INTRODUCTION
Perianal fistulas are an increasingly common condition of the gastrointestinal tract that causes morbidity. Names that tell us much about perianal fistulas include Goodsall, who described the course of fistulous tracks from the skin to the anus; and Parks, whose classification of fistulas is used in surgical practice.

Goodsall described that if there is a cutaneous opening that is anterior to the transverse anal line, then this track will likely have a direct radial fistulous extension into the anal canal, while openings posterior to the line, enter into the canal posteriorly in the midline.

The challenge that is seen in the management of fistulas is definition of the course of the track that extends between the external and internal openings so that the appropriate surgical option can be used. Magnetic resonance (MR) imaging with 3.0 tesla machines due to high resolution will help in more accurate demonstration of the perianal anatomy.

ANATOMY OF THE ANAL REGION
The “anal clock” (Fig 1) helps describe the site and direction of fistulous tracks. It is the view of the anal region when a patient is in the lithotomy position, and this is also the view obtained in the axial sections of MR imaging. The anterior perineum is at 12 o’clock and at 6 o’clock, the natal cleft is seen; 3 o’clock shows the left lateral aspect, and 9 o’clock would be the right aspect, to the right aspect of the canal.

The internal sphincter is an involuntary sphincter, composed of smooth muscle and it is continuous with the circular smooth muscle seen in the rectum. 85% resting anal tone is given by the internal sphincter. The external sphincter is composed of striated muscle and is continuous superiorly with the puborectalis and levator ani muscles. It contributes only 15% of resting anal tone, but its strong voluntary contractions resist defecation. A division of the external sphincter can lead to incontinence.

Figure 1. Diagram of the anal clock.

Figure 2. Line diagram shows the normal anatomy of the perianal region in the coronal plane. a = anal canal, IAF = ischioanal fossa, IRF = ischiorectal fossa, R = rectum.

Figure 3. Line diagram shows the normal anatomy of the perianal region in the axial plane.

PERIANAL FISTULA ETIOLOGY
Idiopathic fistulas are thought to be due to the chronic phase of intramuscular anal gland sepsis. However, perianal fistulas may also be caused by other conditions, including Crohn disease, tuberculosis, trauma during childbirth, pelvic infection, pelvic malignancy, and radiation therapy.

EVALUATION OF FISTULAS
The relationship of the fistulous track to the sphincter complex is among the main objectives in performing and interpreting any imaging study for perianal fistulas.

Fistulography was the most traditional of techniques, but also the most unreliable and difficult to interpret.

Endoscopic anal ultrasonography has proved inferior and computed tomography showed some promise. However, the attenuation values for the sphincters, levator ani, fibrotic fistulous tracks, and active fistulas are so similar that it is difficult to...
characterize these structures accurately, unless the track contains gas or leaked contrast material.

MR imaging appearance of this condition showed greater concordance with surgical findings than does any other imaging evaluation. At present advanced 3.0 Tesla MR imaging is becoming increasingly widespread and is known to depict the anatomy with a high resolution.

Methodology

Patients clinically suspected to have perianal fistulas and referred for MRI were selected for the study, over a period of six months. MRI was performed using a 3.0 Tesla MRI, which the higher-field-strength provides a better signal-to-noise ratio, which gives increased spatial and temporal resolution, and decreased imaging time, hence improving lesion visibility, better in 3.0 T than at 1.5 T.

MR Imaging pulse sequences used for perianal fistula assessment:
1. Short-inversion-time inversion recovery (STIR) sequences
2. Fast spin-echo T2-weighted with fat suppression pulse sequences
3. Spin-echo T1-weighted sequences

Examinations performed with a body coil require no patient preparation and are well tolerated. Endoanal coils were initially hoped to further improve the MR imaging evaluation of perianal fistulas, however, it is poorly tolerated in symptomatic patients, and although it provides excellent anatomic detail of the anal sphincters, it fails to provide the overview required for surgical management.

Non-enhanced T1-weighted images provide an excellent anatomic overview of the sphincter complex, levator plate, and the ischiorectal fossae.

On T2-weighted and STIR images, pathologic processes including fistulas, secondary fistulous tracks, and fluid collections are clearly depicted, appearing as areas of high signal intensity in contrast with the lower signal intensity of the sphincters, muscles, and fat.

MR Imaging Grading of Perianal Fistulas

The Parks classification has become the most widely used surgical classification for distinguishing four types of fistula.

- **Inter-sphincteric fistula**: crosses the intersphincteric space and does not cross the external sphincter. (Figure 4)
- **Trans-sphincteric** fistula: crosses from the intersphincteric space, through the external sphincter and into the ischiorectal fossa. (Figure 5)
- **Supra-sphincteric** fistula: passes superiorly into the intersphincteric space, and over the top of the puborectalis muscle then descending through the iliococcygeus muscle into the ischiorectal fossa and then skin. (Figure 6)
- **Extra-sphincteric** fistula: crosses from the perineal skin through the ischiorectal fossa and levator ani, outside the external anal sphincter into the rectum. (Figure 7)

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Figure 4: Left sided intersphincteric fistula.

Figure 5: Transsphincteric fistula at 7 o clock position crossing the midline.

Figure 6: Bilateral suprasphincteric fistulas.

Figure 7: Left sided extrasphincteric fistula with air pocket.

Figure 8: Right sided Ischiorectal abscess.

Figure 9: Horse-shoe abscess in axial view.
Results

Our study included 64 patients with MR imaging before their initial surgical procedure who had surgically proved fistulas. The MR images of each case were examined and each feature was tabulated.

Approximately 4 out of 5 were male patients, forming approximately 81% of the cases. Of the total cases, 3 out of 4 were within the age range of 20 to 39yrs of age (75%) while the remaining were of age 40 and above.

Intersphincteric fistulous tracks were seen in 53% of the cases (n=34), while extrasphincteric and transsphincteric tracks were seen in 17.2% and 14% respectively. A few cases showed multiple fistulous tracks comprising of 9.4% of the cases. 44 cases (69%) had a single external opening and 12 (19%) had multiple external openings.

Discussion

In order to plan surgical management of perianal fistulas, the nature of the primary fistula and any secondary fistulous tracks or associated abscesses has to be studied as accurately as possible. For simple intersphincteric fistulas, fistulotomy or fistulectomy may be performed. Alternatively, in patients with perianal abscess, a simple incision and drainage first may have to be performed first. Fortunately, the majority of fistulas are of the simpler types as per this study.

Conclusions

MR imaging has emerged as the imaging technique of choice for preoperative evaluation of perianal fistulas, providing a highly accurate, rapid, and noninvasive means of performing pre surgical assessment. It provides precise definition of the fistulous track, along with its re-relationship to pelvic structures, and allows identification of secondary fistulas or abscesses. This decreases the incidence of recurrence and allowing side effects such as fecal incontinence to be avoided.

References