

## LEVATOR ANI ABNORMALITIES SEEN WITH MR IMAGING AFTER FORCEPS DELIVERY: DOES THE LENGTH OF THE SECOND STAGE MATTER?

### Hypothesis / aims of study

Abnormalities of the levator ani muscle are seen with MR imaging in 20% of primiparous women after vaginal delivery (1). Forceps delivery was associated with a 3.5 fold relative risk of levator ani injury when compared with spontaneous vaginal delivery in a study comparing stress incontinent primiparous women with continent primiparous controls (2). The aim of this study is to report the frequency of levator ani injury following forceps delivery in asymptomatic primiparous women and to assess if the length of the second stage is a contributing factor.

### Study design, materials and methods

Thirty one primiparous women who delivered their baby by forceps at term were recruited for an ethically approved study on levator ani injury after forceps delivery. A forceps delivery was performed in twelve women (Group A) for non reassuring fetal status after a second stage length of less than 60 minutes and in 19 women (Group B) for failure to advance with a second stage length greater than 100 minutes. Multiplanar proton density MR images were acquired on all women at least one year following delivery. Women with subsequent pregnancies, multiple pregnancy, preterm deliveries or previous pelvic floor surgery were excluded from the study. Individual chart review provided labour details. All MR scans were reviewed and the pubovisceral portion of the levator ani muscles scored on each side on a scale of 0-3 as previously reported (2). A total score of 0 indicates normal levator muscles, a score of 1-3 a minor levator ani defect and a score of 4-6 or unilateral 3 a major levator ani defect. Table 1 reports the demographics and labour characteristics of the women recruited. Statistical analysis was performed using unpaired t-test and chi-squared test.

Table 1

Variable	All women n = 31 mean $\pm$ SD	A: Second stage < 60mins n = 12 mean $\pm$ SD	B: Second stage > 100 mins n = 19 mean $\pm$ SD	A Vs B p =
Age (years)	30.3 $\pm$ 6	30.6 $\pm$ 4.2	30.2 $\pm$ 6.9	0.8
Birth weight (kg)	3.63 $\pm$ 0.479	3.52 $\pm$ 0.351	3.69 $\pm$ 0.541	0.3
First stage length (minutes)	382.5 $\pm$ 170	374.6 $\pm$ 193.2	387.3 $\pm$ 158.8	0.8
Head circumference (cm)	35.7 $\pm$ 1.1	36.0 $\pm$ 1.1	35.5 $\pm$ 1.2	0.2
Second stage length (minutes)	96.7 $\pm$ 58.3	28.8 $\pm$ 12.6	138.7 $\pm$ 25.9	<.0001
	%	%	%	
Epidural use (%)	90.3	75	100	0.02
Induction (%)	61.2	50	68.4	0.30
Oxytocin (%)	90.3	83.3	94	0.29
OP Position (%)	16.1	16.6	15.7	0.94
Vacuum application prior to forceps (%)	58.0	41.6	68.4	0.14

### **Results**

Of the 31 women enrolled in this study 27 (87%) had an abnormality of the pubovisceral portion of the levator ani muscle visible with MR imaging. Four women had normal appearing levator ani muscles, 7 women had minor defects and 20 women had major defects in the levator ani muscle. Table 2 shows the frequency of abnormalities of the levator ani in the two groups.

Table 2

Levator ani	Group A N = 12	Group B N = 19
Normal	4	0
Minor defect	1	6
Major defect	7	13

### **Interpretation of results**

Women delivered by forceps following a long second stage were statistically more likely to have an abnormality of the levator ani muscles visible with MR imaging compared with women delivered after a short second stage ( $p = 0.016$ ).

### **Concluding message**

Forceps delivery is associated with a high incidence of levator ani injury seen with MR imaging in primiparous women. Women with a longer second stage are more likely to have a major defect of the levator ani muscles. Further research is required to assess if these abnormalities are associated with the future development of pelvic floor problems.

### **References**

1. Levator ani muscle abnormalities seen in MR images after vaginal delivery. *Obstet Gynecol* 2003;101:1:46-53.
2. The severity of levator ani muscle injury seen in MR imaging after vaginal delivery correlates with obstetric history. *Proceedings of ICS meeting Neuro Urodyn* 2002

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