends three preventative measures to reduce the risk of OASIS as following: episiotomies at 60 degrees to the midline at crowning, manual perineal protection and warm perineal compresses in second stage of labor.

MLE must be performed correctly for better preventing anal sphincter injury. Stedenfeldt et al. concluded that episiotomies with depth > 16 mm, length > 17 mm, incision point > 9 mm lateral of midpoint and suture angle range 30–60 degrees are significantly associated with less risk of OASIS[14]. Trainings became the main method of improving skills for junior doctors and midwives. The knowledge of performing a proper MLE and repair had universally introduced and trained.

Doctors tend to cutting longer episiotomy and more obtuse angle compared with midwives[18, 19]. Personal career may affect the effect of such training. The impact of training between senior and junior practitioners is rare seen in previous researches. The aim of this study was to evaluate the training effect among variant practitioners, accompany with their knowledge and accuracy of episiotomy before and after the training.

Methods

Eighty-two participants were recruited at three different obstetric centers, included 35 obstetricians and 47 midwives. A 30 minutes training course were given to all participants by one senior obstetrician. This course mainly described in three scenarios about episiotomy: (i) detail of perineal anatomy and the transformation at crowning, (ii) how to perform a MLE incision properly, (iii) techniques for repairing an episiotomy and perineal tears.

Before the training course, participants were asked to complete a cross-sectional questionnaire, which contained occupations of doctor or midwife, obstetric work years, training history and some questions of making a MLE (Fig. 1). A commonly used episiotomy incision pad with anus denoted by a cross and posterior vagina by a semi-circle (Fig. 2) was used for everyone to cut as their usual practice. After taking back the pad and questionnaire, the training course were given. A MLE as a surgical incision is recommend given between 45–60 degrees from the midline[20]. The accuracy of the angle, the length and the distance from fourchette was closely related the incidence of OASIS, increasing the MLE length and distance resulted in reducing the risk of sustaining OASIS and the scarred episiotomies with length > 17 mm, incision point > 9 mm lateral of midpoint and angle range 30–60 degrees are significantly associated with less risk of OASIS[5, 14]. Recommended values about the incision length and distance had not been reported in literatures yet, we usually cut MLE length in 3–4 cm and distance around 1 cm, the length approximately met the scared length 17 mm according to the perineal distension at crowning. The French College of Gynecologists and Obstetricians (2005) recommends a mediolateral incision over an average length of 6 cm. In this course, we had taught the participants that the following parameters may be the most suitable ones: length of 3–4 cm or more, angle of 45–60 degrees and distance of 0.9 cm or more. We considered those incisions to be correct according to these criteria. Then the participants were invited to cut the pad according to those they had learned from the course. They were prompted to make a MLE at 60 degrees, more than 3 cm in length and proper distances from fourchette. A unique number created by each participant, and marked in their own pads and questionnaire. Three parameters were considered for every episiotomy incision: (i) the distance of starting point of the incision from fourchette in millimeters (D), (ii) the angle of incision to the perpendicular in degrees (A), (iii) the length of the incision in millimeters (L). (Fig. 2)

Angles and distances were measured using common protractors and rulers. Continuous variables are presented as mean \pm sd or median and range, as appropriate. Categorical variables are presented as rate. The t test was used to compare continuous variables and the chi-squared test was used to analyze categorical variables. All tests applied were two-tailed, statistical significance was considered at $p < 0.05$. Data were analyzed by SPSS statistical software (SPSS 19, Inc., Chicago,

IL). This study was approved by the Ethics Committees of Women' hospital, School of Medicine Zhejiang University and Approval number 20190057, and all the participates were verbally informed the project and consented to participate.

Results

The characteristics of 82 participants (35 doctors and 47 midwives) were detailed in Table1, the mean obstetric work years were 7.71 ± 7.112 . We qualified less than 5 years of obstetric work as junior accoucheurs and others as senior ones. Among doctors, there were 18 (51.4%) juniors, while only 12 (25.5%) among 47 in midwives. They knew well about the perineal anatomy, only 4(4.9%) participants didn't have any anatomy of perineum. There were 74 (90.2%) participants received MLE training before, including theoretical (24 [29.3%]), practical (21 [25.6%]) or both (29 [35.3%]). More than half of doctors had conducted MLEs or delivers less than 10 cases, while the vast majority of midwives had made more MLEs and delivers than 50 cases.

Table 1
characteristics of participants and their occupation history

	Doctor n = 35		Midwife n = 47	
	N	%	N	%
Obstetric work years (all) (mean \pm SD)	7.71 \pm 7.112			
Obstetric work years(mean \pm SD)	6.77 \pm 7.562		8.26 \pm 6.834	
< 5 years	18	51.4	12	25.5
\geq 5 years	17	48.6	35	74.5
Knowledge of anatomy				
master	16	45.7	33	70.2
acquaintance	18	51.4	11	23.4
none	1	2.9	3	6.4
Training history				
theoretical	15 + 5(both)	57.1	9 + 24(both)	70.2
practical	9 + 5(both)	40	12 + 24(both)	76.6
none	6	17.1	2	4.3
Conduct delivers				
< 10	18	51.4	5	10.6
\geq 10–50	8	22.9	3	6.4
\geq 50–100	4	11.4	3	6.4
\geq 100	5	14.3	36	76.6
Conduct MLEs				
< 10	20	57.1	7	14.9
\geq 10–50	11	31.4	10	21.3
\geq 50–100	1	2.9	7	14.9
\geq 100	3	8.6	23	48.9

Preventing OASIS was the major (74/82) cause for performing a MLE, according to this survey, fetal distress and macrosomia were the second and third cause respectively. For the doctors only, instrument deliver become the leading cause of performing a MLE (30/35). When performing a MLE, most of them (53/82) concerned about if they had made a proper incision. OASIS may be the nightmare for accoucheurs, the difficulty of suturing confused 84.1% (69/82) of participants. Furthermore the consequence of repeated suturing and pelvic floor disorders should take into account.

The details about incisions performed before and after course were show in Table2. Before training, the mean values of three parameters were 3.146 cm in length, 48 degrees in angle and 0.909 cm in distance. They increased to 3.429 cm, 50.622degrees and 1.082 cm respectively, and had significant differences after the course. And doctors had increased angle degrees significantly ($P = 0.022$), while midwives had increased the length and distance significantly ($p = 0.001$, $p = 0.004$). Only senior participants had increased the length and distance of incisions significantly ($P = 0.010$, $P = 0.020$), the accuracy of these two parameters also improved significantly ($P = 0.020$, $P = 0.031$). While the juniors cut the MLE in more length and distance compared to seniors, but these were no statistical significance improved in junior participants. Although the degrees and accuracies of the angle increased in junior and senior groups, no improvements had seen with statistical significance. After the course, the accuracy of the length and distance showed significantly increased in all participants, while the accuracy of the angle showed no significant difference. In subgroups of midwives and seniors, the accuracy of the length and distance also showed significantly increased after the course. (Table3)

Table 2
MLE parameters performed by participants before and after the training course

	Length (mm)			Angles (degrees)			Distance (mm)		
	before	after	p-value	before	after	p-value	before	after	p-value
Doctors (n = 35)	33.97	34.66	0.558	48.657	53.057	0.022	9.17	10.43	0.111
Midwives (n = 47)	29.60	34.02	0.001	47.511	48.809	0.393	9.02	15.16	0.004
Juniors (n = 30)	32.73	34.90	0.068	46.667	49.767	0.131	9.40	11.13	0.014
Seniors (n = 52)	30.73	33.94	0.010	48.769	51.115	0.113	8.90	10.64	0.020
total(N = 82)	31.46	34.29	0.002	48.000	50.622	0.028	9.09	10.82	0.001

Table 3
Accuracy of MLE performed by participants before and after the training course

	Validity of length n (%)			Validity of angle n (%)			Validity of distance n (%)		
	before	after	p-value	before	after	p-value	before	after	p-value
Doctors(n = 35)	25(71.4%)	28(80.0%)	0.375	23(65.7%)	23(65.7%)	1	19(54.3%)	25(71.4%)	0.146
Midwives(n = 47)	22(46.8%)	34(72.3%)	0.002	24(51.1%)	34(72.3%)	0.052	21(44.7%)	30(63.8%)	0.022
Juniors(n = 30)	22(73.3%)	24(80.0%)	0.500	16(53.3%)	22(73.3%)	0.125	17(56.7%)	22(73.3%)	0.180
Seniors(n = 52)	25(48.1%)	38(73.1%)	0.020	31(59.6%)	35(67.3%)	0.541	23(44.2%)	33(63.5%)	0.031
total(N = 82)	47(57.3%)	62(75.6%)	0.010	47(57.3%)	57(69.5%)	0.144	40(48.8%)	55(67.1%)	0.040

Discussion

MLE was regarded as the most important surgery to reduce OASSIS for normal or instrument vaginal delivery, although there were conflicting conclusions about the role of MLE in preventing OASIS[21], this may be due to the absence of consensus on optimal MLE for preventing OASIS. Traditional perineal laceration management training programs focused on repairing techniques, actually, we should lay more emphasis on training as 'how to perform an episiotomy'. Our study focused on this point and we found that proper training course could improve the participant knowledge of performing a MLE, and they could cut a MLE more optimally.

We found that more than half of doctors and midwives cut MLE correctly as measured by angles, 72.3% midwives and 65.7% doctors performing MLE at right angles after our training. The total cutting accuracies of length and distance were significantly improved after the course. Junior participants and midwives were more likely to cut the angle within the range (73.3% and 72.3%), and 69.5% accoucheurs cut correctly. While Vasanth et al. revealed that only 22% doctors and no midwife cut the incision of MLE correctly[18], Fanny et al. found only 43% accoucheurs had cut the correct range[22]. The variability of MLE incision between simulation setting and actual patients were highlighted, the high accuracy of our study might be attributed to the cutting in a paper for practice, while they had measured the actual MLE cut in delivery. Training with simulation settings can improve practical skills and cognitions, multitudinous training models were used for medical teaching.

A suitable training model enabled accurate measurement of MLE parameters and improved knowledge of episiotomy. Silf et al. used a bespoke training model to performing a MLE. They found that only 31.9% of midwives and 41.5% of obstetricians cut the incision with angle ranging from 40 to 60 degrees, history of previously perineal repair training made no difference for correctness of episiotomy[23]. Wong et al. found midwives made MLE closer to the midline by 7.6 degrees compared with doctors and the main indications for performing episiotomies were to expedite delivery, prevent OASIS and fetal distress[24]. Our study also showed that midwives trended to cut a smaller angle, and preventing OASIS, fetal distress, macrosomia were the main indications for performing a MLE. We used a paper model to evaluate the training impacts on participants, and found the accuracy of incisions increased after training. Achieved 72.3% of midwives and 65.7% doctors cut the incision with angle ranging from 45 to 60 degrees. Doctors cut more obtuse angle after the course, while midwives had increased length and distance significantly. The participants of SUPPORT (Strategy for Using Practical aids for Prevention of OASIS, Recording episiotomies and clinician Training) also reported that they had improved knowledge of performing an episiotomy during the training[25].

Our study was the rare one that evaluated how the participants performing a MLE before and after the training course, training protocol had positive role as significant improvements were observed. The main limitation of our study was that MLEs were simulated cut at paper pad, and it might be some difference to real cut.

Many researches had studied the relationship between the scar or suture parameters of episiotomies and OASIS[14–16, 26–28]. For the varying degrees of extensions at crowning, accoucheurs can't foreknow the suture angle, length and distance from midline when cut a MLE[13, 29–31]. Further studies should focus on the relationship between OASIS and the cutting angle, length and distance. As the cutting parameters of MLE are instantaneous, scissors with scale plate and fixed angle may be the ideal candidate. Studies used a special device as Episcissors-60 cutting at crowning showed an encouraging result for performing a MLE[25, 29]. Now no consensus is reached on optimal MLE for preventing OASIS, randomized controlled trials using special device should design to carry out.

Conclusion

Training course can improve the knowledge of MLE. The angle, length and distance of incisions all increased and the accuracy of the length and distance significantly improved after course, and the senior participants profited more from the training course. A majority of participants knew well about the perineal anatomy and performing a MLE properly. The most causes of cutting a MLE were preventing OASIS, fetal distress and macrosomia. When performing a MLE, major participants would think about the property of the incision, and worry about the healing of wound.

Abbreviations

MLE: mediolateral episiotomy, OASIS: obstetric anal sphincter injuries

Declarations

Authors contributions:

Baihui Zhao: developed the conception, drafted the work

Yuan Chen: design of the work and revised

Fangfang Xi and Tian Dong: data analysis and interpretation

Yuqun Pu and Yali Wang: assistant for project implement

Qiong Luo: design of the work, consultant

Acknowledgment: The authors thank the Staff at women's hospital, Zhejiang University for technical assistance and facility supports.

Declarations:

Competing Interest: The authors declare that they have no conflict of interest.

Consent for publication: All the authors were in agreement with the content of the manuscript and consented for publication.

Funding

This study was funded by the Medical and Health Research Projects of Zhejiang Province (No.2019PY007, 2019RC199), National Nature Science Foundation of China grant (No.81571447), Construction of Medical Core Subjects and Innovation Platform in Zhejiang Province grant (No. 2018RC005)

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Figures

Questionnaire

Occupation: Doctor Midwife

Obstetric work years: Year

1. Knowledge about perineum anatomy:

Acquaintance Some None

2. History of training about episiotomy (multiple):

Theoretical Practical None

3. Cases of delivery: <10 <=10—50 <=50-100 >=100

4. Cases of episiotomy: <10 <=10—50 <=50-100 >=100

5. Causes for mediolateral episiotomy (mutiple):

Preventing OASIS Preterm delivery Macrosomia Expedite delivery

Instrumental delivery Breech delivery Twin delivery Fetal distress

6. Worry about when cut a mediolateral episiotomy (mutiple):

Bleeding Trauma If the incision properly (length, distance, angle)

Repair difficultly None

7. Main concerned about when severe tear happened (multiple):

Repair difficultly Massive bleeding Infection of incision

Repeated repair Pelvic floor disfunction (fecal incontinence, dyspareunia)

None

Figure 1

The participants were asked to complete this cross-sectional questionnaire which contained occupations of doctor or midwife, obstetric work years, training history and some questions about cutting a MLE.

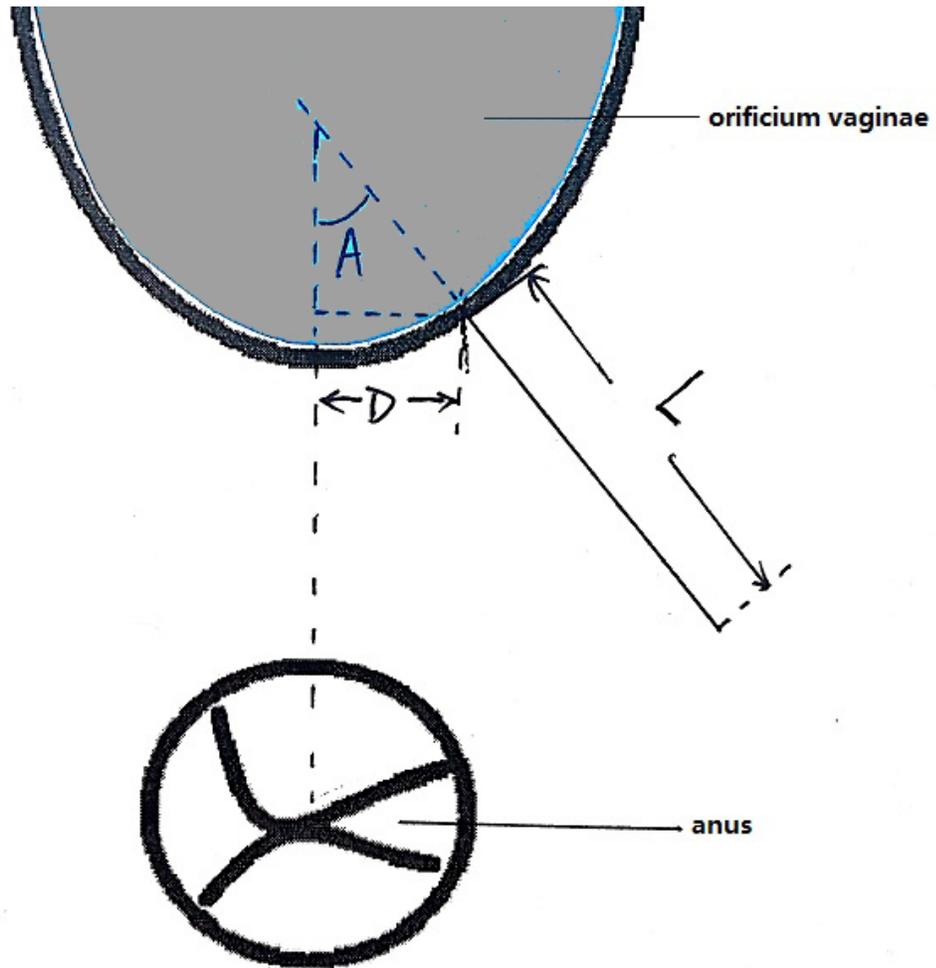


Figure 2

Paper used for training to cut a MLE and Measurements undertaken after each performed MLE by participants. D=the distance of starting point of the incision from fourchette in millimeters, A= the angle of incision to the perpendicular in degrees, L=the length of the incision in millimeters

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [episiotomydata.xls](#)