



# RESIDENT KNOWLEDGE AND COMPETENCE OF OBSTETRIC ANAL SPHINCTER INJURIES AND REPAIR



## A Resident-Driven Educational Intervention

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### Background

Obstetric anal sphincter injuries are a serious complication of vaginal deliveries; true incidence is estimated at 11% of all vaginal deliveries by Dudding, et. al. (1). Fecal incontinence of some degree has been reported in 50% of women after an anal sphincter repair (2). Risk factors for anal sphincter injuries include birth weight >4kg, persistent occiput-posterior position, nulliparity, induction of labor, epidural analgesia, second stage of labor >1hr, shoulder dystocia, episiotomy (midline greater risk than mediolateral), and operative vaginal delivery (3).

The success of anal sphincter repair is influenced by the experience of surgeon, suture material used, and occurrence of infection at repair site (4). Complication rates are high following sphincter injuries, with up to a 12% infection rate after 3rd-degree repairs and 24% breakdown and infection rate after 4th-degree repair (5). There is a high rate of anal incontinence following repair, even without infection or breakdown. A study by Pollack, et. al., revealed that 29-53% of women report incontinence of flatus and 5-10% complain of incontinence of stool at 3-6 months following repair (6).

In 2002, a study by McLennan, et. al., surveying fourth year residents, revealed that 60% of respondents had not received formal education on repair of perineal lacerations and less than 30% of third degree lacerations were repaired under the supervision of an attending physician (7). In 2010, a study conducted at several US obgyn residencies testing residents on anal sphincter laceration repairs found that only 42.5% were proficient (8).

### Hypothesis / Aims of Study

This study describes the results obtained from a resident-driven educational intervention implemented at a single US obstetrics and gynecology residency program. We examined residents' knowledge of perineal anatomy, repair technique and post-partum care, and surveyed the confidence and the perceived competence of the resident physicians to perform these repairs. A simulation workshop was then conducted utilizing both the beef-tongue model and the pig sphincter model for teaching obstetric anal sphincter injury repair. We then surveyed the residents regarding which model was most preferred for instruction.

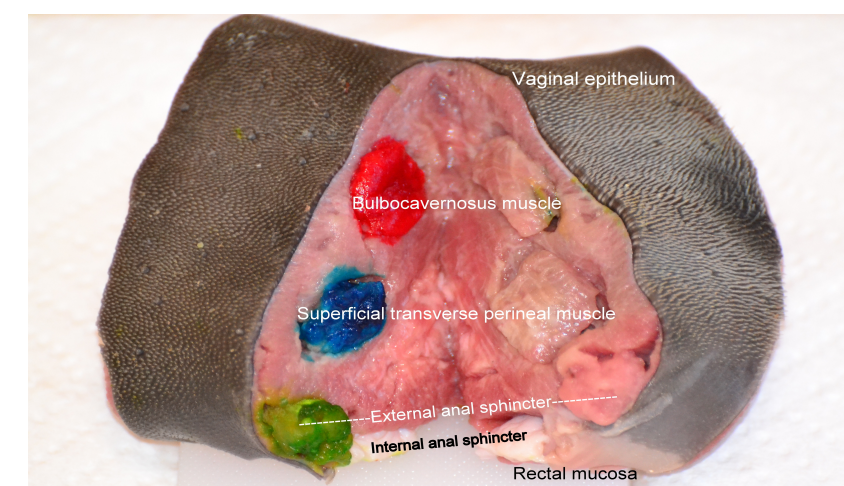
We hypothesized that residents would not perform well on the written knowledge exam or on the simulation mode, based upon previously published studies revealing the majority of residents were not proficient in repair (8). We also hypothesized that the pig sphincter model would be favored by the residents for instruction technique due to the anatomical accuracy of the model.

### Methodology

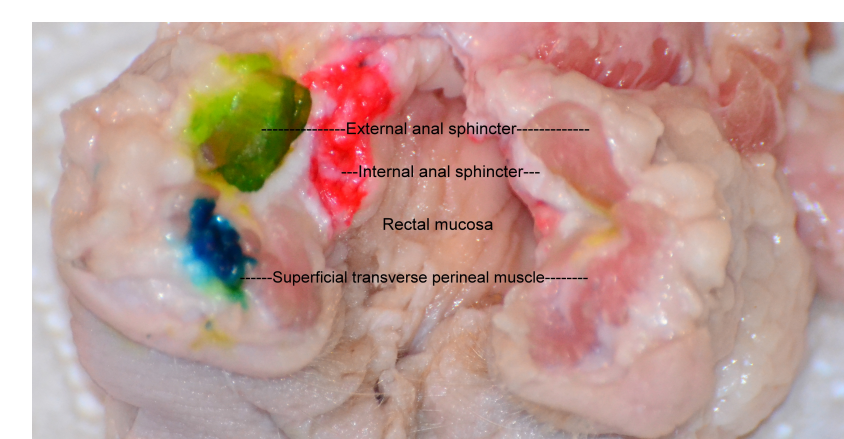
This study was undertaken in a university affiliated Ob/Gyn resident program. A workshop was developed to teach the residents about obstetric anal sphincter injuries. Baseline medical knowledge was assessed with a multiple-choice test, validated by four senior faculty members in urogynecology and general obstetrics and gynecology. Baseline resident confidence was assessed with a survey validated by the same four faculty members. Residents' baseline surgical competence in repairing fourth degree lacerations was evaluated using the previously described beef tongue model (9). Surgical competence was assessed by using a previously validated surgical checklist specific to this task, as described by Siddighi, et. al. (9). Two senior faculty members involved in the project and the 2 senior residents acting as primary investigators administered the skills assessment with the beef tongue model.

The instructional component of the session was then implemented, which included a didactic slide presentation focused on diagnosis, informed consent, antibiotic use during repair, postpartum management, and counseling during future pregnancies. Instruction on perineal anatomy and physiology also was discussed, with emphasis on the importance of both the internal and external anal sphincters for the continence mechanism. An ACOG-provided instructional DVD with high-quality anatomical animation was then shown (10). Residents were then given the opportunity to practice the fourth degree repair technique on a pig-sphincter model. A modified version of the validated checklist used for evaluating the surgical competence prior to the educational intervention was provided as a guide for the residents through the critical steps of the procedure. Out of the 14 eligible residents, 12 residents participated in some component of the study but only 3 juniors and 3 seniors were able to participate fully.

### Beef Tongue Model



### Pig Sphincter Model



### OASIS Knowledge Test

- On inspection of the perineum after a vaginal delivery, this is what you find. What anatomical structure is marked with the blue arrow?
  - Bulbocavernosus
  - External anal sphincter
  - Internal anal sphincter
  - Rectal mucosa
- A third degree laceration could involve all of the following anatomical structures EXCEPT:
  - Bulbocavernosus
  - Superficial transverse perineal muscles
  - Iliococcygeus
  - Internal anal sphincter
  - External anal sphincter
- Which of the following is true about the internal anal sphincter:
  - It is confluent with the puborectalis muscle dorsally.
  - It is smooth muscle innervated by the pudendal nerve.
  - It is smooth muscle that contributes up to 70% of resting tone of the anal sphincter.
  - Damage to the internal anal sphincter can lead to urge fecal incontinence.
- In counseling a patient after a 3<sup>rd</sup> or 4<sup>th</sup> degree laceration repair, it is important to discuss the following possible complications EXCEPT:
  - Incontinence of stool
  - Incontinence of flatus
  - Perineal pain
  - External hemorrhoids
  - Dyspareunia
- According to expert opinion, which antibiotic is most likely to prevent post partum wound infection and dehiscence of a 3<sup>rd</sup> or 4<sup>th</sup> degree repair?
  - Oral Augmentin for 5 day course
  - IV Cephalosporin x one dose at time of repair & oral cephalosporin for 3 day course
  - IV Metronidazole x one dose at time of repair & oral metronidazole for 3 day course
  - IV Cephalosporin & Metronidazole at time of repair & oral Cephalosporin & Metronidazole for 3 day course
  - No antibiotics indicated
- Which of the following suture material is not recommended for re-approximating or overlapping the external anal sphincter due to increased risk of wound dehiscence and post partum perineal pain?
  - 3.0 Plain
  - 3.0 Chromic
  - 3.0 Vicryl
  - 2.0 polydioxanone sulfate (PDS)
- In the overlapping technique of the external anal sphincter, the appropriate suture technique involves:
  - Interrupted sutures at the 3, 6, 9, 12 o'clock positions
  - Figure of eight sutures along the medial aspect
  - Multiple mattress sutures
  - Simple interrupted sutures at the cephalad and caudad aspects

Please read the following case and apply the information to answer the next five questions.  
28 y.o. G1P1 delivers a vigorous 9lb 2oz baby with vacuum assist after pushing for 2.5 hours. An episiotomy was performed. Baby was noted to be in the occiput-posterior position. The patient had an epidural for delivery that was working well for her.

- On first inspection of the perineum, there appears to be a substantial laceration. The next best step is:
  - Proceed to the OR as you anticipate a 3<sup>rd</sup> or 4<sup>th</sup> degree laceration.
  - Counsel the patient that you need to perform a rectal exam.
  - Call anesthesia to come to bolus her epidural for the repair.
  - Ask the nurse for a local anesthetic.
  - Place first stitch 1 cm above the apex of on the vaginal mucosa.
- You make the diagnosis of a 4<sup>th</sup> degree laceration. As you begin to explain this to the patient, her partner asks you why this happened. All of the following increased her risk EXCEPT:
  - Nulliparity
  - Vacuum delivery
  - Episiotomy
  - Occiput-posterior position
  - Maternal age <30
- In obtaining informed consent prior to your repair, all of the following risks are important to discuss, EXCEPT:
  - Loss of rectal tone
  - Perineal abscess
  - Unsatisfactory repair
  - Constipation
  - Dyspareunia
- In counseling the patient about post partum care, all of the following may be beneficial EXCEPT:
  - Sitz baths
  - Cold packs
  - Rectal suppositories
  - Stool softeners
  - All of the above
- Your patient wants to know how this event will impact her future deliveries. You feel confident telling her all of the following EXCEPT:
  - Risk of recurrence with a subsequent vaginal delivery is <5%.
  - There is no evidence that an episiotomy in your next delivery will prevent recurrence.
  - A fourth degree laceration is not a contraindication to a subsequent vaginal delivery.
  - If patient has continued evidence of anal sphincter compromise, cesarean section should be offered for delivery.

Answers: 1)c 2)c 3)c 4)d 5)d 6)b 7)c 8)b 9)e 10)d 11)c 12)d

### Resident Survey Results

	Junior Residents	Senior Residents	Average Score
Pre-intervention exam score	66	73	70
Pre-intervention repair score	54	64	58
Considers pig model more anatomically accurate	100	67	83
Considers pig model more realistic in tissue consistency	67	67	67
Prefers pig model for learning repair	100	67	83

### Discussion of Results

This program has a resident complement of 4 each year and 2 of the 16 residents were the primary coordinators of this simulation, thus the number that participated in this pilot study was small and further data is necessary to make definitive conclusions. With this study we do contribute to the evidence that residents are not learning necessary background information nor gaining surgical competence for management of obstetric anal sphincter injuries. There is little difference in the knowledge regarding this topic held by junior and senior residents. We illustrate that with a resident-driven educational session, resident confidence in ability to perform a repair may increase. Additionally, we show that the pig sphincter model was preferred by the residents as the simulation tool over the beef tongue model.

The use of externally and internally validated evaluation instruments is a strength of this study, which is low cost and easy to implement in multi-center settings. The small number of participants is an obvious limitation.

### Conclusions

Fewer operative vaginal deliveries and increasing numbers of Cesarean sections have decreased incidence of obstetric anal sphincter injuries in the US, decreasing resident exposure to this complication of vaginal deliveries. A resident-driven educational intervention can improve resident confidence in performing obstetric anal sphincter repairs. Residents preferred the pig sphincter model for learning sphincter repairs, finding it more anatomically accurate and more realistic in tissue consistency than the traditional beef tongue model.

In the future we plan to analyze occurrence of diagnosed obstetric anal sphincter lacerations from the time period prior to the intervention and then following; we hypothesize that the prevalence of diagnosed sphincter injuries will increase as the delivering residents have increased awareness, knowledge, and comfort in repair diagnosis and repair technique. We also have incorporated a test of skill into the annual resident OSCE and will analyze retention of knowledge from the workshop.

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