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## LEOPOLD'S MANEUVERS: HOW COMMON IS IT IN OUR DAILY PRACTICE?

### LEOPOLDOVI HVATOVI: KOLIKO SU ČESTI U NAŠOJ SVAKODNEVNOJ PRAKSI

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*Professional paper*

*Key words:* Leopold's maneuvers, ultrasound, fetal orientation

**SUMMARY. Objective.** To determine how frequent obstetricians use Leopold's maneuvers in their practice. **Subjects and Methods.** A questionnaire with numerical scale was distributed among practicing obstetricians. They examined how frequent the symphyseal fundal height (SFH) measurement, Leopold's maneuvers and ultrasound examination for fetal orientation were performed. **Results.** A total of 165 obstetricians completed the questionnaire. Only 56 (33.9%) respondents indicated that they use SFH. The first and third Leopold's maneuver were the most frequent abdominal grips performed. Only 36 (21.8%) respondents regularly perform all four maneuvers. Seventy seven (46.7%) respondents use ultrasound to determine fetal orientation. The use of ultrasound was significantly higher ( $p=0.02$ ) in those practicing for less than 10 years (62.6%) compared to those practicing for 10 years or more (43.3%). **Conclusion.** Leopold's maneuvers are still common in daily obstetrics practice. Abdominal palpation remains a common method to estimate the uterine size. The first and third Leopold's maneuver were the most frequent abdominal grips performed. Ultrasound examination is commonly used to determine fetal orientation.

*Stručni članak*

*Ključne riječi:* Leopoldovi hvatovi, ultrazvuk, fetalni položaj i stav

**SAŽETAK. Cilj rada** je ustanoviti koliko često opstetričari u svojoj praksi rabe Leopold-Pavlikove hvatove. **Materijal i metode.** Upitnik s brojčanim podatcima je podijeljen opstetričarima iz prakse. Oni su pokazali koliko često izvode mjerenje udaljenosti fundus simfiza, Leopoldove hvatove i pregled ultrazvukom za prosudbu fetalnog položaja i stava. **Rezultati.** Ukupno je 165 opstetričara ispunilo upitnik. Samo 56 (33,9%) njih mjere udaljenost fundus simfiza. Prvi i treći Leopoldov hvat su najčešće rabljeni hvatovi. Samo 36 (21,8%) ispitanika redovito izvode sva četiri hvata. Sedamdeset sedam (47,7%) rabe ultrazvučni pregled da odrede položaj i stav djeteta. Uporaba ultrazvuka je bila značajno češća ( $p=0,02$ ) u onih koji rade manje od 10 godina (62,6%) od onih koji rade dulje od 10 godina (43,3%). **Zaključak.** Leopoldovi hvatovi su još uvijek uobičajeni u svakodnevnoj opstetričnoj praksi. Palpacija trbuha trudnice je uobičajena metoda za prosudbu veličine maternice. Prvi i treći Leopoldov hvat su najčešće rabljeni hvatovi. Pregled ultrazvukom se obično rabi za prosudbu položaja i stava fetusa.

## Introduction

Determining the fetal gestational age, lie and presentation are essential for managing and planning pregnancy care. Leopold's\* four maneuvers are to determine fetal orientation. This systematic approach has a great deal of information about the fetus: the fetal pole occupying the fundus, the position of the fetal back, the presenting part and its engagement, and fetal attitude. These maneuvers have become one of the core skills for medical students and residents to acquire during their training. The American College of Obstetricians and Gynecologists (ACOG) recommends Leopold's maneuvers and the measurement of uterine fundus as the primary method for clinical estimation of fetal weight.<sup>1</sup> However, its sensitivity and specificity are variable.<sup>2</sup>

Moreover, its accuracy depends on the examiner's experience.<sup>3</sup> In this study we aim to determine how common Leopold's maneuvers are in current obstetrical practice.

## Materials and Methods

A questionnaire was distributed among obstetricians attending the 7<sup>th</sup> Congress of Perinatal Medicine (Zagreb, Croatia, 21–24 September, 2005), 15<sup>th</sup> World Congress on Ultrasound in Obstetrics & Gynecology (Vancouver, Canada, 25–29 September, 2005) and Ian Donald Congress (Doha, Qatar, 4–8 January, 2006). De-

\* *Opaska uredništva:* u hrvatskom porodničarskom nazivlju *Leopold-Pavlikovi hvatovi* – *Editorial remark:* in Croatian obstetrical terminology known as *Leopold-Pavlik's maneuvers*.

mographics included current post, country of certification of specialization and number of years in practice (obstetrics). In addition, a serial of statements examining how frequent the obstetrician performs symphyseal fundal height (SFH) measurement, Leopold's maneuvers and ultrasound examination for fetal orientation were recorded. The options provided for these statements were as follow. **A:** maneuver is never used; **B:** rarely used (only in 25% of patients); **C:** occasionally used (in 50% of patients); **D:** often used (in 75% of patients); **E:** always used (in 100% of patients).

## Results

A total of 165 obstetricians properly completed the questionnaire. Respondents were from 15 different nationalities (Table 1). Eighty eight (53.3%) respondents were practicing general obstetrics and gynecology, whereas 45 (27.3%) were of maternal fetal medicine interest (Table 2). The mean years in obstetrics practice was 13.3 years (95% CI, 12.0-14.6).

Only 56 (33.9%) respondents indicated that they always assess the uterine size by measuring the symphyseal fundal height, compared to 81 (48.5%) respondents who palpate the abdomen to determine uterine size. The first and third Leopold's maneuver were the most frequent performed grips, 93.3% and 92.7%, respectively. The first Leopold's maneuver was the most regular (always) performed grip (72.7%). The second pelvic grip was the least frequent (39.4%) maneuver performed (Figures 1-4). Only 36 (21.8%) respondents indicated that they regularly perform all four Leopold's maneuvers. Seventy seven (46.7%) respondents use ultrasound to determine fetal lie, position or presentation. Thirty two (19.3%) respondent use ultrasound with every pregnant woman they examine (Figure 5). Three (1.8%) respondents determine fetal orientation exclusively by ultrasound.

The use of ultrasound was related to years of practice. The number of respondents who never used ultrasound

Table 1. Origin of certification of respondents  
Tablica 1. Porijeklo specijalizacije ispitanika

Middle East	60 (36,4%)
United Kingdom	40 (24,2%)
Other European countries	23 (13,9%)
Indian Subcontinent	22 (13,3%)
North America	14 (8,6%)
South America	4 (2,4%)
Australia / New Zealand	2 (1,2%)

Table 2. Type of training of respondents  
Tablica 2. Vrsta sub/specijalizacije ispitanika

General Obstetrics and Gynecology	88 (53,3%)
Maternal-fetal medicine	45 (27,3%)
Infertility	22 (13,3%)
Ultrasound	10 (6,1%)

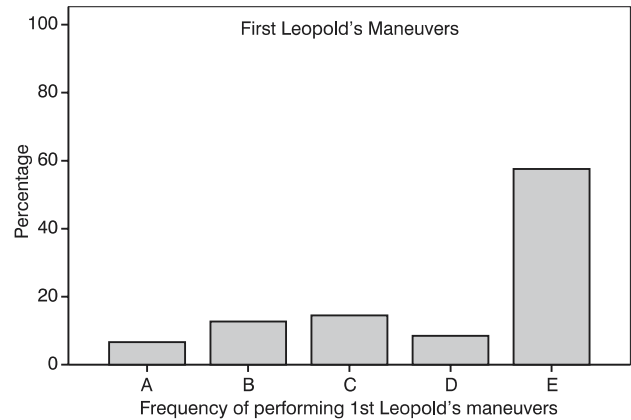


Figure 1. Percentage of respondents performing Leopold's first maneuver  
Slika 1. Postotak ispitanika koji rade 1. Leopoldov hvat

Explanation – tumačenje. Y axis: per cent, x axis: frequency of usage of Leopold's maneuver – učestalost korištenja Leopoldovih hvatova: A. never – nikad; B. rare – rijetko (25%); C. occasionally – povremeno (50%); D. often – često (75%); E. always – uvijek (100%)

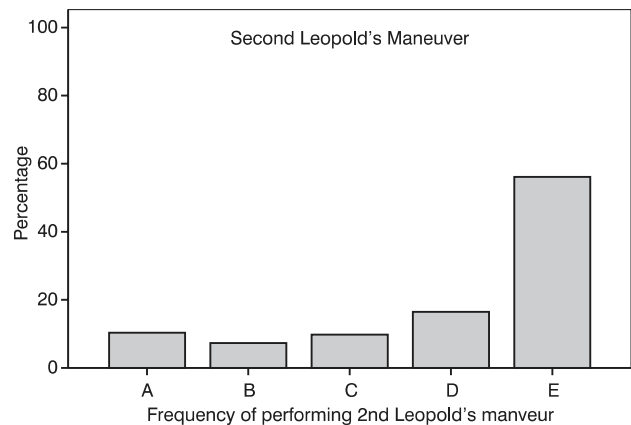


Figure 2. Percentage of respondents performing Leopold's second maneuver  
Slika 2. Postotak ispitanika koji rade 2. Leopoldov hvat

Explanation like in Figure 1. – Tumačenje kao u slici 1.

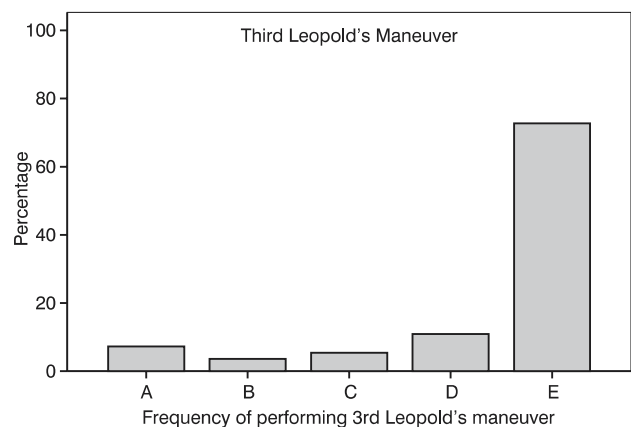


Figure 3. Percentage of respondents performing Leopold's third maneuver  
Slika 3. Postotak ispitanika koji rade treći Leopoldov hvat

Explanation like in Figure 1. – Tumačenje kao u slici 1.

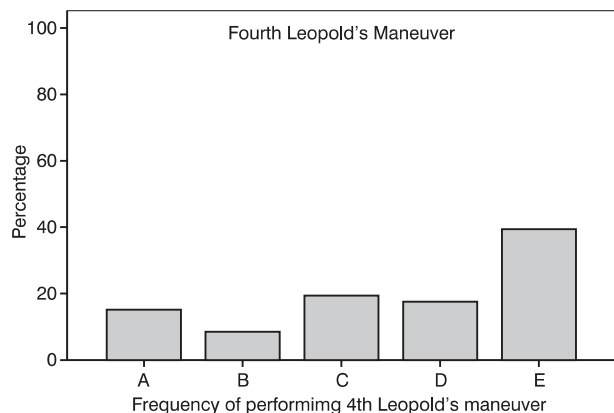


Figure 4. Percentage of respondents performing Leopold's fourth maneuver  
Slika 4. Postotak ispitanika koji rade četvrti Leopoldov hvat

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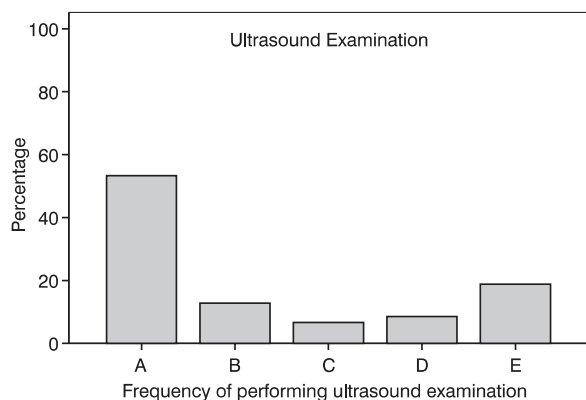


Figure 5. Percentage of respondents performing ultrasound for fetal orientation  
Slika 5. Postotak ispitanika koji rabe ultrazvuk za dijagnozu položaja i stava fetusa

Explanation like in Figure 1. – Tumačenje kao u slici 1.

for fetal orientation was significantly lower ( $p=0.02$ ) in those practicing for less than 10 years (43.3%) compared to those practicing for 10 years or more (62.6%).

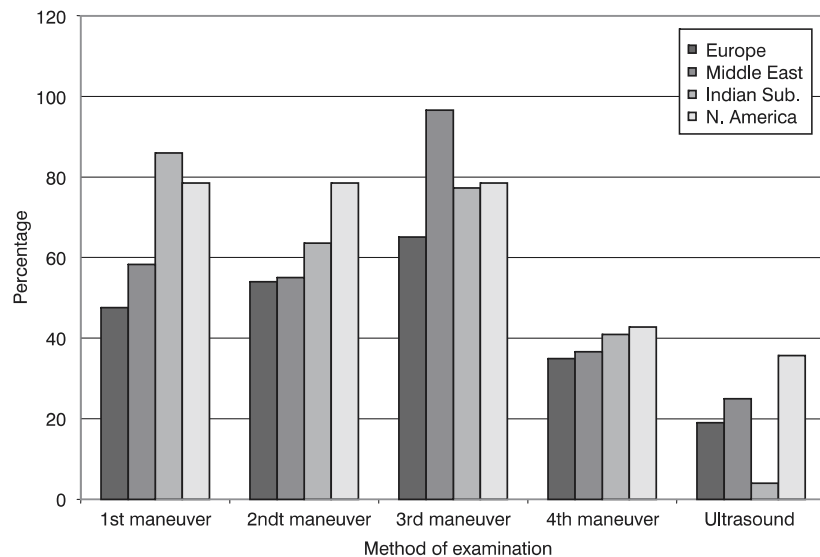


Figure 6. Percentage of respondents performing Leopold's maneuvers and ultrasound examination according to region of certification  
Slika 6. Postotak ispitanika koji rade Leopoldove hvatove i pregled ultrazvukom prema porijeklu specijalizacije

Ultrasound was more regularly used by respondents with ultrasound and maternal fetal medicine interest (25.5%) than by general obstetrician and gynecologist (14.7%). However, this was not statistically significant. Ultrasound was significantly more regularly used by respondents from North America ( $p=0.02$ ) than by those from the Indian subcontinent (Figure 6).

### Discussion

Leopold's maneuvers remain a popular method for assessing fetal attitude, lie, position and presentation. Its accuracy depends mainly on the experience of the examining physician.<sup>4</sup> This is particularly true in identifying the upper most border of the uterine fundus.<sup>5</sup> Its sensitivity is not related to maternal height, maternal body mass index, parity, gestational age, placental position or fetal presentation.<sup>6</sup>

Although the impact of symphysial-fundal height (SFH) measurements on prenatal outcome remains controversial, it has replaced, in many settings, abdominal palpation.<sup>7</sup> The symphyseal fundal measurement is more accurate than abdominal palpation in estimating the gestational age.<sup>8</sup> And yet, only 33.9% of the respondents indicated that they regularly measure the SFH. The poor sensitivity of abdominal palpation is due to three main factors. First, finger breadth is inaccurate in measuring a distance between two landmarks. Second, the anatomical position of the umbilicus varies among mothers. Finally, the gestational age at which the uterine fundus reaches the umbilicus varies among pregnant women.

The first and third maneuvers were the most regularly performed grips. The reason for this might be that they provide most of the required information, particularly fetal lie, presentation, and engagement. In contrast, the fourth maneuver was the least performed grip among the respondents. This might be due to uncomfortableness of the method, or because it does not provide any significant additional information to the obstetrician.

More than a third of the respondents indicated that they use ultrasound to determine fetal orientation. This trend will most likely increase in the coming years.<sup>9</sup> The availability of ultrasound machines might explain the significantly higher usage of ultrasound among North American obstetricians compared to those from the Indian Subcontinent. The high rate of ultrasound usage among respondents with less than 10 years of practice compared to those of more than 10 years might be due to the background training. Many residency programs, in the past decade, have included ultrasound training in their curriculum.<sup>10</sup> The accuracy of ultrasound in determining fetal presentation,<sup>11</sup> position<sup>12</sup> and engagement<sup>13</sup> compared to manual abdominal palpation might be another factor. These findings indicate that ultrasound is a common tool among obstetricians to determine fetal orientation. Indeed, for some obstetricians (1.8%), it has replaced Leopold's maneuvers. Nevertheless, manual abdominal palpation remains a useful tool for antenatal care.<sup>14</sup> In fact, Leopold's maneuvers, when used by experienced clinicians, can be an effective and accurate screening tool, particularly in settings where ultrasound may not be readily available.<sup>15,16</sup>

## Conclusion

Abdominal palpation remains a common method to estimate the uterine size. Leopold's maneuvers are still common in daily obstetrics practice. The first and third Leopold's maneuver are the most frequent abdominal grips. Ultrasound is commonly used by obstetricians to determine fetal orientation.

## References

1. Chatfield J. ACOG issue Guidelines on fetal macrosomia. *Am Fam Physician* 2001;64:169–70.
2. Engstrom JL, McFarlin BL, Sittler CP. Fundal height measurement. Part 2. Intra- and interexaminer reliability of three measurement techniques. *J Nurse Midwifery* 1993;38:17–22.
3. Watson WJ, Welter S, Day D. Antepartum identification of breech presentation. *J Reprod Med* 2004;49(4):294–6.

4. Nahum GG. Predicting fetal weight. Are Leopold's maneuvers still worth teaching to medical students and house staff? *J Reprod Med* 2002;47:271–8.

5. Engstrom JL, Sittler CP, Swift KE. Fundal height measurement. Part 5. The effect of clinician bias on fundal height measurements. *J Nurse Midwifery* 1994;39:130–41.

6. Engstrom JL, McFarlin BL, Sampson MB. Fundal height measurement. Part 4. Accuracy of clinicians' identification of the uterine fundus during pregnancy. *J Nurse Midwifery* 1993;38(6):318–23.

7. Neilson JP. Symphysis-fundal height measurement in pregnancy. *Cochrane Database Syst Rev* 2000;(2):CD000944.

8. Engstrom JL. Measurement of fundal height. *J Obstet Gynecol Neonatal Nurs* 1988;17:172–8.

9. Lee W, Hodges AN, Williams S, Vettraino IM, McNie B. Fetal ultrasound training for obstetrics and gynecology residents. *Obstet Gynecol* 2004;103:333–8.

10. Calhoun BC, Hume RF. Integrated Obstetric Curriculum for Obstetrics and Gynecology Residency, Radiology Residency and Maternal-Fetal Medicine Fellowship Program at an accredited American Institute of Ultrasound in Medicine Diagnostic Ultrasound Center. *Ultrasound Obstet Gynecol* 2000;16:68–71.

11. Thorp JM Jr, Jenkins T, Watson W. Utility of Leopold maneuvers in screening for malpresentation. *Obstet Gynecol* 1991;78:394–6.

12. Akmal S, Tsoi E, Nicolaidis KH. Intrapartum sonography to determine fetal occipital position: interobserver agreement. *Ultrasound Obstet Gynecol* 2004;24:421–4.

13. Dietz HP, Lanzarone V. Measuring engagement of the fetal head: validity and reproducibility of a new ultrasound technique. *Ultrasound Obstet Gynecol* 2005;25:165–8.

14. Stuart JM, Healy TJ, Sutton M, Swingler GR. Symphysis-fundus measurements in screening for small-for-dates infants: a community based study in Gloucestershire. *J Roy Coll Gen Pract* 1989;39:45–8.

15. Lydon-Rochelle M, Albers L, Gorwoda J, Craig E, Qualls C. Accuracy of Leopold maneuvers in screening for malpresentation: a prospective study. *Birth* 1993;20:132–5.

16. Euans DW, Connor PD, Hahn RG, Rodney WM, Arheart KL. A comparison of manual and ultrasound measurements of fundal height. *J Fam Pract* 1995;40:233–6.

*Paper received:* August, 17, 2006; *Accepted:* March, 20, 2007.

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