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## Does Dancing Reduce Pain During the First Stage of Labor?

Mattea M. Krasicky

*Philadelphia College of Osteopathic Medicine*

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# **Does Dancing Reduce Pain During the First Stage of Labor?**

Mattea M. Krasicky, PA-S

A SELECTIVE EVIDENCE BASED MEDICINE REVIEW

In Partial Fulfillment of the Requirements For

The Degree of Master of Science

In

Health Sciences – Physician Assistant

Department of Physician Assistant Studies  
Philadelphia College of Osteopathic Medicine  
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## ABSTRACT

**OBJECTIVE:** The objective of this selective evidence-based medicine (EBM) review is to determine whether or not “Does dancing reduce pain during the first stage of labor?”

**STUDY DESIGN:** Systematic review of one randomized controlled trial (RCT), one single-blind RCT, and one cohort study.

**DATA SOURCES:** All articles were published in English in peer-reviewed journals between 2014-2020. The articles were obtained via PubMed, Academic Search Premier, AMED, CINHAL Plus, Health Source: Nursing/Academic Edition, and MEDLINE.

**OUTCOMES MEASURED:** The outcome measured in all three studies was pain severity during labor. Outcomes were measured using the Visual Analog Scale (VAS) of 0 (no pain) to 10 (most severe pain ever experienced).

**RESULTS:** The RCT conducted by Abdollahian et al.<sup>9</sup> found a statistically significant difference in pain scores between the dance intervention and control groups. The mean pain score 60 minutes after intervention in the dance group was 9.50 compared to 9.95 in the control group with a p-value of 0.036. The single-blind RCT conducted by Gönenç and Dikmen<sup>10</sup> found a statistically significant difference in mean pain scores between the dance and music intervention group and control groups. The mean pain score 60 minutes after intervention in the dance and music group was 6.87 compared to 9.12 in the control group with a p-value of <0.001. The cohort study conducted by Akin and Saydam<sup>11</sup> showed a statistically significant difference in mean pain scores between the dancing with spouse intervention group and control group at 9 cm of cervical dilation. The mean pain score in the dancing with spouse group was 8.60 after intervention compared to 9.17 in the control group with a p-value of 0.014.

**CONCLUSION:** All three studies evaluated in this review demonstrated statistically significant lower pain scores in dance intervention groups compared to control groups. This evidence supports dance during the active phase of labor as an effective method of pain control. Further studies should standardize the dance intervention and labor environment and use blinded raters to administer pain scales.

**KEY WORDS:** dance, labor pain

## INTRODUCTION

The first stage of labor is the time between the onset of labor and complete cervical dilation to 10 cm.<sup>1</sup> It is characterized by painful uterine contractions, which arise from uterine tissue ischemia and distention of uterine mechanoreceptors, resulting in abdominal pain and low back pain.<sup>2</sup> Labor pain is universal but unique, depending on an individual's personal pain tolerance, family and social support, and expectations for labor. Individualized pain management during labor is therefore necessary and requires effective strategies. Patient education prior to labor about pain management options helps establish a sense of personal control, which improves the labor experience.<sup>2</sup> Providers should be familiar with a variety of pain control strategies.

With over 3.6 million births in the United States in 2020,<sup>3</sup> childbirth is the number one overall reason for hospitalization among women in the US.<sup>4</sup> Maternity care is the most expensive hospital-based condition and out-of-pocket spending is rising over time.<sup>4</sup> In 2015, the average out-of-pocket cost of a vaginal delivery for women with marketplace insurance was over \$4,000.<sup>4</sup> The cost of pharmacologic pain management is not well documented and inconsistent depending on state and insurance coverage. As such, nonpharmacologic pain management options have continued to be popular due to reduced maternity care costs, in addition to various psychological, emotional, spiritual, and physical benefits.<sup>5</sup>

Current pain management strategies during labor are categorized based on the complexity and cost of administration. Low resource strategies, such as movement, massage, and breathing techniques, are simple, inexpensive, and readily available.<sup>6</sup> Moderate resource pain management involves specialized assistance and specific equipment, such as acupuncture, yoga, and water immersion.<sup>6</sup> High resource methods are pharmacologic and include either systemic analgesia, such as opioids, or more commonly used neuraxial analgesia, such as epidural, spinal,

or combined spinal and epidural analgesia.<sup>2</sup> Patients may opt to use pain control strategies that incorporate several methods. Nonpharmacologic interventions early in labor can help delay the need for pharmacologic interventions, which may reduce adverse effects of neuraxial analgesia on both the mother and fetus.<sup>6</sup> New methods should be developed and investigated in order to support patient goals of care.

Recently, social media has sparked interest in dancing during labor. While there are many forms of dance, “labor dance” generally involves fluid body movements, pelvic tilt, hip circles, and upright posture. One feasibility study reported that 88.6% of surveyed women were interested in participating in a future study to evaluate low-impact dancing for pain reduction during labor.<sup>7</sup> Dance has been established as a method of pain control in other conditions, such as chronic low back pain. Castrillon et al.<sup>8</sup> found that a belly dance program improved pain in women with chronic low back pain by improving posture and spinal stability. In the context of labor, upright positioning and low-impact movements have been established as beneficial to improving circulation and maternal discomfort.<sup>5</sup> Upright positioning allows gravity to help the fetus descend into the pelvis during the active phase of labor, reducing ischemic pain by alleviating compression of abdominal blood vessels and improving blood flow to the uterus.<sup>5</sup> Low-impact movements, such as those associated with labor dance, help relax pelvic floor muscles, unload the spine, distribute force across the body, and distract the patient from the pain of labor.<sup>5,8,9</sup> Based on this evidence, dance during the active phase of labor may reduce pain. This paper evaluates two randomized controlled trials (RCTs) and one cohort study, assessing the efficacy of dancing during the first stage of labor as a method of pain control.

## OBJECTIVE

The objective of this selective evidence-based medicine (EBM) review is to determine whether or not “Does dancing reduce pain during the first stage of labor?”

## METHODS

The population of focus in this review is pregnant women with single, uncomplicated pregnancies at 37-42 weeks of gestation. The intervention under investigation is dance movements during the first stage of labor compared to usual labor care and the outcome measured is pain severity during labor. Types of studies included in this review are one RCT, one single-blind RCT, and one cohort study.

The keywords used to select relevant articles were “dance”, “labor pain”, and “randomized controlled trial”. All articles were published in English in peer-reviewed journals and obtained via PubMed, Academic Search Premier, AMED, CINHAI Plus, Health Source: Nursing/Academic Edition, and MEDLINE. The studies were selected based on their ability to answer the clinical question and if they measured patient-oriented evidence. Inclusion criteria were experimental studies published in English in or after 2010. Exclusion criteria were observational or feasibility studies published before 2010. The statistics reported include mean pain score and standard deviation, F-score, and p-value. Table 1 demonstrates the demographics and characteristics of the included studies.

**Table 1: Demographics & Characteristics of Included Studies**

Study	Type	# pts	Age (yrs)	Inclusion Criteria	Exclusion Criteria	W/D	Intervention
Abdolahian (2014) <sup>9</sup>	RCT	60	18-35	Patients 18-35y/o, primiparous, single pregnancies, cephalic presentation, 38-40wks gestation,	Not specified	0	Standing upright with pelvic tilt and rocked their hips back and forth or in a circle while their partner massaged their

				anticipated normal birth, and no hx of infertility			back and sacrum for a minimum of 30 mins.
Gönenç (2020) <sup>10</sup>	Single-blind RCT	93	18-34	Nulliparity, single fetus, cephalic position, 38-42 wks gestation, fetal weight 2500-4000g, normal fetal HR, anticipated normal birth, active phase of first stage of labor w/o analgesia	Voluntary withdrawal, abnormal fetal HR, unexpected complication of mother or fetus, use of exogenous oxytocin, analgesics, or anesthesia, precipitous labor, C-section	6	Dance: circular movement of pelvis and waist, movement of body/pelvis left and right, semi-squatting, and pelvic tilts. Performed in an upright position supported by a researcher.
Akin (2020) <sup>11</sup>	Cohort	160	<20-34	Admitted to Ministry of Health Urla State Hospital, cervical dilation btwn 4-8cm, received labor dance training, 37-41 wks gestation, uncomplicated	C-section, induced labor, use of narcotic analgesics	28	Labor dance with spouse massaging pregnant woman's sacral areas during dance.

## OUTCOMES MEASURED

The primary outcome assessed in this EBM review is pain severity during labor. All three articles measured pain severity using the Visual Analog Scale (VAS), a tool used to evaluate subjective pain on a scale from zero to ten, with zero representing no pain and ten representing the most severe pain. Abdolahian et al.<sup>9</sup> asked participants to score their pain before labor and every 30 minutes until cervical dilation reached 10 cm. Gönenç and Dikmen<sup>10</sup> obtained a baseline pain score at 4-5 cm of cervical dilation and repeated the pain measurement immediately after, 30 minutes after, and 60 minutes after intervention. Akin and Saydam<sup>11</sup> administered the VAS at 4 cm cervical dilation and at 9 cm cervical dilation. For consistency,

pain score at 60 minutes after intervention or at 9 cm of cervical dilation will be analyzed in this review.

## RESULTS

Abdolahian et al.<sup>9</sup> conducted a RCT to evaluate the effectiveness of dance labor in pain reduction. The authors recruited 60 primiparous women aged 18-35 years old with single pregnancies from a large general public hospital of Shiraz University of Medical Sciences in Iran.<sup>9</sup> The inclusion and exclusion criteria of the participants are outlined in Table 1. Women were randomized into two groups via a table of random numbers, where even numbers were assigned to the dance labor group and odd numbers were assigned to the control group.<sup>9</sup> The dance group participants were instructed to stand upright with pelvic tilt and rock their hips with their arms on their partner's shoulders while their partner massaged their back and sacrum for at least 30 minutes.<sup>9</sup> The control group participants selected their own positioning and received usual labor care with no pain management interventions.<sup>9</sup> Both groups underwent labor in labor rooms with equal environmental conditions, equipment, monitoring, and family members present.<sup>9</sup>

Pain severity was recorded using a VAS in both groups before labor and every 30 minutes until cervical dilation reached 10 cm.<sup>9</sup> The statistical analysis included mean pain score before and after intervention and p-values, where a p-value <0.05 was considered statistically significant.<sup>9</sup> The mean pain score before intervention in the dance labor group was 6.89, compared to 8.29 in the control group.<sup>9</sup> At 60 minutes after intervention, the mean pain score in the dance labor group was 9.5, compared to 9.93 in the control group.<sup>9</sup> There was a statistically significant difference in pain score between the two groups at 60 minutes after intervention with a p-value of 0.036.<sup>9</sup> The results of this study are outlined in Table 2.



**Table 2: Comparison of Pain Scores Before and 60 Minutes After Intervention<sup>9</sup>**

	<b>Before Intervention</b> <i>(Mean)</i>	<b>60 Minutes After Intervention</b> <i>(Mean)</i>	<b>P-value</b>
<b>Dance Labor Group</b>	6.89	9.5	0.036
<b>Control Group</b>	8.29	9.93	

Gönenç and Dikmen<sup>10</sup> conducted a single-blind RCT to test the effects of dance and music (DM) and music alone on pain during the active phase of labor. To maintain consistency, this review will not include the music alone group. The authors conducted the study in the childbirth unit of a maternity and children's hospital in Konya Province, Turkey between February and June of 2018.<sup>10</sup> The inclusion and exclusion criteria for this study are outlined in Table 1. 99 women were recruited and underwent block randomization into one of three study groups, with 33 participants per group.<sup>10</sup> After exclusion, the study analyzed 31 participants in the DM group and 32 participants in the control group.<sup>10</sup> The labor dance intervention consisted of a circular movement of the pelvis and waist, movement of body and pelvis from side to side, semi-squatting, and pelvic tilts.<sup>10</sup> Participants in the DM group performed the labor dance for at least 30 minutes standing upright with their arms on the researcher's shoulders for support in addition to routine labor care.<sup>10</sup> The control group received usual labor care, but did not receive support from anyone other than nurses or midwives due to restrictions that prohibit relatives from being present during labor.<sup>10</sup>

Baseline pain scores were obtained for all participants at 4-5 cm of cervical dilation, at which point the participants performed their designated intervention, followed by repeat pain measurements soon after intervention, 30 minutes after, and 60 minutes after.<sup>10</sup> Statistical measures included mean pain score and standard deviation, F scores, and p-values, where a p-value <0.05 was considered statistically significant.<sup>10</sup> The mean pain score and standard deviation before intervention in the DM group was  $6.97 \pm 2.32$ , compared to  $6.28 \pm 1.17$  in the

control group.<sup>10</sup> The mean pain score and standard deviation at 60 minutes after intervention in the DM group was  $6.87 \pm 2.75$ , compared to  $9.12 \pm 1.64$  in the control group.<sup>10</sup> There was a statistically significant difference in pain score between the groups at 60 minutes after intervention with an F-score of 7.514 and a p-value  $<0.001$ .<sup>10</sup> The results of this study are outlined in Table 3.

**Table 3: Comparison of Pain Scores Before and 60 Minutes After Intervention<sup>10</sup>**

	<b>Before Intervention</b> (Mean $\pm$ SD)	<b>60 Minutes After Intervention</b> (Mean $\pm$ SD)	<b>P-value</b>
<b>DM Group</b>	$6.97 \pm 2.32$	$6.87 \pm 2.75$	$<0.001$
<b>Control Group</b>	$6.28 \pm 1.17$	$9.12 \pm 1.64$	

Akin and Saydam<sup>11</sup> conducted a cohort study to evaluate the effect of labor dance during the active phase of labor on perceived labor pain. The study included 160 pregnant women admitted for labor to Urla State Hospital in Izmir, Turkey between April and October 2017.<sup>11</sup> The inclusion and exclusion criteria for this study are outlined in Table 1. Participants were assigned to the spouse/partner dance group (DPSG) if they attended a prenatal labor dance training, the midwife dance group if they agreed to perform labor dance with a midwife, and the control group if they did not want to perform labor dance.<sup>11</sup> For the purpose of this review, only the DPSG and control groups will be included in the analysis. After exclusion, the study analyzed 40 participants in the DPSG and 80 in the control group.<sup>11</sup> The DSPG was trained in labor dance during prenatal training without information about the aim of the study as to not impact the results.<sup>11</sup> These participants danced with their spouses intermittently during the active phase of labor while the spouse massaged the participant's sacral areas.<sup>11</sup> The control group received routine labor care and monitoring.<sup>11</sup>

A VAS was administered to all groups when cervical dilation reached 4 cm and again when cervical dilation reached 9 cm.<sup>11</sup> Statistical measures included mean pain scores and

standard deviation, as well as p-values, where a p-value <0.05 was considered statistically significant.<sup>11</sup> The mean pain score at 4 cm cervical dilation in the DSPG was  $5.02 \pm 1.14$ , compared to  $5.61 \pm 1.34$  in the control group.<sup>11</sup> The mean pain score at 9 cm cervical dilation in the DSPG was  $8.60 \pm 1.03$ , compared to  $9.17 \pm 0.44$  in the control group.<sup>11</sup> There was a statistically significant difference in pain score after intervention at 9 cm cervical dilation with a p-value of 0.014.<sup>11</sup> The results of this study are outlined in Table 4.

**Table 4: Comparison of Pain Scores at 4 cm (Before Intervention) and 9 cm (After Intervention) Cervical Dilation<sup>11</sup>**

	<b>4 cm Cervical Dilation</b> (Mean $\pm$ SD)	<b>9 cm Cervical Dilation</b> (Mean $\pm$ SD)	<b>P-value</b>
<b>DSPG</b>	$5.02 \pm 1.14$	$8.60 \pm 1.03$	0.014
<b>Control Group</b>	$5.61 \pm 1.34$	$9.17 \pm 0.44$	

## DISCUSSION

The goal of this systematic review was to evaluate the efficacy of dancing during labor as a method of pain control. All three studies demonstrated statistically significant pain reduction after dance intervention during the active phase of labor, demonstrated by p-values <0.05. In all studies, pain scores in the dance intervention groups were lower than pain scores in the control groups that did not dance. The dance intervention group in the Gönenç and Dikmen<sup>10</sup> study had the lowest pain score after intervention at 6.87, possibly because participants were allowed to select their own music or because there were more movements involved in the labor dance than the other studies. None of the studies included an assessment of mean change from baseline in each group or mean difference in pain score between intervention and control groups.

There were several limitations in each of the studies. All studies included relatively small sample sizes and Abdollahian et al.<sup>9</sup> had the smallest at 60 participants. Abdollahian et al.<sup>9</sup> did not mention whether any participants were excluded from analysis and Akin and Saydam<sup>11</sup> reported a 30% loss to follow up. None of the studies included intention-to-treat or worst-case analyses.

These factors reduce the validity of all three studies. Participants and researchers were not blinded to the intervention in all three studies, which could have created bias and skewed the results. Gönenç and Dikmen<sup>10</sup> utilized nurses who were not involved in the study to administer the pain scales, but this alone is unlikely to eliminate bias. Akin and Saydam<sup>11</sup> did not randomize participants to groups, but allowed participants to select their intervention. Participants who were inclined to perform labor dance may have had expectations about the experience and reported lower pain scores as a result. Only Abdollahian et al.<sup>9</sup> specified that the control group did not receive any sort of pain management intervention. It is unclear whether the control groups in the other studies received pain management.

Dance intervention, timing of intervention, use of music, and labor room environment were not standardized between studies, reducing the ability to isolate the effects of dance as an intervention. The lowest overall pain scores in the dance group post-intervention were reported in Gönenç and Dikmen,<sup>10</sup> where participants listened to music of their choice while dancing. This study did not include a dance only intervention group; therefore, the results of this study do not indicate whether dance alone is an effective method of pain control. The highest overall pain scores in the dance group post-intervention were reported in Abdollahian et al.,<sup>9</sup> which did not specify whether participants listened to music or how the room was arranged. Labor environment is likely to influence patient pain perception and introduces a challenge to isolating the effects of dance on pain. Additionally, all dance intervention participants in each study were assisted by either a spouse or researcher. As such, the studies did not evaluate the effect of dance alone, but rather dance supported by a partner and sacral massage.

Abdollahian et al.<sup>9</sup> reported a significant difference in pain between the control group and dance group before administration of the dance intervention. It is unclear whether the authors of

this study accounted for this difference in their statistical analysis, potentially invalidating their results. Gönenç and Dikmen<sup>10</sup> conducted the study at a hospital where family members were not allowed to be present during labor, which may have impacted the participants' emotional states and their perception of pain throughout the labor process. However, the results of this study are valuable for cultural practices that only allow the patient and hospital staff to be present at birth. Akin and Saydam<sup>11</sup> evaluated pain at intervals of cervical dilation instead of time, as compared to the other studies in this review, therefore making it difficult to reliably compare pain scores because the participants may have had different durations of the active phase of labor and may not have measured pain scores at comparable intervals. Akin and Saydam<sup>11</sup> included multiparous women in their study, whereas the other two studies only included nulliparous or primiparous women, therefore limiting the generalizability of their results.

## **CONCLUSION**

The studies included in this systematic review demonstrated that dancing during the active phase of labor reduces pain for patients with uncomplicated pregnancies. All three studies found a statistically significant difference in mean pain score between dance intervention and control groups. Dance intervention groups in all three studies had lower mean pain scores after intervention than control groups with no intervention. However, it is unclear how much of these effects can be attributed to dance itself. Benefits of dancing as a method of pain reduction include low cost, ease of administration, and enjoyability. Disadvantages may include difficulty monitoring the fetus and patient, riskiness in complicated pregnancies, and provider and patient inexperience with this method. Dance as a method of pain control during labor is worth further investigation, as it may be useful in both reducing pain and improving the experience of labor.

The studies evaluated in this review highlighted the need for consistency and standardization of labor dance in future trials. In general, future trials should include larger sample sizes and randomize patients to control groups or dance intervention groups to reduce bias. While it is difficult to blind the participants to the intervention, blind raters should be utilized to administer pain scales to the participants and individuals responsible for data analysis should be blinded to the purpose of the study to reduce bias. They should also recruit multiparous patients in order to improve generalizability, as well as to compare results between primiparous and multiparous patients.

Regarding the dance interventions, future studies should specify the movements involved in labor dance, as well as the length of time performing labor dance, in order to improve reproducibility of the studies. Studies could also aim to evaluate the efficacy of dancing alone instead of with a partner, since different areas of the world involve different labor practices and regulations, and this would improve generalizability and utilization of dance as a method of labor pain control across different cultures. Music selection, noise-monitoring, and dimly lit rooms need to be standardized across future studies to improve validity and reliability of the findings. Future studies should also specify whether pain management was offered to the control group, and if so, what types of pain management were offered. It would be unethical to withhold pain control for patients in labor, so future studies could compare dance intervention with other types of pain control. Further research is necessary to establish dance during the active phase of labor as a safe and effective method of pain control.

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