

Perianal sepsis: surgical perspective and practical MRI reporting for radiologists

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Sydney, Australia



MACQUARIE UNIVERSITY
Hospital



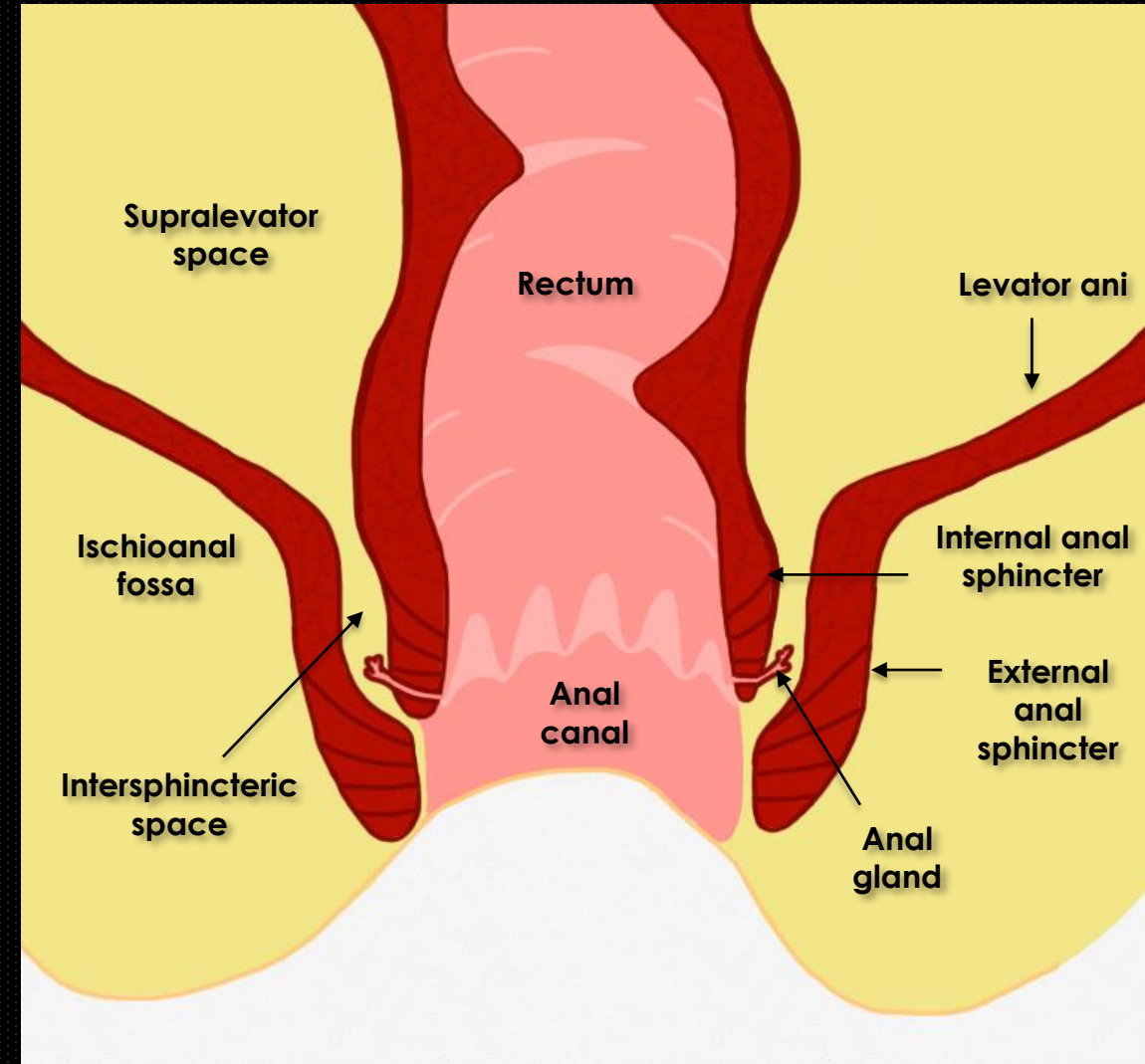
Royal North
Shore Hospital

LEARNING OBJECTIVES

1. Summarize current **surgical approaches** to perianal sepsis to help radiologists **focus on reporting the MRI findings relevant to surgical management**
2. Describe a **structured MRI reporting template and diagrammatic worksheet** for perianal sepsis
3. Illustrate the value of this structured reporting method using **case studies**

BACKGROUND

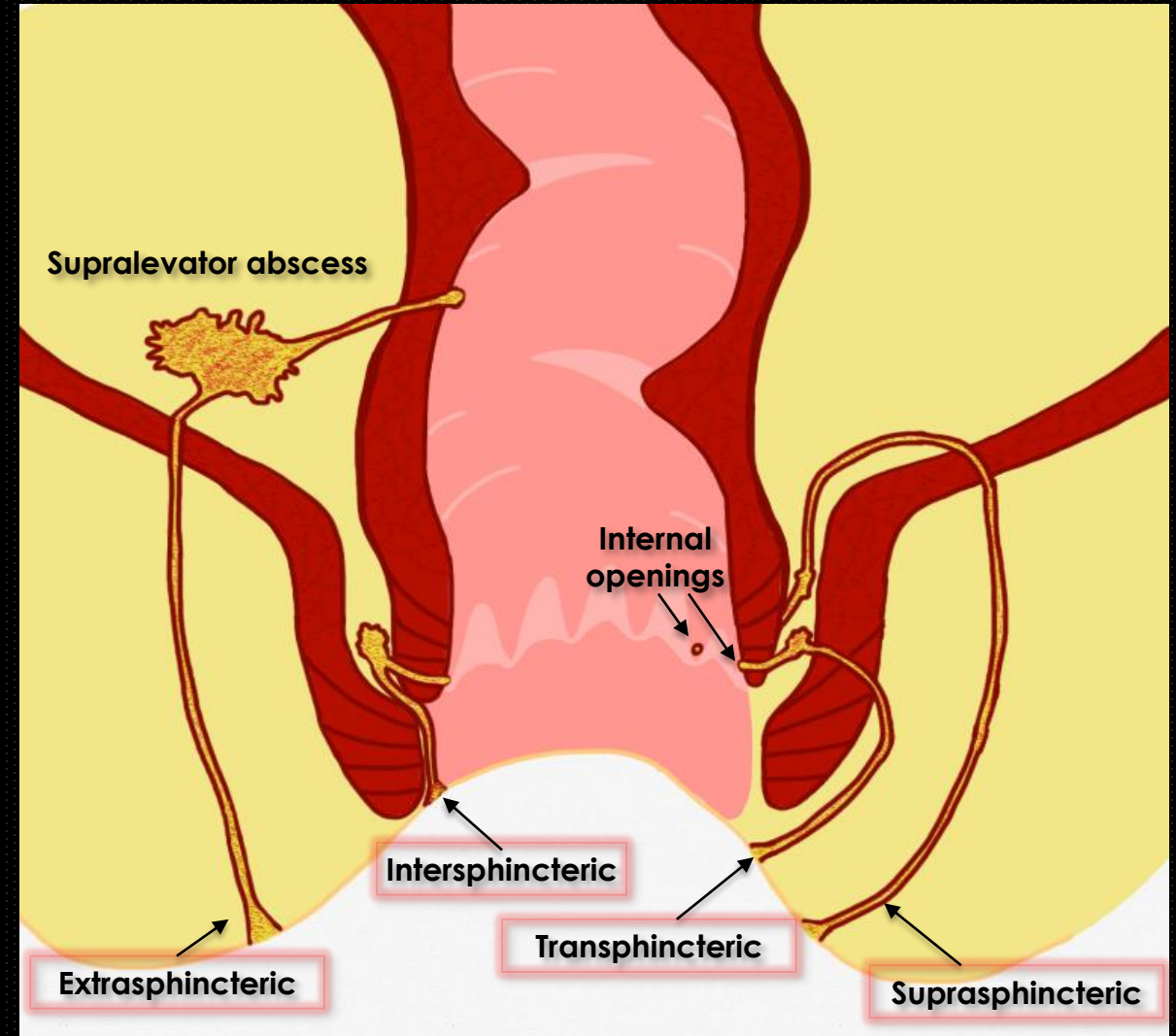
- Why perform MRI for perianal sepsis?
 - Determine **relationship of fistula(e)** with the **anal sphincter complex**
 - Identify any **extensions** (i.e. secondary fistulae +/- abscesses)
- MRI findings can **inform management decisions**
 - MRI has superior contrast resolution compared to CT
 - MRI has superior field of view and supralelevator space assessment compared to endoanal ultrasound and clinical examination



BACKGROUND

- The **cryptoglandular theory** of perianal fistula formation postulates that infection begins in an obstructed anal gland located in the intersphincteric plane near the dentate line
- In **inflammatory bowel diseases** such as Crohn's disease, infection commonly arises from transmural inflammation leading to complex perianal sepsis
- Preoperative MRI is particularly useful for assessing perianal sepsis in patients with **Crohn's disease, recurrent fistulae** or **supralevator sepsis**

PARKS CLASSIFICATION OF PERIANAL FISTULAE



PERIANAL FISTULA MANAGEMENT

Clinically, fistulae are classified as **simple** and **complex**

Complex fistulae are those where surgical treatment may pose a **higher risk of disturbed faecal continence**

Simple fistulae

Intersphincteric fistulae

Low transphincteric fistulae

Complex fistulae

Fistula factors

Fistulae with extensions and branching

Recurrent fistulae

High fistulae encompassing greater amount of muscle of the anal sphincter

Patient factors

Inflammatory bowel disease

Pre-existing incontinence

Previous local radiation

Anterior fistulae in females

SURGICAL APPROACHES

Surgical principles

- Eliminate septic foci and any associated fistula
- Preserve anal sphincter function and continence

There is a progressive trade-off between operative sphincter division, post-operative healing rates and functional compromise

Surgical management is influenced by

• Patient factors

- Aetiology, e.g. Crohn's disease versus cryptoglandular
- Comorbidities
 - Previous fistulae, perineal surgery, irradiation, vaginal delivery, incontinence

• Fistula factors

- Location
- Topography, including the amount of anal sphincter complex involved
- Complexity: Parks classification and degree of secondary tracts and extensions

SURGICAL APPROACHES

Definitive surgical interventions include

- Fistulotomy
- Cutting setons
- Mucosal advancement flaps
- Ligation of intersphincteric fistula tract (LIFT)
- Metallic clips
- Biomaterials including glue variants and fistula plugs

Palliative strategies

- Non-cutting seton

Newer emerging techniques

- Video-assisted anal fistula treatment (VAAFT)
- Stem cell therapy

Detailed description is beyond the scope of this poster

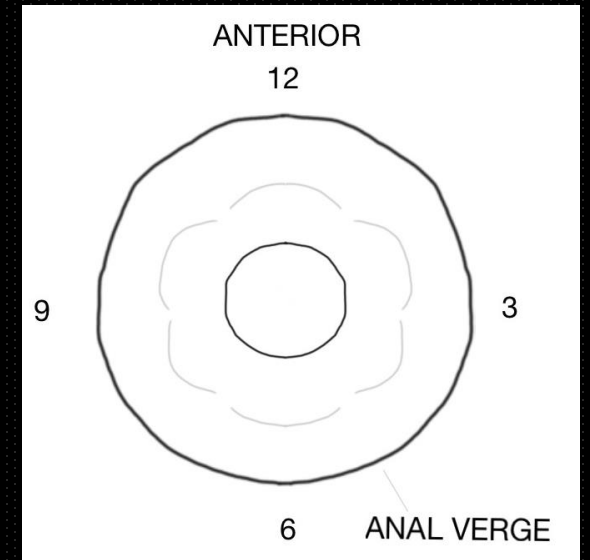
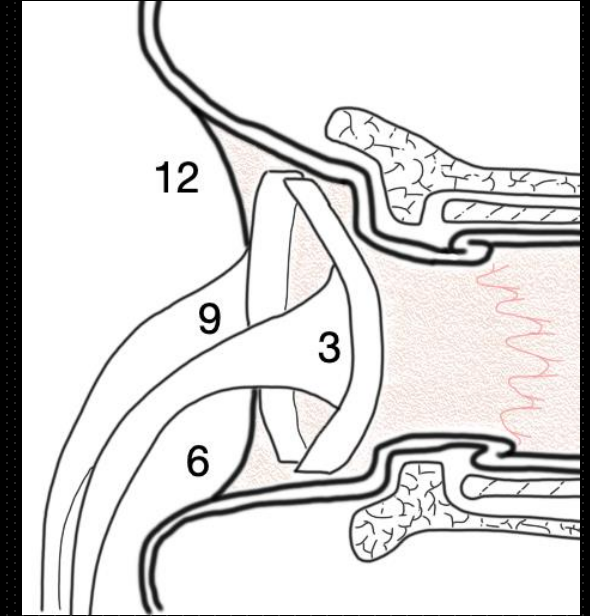


Example of a non-cutting seton to treat a perianal fistula that has an external opening at 7-8 o'clock position

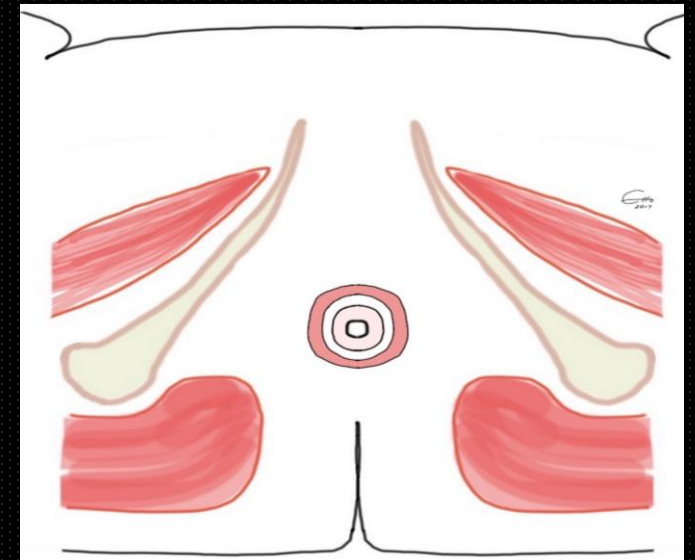
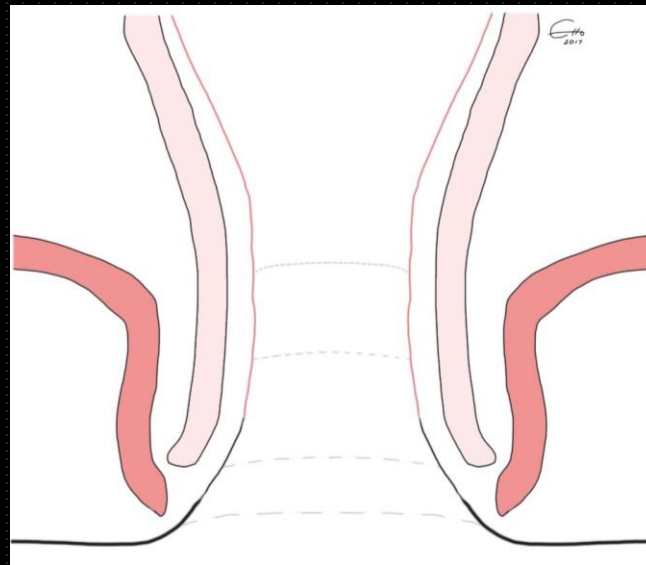
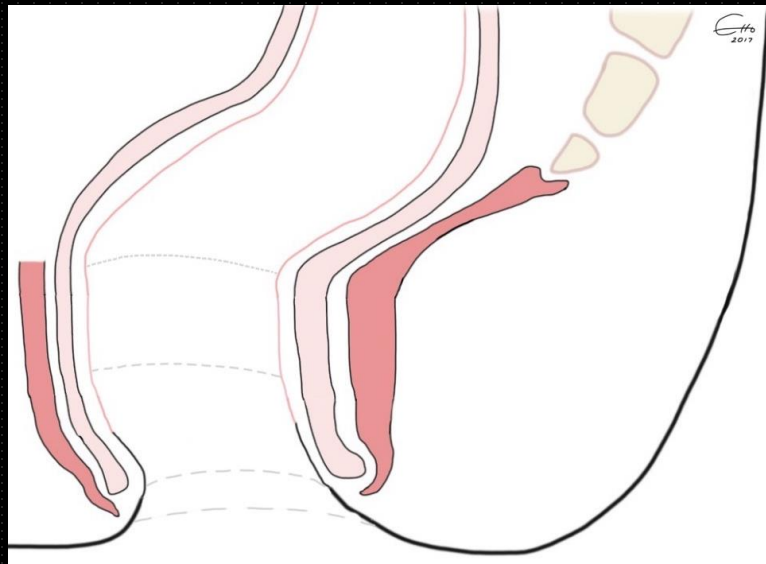
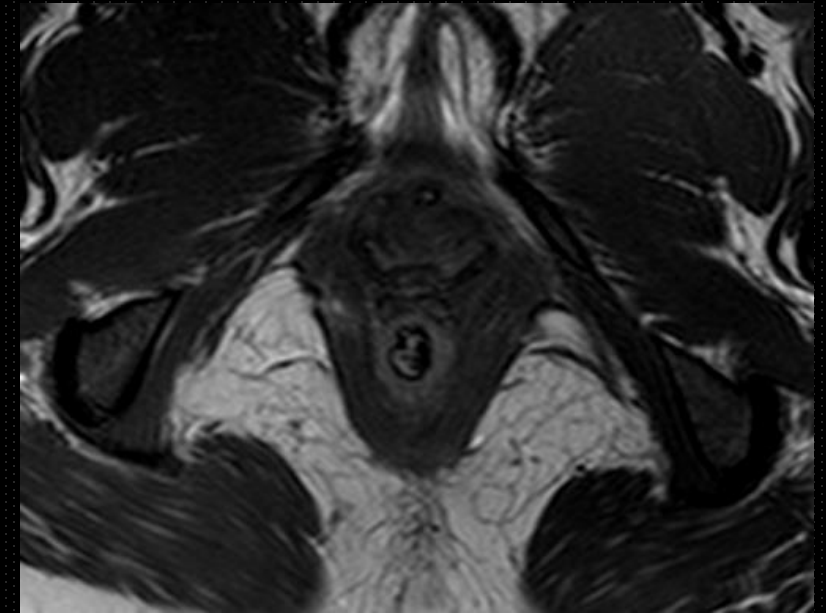
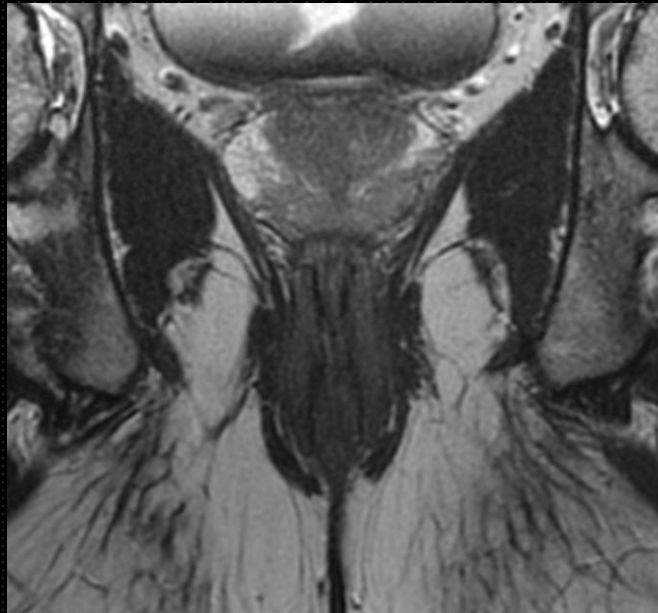
THE SAME
PATIENT,
DIFFERENT
PERSPECTIVE

THE SURGEON'S PERSPECTIVE

- Detailed clinical assessment of perianal sepsis is typically performed under general anaesthesia
- With the patient in the lithotomy position, an anal retractor may be placed
- Findings such as internal and external openings of fistula(e) and palpable abscess(es) are recorded using the anal clock annotation



THE RADIOLOGIST'S PERSPECTIVE



HOW CAN THE RADIOLOGIST HELP THE SURGEON TO APPROACH PERIANAL SEPSIS?

It can be challenging for radiologists to accurately and efficiently communicate MRI findings of perianal sepsis using text-only reports

Clinicians can find it equally challenging understanding the text-only report



Department of Radiology Concord Repatriation General Hospital

Name:
DoB: 13-06-1983
Referring Dr:

MRN:
Gender: M

Procedure ID:
Exam Date: 14-09-2015

MRI Pelvis with Contrast
Performed on 14-09-2015, 12:37

CLINICAL HISTORY PROVIDED: Established inflammatory bowel disease/Crohn's disease with perianal involvement.

TECHNIQUE: Sagittal T2, oblique coronal and axial T2, T2 SPIR and post contrast T1 SPIR sequences. Intravenous buscopan was administered.

FINDINGS: There are internal openings in the lower anal canal, 1 cm from the anal verge. They both open into a large, circumferential intersphincteric abscess, that measures 1.5 cm in thickness and 4.4 cm in craniocaudal length. Inferiorly on the left, the abscess leads to an external opening in the left natal cleft at 3 o'clock location. On the right, in the posterior aspect of the ischioanal fossa, there is a blind ending abscess extension that extends outside the external sphincter but there is no obvious external opening. There is adjacent inflammatory change in the subcutaneous fat. On the left anteriorly, there is extension of the abscess to the base of the penis, which is compressed and mildly displaced to the right but there is no obvious inflammation of the base of the penis. This component measures 2.2 x 1.3 x 1.7 cm.

At the 6 o'clock location, 1.3 cm from the anal verge, just slightly superior to the internal openings described above, there is a further internal opening of a fistula tract, that is transsphincteric and extends towards the natal cleft at 6 o'clock, there is no obvious external opening.

There is no supra levator extension of the intersphincteric abscess. The levator plate demonstrates adjacent mild oedema but is not thickened. No extension of inflammation to the mesorectum. No bony involvement in the pelvis.

COMMENT: Two anterior internal openings in the low anal canal, opening into a large circumferential intersphincteric abscess. There is an external opening from the abscess to the left side of the natal cleft, at about 3 o'clock. On the right posteriorly, there is an extension of the abscess, across the external sphincter to the posterior right ischioanal fossa without an external opening. A further extension is seen anteriorly to the left, where there is an abscess to the left of the base of the penis. There is no obvious inflammation of the base of the penis. There is an additional transsphincteric fistula tract at six o'clock with no obvious external opening seen, please correlate clinically. There is no supra levator sepsis.

Dictating Doctor: Dr J Yang
Approving Doctor: Dr J Yang

HOW CAN THE RADIOLOGIST HELP THE SURGEON TO APPROACH PERIANAL SEPSIS?

To address this, we developed a **structured reporting template** with a **diagrammatic worksheet** through a collaboration between radiologists and surgeons

We will now explain each element of the worksheet, including

- **reporting tips** for radiologists
- How each element helps surgeons to make **management decisions**

Concord Hospital
MRI Perianal Fistula Worksheet

Patient Name

MRN DOB

Date of Scan

Radiologist

Internal Opening

Position: ____ o'clock
Location in anal canal
Lower 1/3
Middle 1/3
Upper 1/3

External Opening

Position: ____ o'clock

Type of Primary Fistula
(circle one)
Superficial (ie no muscle involvement)
Inter-sphincteric
Trans-sphincteric
Supra-sphincteric
Extra-sphincteric

Accessory tracts/Extensions
No
Yes

Supralelevator Sepsis
No
Yes

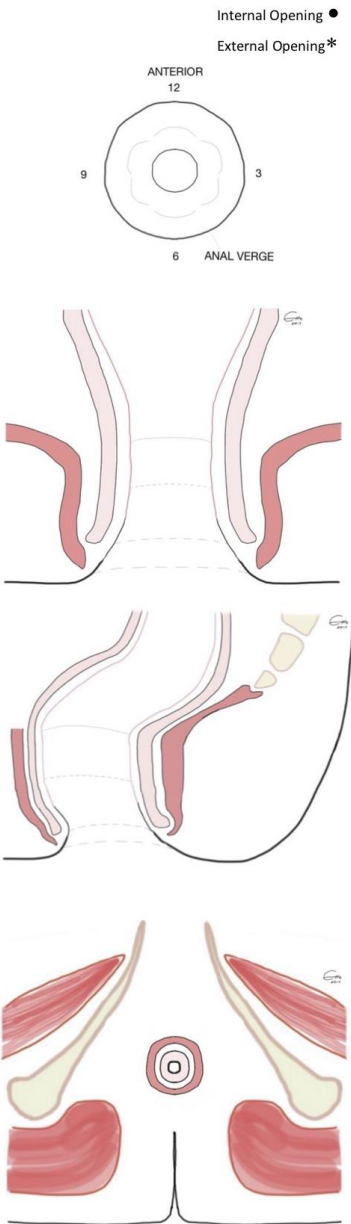
Associated Abscess
(circle one or more)
Superficial
Intersphincteric
Ischio-rectal fossa
Supra-levator

Evidence of previous sphincter injury
No
Yes

Activity
Active
Fibrotic

Internal Opening ●
External Opening*

ANTERIOR
12
9 3
6 ANAL VERGE



Concord Hospital Radiology and Colorectal 2017 08

WORKSHEET EXPLAINED

Internal Opening

Position: ____ o'clock

Location in anal canal

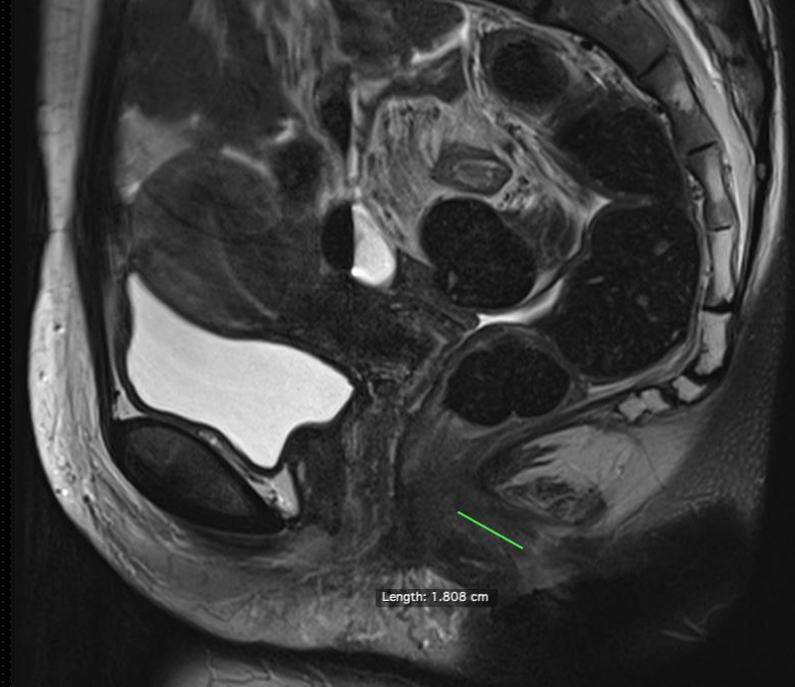
Lower 1/3

Middle 1/3

Upper 1/3

External Opening

Position: ____ o'clock



Internal opening (IO)

- Reporting tips: report position using o'clock annotation
- IO location should be confirmed on 2 planes to confirm the craniocaudal location in the anorectum
- Divide the anal canal length into lower, middle and upper thirds. Surgeons find this more useful than the exact distance from the anal verge in millimetres

Example of anatomic variation in anal canal length between 2 patients (18 vs 46mm). Reporting IO position in the anal canal as lower, middle and upper thirds can be more useful to the surgeon

WORKSHEET EXPLAINED

External opening (EO)

- Tip: Also report position using o'clock annotation
- Clinically, the EO is seen as a defect in the perineal skin. On MRI, the EO may be difficult to see.
- It is useful for the radiologist to have prior knowledge of the clinically apparent EO from the surgeon.
- The radiologist can then focus their search for subtle underlying sepsis or fistula that could otherwise be missed or underestimated

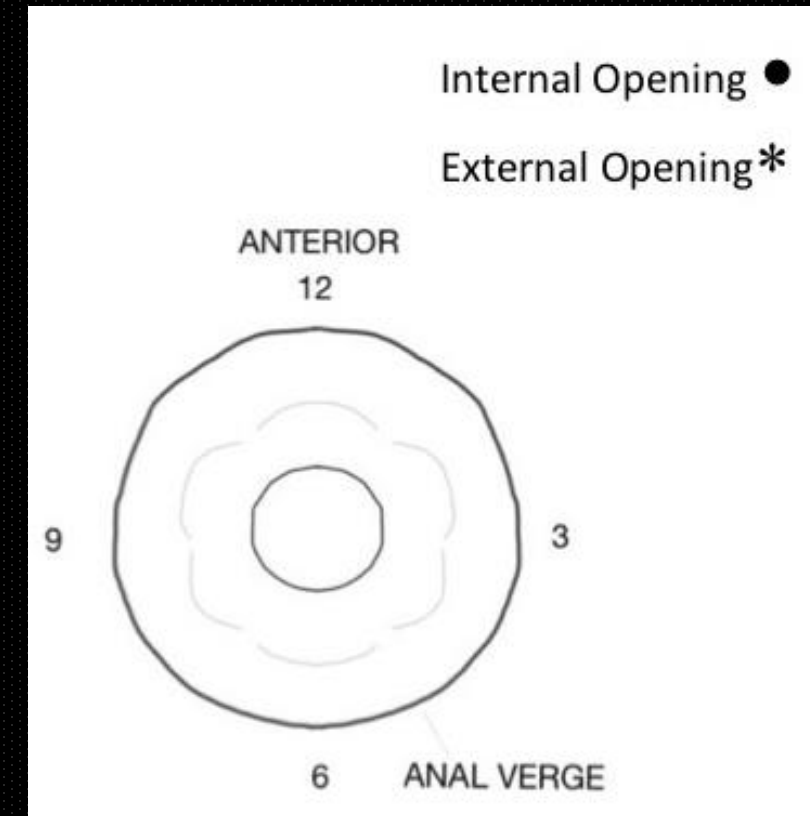


Illustration of the anal canal from the perspective of a surgeon performing procedure in the lithotomy position. Radiologist can annotate this to show expected position of a fistula or seton, for instance

WORKSHEET EXPLAINED

Fistula type

- Use the Parks classification

Accessory tracts/Extensions

- These may require surgical exploration, hence important for the surgeon to know
- Tip: Illustrate the fistula and extensions as a diagram for the surgeon. We have found that this is the most time-efficient and accurate way to communicate this to the surgeon, as the morphology may be very complex and difficult to otherwise describe

Type of Primary Fistula

(circle one)

Superficial (ie no muscle involvement)

Inter-sphincteric

Trans-sphincteric

Supra-sphincteric

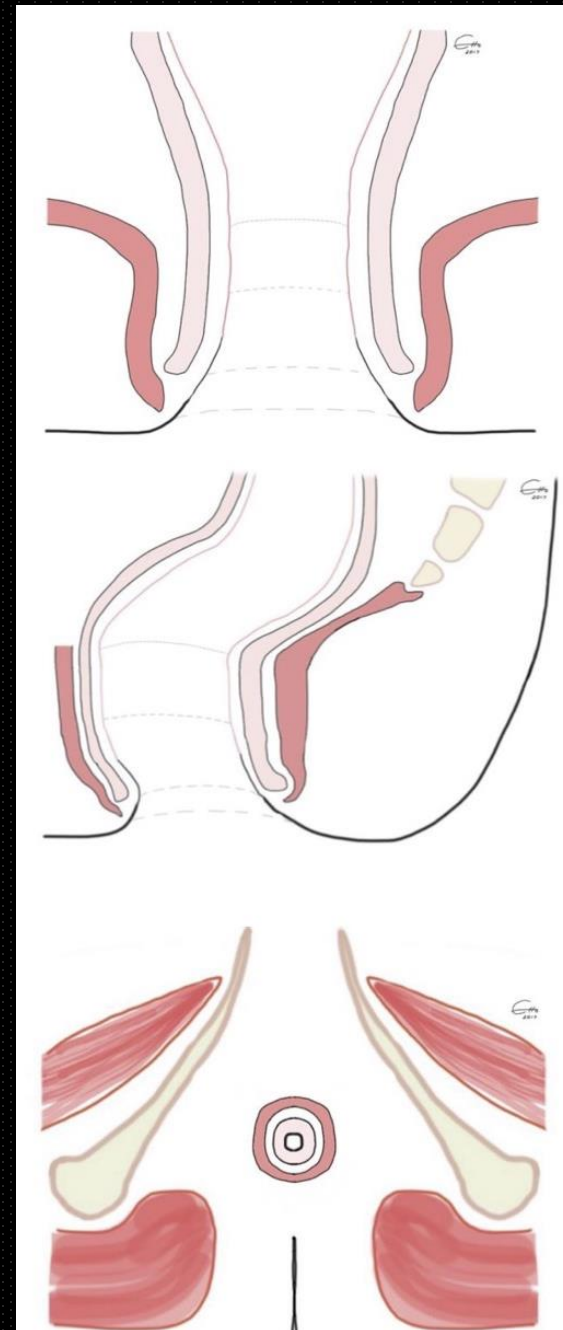
Extra-sphincteric

Accessory tracts/Extensions

No

Yes

Radiologist can draw fistulae, abscesses and surgical material such as setons on these diagrams of the anorectal region. Surgeons find these diagrams to be useful representation of perianal sepsis MRI findings to plan treatment.



WORKSHEET EXPLAINED

Supralevator sepsis

- Can be occult on digital rectal examination and endoanal ultrasound
- MRI is superior in assessing the supralevator space compared with clinical examination and endoanal ultrasound
- Tip: Always look for supralevator sepsis, this must not be missed as it requires surgical intervention

Abscess

- Require surgical intervention
- Tip: For the surgeon, abscess location is the most important for planning treatment
- Abscesses may be multiple

Supralevator Sepsis

No

Yes

Associated Abscess

(circle one or more)

Superficial

Inters-sphincteric

Ischio-rectal fossa

Supra-levator

WORKSHEET EXPLAINED

Evidence of **previous sphincter injury**

- Includes evidence of prior surgery
- Some surgical materials appear as MR signal voids with typical shapes, e.g. a loop-shaped seton
- Other surgical material such as plugs or glue may not be visible. Advancement flaps can be subtle to detect on MR. Correlation with a recent operation or examination-under-anaesthesia report is very useful

Evidence of previous sphincter injury

No

Yes

WORKSHEET EXPLAINED

Activity of fistula

- Active fistulae containing fluid or pus typically enhance, with or without T2 hypointense walls. These require active management
- Fibrotic tracts are T2 hypointense with no associated enhancement. These are managed non-operatively
- Tip: On serial imaging, a healing tract should demonstrate reduction in
 - tract size
 - T2 hyperintensity
 - enhancement

Activity

Active

Fibrotic

CASES

All images are deidentified and used with patient consent

CASE 1

A 24-year old female presents for MRI evaluation of complex perianal sepsis prior to VAFFT (video-assisted anal fistula treatment) procedure

She had fistulizing perianal Crohn's disease previously treated with multiple surgeries including seton insertion



Clinical photograph shows the external opening (1-2 o'clock) of a fistula previously treated with a loose seton (removed)

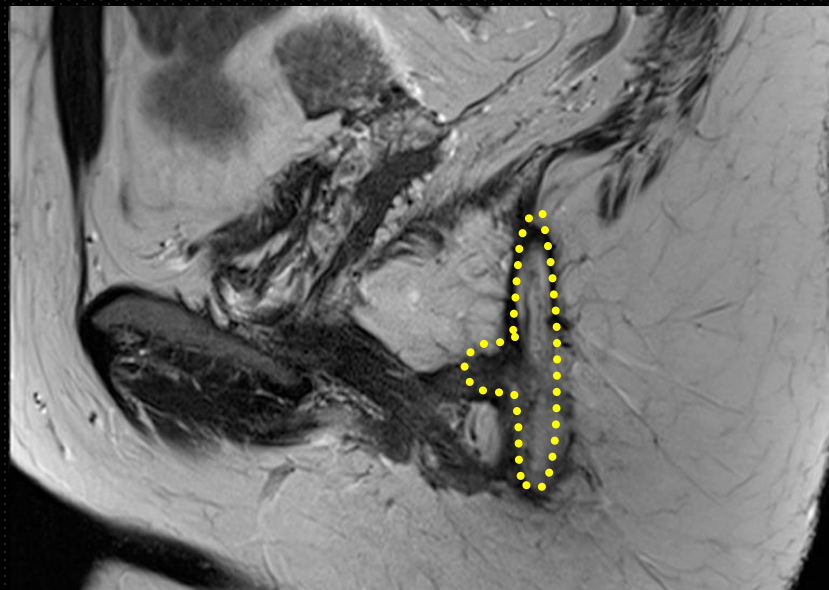
CASE 1: MRI

A seton (not shown) was in situ at the time of MRI

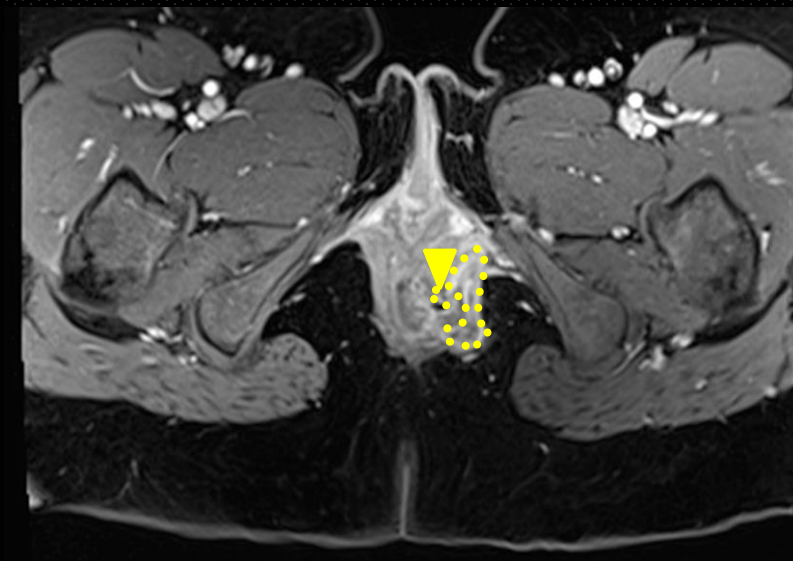
Internal opening (▼) of a **transphincteric fistula** at 4 o'clock middle-third of the anal canal with bifurcating extensions in a T-shape within the left ischioanal fossa (•••)

Abscess (•••) between middle third of anal canal and vagina at 12 o'clock

Abscess (•••) in the intersphincteric plane middle third of anal canal between 3-6 o'clock



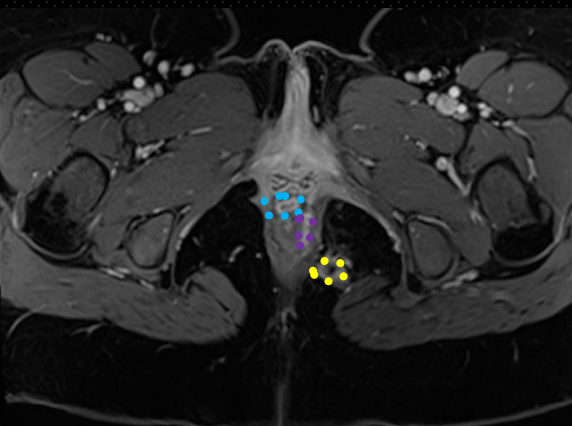
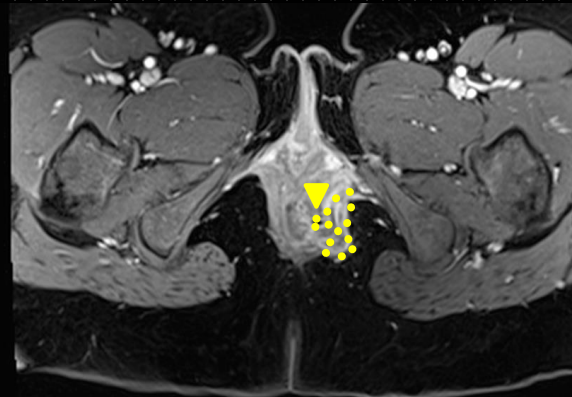
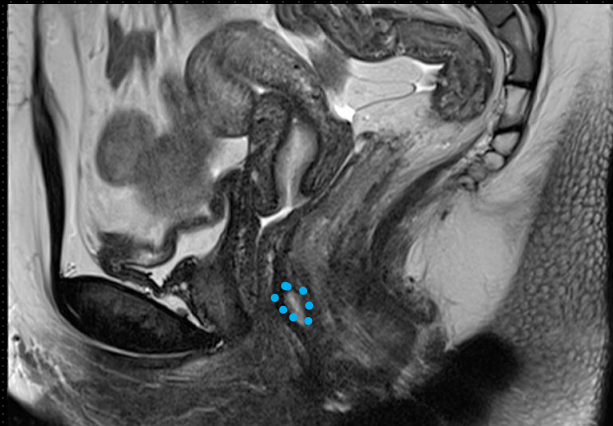
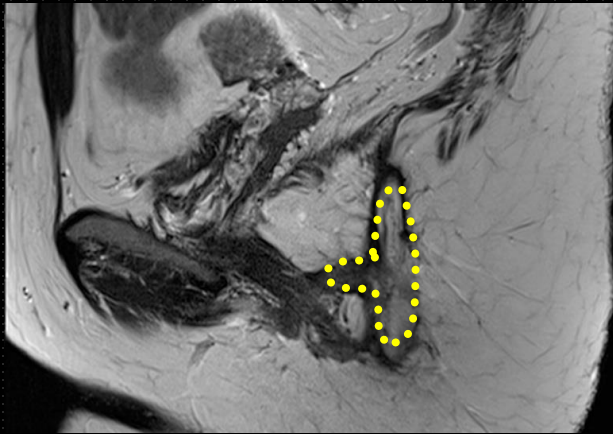
Sagittal T2W



Contrast-enhanced oblique axial T1W FS

CASE 1: WORKSHEET

The morphology of this complex perianal sepsis can be communicated accurately and efficiently by using the reporting worksheet to make a real impact on clinical management



Concord Hospital MRI Perianal Fistula Worksheet

Patient NamePatient 2.....

MRN DOB

Date of Scan

Radiologist

Internal Opening

Position: ...4... o'clock

Location in anal canal

Lower 1/3

☒ Middle 1/3

Upper 1/3

External Opening

Position: ...2... o'clock

Type of Primary Fistula

(circle one)

Superficial (ie no muscle involvement)

☒ Inter-sphincteric

☒ Trans-sphincteric

Supra-sphincteric

Extra-sphincteric

Accessory tracts/Extensions

No

☒ Yes

Supralelevator Sepsis

☒ No

Yes

Associated Abscess

Yes x 2

(circle one or more)

Superficial

☒ Inters-sphincteric

Ischio-rectal fossa

Supra-levator

Evidence of previous sphincter injury

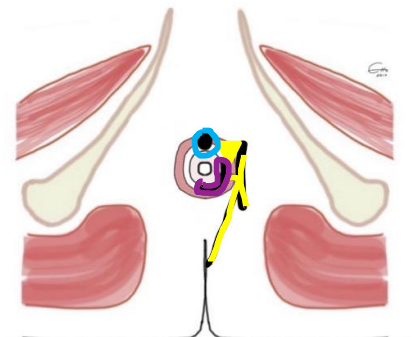
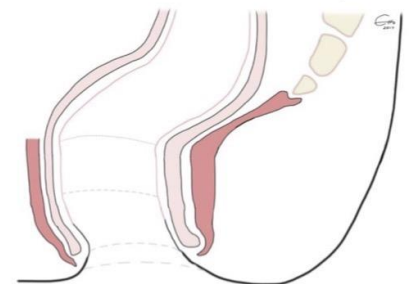
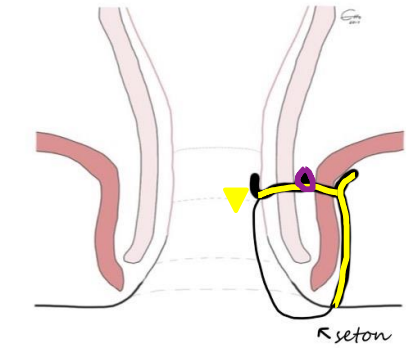
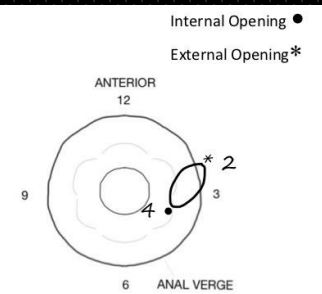
☒ No

Yes

Activity

☒ Active

Fibrotic



CASE 2

A 32-year old male with Crohn's disease presented with clinically complex perianal sepsis

He had previously undergone surgical management, including seton insertion

As part of planning for further treatment including surgery, MRI was performed to evaluate perianal sepsis anatomy

CASE 2: MRI

Fistula 1: Transphincteric. Internal opening at 1 o'clock mid third anal canal (▼)

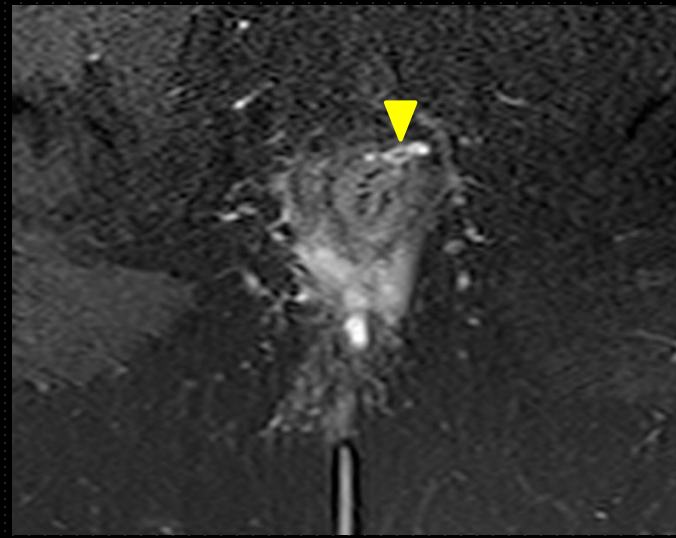
Fluid-filled fistula descends in the left ischioanal fossa (•••)

Fistula 2: Transphincteric. Internal opening at 6 o'clock lower third anal canal (▼)

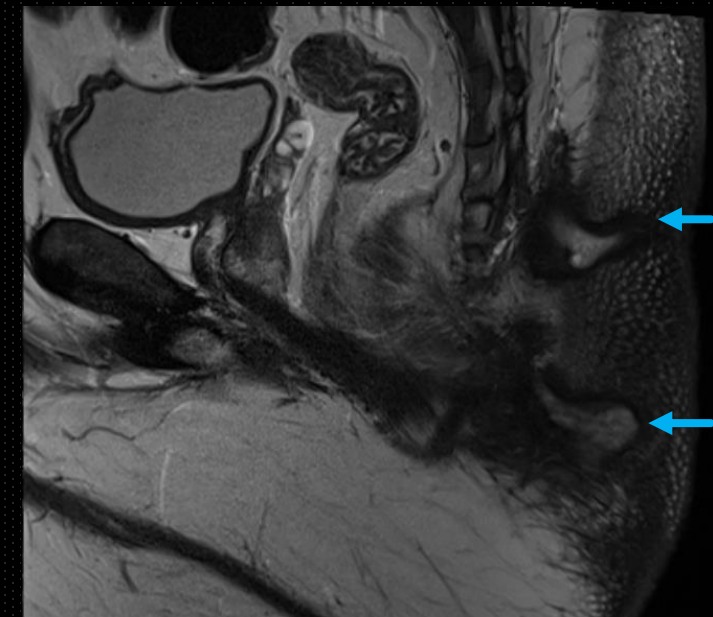
Fluid-filled fistula passes posteriorly and bifurcates into 2 external openings (↑)

Associated sepsis (•••)

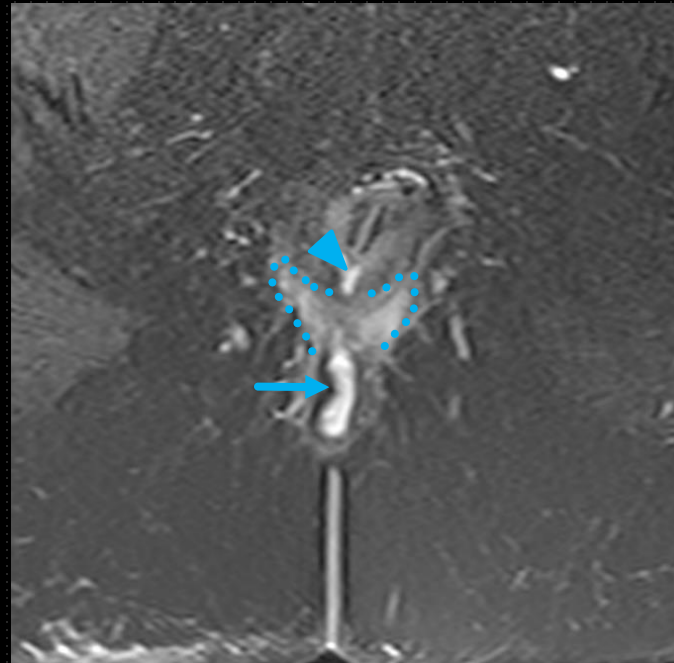
- posterior to the anal canal in a horseshoe-shape
- Deep in the right ischioanal fossa, adjacent to levator plate



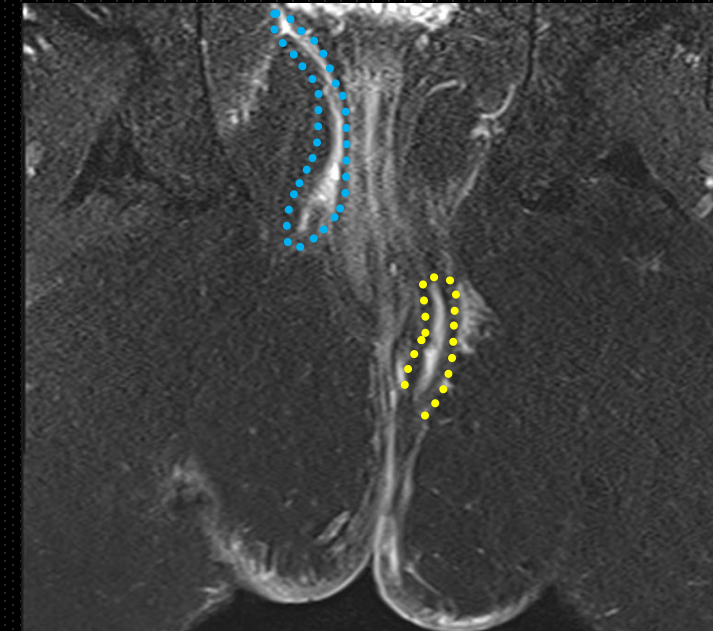
Oblique axial T2W FS mid third anal canal



Sagittal T2W



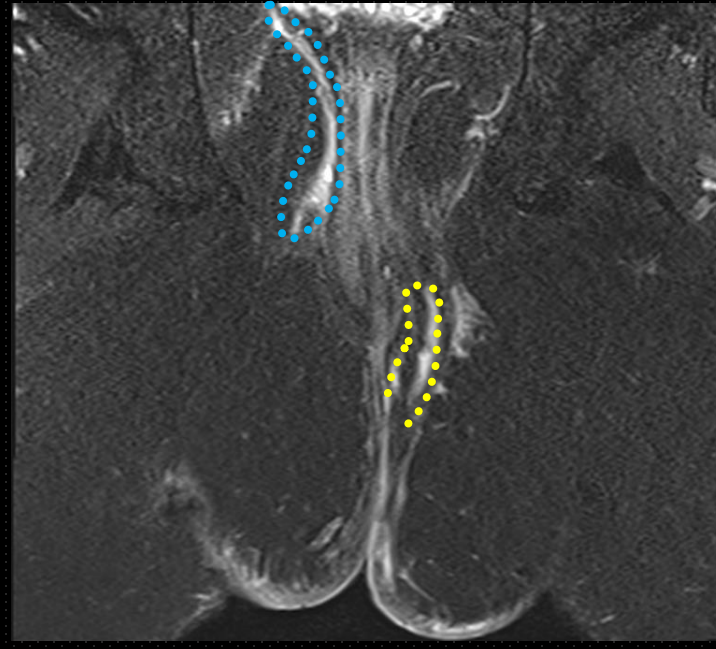
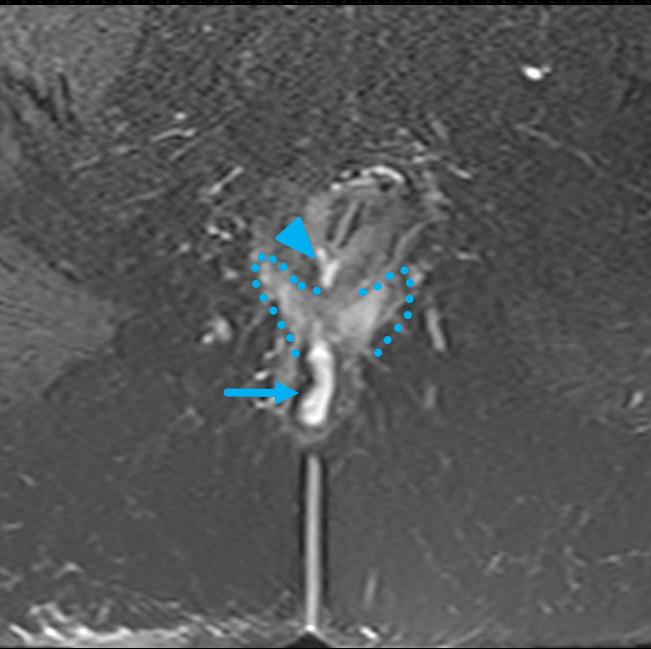
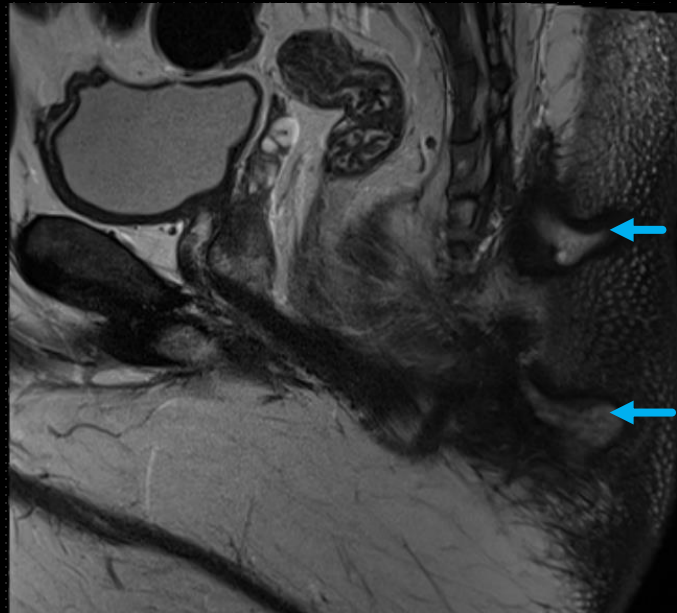
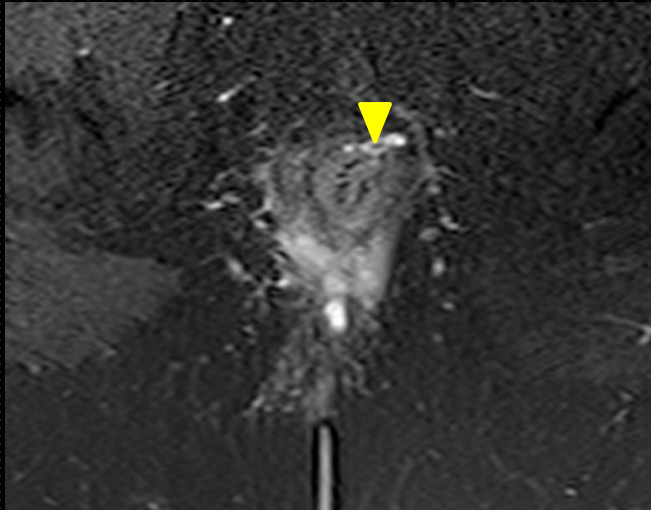
Oblique axial T2W FS lower third anal canal



Oblique coronal T2W FS

CASE 2: WORKSHEET

Fistula 1 Fistula 2



Concord Hospital MRI Perianal Fistula Worksheet

Patient Name Patient 3

MRN DOB

Date of Scan

Radiologist

Internal Opening

Position: o'clock
Location in anal canal
Lower 1/3
Middle 1/3
Upper 1/3

① 1
② 6
Middle 1/3
Lower 1/3

External Opening

Position: o'clock

1 6 (x2)

Type of Primary Fistula

(circle one)
Superficial (ie no muscle involvement)
Inter-sphincteric
Trans-sphincteric
Supra-sphincteric
Extra-sphincteric

Trans Trans

Accessory tracts/Extensions

No Yes Yes Yes

Supralelevator Sepsis

No No No No

Associated Abscess

(circle one or more)
Superficial
Inters-sphincteric
Ischio-rectal fossa
Supra-levator

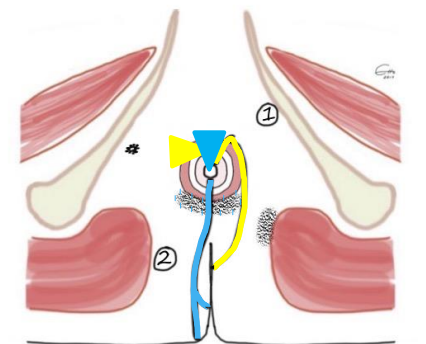
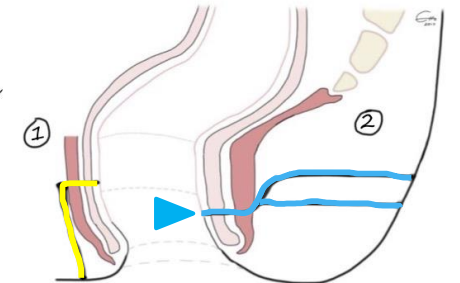
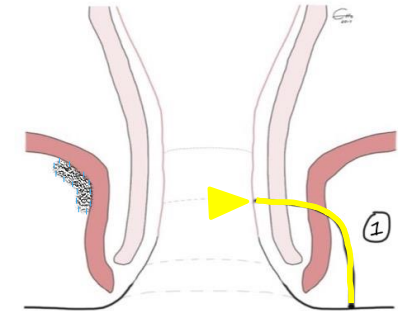
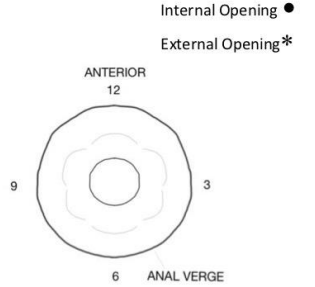
No No

Evidence of previous sphincter injury

No Yes

Activity

Active Fibrotic Active Active



CASE STUDY 2: POST-OP CLINICAL OUTCOME

Multiple loose setons (↑) were placed to manage his complex perianal sepsis

The pre-operative MRI was useful in defining the extent of sepsis

The MRI perianal fistula worksheet improves communication between radiologists and surgeons

Radiologists also find it easier to compare serial MRIs



Post-operative clinical photograph

CONCLUSIONS

This MRI perianal fistula worksheet developed by collaboration between radiologists and colorectal surgeons

- Presents a more concise guide to surgical anatomy compared with text-only reports
- Improves communication between radiologists and surgeons of key MR findings that will impact on patient management
- Reduces radiologists reporting time
- Facilitates comparison between MRI scans to assess treatment response

Concord Hospital MRI Perianal Fistula Worksheet

Patient Name

MRN DOB

Date of Scan

Radiologist

Internal Opening

Position: ____ o'clock

Location in anal canal

Lower 1/3

Middle 1/3

Upper 1/3

External Opening

Position: ____ o'clock

Type of Primary Fistula

(circle one)

Superficial (ie no muscle involvement)

Inter-sphincteric

Trans-sphincteric

Supra-sphincteric

Extra-sphincteric

Accessory tracts/Extensions

No

Yes

Supralevator Sepsis

No

Yes

Associated Abscess

(circle one or more)

Superficial

Inters-phincteric

Ischio-rectal fossa

Supra-levator

Evidence of previous sphincter injury

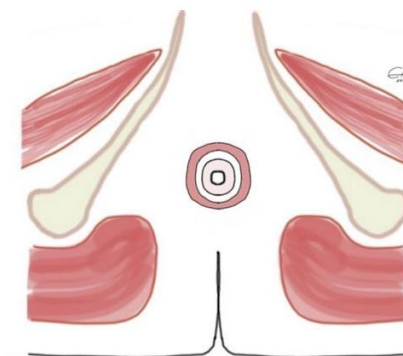
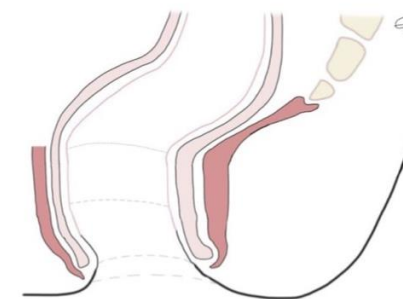
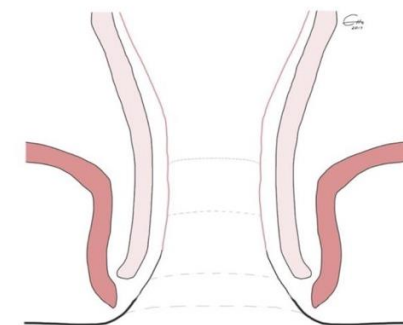
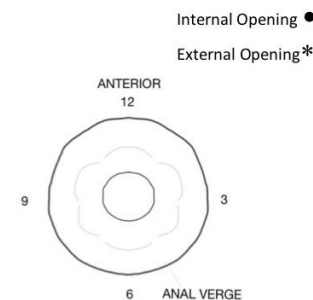
No

Yes

Activity

Active

Fibrotic

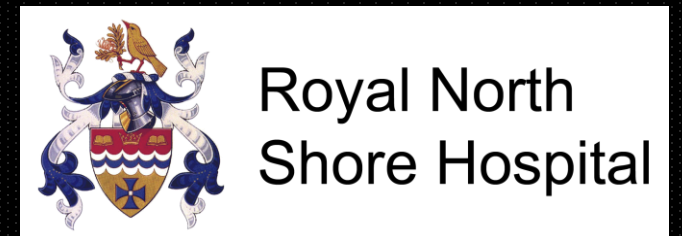


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THANK YOU