



When the parturient experiences a protracted second stage and the fetus is at low station with a well-flexed head, vacuum extraction becomes an outlet, "lift-out" procedure.

## Preserving the option of vacuum extraction

### 5 experts tell why and how

In properly selected cases, vacuum extraction or forceps may be the best option for the patient, but declining usage rates threaten their availability.

**O**perative vaginal deliveries are on the wane, even though they may produce the best outcomes in some cases. The reasons? Fear of litigation, patient resistance, and diminishing numbers of experienced physicians. OBG MANAGEMENT convened a panel of experts from a variety of practice settings to address the challenge of offering vacuum and forceps appropriately when external forces discourage their use. Our panelists discuss patient selection, sequential use of vacuum and forceps, and

the need to use universal documentation terminology consistently.

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#### Why vacuum and forceps are losing favor

**LONKY:** Operative vaginal deliveries have declined over the past 2 decades as cesarean section rates have increased. What factors are responsible for the shift?

**VINES:** Some of our colleagues believe operative delivery should no longer be performed. Although this view is based more on fear of

## Panelists

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litigation than any scientific basis, we are seeing a downturn in forceps and vacuum deliveries in response, although the proportion of vacuum deliveries has increased notably.

A California study<sup>1</sup> of more than half a million women found that about 13% of deliveries were operative. In a Washington study<sup>2</sup> on sequential use of vacuum and forceps, the operative delivery rate was 14.4%. Both investigations gathered data from the late 1980s to late 1990s. Perhaps there has been a drop more recently, but Hospital Corporation of America (HCA) data suggest an operative delivery rate of 12% to 14%—mostly vacuum.

**BOFILL:** The best report on regional differences<sup>3</sup> demonstrated that the rate of operative vaginal delivery and even cesarean is much higher in the Southeast than in the rest of the country.

**Fear of litigation starts a vicious cycle.** As for whether operative vaginal deliveries are declining overall, Yeomans and Hankins<sup>4</sup> describe a vicious cycle in which fear of litigation leads to less teaching, which leads to less use of forceps and vacuum, which leads to more bad outcomes—because of meager training—which leads to more litigation.

In our hospital, operative vaginal delivery rates have dropped from about 16% to approximately 12%.

**GARITE:** The ratio of vacuum deliveries to forceps is changing most dramatically.

### Vacuum injuries increase as vacuum displaces forceps

**VINES:** The number of vacuum-related injuries has increased because the frequency of vacuum and forceps deliveries has reversed. The incidence hasn't necessarily gone up, but the absolute numbers have, and that has prompted critical review.

**LONKY:** At Kaiser Permanente on the West Coast, there has been a dramatic shift to the vacuum over the forceps. When I completed my training in 1986, I probably performed forceps and vacuum deliveries at equal rates. Now I may do 1 forceps delivery a year.

**HAYASHI:** Other factors are early descriptive studies that implicated operative deliveries as the cause of poor outcomes in infants.

### KEY POINTS

- Operative vaginal deliveries have been declining overall, and the ratio of vacuum to forceps deliveries has increased.
- Avoid forceps rotations exceeding 45° and do not attempt to forcibly rotate the head with a vacuum device because of the potential for injury and litigation.
- The best candidates for operative vaginal delivery have a prolonged second stage of labor or non-reassuring fetal status, the fetal head at the outlet or low in the pelvis, and a functioning epidural.
- Avoid sequential use of vacuum and forceps.

Although those studies were of poor quality, they influenced physician behavior.

A growing base of studies on the effects of operative delivery on pelvic floor function also has contributed.

The ease, safety, and acceptance of cesarean birth has also played a role in diminishing operative vaginal deliveries, as has the increasing number of women trainees, many of whom feel they lack adequate strength to pull forceps effectively to deliver the fetal head.

### Fewer procedures performed means fewer training opportunities

**LONKY:** Do training programs have an obligation to provide ample opportunity to train in operative vaginal delivery?

**HAYASHI:** Yes. They are obliged to teach operative delivery whenever the opportunity presents itself. I would say 20 procedures would be “ample” to teach outlet deliveries, while 30 or more would be needed for the more difficult low outlet deliveries involving rotation.

**GARITE:** Yeomans and Hankins<sup>4</sup> mention that, as the number of operative deliveries goes down, the number of physicians with the expertise to train new physicians goes down as well. In our teaching hospital, we have problems not only in gathering an adequate volume of good candidates for operative delivery, but in finding teachers who are comfortable teaching use of forceps.

**VINES:** In Dallas, we have a regular influx of new physicians trained in residency programs with limited or nonexistent exposure to vacuum. These doctors join groups where partners frequently use vacuum, and many of them—myself included—are essentially self-taught. We try to rectify that by providing hands-on experience with the vacuum, as well as the opportunity to learn from mentors.

**‘Flight simulator’ would aid training.** Here’s a proposal: Since there is limited opportunity to teach reproducible skills in the vacuum or forceps, we might create a simulator where operative devices could be applied to “fetal

## TABLE

### ACOG criteria for types of forceps deliveries

#### Outlet forceps

Scalp is visible at the introitus without separating labia.

Fetal skull has reached pelvic floor.

Sagittal suture is in anteroposterior diameter or right or left occiput anterior or posterior position.

Fetal head is at or on perineum.

Rotation does not exceed 45°.

#### Low forceps

Leading point of fetal skull is at station  $\geq +2$  cm and not on the pelvic floor.

Rotation is 45° or less (left or right occiput anterior to occiput anterior, or left or right occiput posterior to occiput posterior).

Rotation is greater than 45°.

#### Midforceps

Station is above +2 cm but head is engaged.

#### High forceps

Not included in classification.

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heads,” which could be programmed for different positions, stations, or orientations. Pilots learn to handle wind shear and other hazardous but infrequent situations in a simulator—not by practicing in actual wind shear.

**BOFILL:** That would be a great resource, but it would be costly to develop a truly appropriate model, and we would have to interest bioengineers in building a system.

**GARITE:** And while we have more and more technological opportunities, which cost more and more money, we have less and less funding available in academic departments.

### Patient selection

**LONKY:** Developing the expertise to perform

the procedure is only half the picture. The other is choosing the right candidate (TABLE). In what clinical scenarios is operative vaginal delivery the best choice?

**HAYASHI:** These situations:

1. An exhausted patient in a protracted second stage of labor. The well-flexed fetal head is at +4 station, occiput-anterior position. This is essentially an outlet, “lift-out” situation.

### One of the biggest problems with fetal heart rate monitoring is overreaction to cord compression patterns.

2. A patient with adequate clinical pelvimetry who is becoming exhausted at 3 hours with epidural and in whom the fetus is occiput-posterior at +4 station.

3. A patient with adequate clinical pelvimetry and a transverse arrest, 3 hours with epidural, at +2 station.

4. A patient with worrisome or nonreassuring fetal heart rate deceleration with the fetal head at a low station—ie, +2 to +4.

The last 3 scenarios would involve a trial of operative vaginal delivery.

#### Should ‘difficult’ operative vaginal deliveries ever be performed?

**VINES:** Several respected lecturers and researchers are teaching that “difficult” operative vaginal deliveries should not be performed. Dr. Steven Clark from Utah and Dr. Jeff Phelan from California say we should perform easy vaginal deliveries or easy cesarean sections. And Dr. Gary Hankins has steered us away from forceps deliveries that involve more than 45° of rotation.

Yet I believe some patients still should be delivered via operative technique. For example, in rotational deliveries (occiput transverse and occiput posterior), Dr. Aldo Vacca has presented compelling evidence that, when the vacuum is placed on the correct point of the fetal head (the flexion point) and given correct axis traction, 90% or more will autorotate

to an occiput-anterior position and deliver.

**HAYASHI:** We are entering a time when operative vaginal delivery for rotations of more than 45° will be abandoned, for fear of litigation.

**GARITE:** I agree that acceptance of rotational vaginal deliveries has ended. Defending these cases in court when there is a bad outcome is extremely difficult. The key to success is choosing the right candidate.

**BOFILL:** The best candidates have a prolonged second stage of labor or nonreassuring fetal status with the head at the outlet or low in the pelvis and a functioning epidural.

I also would include cases with little or no rotation required. These patients account for about 50% of our operative vaginal deliveries. They are the best cases to teach and to learn.

**HAYASHI:** I recently reviewed a case in which the patient had been in the second stage of labor for 3 hours. The fetus was at +3 station and in the left occipital transverse position, and no progress had been made for 2 hours with epidural anesthesia. After a discussion with the attending, the physician, who was 2 years out of residency, elected to perform a cesarean.

One might argue that this was the best course, given the physician’s lack of confidence and experience performing rotational operative delivery. However, in experienced hands, flexing the fetal head and rotating the fetus to the occiput-anterior position could have resulted in an easy delivery. Unfortunately, in today’s medicolegal climate, the obstetrician may be liable if the operative delivery is difficult in any way.

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#### Overreaction to cord compression

**GARITE:** One of the biggest problems with fetal heart rate monitoring is overreaction to cord compression patterns, which are rarely associated with adverse outcomes. Unless a prolonged deceleration is unremitting, I would be careful about performing operative vaginal delivery on the basis of questionable fetal heart rate monitoring.

**LONKY:** Still, when there is a prolonged

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deceleration, it sometimes is difficult to do nothing. Increased litigation has eroded our confidence. Do you agree?

**VINES:** The confidence factor definitely comes into play. No matter how well we can describe the physiology behind cord-compression decelerations and why they do not indicate a fetus in trouble, some physicians will be willing to testify that cord-compression-type

**Physicians often respond to anxiety about litigation rather than do the best thing for the fetus.**

decelerations are ominous, and will argue that the prudent doctor would have anticipated a bad outcome and changed directions earlier.

A real problem arises when, during the second stage of labor, the cord-compression issue evolves into prolonged bradycardia without remission and there is a finite amount of time to act. Frequently, an expeditiously applied vacuum is much more time-saving than a cesarean delivery.

**BOFILL:** We do a significant number of deliveries for cord-compression patterns with the baby at the outlet. I used to be somewhat critical; now, I am a bit more pragmatic, having examined many cases. Babies and mothers did well, and cord gases were normal or nearly normal, with normal Apgar scores.

**GARITE:** Apgar scores and cord pH levels when operative vaginal delivery is not performed are also close to normal. My point is that we often respond to anxiety about litigation rather than doing the best thing for the fetus. We get into trouble when we start doing midpelvic deliveries or c-sections for those kinds of patterns.

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**Describing fetal station:**

**Thirds versus fifths**

**VINES:** Many physicians and nurses continue to describe the position of the fetal head in thirds rather than centimeters, even if they

were trained to do otherwise. How can we all get on the same page in describing rotation and its relation to fetal station and type of delivery if we use different terms?

**GARITE:** When ACOG redefined the classification of station, it was not accepted. Most people and even publications continue to use the 0 to +3 system, so it is confusing.

**VINES:** How do we support physicians in cases of mid or low applications of vacuum that may come to litigation, when we are not willing to use a 5-cm breakdown? We're hamstrung.

**GARITE:** I advise 2 things: Tell us what system you're using. Say +2 of 3 or +2 of 5. Second, document the indication before performing a midforceps delivery. Litigation invariably has involved midforceps deliveries for which the indication was not clearly explained.

**BOFILL:** I was a resident in 1988 when the new ACOG guidelines came out, and I was expected to start using the 5-cm breakdown the next day. I have used it ever since and I teach all my residents to use it as well. We all should have adopted it by now.

**VINES:** The Hospital Corporation of America's (HCA's) Perinatal Safety Initiative, in which I participated, determined that documentation of fetal station became a major point in litigation when nurses and doctors documented differently. We tried to address the problem in the 140 HCA hospitals that offer OB services by encouraging doctors and nurses to adopt the centimeter system.

Complicating matters further, the Association of Women's Health, Obstetric, and Neonatal Nurses is teaching that station from engagement to the perineum should be divided into fourths—so now we've got thirds, fourths, and fifths.

**'Why' as important as 'where'**

**GARITE:** Not to diminish this discussion, but what I notice in reviewing cases is that a deficiency in the description of why an operative delivery was performed and from what station or position is much more often a problem than whether different systems were used.

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### Sequential techniques

**LONKY:** Let's say we agree that midpelvic deliveries should be avoided. Does that apply to both forceps and the vacuum? What about a combination of the two?

**VINES:** We discourage residents and practicing physicians from using the techniques sequentially. Both the Towner<sup>1</sup> and Gardella<sup>2</sup> studies indicate that sequential vacuum and forceps increases the chance of intracranial hemorrhage or another untoward event.

**BOFILL:** I am somewhat critical of the Towner study because not a single medical chart was examined—it was all birth certificate data. I'm not convinced that such data is 100% accurate. We teach that we should avoid sequential deliveries, but I have seen many performed by experienced physicians. Still, bad outcomes will be difficult to defend in court.

**LONKY:** Sequential deliveries can involve something as simple as reapplying a vacuum after it falls off. In the vacuum-forceps sequence, the hope is to bring the fetal head to the outlet station so that a forceps delivery can be performed. I use vacuum much more frequently than forceps to do rotations to get us to the outlet; then I switch over. I guess the issue is not only whether sequential deliveries should be performed, but whether the obstetrician accomplishes with the first procedure what was needed before moving to the second procedure.

**GARITE:** The comment about the Towner study<sup>1</sup> is important. I, too, have concerns about the validity of birth certificate studies.

Virtually everybody has tried a vacuum and had it pop off at the perineum and then applied a simple outlet forceps. There is probably little harm in that scenario. Then there are procedures that involve a terribly nonreassuring fetal heart rate pattern, and the obstetrician decides to try operative vaginal delivery in lieu of cesarean. When that fails, another device is tried, and finally a cesarean section. That is where malpractice cases become problematic. When those types of cases are mixed up, it's like comparing apples and oranges.

### When measuring fetal station, follow ACOG recommendations

**P**rior to 1988, when the American College of Obstetricians and Gynecologists redefined station for forceps deliveries, the birth canal was described in thirds using a numerical score that ranged from 0 to +3. The current classification measures the distance between the leading bony point of the fetal head and the maternal ischial spines, using a scale of 0 to +5 cm.<sup>5</sup> Under this classification, an infant whose head is 2 cm below the ischial spines is considered to be at +2 station.

### Forceps and perineal injury

**VINES:** What are we to conclude about safety of the forceps when the 2003 Cochrane database and numerous recent studies show an increased rate of anorectal injury and incontinence with forceps compared to vacuum?

**GARITE:** I view these studies as preliminary. I am not convinced that we have all the answers about the significance of delivery—however it occurs—and anorectal injury. Many of these studies are imaging studies rather than long-term follow-up, and I would be careful interpreting those. As in any aspect of medicine, one weighs risks and benefits. It's one thing to choose to do a cesarean section on a woman having only 1 or 2 children, but what about women who will have 4 or 5 children? Should we perform a cesarean when we can do an operative vaginal delivery instead? Which is worse—some perineal trauma or the risk of placenta accreta and hysterectomy in her fourth and fifth pregnancies? It's a risk-benefit analysis, and we don't have all the data to make the decision.

**VINES:** Besides the additional expense associated with an increased cesarean section rate, there are the long-term medical costs of repeat cesareans.

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# Vaginal delivery procedure note

(Multiple gestations: complete 1 form for each infant delivered)

Spontaneous vaginal delivery

Vacuum-assisted

Forceps-assisted

## PREPROCEDURE EVALUATION FOR VACUUM OR FORCEPS

### Preoperative diagnosis (indication for use)

- Prolonged second stage
- Suspicion of potential/immediate fetal compromise
- Maternal exhaustion
- Other:

### Fetal heart rate interpretation: Check all that apply

- Reassuring
- Nonreassuring
- Decelerations (describe)

### Examination findings

- EFW \_\_\_\_\_  
 Fetal station \_\_\_\_\_  
 Position of head \_\_\_\_\_
- Cervix completely dilated and effaced
  - Maternal-fetal size appropriate for application
  - Bladder empty

### Patient counseling

- Indications discussed
- Questions answered
- Patient consented to operative delivery

### Cup placement (vacuum only)

- Flexion point identified
- Cup choice appropriate for application site
- Maternal tissue excluded from vacuum cup

## DETAILS OF PROCEDURE

### Station at application

- +1
- +2
- +3
- +4
- +5

### Position

- OA     ROT
- LOA    LOP
- ROA    ROP
- LOT     OP

### Anesthesia

- Local
- Epidural
- Spinal
- General
- Sedation

### Episiotomy/laceration

- Episiotomy: No / Yes  
 Median  
 Mediolateral  
 Degree: 1 2 3 4  
 Repair suture: \_\_\_\_\_
- Laceration:  
 No  
 Yes:  
 Degree: 1 2 3 4

## FORCEPS-ASSISTED

### Forceps used

- Simpson Forceps
- Eliot Forceps
- Tucker-McLean Forceps
- Luikart Forceps
- Keilland Forceps
- Other (describe)

### Complete and check all categories

- Bladder catheterized prior to application of forceps
- Hinge/lock approximated without difficulty
- Advancement in station with each pull

### Rotation of fetal head: Forceps rotation

- None
- 0-45°
- >45°

## VACUUM-ASSISTED

### Vacuum used

- Kiwi Omni
- Mity-Vac M-cup
- Mity Vac Bell
- Kobayashi Cup
- Other (describe)

### Complete and check all categories

- Total time of vacuum application \_\_\_\_\_ (minutes) (1<sup>st</sup> application to delivery)
- Maximum vacuum achieved \_\_\_\_\_ (cm Hg)
- Number of pulls (contractions) \_\_\_\_\_
- Number of involuntary releases ("pop-offs") \_\_\_\_\_
- Vacuum reduced between contractions
- Advancement in station with each pull

### Rotation of fetal head: Vacuum autorotation

- None
- 0-45°
- >45°

## POSTPROCEDURE EVALUATION

### Infant

- Male
  - Female
- Weight \_\_\_\_\_  
 Date of delivery: \_\_\_\_\_  
 Time of delivery: \_\_\_\_\_

### Cord blood gases

- Not collected
- Arterial
- Venous
- pH \_\_\_\_\_
- pO2 \_\_\_\_\_
- pCO2 \_\_\_\_\_
- BE/BD \_\_\_\_\_
- HC03 \_\_\_\_\_

### Amniotic fluid

- Clear
- Meconium
- Blood

### Suction

- Yes
- No

### Maternal EBL \_\_\_\_\_mL

### Placenta

- Spontaneous
- Manually extracted
- Abnormal (describe below)
- Sent for pathology evaluation

### Shoulder dystocia

- Yes
- No

### Fetal injury / anomalies

- No
  - Yes (see additional notes below)
- Describe any forceps marks:

### Vacuum application

- Median flexing
- Median deflexing
- Paramedian flexing
- Paramedian deflexing

### Extraction successful

- Yes
- No (Indicate reason below)

### Newborn evaluation

- NRP-certified personnel in attendance at delivery
- Neonatologist/pediatrician

### Nuchal cord/ true knot

- Yes
- No

### Maneuvers employed

- Suprapubic pressure
- McRoberts
- Rotation/Wood's
- Posterior arm
- Other (describe)

Additional notes dictated: Yes \_\_\_\_\_ No \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Patient identification information



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### A 1-minute form for reporting deliveries

**BOFILL:** Is the time ripe for a standardized method of reporting operative vaginal deliveries? I think it is, and I created a form to show how easy it would be. The form incorporates a check-box format, and can be completed in less than 1 minute. It includes areas for freehand description of any problems.

**For a sample reporting form for operative vaginal deliveries, see the 1-minute version on page 58.**

### 'Preflight checklist' key to fail-safe system

**LONKY:** One way to assess competency in both training and practice is to set up a fail-safe system that ensures that all the right things are considered before, during, and immediately after the procedure. We need a document that asks, "Did you check this?" "Did you check that?" and so on (FIGURE). The document would help the physician recognize whether he or she is approaching one of several clearly identified pitfalls. It also would encourage documentation of the procedure.

**GARITE:** The Residency Review Committee now requires competency assessments. A checklist that must be completed to ensure appropriate assessment would help tremendously.

**VINES:** My pilot friends tell me that though they probably know every item on the preflight checklist, the necessity of going through it and checking everything off time after time actually makes them better pilots because it prompts them to think about all the systems of their airplane and what their procedures will be if and when complications develop. Such a checklist would prompt physicians to think in advance and make better decisions.

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### Will forceps, vacuum delivery go the way of vaginal breech delivery?

**LONKY:** What does the future hold for vacuum and forceps deliveries? And how are you plan-

ning your training programs?

**HAYASHI:** We will be limited to outlet forceps and low vacuum involving rotations of less than 45°, with indications clearly documented. When the fetus is occiput-posterior, operative delivery will be limited to cases of maternal exhaustion only. Any expectation of rotation by forceps or autorotation by extraction will be discouraged.

**GARITE:** When programs are having a hard time finding people who can teach a modality and patients who will accept that modality, how do they proceed? An example is what happened with breech presentations. Although they still occur, we are not allowed to teach them because the recommendation is against vaginal breech deliveries.

Doctors need to know how to perform operative vaginal deliveries, however, because they will encounter situations in which operative delivery is clearly the best option. Whether we have to teach both vacuum and forceps is another question. I would like to say yes, but I don't think all programs will have the wherewithal to teach forceps adequately.

**BOFILL:** If we don't do a good job of teaching and promoting operative vaginal delivery we will unfortunately lose it—to the great detriment of our patients. If that happens, I'm not sure we can ever get it back, so we must be diligent and look for opportunities to teach and to be proponents. ■

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*Drs. Bofill, Hayashi, Lonky, and Vines report no financial relationship with any companies whose products are mentioned in this article. Dr. Garite TK*