



# Comparison of obstetric outcomes and morbidity in nulliparous pregnant women who received antenatal and intrapartum perineal massage

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## ABSTRACT

**Objectives:** We aimed to compare antepartum and intrapartum perineal massage in nulliparous patients to a control group in terms of “reducing the episiotomy necessity, duration of the second stage of labor, obstetric outcomes, and perineal injury”; and aimed to see if these two massages were superior to each other.

**Materials and Methods:** One hundred and seventy-three nulliparous pregnant women who delivered at 37–42 weeks of gestation were included in the study. Of these pregnant, 55 were in the antenatal massage group (AG), 59 were in the intrapartum massage group (IG), and 59 were in the control group (CG). Among these groups, demographic data of the patients, whether vacuum was applied during delivery, duration of the second stage of labor, whether episiotomy was performed, the degree-of-perineal injury, if any, and 1<sup>st</sup> and 5<sup>th</sup> minute Apgar scores were compared.

**Results:** 14 (25.5%) patients in AG, 11 (18.6%) patients in IG, and 5 (8.6%) patients in CG were delivered without performing episiotomy ( $p=0.04$ ). The rate of having an intact perineum (no perineal laceration) was statistically significantly higher in AG (eight in AG, three in IG, two in CG) ( $p=0.03$ ). Third degree perineal laceration was less common in both AG and IG compared to CG. However, there was a statistically significant difference only between AG and CG ( $p=0.04$ ).

**Conclusion:** Antenatal perineal massage is effective in reducing the episiotomy necessity and the duration of the second stage of labor compared to the control group, but no significant difference was found with intrapartum perineal massage. So, we recommend starting intrapartum perineal massage in patients who have not started in the antenatal period.

**Keywords:** Antenatal perineal massage; episiotomy; intrapartum perineal massage; perineal laceration; perineal massage

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## INTRODUCTION

Although the incidence of third and fourth degree perineal lacerations has been reported as 0.5%–10% in vaginal delivery, it is known that 30%–80% of the patients have different degrees of lacerations. These lacerations are more common especially in nulliparous pregnant women.<sup>1,2</sup>

Episiotomy has been a routine component of vaginal deliveries for many years to reduce anal sphincter injury, uncontrolled perineal lacerations, the risk of operative delivery, and birth trauma to the fetus.<sup>3</sup> However, in recent years, it has been reported that routine episiotomy is not protective for perineal lacerations, and contrary to expectations, it has negative effects on perineal trauma and postpartum recovery time.<sup>4</sup>

American College of Obstetricians and Gynecologists (ACOG) and Royal College of Obstetricians and Gynaecologists (RCOG) do not recommend routine episiotomy in vaginal deliveries. Today, it is recommended to abandon routine episiotomy and to apply limited episiotomy only in cases where the fetus must be delivered quickly, in operative vaginal deliveries and in cases of shoulder dystocia.<sup>5,6</sup>

There are studies reporting that techniques such as “warm application to the perineum, perineal massage, pelvic floor muscle exercises, use of massage and dilatation devices, application of hyaluronidase to the perineum and passing the labor stages in water” are used to reduce the episiotomy necessity and the possibility of perineal trauma.<sup>7-9</sup>

The effectiveness of perineal massage in reducing the perineal trauma, the episiotomy necessity and the length of the second stage of labor is being investigated in several research.<sup>10-12</sup>

In researches, perineal massage timing has been reported as antepartum or intrapartum periods. Antepartum perineal massage describes the daily perineal massage starting 4–6 weeks before the expected delivery time, while intrapartum perineal massage describes the intermittent perineal massage during the second stage of labor at a cervical opening of 4 cm and above.<sup>11,13</sup> The effect of perineal massage on perineal trauma and obstetric outcomes is controversial. To the best of our knowledge, there is no study in the literature comparing perineal massage performed during the intrapartum or antepartum period in terms of birth complications and perinatal outcomes. We aimed to compare antepartum and intrapartum perineal massage in nulliparous patients to a control group in terms of “reducing the episiotomy necessity, duration of the second stage of labor, obstetric outcomes, and perineal injury”; and aimed to see if these two massages were superior to each other.

## MATERIALS AND METHODS

This study was conducted following the principles of the Declaration of Helsinki. This randomized controlled trial began on August 1, 2021 and was finished on January 20, 2022. Nulliparous pregnant women aged 20–35 years and delivered at 37–42 weeks of gestation were included in the study. In the antenatal massage group (AG), 82 patients who applied to the pregnant outpatient clinic in the third trimester and agreed to perform perineal massage for 10 minutes a day after 34 weeks of gestation until delivery were included. Perineal massage was described as applying olive oil to the hands and vagina to facilitate the movement of the hands, and placing one or two fingers (preferably the index and middle fingers) 3–4 cm inside the vagina and stretching them towards the rectum in a U shape from 3 o'clock to 9 o'clock. The first perineal massage was taught to the patient by the midwife or doctor. They were asked to perform perineal massage for 10 minutes a day until delivery. Twenty-seven patients were excluded from the study: 14 pregnant women could not do perineal massage regularly, two pregnant women had preterm births, five pregnant women did not deliver in our hospital, and six pregnant women delivered by cesarean section. Sixty-two nulliparous pregnant women admitted to the delivery room for vaginal delivery were included in the intrapartum massage group (IG). Massage was started when the cervical opening, which is considered as the active phase of labor for pregnant women, was at least 4 cm.<sup>14</sup> After the patients were placed in the lithotomy position, the massage was performed by applying olive oil to the practitioner's two fingers and the patient's vagina in the interval where there was no contraction. After placing the fingers in the vagina up to the second node, a “U” shaped stretching movement was performed from 3 to 9 o'clock level. Massage was performed a total of four times, the last of which was in full cervical dilatation. The total duration of the four was 10 minutes. Three patients who required cesarean section during labor were excluded from the study. In the control group (CG), 59 patients who were not performed perineal massage during the antepartum or intrapartum period were included. Patients who agreed to have regular perineal massage after 34 weeks of gestation were included in the AG. To ensure randomization for IG and C, patients with an even last digit of the protocol number were included in IG, and patients with odd numbers were included in CG. Demographic data of the patients, obstetric histories, vacuum application during delivery, duration of the second stage of labor, whether episiotomy performed, the degree of perineal injury, if any, and 1<sup>st</sup> and 5<sup>th</sup> minute apgar scores after delivery were recorded. The second stage of labor, the time from full cervical dilation to the completion of fetal delivery, was recorded in minutes.

The degree of laceration in the classification of perineal injury;

**First Degree:** superficial injury to the vaginal mucosa that may involve the perineal skin.

**Second Degree:** first-degree laceration involving the vaginal mucosa and perineal body.

**Third Degree:** second-degree laceration with the involvement of the anal sphincter. This is further classified into three sub-categories:

**A:** Less than 50% of the anal sphincter is torn.

**B:** Greater than 50% of the anal sphincter is torn.

**C:** External and internal anal sphincters are torn.

**Fourth Degree:** third-degree laceration involving the rectal mucosa.

Severe perineal lacerations, which include third- and fourth-degree lacerations, are referred to as obstetric anal sphincter injuries (OASIS).<sup>15</sup>

### Statistical Analysis

IBM SPSS ver for data analysis, 21 (IBM Corp., Armonk, N.Y., USA) was used. The conformity of the data to the normal distribution was tested with the Shapiro–Wilk test. Kruskal–Wallis and One-Way ANOVA tests were performed for non-parametric and parametric data, respectively. Tukey test was used for ANOVA test, Mann–Whitney U test with Bonferroni correction was used for Kruskal–Wallis and Bonferroni test was used for chi-square in multiple comparisons. Descriptive statistics of continuous variables were presented as mean  $\pm$  standard deviation, median (minimum-maximum) value, and categorical variables as number (%). A  $p$ -value  $<0.05$  was considered statistically significant.

### RESULTS

A total of 173 patients, 55 of whom were in AG, 59 in IG, and 59 in CG, were included in our study. Demographic data of the patients are presented in Table 1.

14 (25.5%) patients in AG, 11 (18.6%) patients in IG, and 5 (8.6%) patients in CG were delivered without episiotomy. The rate of episiotomy was found to be higher in CG compared to AG and IG (statistically significant between AG and CG,  $p=0.01$ ). Perineal laceration was not observed in 8 (14.4%) of 14 deliveries without episiotomy in AG, while first degree laceration was observed in five and second degree laceration in one patient. On the other hand, perineal laceration was not observed in 3 (5.1%) patients on IG, first degree laceration was observed in 3 (5.1%) and second degree lacerations were observed in 5 (8.5%) patients. On CG, 2 (3.4%) patients had no perineal injury, 1 (1.7%) had first degree laceration, and 3 (5.1%) had second degree laceration. The rate of having an intact perineum (no perineal laceration) was statistically significantly higher in AG ( $p=0.04$  and  $p=0.03$ ) (Table 2).

When we compared the groups among third-degree perineal lacerations, third degree laceration was observed in 1 (1.8%) patient in AG, in 3 (5.1%) patients in IG, and in seven patients (11.9%) in CG. Third degree perineal laceration was the lowest in AG and this difference was statistically significant compared to CG ( $p=0.03$ ) (Table 2). Fourth degree perineal injury was not observed in any of the three groups.

Prenatal hemoglobin values were  $11.8\pm 1.2$  g/l,  $11.8\pm 1.1$  g/l and  $11.7\pm 1.3$  g/l in the groups, respectively ( $p=0.7$ ). Postpartum hemoglobin values were  $10.7\pm 1.7$  g/l,  $10.9\pm 1.3$  g/l and  $10.1\pm 1.1$  g/l, respectively, the difference was statistically significant ( $p=0.03$ ).

In addition, no statistically significant difference was found between the groups at birth week, birth weight, number of patients receiving labor induction, and 1<sup>st</sup> and 5<sup>th</sup> minute apgar scores of the fetus ( $p>0.05$ ) (Table 3).

### DISCUSSION

In this study, in which we compared the results of perineal massage performed in the antenatal or intrapartum period on obstetric and perinatal outcomes, we found that perineal massage performed in both periods (compared to the control

**Table 1. Demographic data of the patients**

	AG (n=55)	IG (n=59)	CG (n=59)	$p$ -value
Age	25.9 $\pm$ 4.1	25.2 $\pm$ 3.9	24.8 $\pm$ 3.6	0.3*
Weight	74.4 $\pm$ 9	73.3 $\pm$ 8.4	75.9 $\pm$ 10	0.07*
Height	1.65 $\pm$ 0.4	1.63 $\pm$ 0.5	1.66 $\pm$ 0.4	0.3*
Weight gained during pregnancy	12 (4–24)	12 (7–25)	13 (5–21)	0.6**
Gravidy	1 (1–3)	1 (1–4)	1 (1–3)	0.9**

\*One-Way ANOVA test was used; \*\*The–Kruskal Wallis test was used.

AG: antenatal massage group; IG: intrapartum massage group; CG: control group; n: number

group) was effective in reducing the rate of episiotomy and the duration of the second stage of labor. In terms of the absence of laceration in the perineum, massage performed during the antenatal period was found to be more effective than the massage performed during the intrapartum period. According to our study results, we think that perineal massage may have an important role in today's world, where routine episiotomy was abandoned and birth as close to natural is aimed with minimal trauma. This study is valuable in that there is no study in the literature comparing massage performed in these two different periods.

In a meta-analysis, it was reported that perineal massage performed in the antenatal period reduced the incidence of episiotomy, and had a protective effect especially against third and fourth degree perineal lacerations.<sup>10</sup> According to the results of the Cochrane systematic review, which included 2,497 women, in which perineal massage performed during the antenatal period was examined, it was reported that perineal massage provided a reduction in episiotomy requirement, perineal traumas and postpartum perineal pain, but differently, it was emphasized that the protective effect of perineal massage was not observed in third and fourth degree lacerations.<sup>11</sup> On the contrary, in their case-control study, Mei-dan et al.<sup>16</sup> found no significant difference in episiotomy rates between women who received and did not receive perineal massage during the antenatal period. In studies investigating the effectiveness of intrapartum perineal massage, the results of the study are also controversial. Karaçam et al.<sup>17</sup> found that the rate of episiotomy

in women who received intrapartum perineal massage was lower than the control group. However, another study investigating the effect of perineal massage in the second stage of labor did not observe a difference in the rate of episiotomy between the massage and control groups.<sup>18</sup> In another study, although intrapartum perineal massage reduced the rate of episiotomy, no protective effect was found in terms of perineal lacerations.<sup>19</sup> In our study, we concluded that perineal massage performed both in the antenatal and intrapartum periods reduced the rate of episiotomy (only antenatal perineal massage is statistically significant compared to control patients, although intrapartum perineal massage reduces the episiotomy rate, it is not statistically significant), and perineal massage performed at two different times was not superior to each other. It has been reported that in the area where perineal massage was performed, an increase in muscle strength, elongation in muscle length and release of endorphins that help control pain increase.<sup>20</sup> We also think that this stretching exercises performed to the perineum reduce the episiotomy necessity due to the increase in muscle strength and muscle elasticity. It is noteworthy that perineal massage started in the intrapartum period has no significant difference with the one started in the antepartum period in reducing the rate of episiotomy. Based on this result, it may be important to performing perineal massage to patients in labor in order to reduce the routine episiotomy by healthcare professionals who manage labor. Perineal massage performed in the antenatal period seems to be more effective than the intrapartum massage in terms of no laceration (intact perineum). We think that this

**Table 2. Variables related to labor and outcomes**

	AG (n=55)	IG (n=59)	CG (n=59)	$p^1$	$p^2$	$p^3$
Episiotomy**	41 (74.5%)	48 (81.4%)	54 (91.5%)	0.3	<b>0.01</b>	0.06
Induction of labor, n (%)**	12 (23.6%)	9 (22%)	11 (20.3%)	0.5	<b>0.5</b>	0.8
No laceration**	8 (14.4%)	3 (5.1%)	2 (3.4%)	<b>0.04</b>	<b>0.03</b>	0.5
Third degree laceration**	1 (1.8%)	3 (5.1%)	7 (11.9%)	0.6	<b>0.03</b>	0.1
Vacuum/forceps**	1 (1.8%)	2 (3.4%)	4 (6.8%)	0.6	0.3	0.6
Stage 2 of labor (min)*	30.1±14.8	28.9±15	36.8±14.4	0.9	<b>0.04</b>	<b>0.01</b>

Significant values are shown in bold.

\*Chi-square test was used; \*\* One-Way ANOVA test was used.

$p^1$ : AG-IG;  $p^2$ : AG-CG;  $p^3$ : IG-CG; AG: antenatal massage group; IG: intrapartum massage group; CG: control group; n: number

**Table 3. Perinatal outcomes**

	AG	IG	CG	$p$ -value
Birth weight	3282±375	3310±391	3344±400	0.6
Birth week	39.2±1.2	39.1±1.1	39.3±1.1	0.08
1 <sup>st</sup> min Apgar	7.7±1.3	7.4±1.6	7.2±1.6	0.2
5 <sup>th</sup> min Apgar	8.9±1.2	8.8±1.4	8.8±1.2	0.9

AG: antenatal massage group; IG: intrapartum massage group; CG: control group; n: number

result is due to a more significant increase in skin and muscle elasticity with longer massage. In addition, daily massage after the third trimester of pregnancy can be effective in overcoming the fear of vaginal birth and examination, increasing the motivation of vaginal birth and increasing the self-confidence of the patients.

Although there are studies reporting that perineal massage has no effect on the duration of the second stage of labor,<sup>8,21</sup> a meta-analysis concluded that antenatal massage is effective in shortening the duration of the second stage of labor.<sup>10</sup> Akhlaghi et al.<sup>22</sup> also reported that perineal massage performed during the intrapartum period was effective in shortening the second stage of labor. Similarly, in our study, we observed that massage performed both in the antenatal period and in the intrapartum period shortened the second stage of labor compared to the control group. In addition, we did not observe any difference in the effectiveness of massages performed at two different times in shortening the duration of the second stage of labor. It is known that the blood supply and oxygenation increase in the perineal massage area, the resulting pain decreases, and the massage helps in pain control by stimulating the release of endorphins.<sup>23</sup> It has also been reported that massage can stimulate the release of oxytocin.<sup>24</sup> This may be associated with the shortening of the second stage of labor.

Abdelhakim et al.<sup>10</sup> emphasized that antenatal perineal massage caused an amelioration in the apgar score of the fetus. In another study, it was reported that perineal massage performed during the antenatal period did not change the rate of birth asphyxia, the rate of hospitalization in the neonatal intensive care unit, the 1<sup>st</sup> and 5<sup>th</sup> minute apgar scores, and the rates of using vacuum/forceps.<sup>25</sup> Aquino et al.<sup>26</sup> also observed no difference in the apgar score of patients who was performed intrapartum perineal massage. In our study, we observed that perineal massage performed both in the antenatal and intrapartum periods reduced the rate of episiotomy and shortened the second stage of labor, but it was not superior to the control group in terms of vacuum application and 1<sup>st</sup> and 5<sup>th</sup> minute apgar scores. Studies with a larger number of patients may be more effective in demonstrating perinatal outcomes.

## CONCLUSION

As a result, in this study, which compared the effectiveness of antenatal and intrapartum perineal massage, which we have not encountered before in the literature; we observed that perineal massage, which is simple, easy to apply, less time consuming, inexpensive and has no negative consequences for the newborn,

is similarly effective in shortening the rate of episiotomy and the duration of the second stage of labor. Antenatal massage was found to be more effective in terms of intact perineum (no laceration). Based on these findings, it seems more appropriate to recommend regular perineal massage applications to be started in the antenatal period in nullipare pregnant. However, we recommend starting intrapartum perineal massage in patients who have not started in the antenatal period. As stated in the literature, reducing the rate of episiotomy and perineal lacerations are used as a quality measure of health,<sup>27</sup> and perineal massage is also effective on this.

## ETHICS

**Ethics Committee Approval:** This study was approved by Erzincan Binali Yıldırım University Clinical Researches Ethics Committee (decision no: 11/17 and date: 25/10/2021).

**Informed Consent:** It was obtained.

**Peer-review:** Externally peer-reviewed.

## Contributions

Concept: T.K., S.K.; Design: T.K., S.K.; Data Collection and/or Processing: S.K., N.Y.; Analysis and/or Interpretation: T.K., N.Y.; Drafting: S.K.; Critical Revisions: P.U.; Writing: T.K.

## DISCLOSURES

**Conflict of Interest:** No conflict of interest was declared by the authors.

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