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Levonorgestrel 52 mg intrauterine device placement without uterine sounding: A feasibility study☆,☆☆

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ABSTRACT

Objectives: To evaluate feasibility of levonorgestrel 52 mg intrauterine device (IUD) placement without uterine sounding.

Study design: We performed a three-phase feasibility study from February 2023-May 2024. In phase one, participants had levonorgestrel 52 mg IUD placement with sounding. In the experimental phases, placement occurred without sounding and with (phase two) or without (phase three) concurrent transabdominal sonography and participants had 3-month follow-up. We defined feasibility as successful IUD placement without uterine sounding based on ultrasound confirmation. We measured total instrumentation time from the sound or inserter touching the cervix to inserter removal. Participants reported maximal pain experienced using a 100-mm Visual Analog Scale when the inserter was removed. We calculated a sample size of 30 per phase so that if there was one failed placement, the lower 95% confidence interval of the successful placement rate would be no less than 90.0%.

Results: Successful placement without sounding occurred in 30(100%) participants in phase two and 28(93.3%) in phase three. Median instrumentation was longest in phase one (49.5 [interquartile range (IQR) 42.3–55.0] seconds) compared to phases two (16.0 [IQR12.0–28.0] seconds, $p < 0.0001$) and three (25.0 [IQR 18.5–32.2] seconds, $p < 0.0001$). Participants' median placement pain was 21.0 (IQR 10.3–32.8) mm in phase one with no difference in phase two (25.5 [IQR 14.3–47.0] mm, $p = 0.35$), but was higher in phase three (36.0 [IQR 22.8, 61.0] mm, $p = 0.01$).

Conclusions: Levonorgestrel 52 mg IUD placement without sounding is feasible with concurrent sonography. Placement without sounding results in shorter instrumentation time but does not decrease maximum placement pain.

Implications:
Levonorgestrel 52 mg IUD placement without uterine sounding is feasible when concurrent abdominal ultrasonography is used. IUD placement without sounding shortens procedure time but does not decrease maximal pain compared to standard placement. Larger trials are needed to fully understand clinician and patient benefits and potential risks when a sound is not used during IUD placement.

1. Introduction

The intrauterine device (IUD) is used by 13% of contraception users in the United States [1]. IUD placement involves an office procedure and the package insert details using a uterine sound to

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measure uterine cavity length. Uterine sounding may have been more important with placement of older IUDs, as in the case with the Lippes Loop, for which cavity size was required to assess the appropriate IUD size [2]. There are no studies that support uterine sounding is necessary for successful, low-risk placement of contemporary IUDs. Phase three trials for product approval have all included uterine sounding during the placement process and excluded potential participants with a sound measurement less than a specified lower threshold [3]. There is a theoretical concern that uteri smaller than this specified threshold may be too small to accommodate modern IUDs and could increase the risk of expulsion. However, a study by Bahamondes et al. [4] found no association between uterine length and IUD expulsion risk; among 89 levonorgestrel IUD users, the uterine length exceeded 3.2 cm in 87 users and neither of the two participants with a length less than 3.2 cm experienced expulsion during the first year.

While measuring the uterine cavity may not be necessary prior to modern IUD placement, potential benefits of a uterine sound are that it may confirm passage into the uterus is possible prior to opening the IUD packaging and may function as a cervical dilator. Attempting to access the uterine cavity with the IUD inserter directly may lead to IUD waste if persistent cervical stenosis is encountered. Alternatively, uterine sounding may provide little benefit and lead to unnecessary additional procedure length. Additionally, patients report pain is greatest during sounding [5–8]; eliminating this step could decrease IUD placement pain. To begin a stepwise assessment of the necessity and impact of sounding, we performed this feasibility study of levonorgestrel 52 mg IUD placement without a uterine sound.

2. Materials and methods

We performed a three-phase longitudinal feasibility trial between February 2023 and May 2024 at a single tertiary referral institution. The University of California, Davis Institutional Review Board approved the study, and all participants gave written informed consent prior to beginning study procedures. We screened patients from our general Obstetrics and Gynecology and Complex Family Planning clinics who presented for levonorgestrel 52 mg IUD placement for contraception.

After the patient's clinician determined there were no contraindication to levonorgestrel 52 mg IUD use and obtained standard consent for IUD placement, research staff approached the patient about the study and an investigator evaluated the patient's medical history for study eligibility. We excluded participants < 18 years, with a history of failed IUD placement, with known cervical stenosis, with cavity-distorting fibroids or uterine anomalies, or desiring IUD use exclusively for non-contraceptive reasons. In phase one, study physicians placed IUDs using a conventional technique with uterine sounding. We planned two stepwise sound-sparing experimental phases, with investigators placing the IUD with concurrent abdominal ultrasonography in phase two and without ultrasonography in phase three.

2.1. Study procedures

After obtaining study consent, investigators collected demographics, medical history, and body mass index (BMI) information. Complex Family Planning faculty or fellows performed all study-related procedures. For all phases, investigators prepared for IUD placement per their standard practice including bimanual exam, speculum and tenaculum placement, and cervical anesthesia per their discretion. At our institution, cervical anesthesia is recommended and routinely utilized in vaginally nulliparous patients [9,10]. Investigators could use additional instrumentation as clinically appropriate (e.g., rigid dilators, os finder, uterine sound, or unplanned ultrasound guidance) if they were unable to pass the IUD inserter into the uterine cavity. At the start of phase one, both Liletta (Medicines360, San Francisco, CA and AbbVie, North Chicago, IL) and Mirena (Bayer Healthcare, Whippany, NJ) IUDs were supplied in clinic; however, during phase one, the clinic transitioned to placing Mirena IUDs only.

In phase one, investigators placed the levonorgestrel 52 mg IUD per product label instructions, including uterine sounding. In phase two, investigators placed the IUD without uterine sounding and with concurrent abdominal ultrasonography by a medical assistant who had no prior ultrasound training. The investigator could adjust the ultrasound probe as needed to improve visualization. The investigators aimed to insert the IUD to the mid uterine position (based on ultrasound visualization), deploy the IUD arms, advance the IUD to the fundus, release the IUD, and remove the IUD inserter. If the investigator inserted the IUD to the fundus initially, the investigator pulled the IUD back to the mid-uterus and then completed the procedure.

In phase three, investigators placed the IUD without uterine sounding or concurrent transabdominal ultrasonography. Investigators advanced the IUD inserter to the fundus, pulled the inserter back 2 cm, deployed the IUD arms, advanced the IUD inserter to the fundus again, then released the IUD and removed the inserter. Investigators performed abdominal or transvaginal ultrasonography after placement to confirm proper intrauterine placement. If an investigator needed to perform uterine sounding in the experimental phases (two and three) after initial attempt with the IUD inserter, this was considered a failed per-protocol placement.

Research staff recorded the total uterine instrumentation time from the first instrument to enter the uterus (sound or IUD inserter) touching the cervix to completion of IUD placement. Timing started in phase one with the sound first touching the cervix, and in phases two and three with the IUD inserter first touching the cervix. To account for all intrauterine instrumentation, including dilation, multiple sounding or insertion attempts, timing ended with inserter removal from the cervix after successful IUD deployment. The time attributed to sounding was measured from the sound first touching the cervix until the IUD inserter touched the cervix.

Participants marked their maximum pain scores during placement immediately following IUD inserter removal from the cervix and 5-minutes after speculum removal on a 100-mm visual analog scale (VAS) with anchors of "no pain" (0 mm) and "worst pain" (100 mm). The investigator placing the IUD rated the procedure as easy, moderate, or difficult and recorded procedural details including cervical anesthesia use, the number of IUD placement or sounding attempts, need for cervical dilation, or use of unplanned sounding or ultrasound guidance.

Additional follow-up for participants in phases two and three included telephone calls 30 ± 7 days after IUD placement and in person visits 90 ± 7 days after IUD placement. For the call, research staff asked participants about symptoms of severe bleeding or pain with plans to instruct those with any concerning symptoms to attend an unscheduled visit. For the scheduled visit, investigators completed an ultrasound (abdominal or vaginal per their discretion) to assess IUD location. Investigators who did not visualize the IUD in the uterine cavity performed a speculum exam and if IUD strings were not visualized, ordered an abdominal radiograph. Physicians treated any complications (perforation or expulsion) per standard practice.

2.2. Statistical analyses

Our primary outcome was feasibility of each of the sound-sparing techniques, defined as successful IUD placement without uterine sounding based on ultrasound confirmation of the IUD in the uterine cavity immediately following placement. Secondary objectives included procedure time, participant pain, and clinician rating

of overall procedure ease. We calculated our sample size such that if there was one unsuccessful placement in each phase, the lower 95% confidence interval of the successful placement rate would be no less than 90.0%. A sample size of 30 subjects in each phase provided a 96.7% success rate with a 95% confidence interval of 90.0 to 100%. Accordingly, if more than one of the 30 subjects per phase had unsuccessful IUD placement with the sound-sparing protocol, we considered that technique non-feasible. We planned to perform phase three only if phase two was considered feasible.

We used Chi square testing for categorical variables and analysis of variance (ANOVA), Kruskal-Wallis, and Mann-Whitney U tests for continuous variables as appropriate. We analyzed participant and procedural characteristics across all three phases to determine differences between the phases. We analyzed procedural outcomes, procedural time, and participant pain scores to determine differences between conventional placement (phase one) *versus* each of the experimental phases (phases two and three).

3. Results

Participant screening, enrollment, and follow-up visit attendance are presented in Figure 1. Participant and procedural characteristics for the 90 enrolled participants are presented in Table 1. Participant characteristics did not differ other than a higher BMI in phase one participants compared to phases two and three.

Seven Complex Family Planning faculty and fellows placed all IUDs. Table 2 summarizes procedure outcomes. Successful placement with sounding occurred in 30/30 (100%, 95% CI 90.0–100%) participants in phase one. Successful placement without sounding occurred in 30/30 (100%, 95% CI 90.0–100%) and 28/30 (93.3%, 95% CI 84.4–100%) participants in phases two and three, respectively. During both unsuccessful per-protocol placements in phase three, investigators used a uterine sound after they could not advance the inserter more than 4 cm through the cervix and lower uterus. Both participants were nulliparous and had no prior IUD use. Investigators accomplished IUD placement only after ultrasound-guided uterine sounding and multiple insertion attempts.

Table 3 summarizes participant maximal pain rated immediately following IUD inserter removal and 5-minutes post-procedure for placements completed per protocol. Median maximal pain during placement did not differ for phases one 21.0 (interquartile range (IQR) 10.3–32.8) mm and two (25.5 [IQR 14.3–47.0] mm, $p = 0.35$); however, participants in phase three 36.0 (IQR 22.8–61.0) mm reported higher median maximal pain than phase one ($p = 0.01$). Table 4 summarizes intrauterine instrumentation and IUD placement times. Median instrumentation was longest in phase one 49.5 (IQR 42.3–55.0) seconds compared to phases two (16.0 [IQR12.0–28.0] seconds, $p < 0.0001$) and

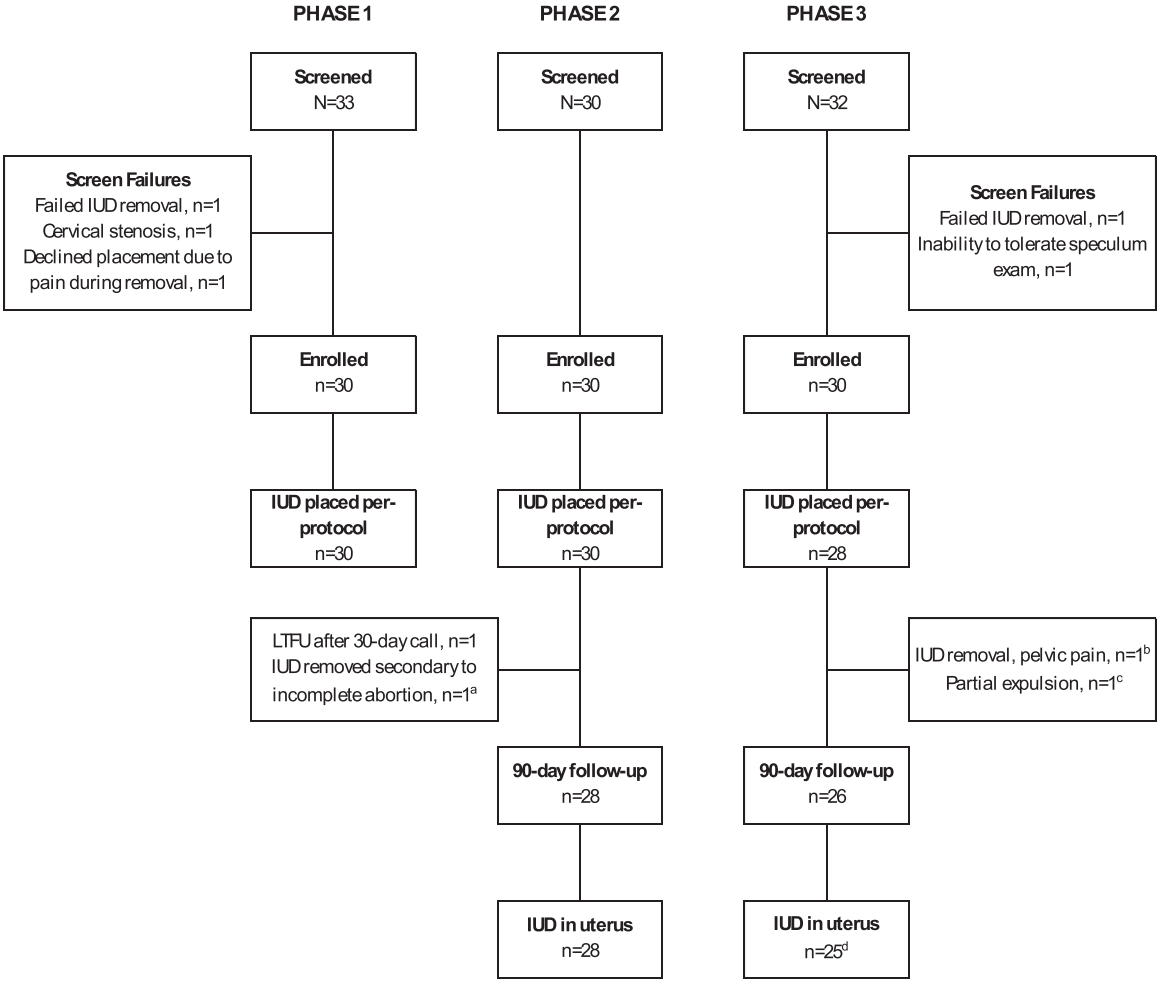

Fig. 1. Flow diagram of study participants in feasibility study of Levonorgestrel 52 mg IUD placement without uterine sounding, February 2023-May 2024. IUD, intrauterine device; LTFU, lost to follow-up. Phase 1: standard placement with uterine sounding. Phases 2 and 3: experimental phases without uterine sounding; phase 2 with concurrent transabdominal ultrasonography guidance. [a]IUD placement 7-days after a medical abortion, presented to the emergency room with heavy bleeding 17 days after placement and had an aspiration with IUD removal for incomplete abortion. [b]Ultrasonography at visit showed IUD in correct location. [c]Evaluation 34 days after IUD placement for pain and bleeding; ultrasonography showed partial expulsion and the IUD removed. [d]IUD perforation identified at visit.

Table 1
Participant and procedure characteristics of a feasibility study of Levonorgestrel 52 mg IUD placement without uterine sounding, February 2023–May 2024

Characteristic	Phase 1[a] (n = 30)	Phase 2[b] (n = 30)	Phase 3[c] (n = 30)	*p*-value
Age (y)	34.1 ± 6.1	33.1 ± 7.5	31.3 ± 7.7	0.33
Race				0.09
Asian	2 (6.7)	9 (30.0)	5 (16.7)	
Black	4 (13.3)	4 (13.3)	1 (3.3)	
White	24 (80.0)	17 (56.7)	24 (80.0)	
Hispanic ethnicity	6 (20.0)	6 (20.0)	4 (13.3)	0.74
BMI (kg/m^2)	30.3 ± 6.6	27.7 ± 7.7	25.6 ± 4.6	0.03
BMI ≥ 30.0	14 (46.6)	7 (23.3)	4 (13.3)	0.01
Obstetrical history				
Nulliparity	15 (50.0)	17 (56.7)	18 (60.0)	0.63
Vaginal nulliparity	20 (66.7)	21 (70.0)	22 (73.3)	0.85
Interval between last delivery and IUD placement				
Interval[d]	84 (53–393)	957.5 (114.5–1940.8)	110.5 (54.3–2396)	0.34
Interval < 8 weeks	5 (16.7)	2 (6.7)	3 (10.0)	0.45
Prior IUD use	22 (73.3)	19 (63.3)	20 (66.7)	0.70
IUD removal prior to insertion	12 (40.0)	12 (40.0)	10 (33.3)	0.83
Cervical anesthesia	18 (60.0)	20 (66.7)	20 (66.7)	0.83
Brand of IUD placed				< 0.0001
Liletta	10 (33.3)	0 (0.0)	0 (0.0)	
Mirena	20 (66.7)	30 (100.0)	30 (100.0)	

BMI, body mass index; IUD, intrauterine device; y, years; w, weeks; d, days.
Data presented as n (%), mean ± standard deviation, or median (interquartile range).
[a] Phase One: standard IUD placement with a sound.
[b] Phase Two: IUD placement without a sound with concurrent abdominal ultrasonography.
[c] Phase Three: IUD placement without a sound, without abdominal ultrasonography.
[d] One participant in each phase with last delivery ≤ 4 weeks at time of IUD placement.

three (25.0 [IQR 18.5–32.2] seconds, $p < 0.0001$). Instrumentation times for those procedures that required multiple instrumentation attempts compared to those completed as planned are presented in Appendix 1.

Ninety-day outcomes were available for 28 of 30 participants in phase two, all of whom had correctly positioned IUDs on ultrasonography without evidence of perforation or expulsion (Fig. 1). For phase three, 90-day outcome data was available for 26 out of the 28 participants that had a successful IUD placement per protocol (Fig. 1). Twenty-five of the 26 participants who attended the 90-day follow-up visit had correctly positioned IUDs on ultrasonography. One participant (IUD placement 100-days post-partum while breastfeeding) had a uterine perforation and elected laparoscopic IUD removal.

4. Discussion

We found IUD placement without sounding was feasible for all participants when concurrent abdominal ultrasonography was used. When ultrasonography was not used, 28 of 30 (93.3% [95% CI 84.4–100%]) placements were successful without uterine sounding Our sample size was calculated such that a sound-sparing technique would be considered feasible if our specialty providers could successfully place the IUD (based on ultrasound confirmation of the IUD in the uterine cavity following placement) in at least 29 of 30 participants (96.7% [95% CI 90.0–100%]) without the use of a uterine sound. Importantly, when we used ultrasonography, no expulsions or perforation occurred over the first 3 months post-placement. Without ultrasonography, only 26 of 30 participants (86.7% [95% CI 74.5–98.8%]) had successful placement without known expulsion or perforation, further exemplifying the likely superiority of using concurrent abdominal ultrasonography when using a sound-sparing technique.

Two other studies have investigated IUD placement without sounding [11,12]. One of these studies is an international randomized control study ($n = 92$) comparing standard copper IUD placement with uterine sounding compared to placement without a sound, but

Table 2
Levonorgestrel 52 mg IUD placement outcomes in a feasibility study without uterine sounding, February 2023–May 2024

Procedure outcomes	Phase 1[a] (n = 30)	Phase 2[b] (n = 30)	Phase 3[c] (n = 30)	*p* value	
				Phase one vs two	*Phase one vs three*
IUD placed successfully per protocol[d]	30 (100.0)	30 (100.0)	28 (93.3)	1.0	0.15
Dilation required	1 (3.3)	0	4 (13.3)	0.31	0.16
Unplanned uterine sounding	n/a	0	2 (6.67)	n/a	n/a
Unplanned abdominal ultrasound guidance	2 (6.7)	n/a	3 (10.0)	n/a	0.64
> 1 IUD placement or sounding attempts[e]	7 (23.3)	0	6 (20.0)	0.005	0.75
Ease of procedure score[f]					
Easy	22 (73.3)	29 (96.7)	22 (73.3)	0.01	1.0
Moderate	7 (23.3)	1 (3.3)	5 (16.7)	0.03	0.52
Difficult	1 (3.3)	0	3 (10.0)	0.31	0.30

IUD, intrauterine device; n/a, not applicable.
Data presented as *n*(%).
[a] Phase One: standard IUD placement with a sound.
[b] Phase Two: IUD placement without a sound with concurrent abdominal ultrasonography.
[c] Phase Three: IUD placement without a sound, without abdominal ultrasonography.
[d] Per protocol in phase one is any successful placement with sounding, Phase and two IUD placement without sounding.
[e] Phase One: 5 procedures required two sounding and one IUD insertion attempt; 1 procedure required one sounding and two IUD insertion attempts, and 1 procedure required two sounding and 4 IUD insertion attempts. Phase Three: 4 procedures required two IUD insertion attempts; two procedures required 3 IUD insertion attempts.
[f] Investigator placing the IUD rated the IUD placement procedure as easy, moderate, or difficult.

Table 3
Participant pain score using a 100-mm Visual Analog Scale in a feasibility study of Levonorgestrel 52 mg IUD placement without uterine sounding, February 2023–May 2024

Pain outcome (cm)	Total population					Participants receiving cervical anesthesia					Participants not receiving cervical anesthesia				
	Phase One[a] n = 30	Phase Two[b] n = 30	Phase Three[c,d] n = 28	p-Value		Phase One n = 18	Phase Two n = 20	Phase Three n = 20	p-Value		Phase One n = 12	Phase Two n = 10	Phase Three n = 8	p-Value	
				Phase One vs Two	*Phase One vs Three*				*Phase One vs Two*	*Phase One vs Three*				*Phase One vs Two*	*Phase One vs Three*
Pain during IUD placement[e]	21.0 (10.3, 32.8)	25.5 (14.3, 47.0)	36.0 (22.8, 61.0	0.35	0.01	24.5 (19.3, 40.8)	26.5 (14.8, 48.9)	44.5 (26.0, 68.0)	0.88	0.04	8.5 (6.0, 25.5)	25.5 (7.8, 41.0)	24.0 (17.0, 26.8)	0.34	0.13
Pain 5-minute after IUD placement[f]	2.0 (0.25,10.5)	2.0 (0.0, 11.0)	10.0 (4.0, 22.5)	0.76	0.05	2.0 (1.0, 21.8)	2.5 (0.0, 16.5)	12.5 (6.8, 23.4)	0.90	0.05	4.0 (0.0, 9.5	1.0 (0.3, 6.5	4.0 (2.3, 18.9)	0.58	0.67

IUD, intrauterine device.
Data presented as median (interquartile range).
[a] Phase One: standard IUD placement with a sound.
[b] Phase Two: IUD placement without a sound with concurrent abdominal ultrasonography.
[c] Phase Three: IUD placement without a sound, without abdominal ultrasonography.
[d] Pain scores not obtained for those with failed placement per protocol. Per protocol in phase one is any successful placement with sound, Phase two and three is IUD placement without a sound.
[e] Participants marked their associated pain score on a 100-mm visual analog scale immediately following removal of IUD inserter.
[f] Participants marked their associated pain score on a 100-mm visual analog scale 5-minutes after speculum remove.

with pre-procedural uterine cavity length assessment with transvaginal ultrasonography [11]. In this study, investigators found no difference in successful placement with (42/46, 91.3%) or without (43/46, 93.5%) sounding, $p > 0.99$. The other is a small feasibility study ($n = 50$) that explored a simplified technique without bimanual examination or uterine sounding for copper ($n = 9$) and levonorgestrel ($n = 41$) IUD placement [12]. In this study, investigators placed all IUDs without sounding; however, cervical dilation (using an os finder) was needed in 7/41 (17%) levonorgestrel IUD placements.

We incorrectly hypothesized that eliminating the uterine sounding step would lead to decreased maximal placement pain. In all phases, we asked participants their placement pain level immediately following IUD inserter removal, not at time the first instrument (uterine sound in phase one or IUD inserter in phases two and three) initially touched the fundus. Based on our findings, we assume that the greatest pain occurs whenever the first instrument touches the fundus which was the sound in phase one and the IUD inserter in phases two and three. It is also possible that because IUD placement took longer with sounding, the patient's interpretation of maximal pain was less when we assessed this outcome after IUD placement was complete. We also found more than one intrauterine instrumentation attempt did not correlate with a higher maximum pain score; participants in phase one had the lowest median pain scores yet required the most sounding or IUD placement attempts. This finding demonstrates that multiple factors are likely to influence pain experienced during IUD placement. Although we did not find less pain, the total time from beginning of pain (when intrauterine instrumentation begins) until the completion of instrumentation (when the IUD inserter is removed) was significantly less in phases two and tree compared to phase one. The shorter total instrumentation time may be of clinical benefit for patients as the amount of time they are experiencing pain may be decreased.

Concurrent abdominal ultrasonography in phase two demonstrated several procedural benefits in our study, including 100% successful placement of all IUDs in a single attempt without uterine sounding. In comparison, in phases one and three, 23.3% (7/30) and 20.0% (6/30) of procedures, respectively, required more than one sounding or IUD placement attempts. These additional attempts likely contributed to the longer median instrumentation durations of 50 and 25 s in phases one and three, respectively, compared to 16 s in phase two. Additionally, investigators rated 96.7 % (29/30) of procedures as "easy" in phase two. We believe these benefits all occurred because ultrasound visualization provides direct guidance during insertion of the flexible IUD inserter.

A strength of our study is the stepwise design with a control group from the same population which allowed us to evaluate differences between standard placement and two sound-sparing techniques. Medical assistants provided ultrasound guidance which is a pragmatic approach that can be reproduced in other clinics that may not have a second clinician available to operate the ultrasound. Another strength is our excellent follow-up rates, with only one participant lost to follow-up during the 90-day extended evaluation during the experimental phases.

As a feasibility study, it is not possible to directly compare or make conclusions about superiority or complications of a sound-sparing placement compared to standard placement. However, between the two sound-sparing techniques evaluated in our study, we demonstrate that placement of a levonorgestrel 52 mg IUD without first sounding the uterus is feasible only with concurrent abdominal ultrasonography. Therefore, if a clinician does not have access to ultrasonography, standard IUD placement with uterine sounding should be performed. Since IUD expulsion and perforation are infrequent complications; a large trial is needed to determine if there is a difference in complication occurrences between placement techniques. We did not power our study to demonstrate differences in pain based on known factors associated with increased procedural

Table 4
Levonorgestrel 52 mg IUD placement duration in a feasibility study without uterine sounding, February 2023–May 2024

Procedure step length (seconds)	Phase one[a] (n = 30)	Phase two[b] (n = 30)	Phase three[c,d] (n = 28)	*p* value	
				Phase one vs two	*Phase one vs three*
Total instrumentation[e]	49.5 (42.3, 55.0)	16.0 (12.0, 28.0)	25.0 (18.5, 32.3)	< 0.0001	< 0.0001
Total IUD placement[f]	14.0 (12.0, 19.8)	16.0 (12.0, 28.0)	25.0 (18.5, 32.3)	0.46	0.001
Total time related to planned sound use[g]	32.0 (26, 39.5)	n/a	n/a	n/a	n/a

IUD, intrauterine device; n/a, not applicable.
Data are presented as median (interquartile range).
[a] Phase One: standard IUD placement with a sound.
[b] Phase Two: IUD placement without a sound with concurrent abdominal ultrasonography.
[c] Phase Three: IUD placement without a sound, without abdominal ultrasonography.
[d] Procedure length not obtained for those with failed placement per protocol. Per protocol in phase one is any successful placement with sound.
[e] Calculated from the time the uterine sound (phase 1) or IUD inserter (phase 2 and 3) touched cervix to IUD inserter removed from the cervix.
[f] Calculated from the time IUD inserter touched cervix to IUD inserter removed from cervix.
[g] Calculated from the time the uterine sound touched the cervix to IUD inserter touched the cervix.

pain such as parity and the use of cervical anesthesia. Also, we did not investigate patient satisfaction in this study, but it is plausible that while placement pain scores were not different, patients may be more satisfied with a shorter total procedure time. While we recruited participants both from general gynecology and family planning specialty clinics, all procedures were performed by Complex Family Planning faculty and fellows who may have more experience with difficult IUD placements or ultrasound guided placements, compared to other clinicians. In addition to clinician experience, patient characteristics such as body habitus and uterine position may limit ultrasound visualization. Lastly, during the study period, the levonorgestrel 52 mg IUD brand in our clinics changed. Although the two levonorgestrel 52 mg IUDs marketed in the United States are the same size (3.2 cm x 3.2 cm) [3], the inserters are slightly different, which may have impacted procedural outcomes between the phases. Our study only explored sound-sparing placement of levonorgestrel 52 mg IUDs, additional studies are needed to determine the feasibility of a sound-sparing technique for other IUDs.

In summary, it is feasible to place levonorgestrel 52 mg IUDs without a uterine sound when concurrent abdominal ultrasonography is used. Larger trials are needed to fully understand the benefits and risks of this sound-sparing methodology including assessment of pain, patient satisfaction, and complications between a sound-sparing and conventional IUD placement technique.

Author contributions

H.A.R.: Writing – review and editing, Investigation. A.N.F.: Writing – review and editing, Investigation. M.D.C.: Writing – review and editing, Validation, Supervision, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. J.B.: Writing – original draft, Visualization, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. S.Y.: Writing – review and editing, Investigation. N.E.: Writing – review and editing, Investigation.

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Appendix A. Supplementary materials

Supplemental material associated with this article can be found in the online version at doi:10.1016/j.contraception.2024.110722.

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