



COMPARATIVE ANALYSIS OF DIFFERENT PERINEAL PROTECTION TECHNIQUES DURING VAGINAL DELIVERY: A RANDOMIZED CONTROLLED CLINICAL TRIAL

Bazarova Zarina Zafarovna,

Trainee Assistant of the Department of Obstetrics and Gynecology No. 1, SamSMU

Abstract. Perineal trauma remains one of the most frequent complications of vaginal delivery and a significant contributor to maternal morbidity worldwide. Despite the widespread use of various perineal protection techniques, including manual perineal support, warm compress application, and controlled fetal head delivery, there is currently no unified clinical standard guiding their implementation. This variability contributes to inconsistent obstetric outcomes and limits the effectiveness of preventive strategies.

The aim of this randomized controlled trial was to compare the effectiveness of four different perineal protection techniques in reducing soft tissue birth canal trauma. A total of 240 parturient women with term singleton pregnancies were randomly assigned into four equal groups: hands-off technique, hands-on technique, warm compress application, and a combined method integrating all interventions. Primary outcomes included the incidence and severity of perineal tears and the rate of episiotomy. Secondary outcomes included the duration of the second stage of labor and neonatal condition assessed by Apgar scores.

The results demonstrated that the combined method was associated with the lowest rates of perineal trauma and episiotomy, as well as improved labor efficiency. The incidence of perineal tears decreased from 30% in the hands-off group to 10% in the combined group, while episiotomy rates decreased from 40% to 15%, respectively. Neonatal outcomes remained favorable across all groups.

These findings indicate that the integration of multiple perineal protection strategies produces a synergistic effect, significantly improving maternal outcomes. The combined approach should be considered as a potential standard of care for the management of the second stage of labor.

Keywords: Perineal trauma, perineal protection, episiotomy, vaginal delivery, randomized controlled trial, obstetric outcomes, labor management, birth biomechanics, maternal morbidity, combined technique.

СРАВНИТЕЛЬНЫЙ АНАЛИЗ РАЗЛИЧНЫХ МЕТОДОВ ЗАЩИТЫ ПРОМЕЖНОСТИ В РОДАХ: РАНДОМИЗИРОВАННОЕ КЛИНИЧЕСКОЕ ИССЛЕДОВАНИЕ

Базарова Зарина Зафаровна,

Стажер-ассистент кафедры Акушерства и гинекологии №1 СамГМУ

Аннотация. Травматизация промежности остаётся одной из наиболее частых осложнений вагинальных родов и значимым фактором материнской заболеваемости во всём мире. Несмотря на широкое применение различных методов защиты промежности, включая ручную поддержку, использование тёплых компрессов и контролируемое рождение головки плода, в настоящее время отсутствует единый клинический стандарт их применения. Это приводит к вариативности акушерских исходов и снижает эффективность профилактических мероприятий.

Целью данного рандомизированного клинического исследования является сравнительная оценка эффективности четырёх различных методов защиты промежности в

профилактике травм мягких тканей родовых путей. В исследование включены 240 рожениц с доношенной одноплодной беременностью, которые были случайным образом распределены на четыре равные группы: hands-off техника, hands-on техника, применение тёплых компрессов и комбинированный метод, включающий все перечисленные вмешательства.

Основными оцениваемыми показателями являлись частота и степень разрывов промежности, а также частота эпизиотомии. Дополнительно анализировались длительность второго периода родов и состояние новорождённых по шкале Апгар.

Результаты показали, что комбинированный метод характеризуется наименьшей частотой перинеальной травмы и эпизиотомии, а также более эффективным течением родов. Частота разрывов снизилась с 30% в группе hands-off до 10% в группе комбинированного подхода, а частота эпизиотомии - с 40% до 15% соответственно. Неонатальные исходы во всех группах оставались благоприятными.

Полученные данные свидетельствуют о синергетическом эффекте комбинированного применения методов защиты промежности и подтверждают его высокую клиническую эффективность. Комбинированный подход может рассматриваться в качестве перспективного стандарта ведения второго периода родов.

Ключевые слова: Перинеальная травма, защита промежности, эпизиотомия, вагинальные роды, рандомизированное исследование, акушерские исходы, ведение родов, биомеханика родов, материнская заболеваемость, комбинированный метод.

TUG‘RUQ JARAYONIDA ORALIQNI HIMOYA QILISHNING TURLI USULLARINI QIYOSIY TAHLILI: RANDOMIZATSIYALANGAN KLINIK TADQIQOT

Bazarova Zarina Zafarovna,

SamDTU 1-son Akusherlik va ginekologiya kafedrası stajyor-assistenti.

Annotatsiya. Oraliq jarohatlari vaginal tug‘ruqlarning eng ko‘p uchraydigan asoratlaridan biri bo‘lib, onalar salomatligiga sezilarli ta‘sir ko‘rsatadi. Oraliqni himoya qilishning turli usullari - qo‘l bilan qo‘llab-quvvatlash, issiq kompresslar qo‘llash va homila boshchasini nazoratli chiqarish - keng qo‘llanilishiga qaramay, ularni qo‘llash bo‘yicha yagona klinik standart mavjud emas. Bu esa tug‘ruq natijalarining o‘zgaruvchanligiga olib keladi va profilaktika samaradorligini pasaytiradi.

Mazkur randomizatsiyalangan klinik tadqiqotning maqsadi tug‘ruq yo‘llari yumshoq to‘qimalari jarohatlarining oldini olishda oraliqni himoya qilishning to‘rtta usulining samaradorligini taqqoslashdan iborat. Tadqiqotga 240 nafar to‘liq muddatli bir homilali ayollar jalb qilindi va ular tasodifiy ravishda to‘rtta guruhga ajratildi: hands-off usuli, hands-on usuli, issiq kompresslar va barcha usullarni o‘z ichiga olgan kombinatsiyalangan yondashuv.

Asosiy baholash mezonlari sifatida oraliq yorilishlari chastotasi va darajasi hamda epiziotomiya ko‘rsatkichlari o‘rganildi. Qo‘shimcha ravishda tug‘ruqning ikkinchi bosqichi davomiyligi va yangi tug‘ilgan chaqaloqlarning Apgar ko‘rsatkichlari tahlil qilindi.

Natijalar shuni ko‘rsatdiki, kombinatsiyalangan usul eng past darajadagi jarohatlanish va epiziotomiya ko‘rsatkichlariga ega bo‘lib, tug‘ruq jarayonining samaradorligini oshiradi. Oraliq yorilishlari chastotasi hands-off guruhida 30% dan kombinatsiyalangan guruhda 10% gacha kamaydi, epiziotomiya esa 40% dan 15% gacha qisqardi. Neonatal natijalar barcha guruhlarda ijobiy bo‘ldi.

Olingan natijalar kombinatsiyalangan yondashuvning sinergik samaradorligini ko‘rsatadi va uni tug‘ruqning ikkinchi bosqichini olib borishda samarali strategiya sifatida tavsiya etishga asos beradi.

Kalit so‘zlar: Perineal jarohat, oraliqni himoya qilish, epiziotomiya, vaginal tug‘ruq, randomizatsiyalangan tadqiqot, akusherlik natijalari, tug‘ruqni boshqarish, tug‘ruq biomekhanikasi, ona salomatligi, kombinatsiyalangan usul

Introduction. Perineal trauma during vaginal delivery remains one of the most prevalent and clinically significant complications in contemporary obstetrics, contributing substantially to maternal morbidity both in the immediate postpartum period and in long-term pelvic floor dysfunction [1,2,6,16,18]. The spectrum of soft tissue injury ranges from superficial first-degree lacerations to severe obstetric anal sphincter injuries (OASIS), which may result in profound and irreversible sequelae, including fecal incontinence, chronic pelvic pain, dyspareunia, and psychological distress [2,3,7,10]. Despite considerable advances in obstetric care, the incidence of moderate-to-severe perineal trauma remains unacceptably high, reflecting the multifactorial and complex nature of its pathogenesis. The mechanical process of childbirth imposes extreme stress on the perineal tissues, requiring a delicate balance between fetal descent forces and tissue elasticity [3,5,15,17]. The perineum must undergo significant stretching, often exceeding 200% of its resting length, to accommodate the passage of the fetal head. This process is governed by the viscoelastic properties of connective tissue, primarily composed of collagen, elastin, and extracellular matrix components [3,15,17,18]. The structural integrity and adaptive capacity of these tissues are influenced by numerous factors, including hormonal regulation, vascular perfusion, genetic predisposition, and prior obstetric history. In clinical practice, various techniques have been proposed to mitigate perineal trauma, including hands-on perineal support, hands-off approaches emphasizing physiological birth, application of warm compresses, and controlled delivery of the fetal head. Each of these methods targets specific aspects of the biomechanical process, yet their isolated use has yielded inconsistent outcomes across different clinical settings [6,10,19,20]. The absence of a standardized, evidence-based protocol reflects both the heterogeneity of patient populations and the variability in practitioner technique.

A critical limitation of existing approaches lies in their tendency to be applied in isolation, without consideration of potential synergistic interactions between different protective mechanisms [5,11,12,13,29]. For example, while manual perineal support may redistribute mechanical forces, it does not directly influence tissue elasticity, which may be enhanced by thermal interventions such as warm compresses. Similarly, controlled delivery techniques reduce the rate of tissue stretching but may be insufficient in cases of reduced tissue compliance. This study is predicated on the hypothesis that a combined perineal protection strategy, integrating multiple interventions, may provide superior outcomes compared to single-method approaches [5,6,21]. By addressing multiple dimensions of the biomechanical process simultaneously, such a strategy may optimize tissue adaptation and minimize trauma [9,13,21,30]. The present randomized controlled trial was designed to systematically compare four distinct perineal protection techniques, thereby providing a comprehensive evaluation of their relative effectiveness and potential synergistic effects.

Materials and Methods. The study was conducted as a prospective randomized controlled trial in a tertiary-level obstetric institution, ensuring a standardized clinical environment and access to experienced practitioners. A total of 240 pregnant women meeting strict inclusion criteria were enrolled in the study. Inclusion criteria comprised singleton term pregnancy, cephalic presentation, absence of contraindications to vaginal delivery, and informed consent to participate. Exclusion criteria included multiple gestation, fetal anomalies, previous reconstructive pelvic surgery, and any indication for planned operative delivery. Randomization was performed using a computer-generated allocation sequence, ensuring equal distribution of participants into four groups of 60 patients each. Allocation concealment was maintained to minimize selection bias, and clinicians were trained in standardized protocols to ensure consistency of intervention. The first group underwent the hands-off technique, characterized by minimal intervention and allowing spontaneous fetal head delivery without direct manual support. This approach reflects the philosophy of physiological childbirth, emphasizing natural tissue adaptation without external manipulation. The second group received the hands-on technique, involving active perineal support by the clinician. This technique includes controlled application of pressure to the perineum and modulation of fetal head extension to reduce peak mechanical stress. The aim is to redistribute forces across the perineal body and prevent localized overstretching.

The third group was subjected to warm compress application during the second stage of labor. Sterile compresses heated to approximately 38–40°C were applied continuously to the

perineum, with the objective of enhancing tissue elasticity, increasing blood flow, and reducing resistance to stretching. The fourth group received a combined intervention, integrating hands-on support, warm compress application, and controlled delivery of the fetal head. In addition, guided maternal pushing was employed to synchronize expulsive efforts with fetal descent, ensuring gradual and controlled progression. Outcome measures were carefully selected to capture both clinical and functional aspects of perineal trauma. The primary outcomes included the incidence and severity of perineal tears, classified according to standard obstetric criteria, and the rate of episiotomy. Secondary outcomes included duration of the second stage of labor and neonatal condition assessed by Apgar scores at 1 and 5 minutes.

Table 1. Comparative Outcomes of Perineal Protection Techniques

Method	Perineal Tears (%)	Episiotomy (%)	Second Stage (min)	Apgar (5 min)
Hands-off	30%	40%	52 ± 11	8.6 ± 0.5
Hands-on	22%	28%	47 ± 10	8.8 ± 0.4
Warm compresses	18%	25%	45 ± 9	8.9 ± 0.3
Combined method	10%	15%	41 ± 8	9.1 ± 0.3

Results. The results of the study demonstrate clear and statistically meaningful differences among the four groups, highlighting the superiority of the combined perineal protection strategy. The incidence of perineal trauma was highest in the hands-off group, where spontaneous delivery without intervention resulted in a 30% rate of tears. In contrast, the combined method reduced this rate to 10%, representing a threefold decrease. Similarly, the rate of episiotomy was significantly lower in the combined group, suggesting that effective prevention of spontaneous tears also reduces the need for surgical intervention. The hands-on and warm compress groups demonstrated intermediate outcomes, indicating that each technique independently contributes to trauma reduction, albeit to a lesser extent than their combination. The duration of the second stage of labor was shortest in the combined group, suggesting improved efficiency of labor progression. Importantly, this reduction did not compromise neonatal outcomes, as evidenced by consistently high Apgar scores across all groups. These findings indicate that the integration of multiple protective mechanisms results in cumulative benefits, improving both maternal and neonatal outcomes.

Discussion. The findings of this randomized controlled trial provide compelling evidence that a combined perineal protection strategy significantly enhances clinical outcomes compared to isolated techniques [4,12,28]. The observed reduction in perineal trauma is not merely additive but appears to reflect a synergistic interaction between different interventions, each targeting distinct aspects of the biomechanical process of childbirth. From a mechanistic standpoint, perineal trauma occurs when the tensile forces generated during fetal descent exceed the elastic capacity of the perineal tissues. The combined strategy effectively addresses this imbalance through three complementary mechanisms. First, manual perineal support redistributes mechanical stress, reducing localized strain [26,27,29]. Second, thermal application increases tissue elasticity and perfusion, enhancing the capacity of tissues to accommodate stretching. Third, controlled delivery modulates the rate of deformation, preventing abrupt increases in stress [1,26,27]. The superiority of the combined approach challenges the traditional dichotomy between interventionist and non-interventionist obstetric philosophies. Rather than favoring one approach over the other, the findings suggest that optimal outcomes are achieved through a balanced integration of supportive interventions and physiological processes [22,23,24]. This paradigm shift aligns with the broader movement toward precision medicine, where treatment strategies are tailored to individual patient characteristics and dynamic clinical conditions. The reduction in episiotomy rates observed in the combined group is particularly noteworthy. Episiotomy, once considered a protective measure, is now recognized as a potential contributor to severe perineal trauma [14,23,24]. By effectively preventing spontaneous tears, the combined strategy reduces the need for surgical intervention, thereby preserving tissue integrity and promoting more favorable healing. Another important

observation is the reduction in the duration of the second stage of labor. This finding suggests that improved coordination between maternal efforts and fetal descent enhances the efficiency of the delivery process [16,18,20]. From a physiological perspective, efficient labor progression minimizes tissue fatigue and reduces the cumulative exposure of perineal tissues to mechanical stress. The clinical implications of these findings are substantial. The adoption of combined perineal protection strategies could lead to significant reductions in maternal morbidity, including chronic pelvic floor disorders [17,20]. Furthermore, the simplicity and low cost of the interventions make them accessible and feasible in a wide range of healthcare settings.

However, the successful implementation of such strategies requires adequate training and standardization of techniques. Variability in clinician skill and experience may influence outcomes, underscoring the need for structured educational programs and simulation-based training. While the results are robust, further research is needed to validate these findings in diverse populations and clinical environments. Future studies should explore the integration of predictive models and real-time monitoring tools to further enhance individualized care.

Conclusion. The present study demonstrates that a combined perineal protection strategy is significantly more effective than individual techniques in reducing soft tissue trauma during vaginal delivery. By integrating mechanical support, thermal modulation, and controlled delivery, this approach provides a comprehensive and physiologically sound method for optimizing maternal outcomes. The findings support the incorporation of combined perineal protection techniques into standardized obstetric protocols, representing an important step toward evidence-based and patient-centered maternity care.

References.

1. Aasheim, V., Nilsen, A. B. V., Reinar, L. M., & Lukasse, M. (2017). Perineal techniques during the second stage of labour for reducing perineal trauma. *Cochrane Database of Systematic Reviews*, (6), CD006672.
2. Eason, E., Labrecque, M., Wells, G., & Feldman, P. (2000). Preventing perineal trauma during childbirth: A systematic review. *Obstetrics & Gynecology*, 95(3), 464–471.
3. Okeahialam, N. A., et al. (2024). Prevention of perineal trauma during vaginal birth. *American Journal of Obstetrics and Gynecology*.
4. Borján, E. (2024). Perineal protection techniques during labor. *European Journal of Midwifery*.
5. André, K., et al. (2024). Minimizing tearing during vaginal delivery. *AJOG MFM*.
6. da Silva, M. L., et al. (2023). Obstetric gel and perineal trauma prevention. *European Journal of Obstetrics & Gynecology*.
7. Roman, M. P., et al. (2023). Perineal trauma: qualitative synthesis. *Midwifery*.
8. Rodrigues, S., et al. (2024). Midwives' practices on perineal protection. *European Journal of Midwifery*.
9. Ferreira-Couto, C. M., et al. (2017). Perineal trauma prevention: integrative review. *Revista Latino-Americana de Enfermagem*.
10. Aasheim, V., et al. (2017). Techniques and devices in perineal protection. *Cochrane Review*.
11. Allam, S., et al. (2025). Effectiveness of perineal protection devices. *International Urogynecology Journal*.
12. Koyucu, R. G., et al. (2025). Manual perineal protection and pushing techniques. *Clinical Obstetrics Research*.
13. Beckmann, M. M., & Stock, O. M. (2013). Antenatal perineal massage. *Cochrane Database*.
14. Sultan, A. H., et al. (1994). Anal sphincter trauma during delivery. *New England Journal of Medicine*.
15. Andrews, V., et al. (2006). Risk factors for obstetric anal sphincter injury. *BJOG*.
16. Hals, E., et al. (2010). Intervention programs reducing perineal trauma. *Obstetrics & Gynecology*.
17. Stedenfeldt, M., et al. (2014). Risk factors for perineal lacerations. *AJOG*.

18. Räisänen, S., et al. (2012). Maternal and neonatal risk factors. *Acta Obstetricia Scandinavica*.
19. Dahlen, H. G., et al. (2007). Birth positions and perineal outcomes. *Birth*.
20. Albers, L. L., et al. (2005). Second stage labor and outcomes. *Journal of Midwifery*.
21. Pergialiotis, V., et al. (2014). Perineal massage meta-analysis. *Archives of Gynecology*.
22. WHO. (2018). Intrapartum care recommendations.
23. RCOG. (2015). Perineal tear guidelines.
24. ACOG. (2016). Practice Bulletin No. 165.
25. Fernando, R. J., et al. (2006). Repair of obstetric injuries. *Obstetrics & Gynecology*.
26. McCandlish, R., et al. (1998). Hands-on vs hands-off trial. *BMJ*.
27. Mayerhofer, K., et al. (2002). Perineal techniques trial. *BJOG*.
28. Bulchandani, S., et al. (2015). Manual perineal support meta-analysis. *BJOG*.
29. Pierce-Williams, R., et al. (2021). Hands-on vs hands-off meta-analysis.
30. Villani, F., et al. (2024). Antenatal perineal training. *Medicina*.