Hands-on Workshop

www.perineum.net
Cape Town, South Africa 3 August 2016

Chairpersons

Mr Abdul H Sultan, MB.ChB (Natal), MD, FRCOG
Consultant Obstetrician & Urogynaecologist

Miss Ranee Thakar, MB.BS, MD, FRCOG
Consultant Obstetrician & Urogynaecologist

Croydon University Hospital
Croydon, Surrey, UK

Email: abdulsultan@nhs.net
ranee.thakar@nhs.net
Obstetric anal sphincter injuries (OASIS)

HANDS ON WORKSHOP

Program (subject to change)

Introduction

Abdul Sultan

Applied Anatomy & Physiology

Ranee Thakar

Endoanal ultrasound

Ranee Thakar

Diagnosis of OASIS

Abdul Sultan

Repair Techniques

Abdul Sultan

Coffee

Video diagnosis & repair

Abdul Sultan

Video repair - pig sphincters

Ranee Thakar

Hands-on repair on pig sphincters

Faculty

Close
Anatomy of the anorectum (Fig 1)

The anorectum is the most distal part of the gastrointestinal tract and consists of two parts: the anal canal and rectum. The anal canal measures about 3.5 cms (2.5 cm anteriorly in female) and lies below the anorectal junction formed by the puborectalis muscle. The striated external anal sphincter (EAS) is made up of three parts (subcutaneous, superficial and deep) and is inseparable from the puborectalis dorsally. The internal anal sphincter (IAS) is a thickened continuation of the circular smooth muscle of the rectum. It is separated from the EAS by the conjoint longitudinal coat which is a continuation of the longitudinal smooth muscle of the rectum.

**EAS:**
- Striated muscle in a state of tonic contraction
- Innervated by the Pudendal nerve
- Up to 30% of resting pressure.
- Most of the squeeze pressure.
- Contraction maintained for < 2 minutes
- Reflex contraction with sudden increase in intra-abdominal pressure
- Relaxes during straining
- Damage results in urge faecal incontinence

**IAS:**
- Smooth muscle
- Autonomic control
- Contributes up to 70% of resting pressure
- Damage results in passive soiling and flatus incontinence

---

**Figure 1: Anatomy of the anal sphincter**

![Diagram of the anal sphincter system](image)
Episiotomy & 2nd degree tears

Introduction
- 85% women who have a vaginal birth sustain some form of perineal trauma
- Approximately 350,000 women per year in the UK need sutures for perineal injury after spontaneous vaginal delivery
- The morbidity associated with perineal injury and repair is a major health problem worldwide

Indications for episiotomy
- Minimise multiple & extensive tears
- Thick & inelastic perineum
- Forceps delivery
- Expedite delivery
- Suspected fetal distress
- Shoulder dystocia
- Breech

Benefits of midline episiotomy
- Decreased blood loss
- Easier to recognise OASIS
- Easier to repair
- Better anatomical result
- Reduced pain
- Decreased risk of infection
- Decreased dyspareunia

Disadvantage of midline episiotomy
- ↑ OASIS

Episiotomy
- 254 primips
- No midwife and only 13 (22%) doctors performed a truly mediolateral episiotomy (between 40 to 60 degrees from the midline)
- Episiotomies angled closer to the midline significantly associated with OASIS (26 vs 37 degrees)

Episiotomy
Eogan et al BJOG 2006
- Case-control study (54 versus 46 controls)
- Mean angle of episiotomy smaller
- (30% versus 38% p<0.001)
- 50% risk reduction for every 6° from midline
- The relationship of episiotomy angle with risk of OASIS was sig (p<0.001)
Angle of episiotomy before and after repair
Kalis V et al 2008 (IJGO)

- 50 women undergoing first delivery
- Mediolateral episiotomy during crowning at 40 degrees away from midline
- Angle of scar measured after delivery = 22.5 degrees
- Should aim for 60 degrees at crowning

Episiotomy & 2nd degree tears
Suture Materials
Dexon vs Vicryl Kettle C, Dowswell T, Ismail K 2010

- Cochrane systematic review of 9 RCT’s (n = 4017)
- Absorbable synthetic materials (Dexon and Vicryl) versus catgut
  - ↓ Perineal pain
  - ↓ ↓ Analgesic use
  - ↓ Dehiscence wounds
  - ↓ Resuturing

Vicryl Rapide vs Vicryl Suture Material

- 5 RCT (n = 2349 women)
- Similar rates of short and long-term pain
- Fewer women in the rapidly absorbing suture group reported the need for pain relief at 10 days
- More women in the standard suture material group required suture removal

Suture material

- Standard polyglactin 910 (Vicryl)- not totally absorbed from the wound until 60–90 days.
- Rapid absorption polyglactin 910 (Vicryl Rapide)- completely absorbed from the tissue by 42 days
Evidence based practice
Repair Techniques
Kettle C, Dowswell T, Ismail K 2012

- Cochrane systematic review - 16 RCT’s (n = 8184) found that continuous stitches compared to interrupted is associated with :
- Less short term pain at 10 days
- Reduction in analgesia use
- Reduction in suture removal
- No significant difference in dyspareunia
- Reduction in pain is even greater if continuous technique used for all layers compared to only skin

Technique of repair

Prior to commencing the repair
- Check extent of perineal trauma – perform per vaginal and per rectal examination
- Check equipment - suture pack, materials
- If needed ensure that appropriate supervision/support is available prior to commencing the repair
- Ensure that the wound is adequately anaesthetised (10-20mls Lignocaine 1%) - don’t inject local through the skin

Step 1 - suturing the vagina
- Identify the apex of the vaginal wound
- Close the vaginal trauma with a loose continuous stitch
- Continue to suture the vagina until the hymenal remnants are reached and re-approximated
- At the fourchette insert the needle through the skin to emerge in the centre of the perineal trauma

Step 2 - suturing the muscle layer
- Check the depth of the trauma - it may be necessary to insert two layers of sutures
- Continue to close the perineal muscle with a continuous non-locking stitch - taking care not to leave any dead space

Step 3 - suturing the perineal skin
- At the inferior end of the wound bring needle out under the skin surface
- The stitches are placed below the skin surface in the subcutaneous layer - thus avoiding the profusion of nerve endings
- Continue taking bites of tissue from each side of the wound until the hymenal remnants are reached
- Secure the finished repair with a loop knot tied in the vagina

Finally
- Check the finished repair is anatomically correct
- No bleeding
- PV - insert two fingers
- PR
- Check swabs & instruments
- Complete documentation
Conclusion

- It is imperative that women receive high quality evidenced based care wherever childbirth takes place
- Practices that reduce the adverse effects of perineal trauma and make vaginal birth more desirable are to be encouraged
- Improved perineal care may decrease the escalating interest in caesarean section as an alternative mode of delivery
Diagnosis of obstetric anal sphincter injuries (OASIS)
Abdul H Sultan

- Until the advent of anal ultrasound, the development of anal incontinence was attributed largely to pelvic neuropathy.
- However prospective studies before and after childbirth have shown that up to one third of women sustain anal sphincter damage that is not recognised at delivery (Sultan AH et al 1993).
- Andrews et al (2006) performed a study in which 241 women having their first vaginal delivery had their perineum re-examined by an experienced research fellow and endoanal ultrasound was performed immediately after delivery and repeated 7 weeks postpartum. When OASIS were identified by the research fellow, the injuries were confirmed and repaired by the duty registrar or consultant. The prevalence of clinically diagnosed OASIS increased from 11% to 25% (n=59). Every clinically diagnosed injury was identified by postpartum endoanal ultrasound. At 7 weeks no de novo defects were identified by ultrasound. This study concluded that most if not all sphincter defects that have previously been designated as "occult" injuries were in fact injuries that should have been recognisable at delivery. It was alarming to find that 87% and 27% of OASIS were not identified by midwives and doctors respectively. Although it is likely that some of these would have been detected at the time of suturing the tear, it is of concern that clinical recognition of OASIS is suboptimal.
- This finding is not unique as Groom and Patterson found that the rate of third degree tears rose to 15% when all "2nd degree tears" were re-examined by a second experienced person.
- It has been shown that only 16% of doctors and 39% of midwives feel that they were trained adequately to identify OASIS (Sultan et al 1995).
- On the other hand it is possible that the sphincter tear had been recognised but classified as a second-degree tear. A questionnaire sent to all UK consultants (Fernando et al 2002) and trainees (Sultan et al 1995) confirmed that up to 40% are still classifying partial and even complete disruption of the sphincter as a second degree. The reason for this confusion is partly due to previous teachings (Sultan & Thakar 2002) and therefore for the sake of clarification and consistency Sultan (1999) proposed a comprehensive classification that is now accepted by RCOG (Greentop guideline 2007), NICE (NICE.org.uk) and the International Consultation on Incontinence (Norton et al 2002) (Fig 2):

**Fig 2: Classification of OASIS (Sultan 2007 Springer)**

OASIS – Classification (See Fig 2)
1st degree = vaginal epithelium
2nd degree = perineal muscles
3rd degree = anal sphincter
  3a = <50% external sphincter thickness
  3b = > 50% external sphincter thickness
  3c = internal sphincter torn
4th degree = 3rd degree + anal epithelium torn
Repair techniques of obstetric anal sphincter injuries (OASIS)

Abdul Sultan

Anal incontinence after primary repair of OASIS  Sultan AH, Thakar R  2007
35 studies in the last 25 years
• Anal incontinence mean 39% (range 15 to 61%)
• Faecal incontinence mean 14% (range 2-29%)

Internal sphincter defects  Mahony R et al 2007
• 500 consecutive OASIS
• Persistent IAS defect independently associated with severe anal incontinence. OR 5.1 (95% CI = 1.5 – 22.9)

Fecal incontinence after vaginal delivery  Fenner DE et al AJOG 2003
• 831 primips completed bowel questionnaire 6 months after delivery
• 20% sustained OASIS
• 30% OASIS vs 20% of controls had poor bowel control.
• Symptoms 10x higher in 4th degree tears

➢ RCT of 161 women
➢ Team of 3 obstetricians and 3 colorectal surgeons
➢ At 12 months 40% reported any anal incontinence (17% flatus > 1 per week)
➢ No difference in outcome between immediate and delayed (8 to 12 hours) repair
No justification in delaying repair until the next day.

Delayed and early secondary anal sphincter repair  Soerensen MM et al 2008
➢ 21 female patients and 21 controls
➢ Delayed primary repair  (<72 hours postpartum)
➢ Early secondary repair  (<14 days postpartum)
➢ Repaired by 2 senior obstetricians
➢ Mean follow up of 4 years
➢ No post-op complications and none needed colostomy
➢ No significant difference in QoL with 19 controls

25% vs 5% of controls had faecal incontinence

Anal canal length & good outcome  Hool GR et al DCR 1998
➢ Secondary overlap sphincter repair (n=51)
➢ Mean follow-up = 16 months
➢ Post-operative anal canal length best predicted continence
Secondary anal sphincter repair  Engel AF et al 1994; Malouf AJ et al 2000

- Prospective study (n= 55) of overlap repair.
- 80% success at 18 months
- 50% at 5 years (n=46)
- But one third had more than one repair

overlap vs end-to-end primary repair  Sultan AH et al 1999

- Anal incontinence: reduced from 42% to 8% (flatus)
- External sphincter defects: reduced from 85% to 15%
- Technique or operator? randomised study needed

End-to-end vs overlap  RCT  Fernando R et al 2004

- 64 randomised
- At one year compared to the end-to-end repair, significantly fewer women with overlap EAS repair suffered faecal incontinence
- 9 of 15 who had 3c/4th degree tear had FU scans
- All 9 had intact IAS.

End-to-end vs Overlap  Rygh AB and Korner H 2010

- 119 primips 3b tear
- Primary outcome = solid stool leakage at least once per week
- No significant difference

End-to-end vs overlap  RCT  Farrell SA et al 2012

- 3 year follow-up
- No significant difference

Methods of repair for OASIS
Fernando R et al 2013  (Cochrane Review)

6 RCTs of EAS overlap –vs- end-to-end

Conclusions

- Overlap appears to be associated with lower risks of developing urgency and anal incontinence symptoms.
- At 36 months there was no difference in flatus or faecal incontinence between the two techniques.
- However, since this evidence is based on only two small trials, more research evidence is needed in order to confirm or refute these findings

Is the overlap repair more robust over time???
Suture materials (www.perineum.net)
- Do NOT use figure-of-eight sutures for the mucosa or muscles
- Anal Mucosa - Single interrupted or non-locking continuous Vicryl 3-0
- Internal Anal Sphincter - Mattress end-to-end PDS 3-0
- External Anal Sphincter - Mattress/Overlap PDS 3-0

Suture material Williams et al 2006
- 112 women – 4x4 randomised study
- No difference in suture related morbidity between Vicryl and PDS
  - But 70% were 3a tears and only 54% 12 month follow-up

Operating Theatre
- Sterile environment
- Good lighting, exposure and assistance
- Appropriate instrument tray, sutures
- Anaesthesia – spinal, epidural, General

Antibiotic prophylaxis for OASIS Duggal N et al 2008
- Prospective placebo controlled RCT (n=147)
- Single IV dose of cephalosporin
- Perineal wound infection 8% vs 24% in placebo

Forceps vs Vacuum Eason and Thakar 2007

<table>
<thead>
<tr>
<th>Study</th>
<th>Vacuum vs forceps</th>
<th>PD (fixed)</th>
<th>PD (fixed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>95% CI</td>
<td>95% CI</td>
</tr>
<tr>
<td>Lester</td>
<td></td>
<td>-9.06 (-9.06, -9.04)</td>
<td></td>
</tr>
<tr>
<td>Veeco</td>
<td></td>
<td>-9.50 (-9.50, -9.50)</td>
<td></td>
</tr>
<tr>
<td>Cell</td>
<td></td>
<td>-9.02 (-9.02, -9.02)</td>
<td></td>
</tr>
<tr>
<td>Johnson&amp;Johnson</td>
<td></td>
<td>-9.08 (-9.08, -9.08)</td>
<td></td>
</tr>
<tr>
<td>Johnson&amp;Johnson</td>
<td></td>
<td>-9.09 (-9.09, -9.09)</td>
<td></td>
</tr>
<tr>
<td>Saloivics</td>
<td></td>
<td>-9.07 (-9.07, -9.07)</td>
<td></td>
</tr>
<tr>
<td>Medline</td>
<td></td>
<td>-9.27 (-9.27, -9.27)</td>
<td></td>
</tr>
<tr>
<td>Versacare</td>
<td></td>
<td>-9.00 (-9.00, -9.00)</td>
<td></td>
</tr>
<tr>
<td>Poppick</td>
<td></td>
<td>-9.09 (-9.09, -9.09)</td>
<td></td>
</tr>
<tr>
<td>Total (95%)</td>
<td></td>
<td>-9.06 (-9.06, -9.04)</td>
<td></td>
</tr>
</tbody>
</table>

Total events: 100 (Vacuum), 151 (Forceps)

Other Interventions to reduce OASIS Laine K et al 2008
- Third and 4th degree tears 4.03% to 1.17%
- 4th degree tears 12 to < 1 per year
OASIS repair - recommended practice  Sultan AH, Thakar R 2007

- Experienced obstetrician
- Repair in operating theatre
- Regional or general anaesthesia
- IV antibiotics +/- oral for 3 days
- EAS
  - End-to-end for all 3a
  - End-to-end or overlap for full thickness and full length 3b
- IAS → End-to-end mattress
- Monofilament sutures (PDS) for the sphincter  (Vicryl 2-0 can also be used)
- Rectal examination before and after repair
- Foleys catheter for 12 hours
- Lactulose 15mls bd for 7 to 10 days
- Clinic Follow up in 2 to 3 months

Labour Ward Protocol See website  www.perineum.net

Also refer to RCOG Green-top guideline 2015

Fig 3 External sphincter defect (between arrows) on 3d endoanal ultrasound
Management of OASIS after subsequent pregnancy

Abdul Sultan

Mode of delivery after OASIS
Caesarean section or Vaginal delivery?

Recurrence risks with previous OASIS  Peleg D et al 1999
- Primips, ceph, term, 3\(^{rd}\)/4\(^{th}\) (n=704); Incidence = 19\% (midline episiotomy)
- Recurrence rate = 12\% vs 7 \% if no previous OASIS (P=0.001)

Previous OASIS - is recurrence predictable? Harkin R et al 2003
- Mediolateral episiotomy
- 2 of 45 (4.4\%) in subsequent vaginal deliveries developed a repeat OASIS

Previous OASIS Poen AC et al 1998
- 43 of 110 women studied
- Anal incontinence 56\% -v- 34\% in women with no subsequent delivery. (RR = 1.6, CI = 1.1-2.5)

Previous OASIS Sangalli MR et al 2000
- 177 women 13 years FU
- Faecal Incontinence in 114 subsequent deliveries (3\(^{rd}\) tears = 2.5\% ; 4\(^{th}\) tears = 26.5\%)

Can OASIS be prevented ? Can only minimise the risk of OASIS
- Episiotomy
  - Restrictive vs Liberal
  - Mediolateral vs Midline
- Instrumental delivery - forceps vs vacuum
- Perineal support  Laine K et al 2012; Hals E et al 2010

- 254 primips, 41\% mediolateral episiotomy
- No midwife and only 13 (22\%) doctors performed a truly mediolateral episiotomy (between 40 to 60 degrees from the midline)
- Episiotomies angled closer to the midline significantly associated with OASIS (26 vs 37 degrees)

Episiotomy Eogan et al 2006
- 50\% risk reduction of third degree tears for every 6\° away from midline

Management of subsequent pregnancy after OASIS  Scheer I et al 2009
- 56 deliveries 2002 –2006
- 38 (70\%) vaginal deliveries
- No significant deterioration in:
  - bowel or bladder symptoms
  - quality of life
  - resting and squeeze pressures
- No significant new scan defects
### Management of pregnancy after OASIS

**Offer CS**

- Asymptomatic

**Abnormal** –
  - Defect >1hr Incremental MSP < 20 mmHg)

- Severe faecal incontinence

- Family not complete

**Vaginal delivery**

- 2* sphincter repair

**Anal manometry & ultrasound** → **Normal**

- Symptomatic

  - Conservative Mx
    - Dietary advice
    - Regulate bowel action
    - Constipating agents:
      - codeine phosphate
      - loperamide
    - PFE & biofeedback

  - mild incontinence (flatus, staining)

- Family complete/ delay

  - Offer CS

**Hospital follow-up** [Perineal Clinic]

- **Vaginal delivery**

- Asymptomatic

### Recurrence rate after previous OASIS

- **Midline episiotomy 12%**
  
  *Peleg et al 1999*

- **Mediolateral episiotomy**
  
  - 4.4% *Harkin R 2003*
  - 4.4% *Efteghi I 2004*
  - 5.6% *Baghestan L et al 2011*
  - 6.8% *Scheer I et al 2009*
  - 7.1% *Jango H et al 2012*
  - 13.4% *Ali A et al 2014*
  - (2 flatus incontinence at follow up)
Treatment of anal incontinence

Conservative management: Biofeedback

*Norton 1999, BJS*

- 67% cure and improvement
- Most successful in urge incontinence
- Improvement even if structural damage

Management of anal incontinence

- Antidiarrhoeal agents
  - e.g. Loperamide (Imodium), Codeine, diphenoxylate (Lomotil)
- Reduces intestinal transit
- Increases rectal compliance & resting pressure of IAS
- Codeine causes drowsiness and dependence

Anterior anal sphincter repair

*Engel AF et al 1994, Malouf et al 2000*

- Prospective study (n=55) of overlap repair.
- Successful outcome at 15 months in 80%.
- 5 year follow-up = 50% success

Dynamic Graciloplasty

- Multicentre trial
- 139 patients
- 60% success and improved QoL
- 74% complication
- 40% reoperation

Dynamic Graciloplasty

- Complications
  - Technical problems with muscle wrap and stimulation
  - Infection
  - Anorectal dysfunction

Sacral nerve modulation

*Altomare DF et al 2009*

- 52 patients with fecal incontinence
- Minimum of 5y FU
- Wexner score ↓ from 15±4 to 5±5 (P<0.001)
- Significant improvement in QoL
- Minor complications 13%

Injectable biomaterials

- Collagen
- PTQ implants
- Carbon coated Zirconium oxide beads
- Polyacrylamide hydrogel
- Small case series show variable short term
- Efficacy
Take Home Messages

- Every woman who has a vaginal delivery has a 3rd or 4th degree tear until proved otherwise
- A 3rd or 4th degree tear (as well as an isolated buttonhole tear of the rectum) cannot be excluded without a rectal examination
- Therefore a careful digital rectal examination with good exposure, adequate lighting and analgesia is mandatory.
- There is Level 1a evidence that second degree tears and episiotomies should be repaired using the continuous technique of repair for all three layers with Vicryl Rapide
- Restoration of normal sphincter length best predicts continence and therefore the full length of the torn sphincter must be repaired
- The torn internal sphincter should be identified and repaired separately using an end-to-end repair technique
- Partially torn external sphincter tears must be repaired using the end-to-end technique.
- Full thickness and full length external sphincter tears can be repaired by either the overlap or end-to-end technique. However the superiority of the overlap repair has only been demonstrated in one study where all repairs were conducted by only two operators. The Cochrane review does not recommend one technique over the other.
- The anal mucosa and anal sphincter muscles must not be repaired using figure-of-eight sutures as they can cause ischaemia and necrosis of tissue
- The best chance of successful repair of OASIS is at the time of delivery; secondary sphincter repair (especially of the internal sphincter) is comparatively poor
- In terms of subsequent pregnancy management:
  - Compare like with like ie. the worst scenarios of CS and VD
  - Risks following CS is not just for one CS but cumulative with each subsequent CS
  - The risk of recurrence of OASIS is about 7%
  - Outcome of vaginal delivery after OASIS is good in selected patients