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## THIRD- AND FOURTH-DEGREE PERINEAL TEARS AND RESTRICTIVE USE OF EPISIOTOMY

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**Aim:** To determine the number and prevalence of third- and fourth-grade perineal tears with restrictive use of episiotomy, and the prevalence of obstetric anal sphincter injuries (OASIS) according to parity, mode of labor termination, delivery duration, epidural analgesia, obstetric team experience, and neonatal birth weight and head circumference. **Subjects and Methods:** This retrospective clinical study included 51 women diagnosed with OASIS, having delivered their newborns at Department of Gynecology and Obstetrics, Sveti Duh University Hospital from January 1, 2010 until December 31, 2014. **Results:** Out of 12858 vaginal deliveries, episiotomy was not used in 77% (n=9887), whereas it was used in 23% (n=2971) of women. The overall prevalence of OASIS during the study period was 0.4%, with 0.7% for mediolateral episiotomy versus 0.3% in women without episiotomy ( $p<0.05$ ). Statistically significant differences between primiparae and multiparae were recorded for the prevalence of OASIS (68.7% vs. 31.3%) and delivery duration  $>10$  hours ( $p<0.05$ ). Risk factors for OASIS were present in 33% of women and included fetal head malrotation, shoulder dystocia, and OASIS in previous delivery. There was no statistically significant difference in the prevalence of OASIS according to birth weight  $<4000$  g (78.4%) versus  $>4000$  g (21.6%), maternal body mass index, and second stage of labor  $>1$  hour (43.6%) versus  $<1$  hour (56.4%) ( $p>0.05$  both). **Conclusion:** Primiparity, delivery duration  $>10$  hours, and use of episiotomy were identified as risk factors for OASIS. Other obstetric risk factors for OASIS were present in one-third of OASIS cases. The prevalence of third- and fourth-degree perineal tears can be reduced with restrictive use of episiotomy and manual perineal protection.

**Key words:** third- and fourth-degree perineal tears, restrictive episiotomy, episiotomy, manual perineal protection

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### INTRODUCTION

Episiotomy is a surgical incision of the perineum to prevent perineal and anal area laceration. It is the second most common surgical procedure in obstetrics after umbilical cord clamping (1). For some 30 years now, midwives and obstetricians all over the world have been reconsidering justification and role of episiotomy, as it used to be performed in almost all primiparae. In Croatia, episiotomy was introduced in the first half of the 20<sup>th</sup> century to become a routine procedure at maternity wards in the 1960s and 1970s, with a prevalence of 90%. Delivery management included manual perineal protection (MPP) performed

by midwife and episiotomy performed by midwife or obstetrician in Croatian maternity wards (2).

In their review from 1983, Thacker and Banta disputed the then rooted opinion that routine episiotomy reduced the incidence of third- and fourth-degree perineal tears, prevented pelvic floor lesions and consequential urinary and anal incontinence, and reduced the risk of neonatal brain damage (3). According to recent meta-analyses and guidelines, perineal lacerations can be reduced by avoiding routine use of episiotomy (4,5). The more so, routine episiotomy has been demonstrated to increase the rate of perineal pain and blood loss, and to favor the occurrence of hematoma, infection,

dehiscence and sexual dysfunction, while increasing economic cost of the procedure (4,5). The conventional attitude of some obstetric centers that episiotomy should be used in all primiparae, and consequentially also in multiparae, has been challenged by numerous studies demonstrating episiotomy to be justified exclusively in case of properly set indications to prevent pelvic floor laceration (5-7).

A restrictive approach with episiotomy used exclusively for medical indication while stimulating MPP has been introduced in clinical practice at Department of Gynecology and Obstetrics, Sveti Duh University Hospital for several years now, having changed the attitudes of midwives and obstetricians on the issue (6).

The aim of the study was to determine the number and prevalence of third- and fourth-degree perineal tears with restrictive use of episiotomy, and the prevalence of obstetric anal sphincter injuries (OASIS) according to obstetric and neonatologic parameters.

## SUBJECTS AND METHODS

This retrospective clinical study was performed at Department of Gynecology and Obstetrics, Sveti Duh University Hospital, during the period from January 1, 2010 until December 31, 2014, when consistent use of restrictive episiotomy was introduced with manual perineal protection. Our analysis approved by the Hospital Ethics Committee included 51 cases of third- and fourth-degree perineal tears out of the total number of 12858 vaginal deliveries.

The following data were collected: maternal parity, anthropometry data (body weight, gestational weight gain, body height and body mass index (BMI)) and age; neonatal gestational age, anthropometry (birth weight and birth length); OASIS distribution according to years, OASIS types (grades I, II, IIIa, IIIb, IIIc and IV) (8), labor onset, use of epidural analgesia, instrumental labor termination with vacuum extraction, and presence of obstetric risk factors (shoulder dystocia, fetal head deflection anomaly). Neonatal parameters were categorized into two groups, as follows: birth weight <4000 g and >4000 g; head circumference ≤34 cm and >34 cm; delivery duration: overall delivery duration <10 hours and >10 hours, and duration of the second stage of labor <1 hour and >1 hour. The obstetric team consisted of a resident and midwife or an obstetrician and midwife (<10 years, less experienced; and ≥10 years, experienced). A team consisting of an obstetrician and experienced midwife was considered most experienced. All these variables were assessed according to the use of episiotomy.

Data were processed by descriptive analysis and differences between the groups tested by use of z-test for proportions. Microsoft Excel™ was employed on data storage and processing. The level of statistical significance was set at  $p \leq 0.05$ .

## RESULTS

During the 5-year study period from January 1, 2010 until December 31, 2014, there were 12858 vaginal deliveries at our maternity ward, with OASIS diagnosed in 51 (0.4%) women. In the group of women with OASIS, there were 35 (68.7%) primiparae and 13 (25.5%) secundiparae, while there was only one (2.0%) tertipara and two (3.9%) quadriparae. The mean age of study women was 31.7 (range, 17-43) years, mean body weight 80 kg, mean gestational weight gain 15.7 kg, mean body height 168 cm, mean BMI 28.4 kg/m<sup>2</sup>, and mean gestational age 40 (range, 37-41.7) weeks (Table 1).

Table 1.

*Anthropometric parameters and age of women with OASIS*

Anthropometric data and age	n	M	SD	Minimum	Median	Maximum
Age (yrs)	51	31.67	5.58	17	32	43
Body weight (kg)	50	79.96	11.02	65	79	113
Gestational weight gain (kg)	49	15.65	4.39	7	15	25
Body height (cm)	50	167.58	6.47	153	168	182
Body mass index (kg/m <sup>2</sup> )	50	28.42	3.05	22.00	28.00	38.70

OASIS = obstetric anal sphincter injuries; n = number of subjects (data unavailable for some observations); M = arithmetic mean; SD = standard deviation

In this study, BMI >30 kg/m<sup>2</sup> was not a risk factor for OASIS ( $p > 0.05$ ). The mean neonatal birth weight was 3687.06 g and mean birth length 51.39 cm. Male newborns (52.9%) prevailed over female ones (47.1%).

The highest and lowest number of third-degree perineal tears was recorded in 2013 and 2010 with 14 (27.5%) and six (11.8%) cases, respectively. The IIIA type was most common, recorded in 68.8% (n=35) of women, whereas there was no case of type IV; button-hole tear, classified separately according to the Sultan and Royal College of Obstetricians and Gynecologists (RCOG) (8), occurred in two (3.9%) cases (Table 2). In the group of 51 women with OASIS, spontaneous delivery prevailed (n=25; 49%), with only four (7.8%) cases of amniotomy induced labor, while the rate of prostaglandin induced labor and labor induced by premature rupture of membranes (PPROM) was the same, 43.2% (n=22 each). Risk factors for OASIS were present in as many as one-third of women with OASIS

(n=17; 33.3%). More than two-thirds of study deliveries (35/51; 68.6%) were managed by an obstetrician and a midwife. Midwives with <10 and >10 years of work at maternity wards attended deliveries associated with the occurrence of OASIS in almost identical proportion, with a slight prevalence of the latter (28/51; 54.9%).

Table 2.  
 Distribution of particular OASIS types (8)

OASIS degree	n	%
Unclassified third-degree perineal tear	3	5.9
IIIA degree	35	68.6
IIIB degree	7	13.7
IIIC degree	4	7.8
Buttonhole tear	2	3.9
Total	51	100.0

OASIS = obstetric anal sphincter injuries; buttonhole tear = injury of rectal mucosa with intact external anal sphincter (ref. 11)

The overall number of deliveries with and without episiotomy was 2971 (23%) and 9887 (77%), respectively. The prevalence of OASIS was 0.7% (22/2971) in vaginal deliveries with episiotomy and 0.3% (29/9887) in vaginal deliveries without episiotomy. In the group of OASIS with episiotomy, 90.9% (n=20) of OASIS cases occurred in primiparae, and only 9.1% (n=2) in multiparae (z=2.98; p<0.01) (Table 3). More than half of OASIS cases (51%) occurred in the 3500-4000 g birth weight group. There was no statistically significant difference in the rate of OASIS between vaginal deliveries with and without episiotomy at neonatal birth weight <4000 g and ≥4000 g (z=-0.1752; p=0.8572) (Table 4).

Table 3.  
 Number of OASIS cases according to maternal parity – with and without episiotomy

Parity		OASIS		
		Episiotomy	No episiotomy	Total n (%)
Primiparae	n	20	15	35
	%	57,1%	42.9%	100.0%
Multiparae	n	2	14	16
	%	12,5%	87.5%	100.0%
Total	n	22	29	51
	%	43.1%	56.9%	100.0%
z-test for proportions		2.9869		
p-value		0.00278		

OASIS = obstetric anal sphincter injuries

Table 4.  
 Number of OASIS cases according to neonatal birth weight – with and without episiotomy

Neonatal birth weight		OASIS		
		Episiotomy	No episiotomy	Total n (%)
<4000 g	n	17	23	40
	%	42.5%	57.5%	100.0%
≥4000 g	n	5	6	11
	%	45.5%	54.6%	100.0%
Total	n	22	29	51
	%	43.1%	56.9%	100.0%
z-test for proportions		-0.1752		
p-value		0.8572		

OASIS = obstetric anal sphincter injuries

The greatest number of OASIS cases was recorded in the group of neonatal head circumference of 35-36 cm (31.3%). However, there was no statistically significant difference in the number of OASIS cases between vaginal deliveries with and without episiotomy according to neonatal head circumference (categorized in two groups of <34 cm and >34 cm; z=-0.1202; p=0.90448). In the group of deliveries of <10-hour duration, episiotomy was not performed in 71.4% (20/28) of deliveries in which OASIS occurred. On the other hand, in the group of deliveries of >10-hour duration, the prevalence of OASIS was 61.1% (n=11) in deliveries with episiotomy as compared with 38.9% (n=7) in deliveries without episiotomy, yielding a statistically significant difference (z=-2.185; p=0.028). In the group of deliveries of >10-hour duration, the occurrence of OASIS was higher in those with episiotomy (p=0.014). Difference obtained by comparison of the occurrence of OASIS with and without episiotomy irrespective of the second labor stage duration did not reach statistical significance (z=-0.099; p=0.920). Risk factors were present in 33% (n=17) of deliveries with OASIS (fetal head malrotation, shoulder dystocia and OASIS) in previous delivery (44% vs. 56%), whereas fetal rotation and deflection anomalies were the most common risk factors for OASIS (n=11; 64.7%), followed by shoulder dystocia (n=3; 17.6%), maternal noncompliance (n=2; 11.8%), and OASIS in previous delivery (n=1; 5.9%), while 65% (n=11) of all deliveries associated with risk factors were conducted by the most experienced team consisting of an obstetrician and experienced midwife. Epidural analgesia was administered to 21 of 51 (41.2%) women with OASIS. There was no statistically significant difference in the prevalence of OASIS in deliveries with and without episiotomy between women with and without epidural analgesia (z=1.11; p=0.26).

Out of 51 deliveries with OASIS, 11 (21.6%) labors were terminated by vacuum extraction. There was no statistically significant difference in the prevalence of OASIS in deliveries with and without episiotomy



between spontaneous labors and those terminated by vacuum extraction ( $z=1.55$ ;  $p=0.12$ ) (Table 5).

Table 5.  
 Number of OASIS cases according to labor termination – with and without episiotomy

Labor termination		OASIS		
		Episiotomy	No episiotomy	Total n (%)
Vacuum extraction	N	7	4	11
	%	63.6%	36.4%	100.0%
Spontaneous	N	15	25	40
	%	37.5%	62.5%	100.0%
Total	N	22	29	51
	%	43.1%	56.9%	100.0%
z-test for proportions		1.5501		
p-value		0.1210		

OASIS = obstetric anal sphincter injuries

## DISCUSSION

Good clinical practice has demonstrated that routine episiotomy is not justified and should be used exclusively when there is medical indication for it (7). Mediolateral episiotomy does not prevent anal sphincter injury, whereas midline episiotomy is a major risk factor for it (5). According to literature data, the prevalence of episiotomy worldwide ranges from 30% in Europe (9,10) to 62.5% in the USA (3). In Argentina, episiotomy has been performed routinely in almost all primiparae (11).

The overall risk of the occurrence of OASIS is 1% (12). Although the injury is diagnosed and appropriately treated immediately after delivery, pain, anal or urinary incontinence, and sexual dysfunction may persist as complications in one-third of these women, compromising their quality of life (12). The risk factors for OASIS include primiparity, neonatal birth weight >4000 g, vertex presentation, labor induction, epidural analgesia, prolonged second stage of labor >1 hour, shoulder dystocia, midline episiotomy, instrumental labor termination (vacuum extraction or forceps extraction), and OASIS in previous delivery (12,13). The prevalence of OASIS has been investigated most extensively in Scandinavian countries and was found to be 4.2% in Denmark, 2.3% in Norway, and 1% in Finland (14). The low prevalence of OASIS recorded in Finland has been attributed to better MPP technique (13). In Norway, considerable reduction in the rate of OASIS from 4.1% in 2004 to 2.3% in 2010 has been ascribed to the national interventional program of MPP (15).

The program included modified manual perineal protection (mMPP) consisting of the following: 1) good

communication between the woman in labor and midwife/obstetrician; 2) midwife/obstetrician slows down fetal head delivery with one hand; 3) while protecting the perineum with the other hand; 4) the woman in labor does not push while the fetal head is protruding and stretching the perineum; and 5) mediolateral or lateral episiotomy is only performed when indicated (15). Our study results showed the prevalence of episiotomy to be 23% in a cohort of 12858 vaginal deliveries, which is consistent with recommendations issued by the international perinatal societies, according to which the rate of episiotomy should not exceed 30% in tertiary perinatal centers with great numbers of pathologic pregnancies and deliveries, whereas in primary and secondary maternity wards it should not exceed 10%-20% (16,17).

According to RCOG, the acceptable rate of OASIS in vaginal deliveries is 1% (18). In our retrospective study, the prevalence of OASIS was 0.4%, i.e. lower than the rate reported elsewhere, where it ranged from 0.9% (18) to 4.2% (13). The lowest prevalence of OASIS of 0.25% has been reported from England (18). The prevalence of OASIS in vaginal deliveries with episiotomy was statistically significantly higher (0.7%) as compared with vaginal deliveries without episiotomy (0.3%). This result is consistent with those reported by other authors who also point out that episiotomy does not reduce the risk of OASIS (4,12,19-22). Randomized controlled studies also failed to demonstrate any major reduction of OASIS in women with *versus* women without episiotomy (23,24).

The prevalence of OASIS is associated with parity, i.e. the risk of OASIS is increased in primiparity (25,26), as also confirmed in the present study, in particular in primiparae with episiotomy. Besides primiparity, a recent Australian study points to birth weight >4000 g and instrumental labor with mediolateral episiotomy as risk factors for OASIS (27). In our study, there was no statistically significant difference in the prevalence of OASIS between neonatal birth weight >4000 g and <4000 g, although some authors suggest that birth weight >4000 g increases the risk of OASIS (28,29). Other authors investigating the risk factors for OASIS report on an association between fetal head circumference and OASIS as a finding of minor relevance (30). Komorowski *et al.* found a minor effect of head circumference on the occurrence of OASIS (31), whereas our results revealed the highest proportion of OASIS (31.3%) to have occurred in the group of newborns with head circumference of 35 cm and 36 cm. In a retrospective study, de Leeuw *et al.* demonstrated labor induction to be a risk factor for OASIS (28), which was not confirmed in our study. We found a statistically significant difference for deliveries of more than 10-hour duration and deliveries with episiotomy.

The presence of risk factors for OASIS was recorded in 33% of cases, while a team consisting of the obstetrician and midwife with greatest experience conducted deliveries in 65% of cases with OASIS, suggesting that the risk factors for the occurrence of OASIS had been recognized before delivery in most cases. Fetal vertex presentation and shoulder dystocia are reported as the major risk factors for OASIS (12,13,28), whereas in our study fetal rotation and deflection anomalies were the most common risk factors for OASIS, followed by shoulder dystocia (17.6%), maternal noncompliance (11.8%), and OASIS in previous delivery (5.9%).

In a prospective obstetric study conducted in Great Britain and Ireland, maternal morbidity was assessed relative to episiotomy and operative labor termination with vacuum extraction and forceps extraction. Study results showed restrictive use of episiotomy to be preferable in vacuum extraction and routine episiotomy in forceps assisted delivery. In vacuum extraction, restrictive use of episiotomy is advised because routine use of episiotomy increases the prevalence of OASIS (32). In our study, vacuum extraction was used in 21.6% (n=11) of OASIS cases. Based on the analysis of numerous retrospective studies, the RCOG guidelines point to epidural analgesia as one of the risk factors for the occurrence of OASIS, recorded in 2% of cases (12). In our study, epidural analgesia was applied in 41.2% (n=21) of all OASIS cases. There was no statistically significant difference in the prevalence of OASIS between deliveries with and without epidural analgesia according to episiotomy. Our results showed the prevalence of OASIS during the study period to be very low, suggesting that restrictive use of mediolateral episiotomy should be more widely employed in clinical routine.

Proper evaluation of the restrictive use of episiotomy and manual perineal protection as a basis of good midwifery practice have certainly contributed to reduction in the use of routine episiotomy as an unnecessary procedure associated with severe perineal tears. The present study showed that midwifery and obstetric routine could be modified with the aim to achieve evidence-based good clinical practice in order to reduce peripartum injuries and protect later reproductive health of women in labor.

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## SAŽETAK

### RAZDORI III. I IV. STUPNJA MEĐICE I RESTRIKTIVNA UPORABA EPIZIOTOMIJE

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**Cilj:** Utvrditi ukupan broj i učestalost razdora međice III. i IV. stupnja u uporabi restriktivne epiziotomije te učestalost opstetričkih ozljeda analnog sfinktera (OASIS) u odnosu na paritet, način dovršenja porođaja, trajanje porođaja, epiduralnu analgeziju, iskustvo porođičkog tima, porođajnu težinu i opseg glave novorođenčeta. **Ispitanice i metode:** U retrospektivno kliničko istraživanje uključena je 51 roditeljica koje su rodile na Klinici za ginekologiju i porodništvo KB-a Sveti Duh u razdoblju od 1. siječnja 2010 do 31. prosinca 2014. s dijagnozom OASIS. **Rezultati:** Od ukupno 12858 vaginalnih porođaja, 77 % (n=9887) žena nije imalo epiziotomiju, dok je 23% (n=2971) imalo epiziotomiju. Ukupna učestalost OASIS-a u promatranom razdoblju iznosila je 0,4%, s mediolateralnom epiziotomijom (0,7%) u odnosu na žene bez epiziotomije (0,3 %; p<0,05). Udio prvorođilja s OASIS-om statistički je bio viši (68,7 %) u odnosu na višerođilje (31,3%) te trajanja porođaja dulje od deset sati (p<0,05). Ukupno je bilo 33 % roditeljica s rizičnim čimbenicima za nastanak OASIS-a (malrotacija glavice, distocija fetalnih ramena, OASIS u prethodnom porođaju). Nije nađena statistički značajna razlika u odnosu na porođajnu težinu novorođenčeta ispod 4000 g (78,4 %) i iznad 4000 g (21,6 %), majčin indeks tjelesne mase u učestalosti OASIS-a u odnosu na trajanje drugog porođajnog doba duže od jedan sat (43,6 %) i kraće od jedan sat (56,4 %) (p>0,05). **Zaključak:** Kao rizični čimbenici za nastanak OASIS-a pokazali su se prvorođnost, duljina trajanja porođaja više od deset sati te primjena epiziotomije. U trećini slučajeva s OASIS-om bili su prisutni ostali opstetrički rizični čimbenici za nastanak OASIS-a. Restriktivna uporaba epiziotomije i manualna perinealna protekcija smanjuju incidenciju razdora III. i IV. stupnja.

**Ključne riječi:** treći i četvrti stupanj razdora međice, restriktivna epiziotomija, manualna perinealna protekcija