

Motilent

Changing the way we see the gut

Research | Trials | Clinic

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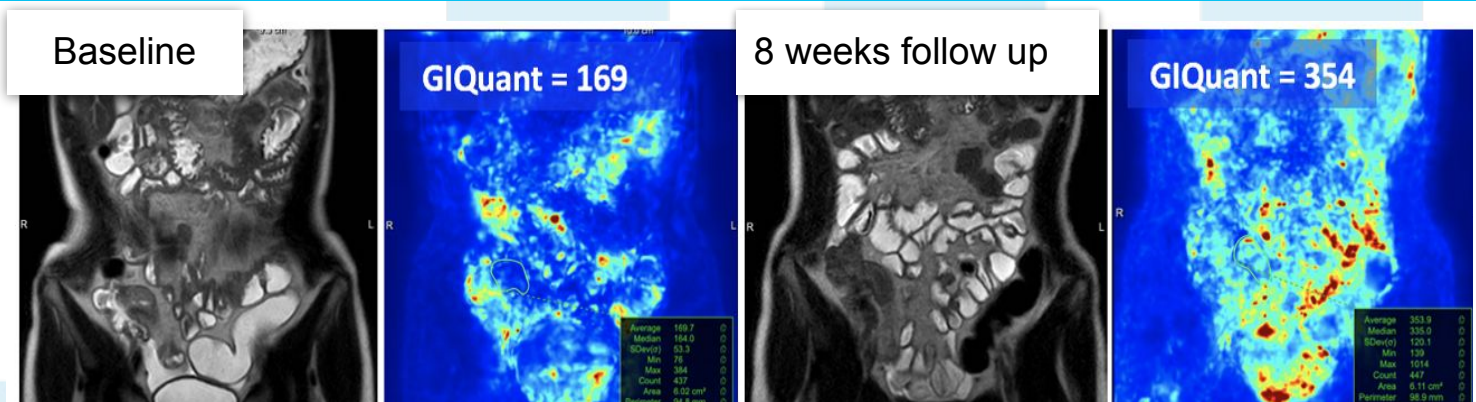
Bringing clinical tests into the preclinical setting.....14

GIQuant facilitates objective reporting of small bowel Crohn's Disease in children and adults.

It **analyzes** MRI data to produce a disease activity score based on small bowel wall motion (peristalsis).

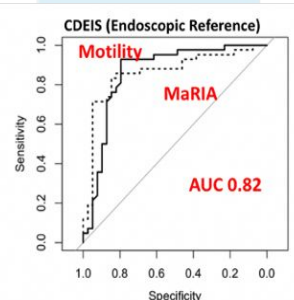
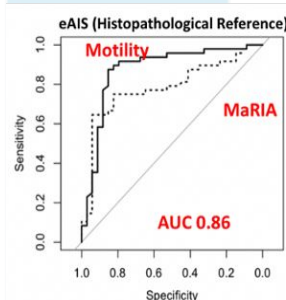
Use it to **quickly identify** treatment response alongside routine tests to optimize patient management.

Treatment response at 8 weeks in SB CD



What does the evidence say?

In an 82 subject multicenter trial, GIQuant demonstrated high sensitivity and specificity against endoscopy (CDEIS) and histopathological (eAIS) endpoints. GIQuant was non-inferior to MaRIA while being simple and rapid to perform (<30s per case).



'We now have a lot of therapies for patients with Crohn's Disease. What is lacking is the tests to match the patient with the best treatment for them.'

GIQuant is a new tool for small bowel Crohn's based on MRI...I get a simple, objective score for a small bowel lesion helping me track treatment response.

Non-invasive, objective and widely available tools like GIQuant are crucial to managing growing budgets and improving patient outcomes'

— Dr Gordon Moran (Gastroenterologist at the University of Nottingham)

Virtual Examination Under Anaesthesia (vEUA)

Measure twice, cut once in perianal Crohn's Disease.

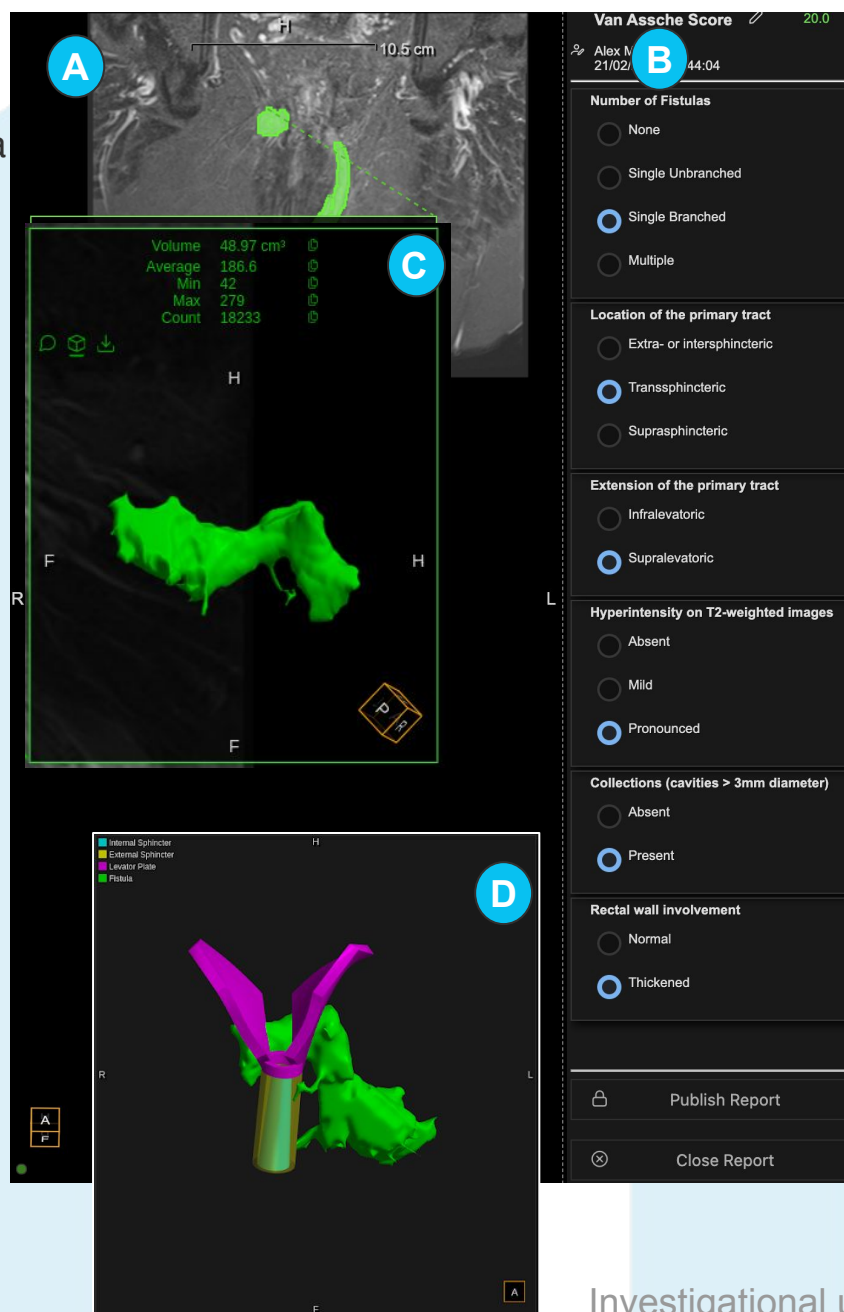


vEUA (virtual examination under anaesthesia) is a **3D, interactive report** created by a radiologist to help guide **surgical intervention** and medical management of **perianal fistula and abscess**.

It is intended to **increase confidence** of anorectal surgeons, reduce likelihood of repeat surgery, reduce time to start medical management, and facilitate treat-to-target for gastroenterologists.

It is important in cases where existing scores, including the **Van Assche**, do not change, but size of collection, fibrosis or length of tract do.

Use vEUA not just to assess treatment, but to also identify patients for clinical trials.



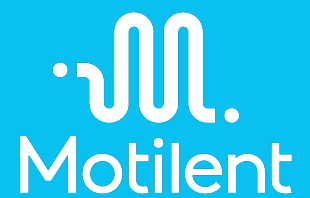
Investigational use

How it works:

- 1) Radiologist provides simple markup on routine MRI data (A).
- 2) Routine trial scoring can be added to the report. All results saved on Entrolytics or REDCap (B).
- 3) A 3D model is generated with disease progress for MDT discussion and surgical planning (C).
- 4) Share your interactive report comprising the fistula and anatomy (D)
- 5) Summary information including volume and tract lengths can be extracted (treatment response).
- 6) Radiology read performed at your local site or via Motilent's reporting service.
- 7) All data saved in the cloud for future review. Coming to clinic soon.

Ultrasound

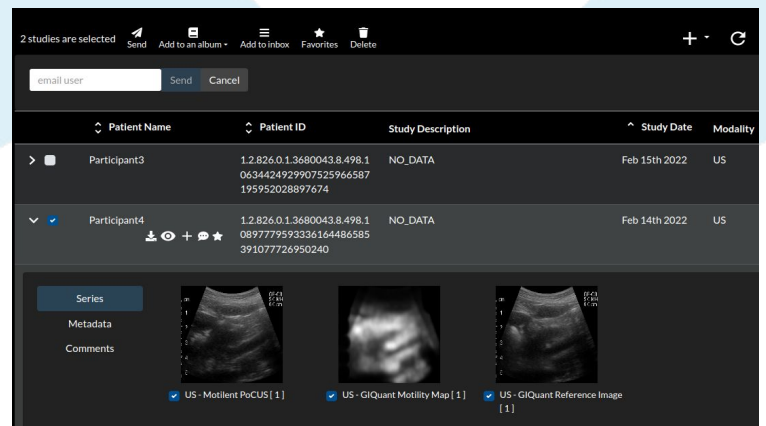
Collaborate | Educate | Evaluate



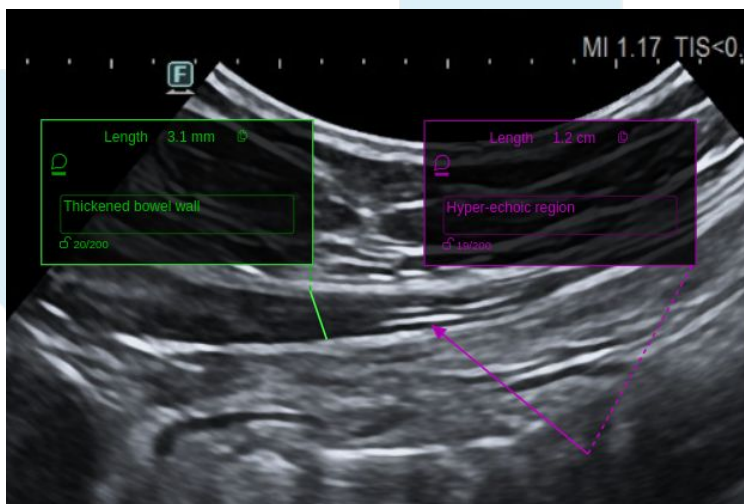
Multi-Reader studies made simple

Upload and **share** ultrasound data in the cloud with Entrolytics. Upload securely with de-identification for remote reading, storage and secondary review.

Drive multi-reader studies and **recruit hard-to-reach subjects**, particularly in **pediatrics** with Crohn's Disease and Ulcerative Colitis.



Teach the next generation



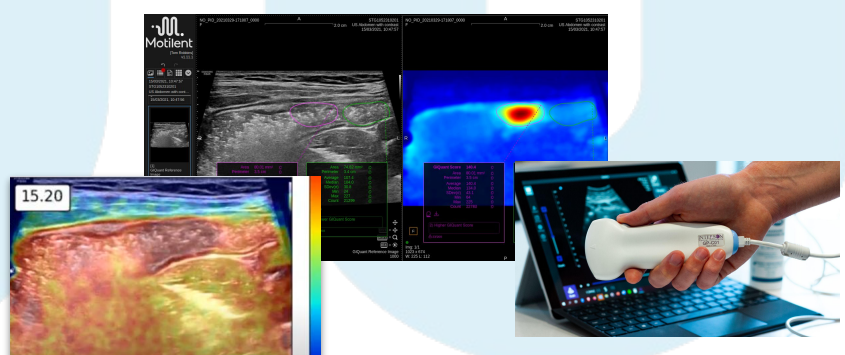
Bowel ultrasound can be a powerful tool when in the hands of a skilled professional. Help train the **next generation** with Entrolytics.

Provide trainees with **annotated case studies** which can be accessed from **anywhere** via our cloud platform, Entrolytics.

Increase confidence with **second reads** by uploading cases to the platform.

Bring the future of care

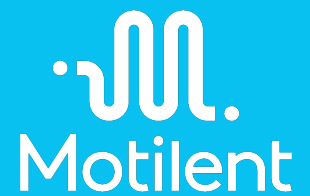
Motilent supports clinicians bringing about the **future** of gastroenterology. This means novel imaging **biomarkers**, **AI**, and **point-of-care** ultrasound.



Investigational use

Endoscopy

Get more out of endoscopy on Entrolytics



Motilent supports Endoscopy in **research** and **trials** by providing a rich toolset for **collaborative** research, whole dataset review in the **cloud**, and access to the latest AI. Reveal new insights via Entrolytics and our API for AI applications in Endoscopy data.

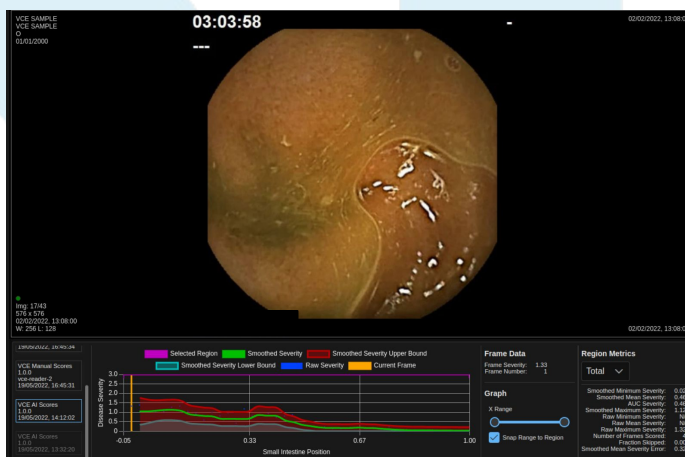
“It’s like a PACS but for Endoscopy, and on the web.”

Prof. Gordon Moran, Gastroenterologist

Case studies in Endoscopy on Entrolytics

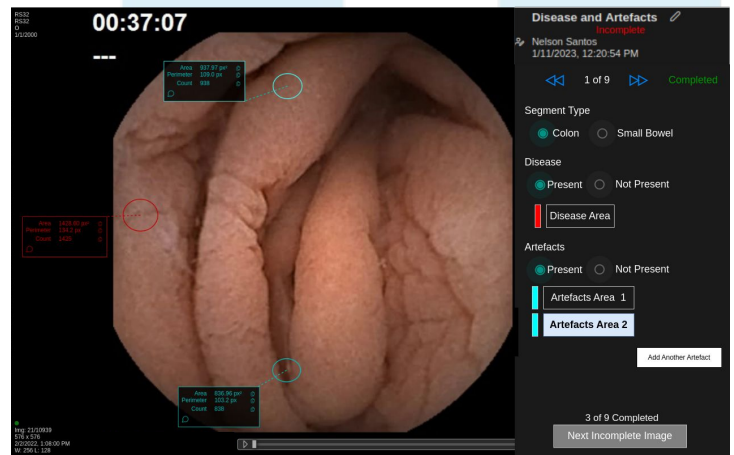
Validation of an AI tool is a necessary but complex procedure requiring **full traceability**.

From running the algorithm, to generating blind reads to validate the tool, and maintaining a fully **auditable trail** of how the validation took place, Entrolytics has the ability to support the process from start to finish.



Results of a **3rd party AI tool** housed on Entrolytics, integrated via our algorithm API.

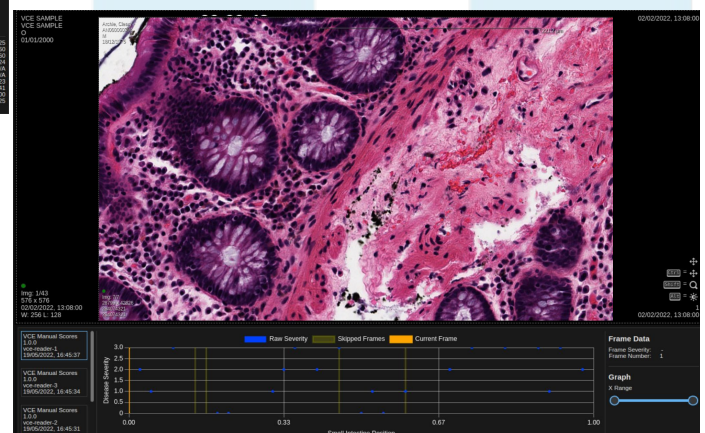
The **AI outputs** and the **expert manual reads** can be collated in a single study, to allow a **fully traceable validation platform**, and cross-referenced with other modalities (e.g histopathology).



The trial orchestrator can assign expert readers to **annotate Endoscopy frames** to capture:

- Areas of disease
- Artifacts on the image
- Level of disease severity

This can be used as part of an ML training or validation process.



Investigational use

Entrolytics is Motilent's secure, multi-modality, cloud-based platform, optimized for gastrointestinal data.

Entrolytics makes it simple to **organize**, **analyze** and **collaborate**, with all of your endoscopy, imaging and histopathology data in one place.

"A fantastic, purpose-built platform for multi-rater scoring and mark-up of IBD imaging."

Prof. Jonathan Dillman

Pediatric Radiologist at Cincinnati Children's Hospital

Why is this important?

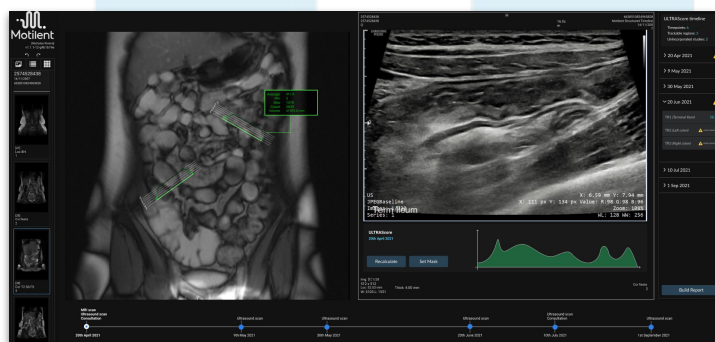
A trusted partner Our service is used by over 50 leading institutions running over 130 research projects worldwide.

Nothing to install Our secure, browser-based cloud network requires no additional hardware or software.

Simplified data handling Quickly set up individual research folders and manage large multi-site research trials. You can customize project users, album permissions, case report forms and trial workflow.

Advanced processing tools Entrolytics gives you access to the latest image analysis tooling in MRI, ultrasound, endoscopy and more.

Maximise data insights Our AI-integrated technology will accelerate your imaging research and clinical trials. Focused workflows and advanced tools allow you to gain maximum insight from your data.



Case studies on:

Stricturing CD | SB Crohn's | PA Fistula | Endoscopy AI V&V | MR vs Ultrasound

Case study - Mixed modality transmural markers for Crohn's Disease

A trans-mural inclusion criteria for clinical trials would open new opportunities for patient selection. Inclusion based on MR Enterography and then follow up with ultrasound at 6 and 12 weeks is made simple with Entrolytics where all data can be uploaded, scored and tracked in a prospective multi-reader investigation and the latest scoring schema (e.g SMaRIA for MRE) used to standardize reporting.

Investigational use

Structured Reporting

Motilent

Multi-reader reporting made easy across imaging, endoscopy and histopathology.

Entrolytics stores images and reports in one place for seamless multi-modality reporting.

Entrolytics provides **integrated reports & custom tools** for quickly producing reports in-browser that **capture care-driving information**.

No additional software is needed, but data outputs can be imported into software such as REDCap, if required.

Quantitative reporting in IBD

MaRIA Score Report

Patient Name: 13-8-83683477
MaRIA Score: 44.17
Published by: Laurence Bourn

Patient Demographics	Report Breakdown
Name: 13-8-83683477 ID: 13-8-83683477 Sex: O Date of Birth: Age at Time of Scan:	MaRIA Score: 44.17 Ileum: 2.16 Wall Thickness: 1.43 Wall Thickness Source: T2W Series Description: I2_haste_cor_bh_pat2_4MM RCE: 1.02 WSI: T1 PRE: 124.88 (134.20, 111.43, 129.00) Series Description: t1_vibe_fs_cor_p2_bh_288_PRE T1 POST: 231.94 (247.83, 246.00, 202.00) Series Description: t1_vibe_fs_cor_0_30_60_POST Noise: T1 PRE: 2.17 (2.03, 1.86, 2.60, 2.20) Series Description: t1_vibe_fs_cor_p2_bh_288_PRE T1 POST: 1.83 (1.57, 1.58, 2.50, 1.68) Series Description: t1_vibe_fs_cor_0_30_60_POST Ulceration: No Oedema: No Disease Length: N/A Series Description: N/A
Publisher Details Published by: Laurence Bourn Publish Date: Fri Sep 16 2022 Publish Time: 17:37:13 GMT+0100 (British Summer Time) Creation Date: Thu May 19 2022 Creation Time: 15:51:17 GMT+0100 (British Summer Time) Time Spent on Report: 2881:45:56	Jejunum: 2.46 Wall Thickness: 1.63 Wall Thickness Source: T2W Series Description: I2_haste_cor_bh_pat2_4MM RCE: 0.99 WSI: T1 PRE: 114.67 (105.33, 114.67, 124.00) Series Description: t1_vibe_fs_cor_p2_bh_288_PRE T1 POST: 210.53 (244.00, 197.00, 190.60) Series Description: t1_vibe_fs_cor_0_30_60_POST Noise: T1 PRE: 2.17 (2.03, 1.86, 2.60, 2.20) Series Description: t1_vibe_fs_cor_p2_bh_288_PRE T1 POST: 1.83 (1.57, 1.58, 2.50, 1.68) Series Description: t1_vibe_fs_cor_0_30_60_POST Ulceration: No Oedema: No Disease Length: N/A Series Description: N/A
Study Details ID: Description: MR Small Bowel Date: 19/05/2011 Accession Number: 2819497684894126	Terminal Ileum: 29.41 Wall Thickness: 9.58 Wall Thickness Source: T2W Series Description: I2_haste_cor_bh_pat2_4MM RCE: 2.08 WSI: T1 PRE: 129.00 (138.00, 119.00, 130.00) Series Description: t1_vibe_fs_cor_p2_bh_288_PRE T1 POST: 354.58 (386.50, 338.00, 329.25) Series Description: t1_vibe_fs_cor_0_30_60_POST Noise: T1 PRE: 2.17 (2.03, 1.86, 2.60, 2.20) Series Description: t1_vibe_fs_cor_p2_bh_288_PRE T1 POST: 1.83 (1.57, 1.58, 2.50, 1.68) Series Description: t1_vibe_fs_cor_0_30_60_POST Ulceration: Yes Oedema: Yes Disease Length: N/A Series Description: N/A

Avoid transcription errors with structured reporting.

The transcription process is time-consuming and error-prone for clinicians and researchers, often involving spreadsheets and manual data entry.

Motilent's structured reporting system helps **turn expert insight into high-quality data** in a way which is traceable, verifiable, and immutable.

MaRIA (Left) is one of many indices and customizations available.

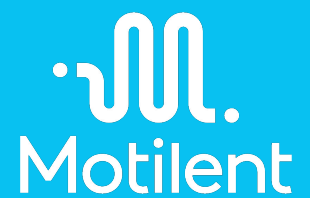
"I've used the Entrolytics platform in my research trials...it has been indispensable. Gone are the days of DICOM email attachments [and] measurements recorded in spreadsheets.

Entrolytics is the future of auditable, high-quality research."

Dr Harbir Sidhu, Consultant Radiologist at UCLH

Investigational use

Motilent Reports



Receive quantified reports with the latest in image assessment technology.

Quickly **assess patient status and progress** with a standardized report showing quantified information from imaging studies.

With Motilent Reports, the information your care team needs most is provided in a standard layout allowing **rapid information intake**.

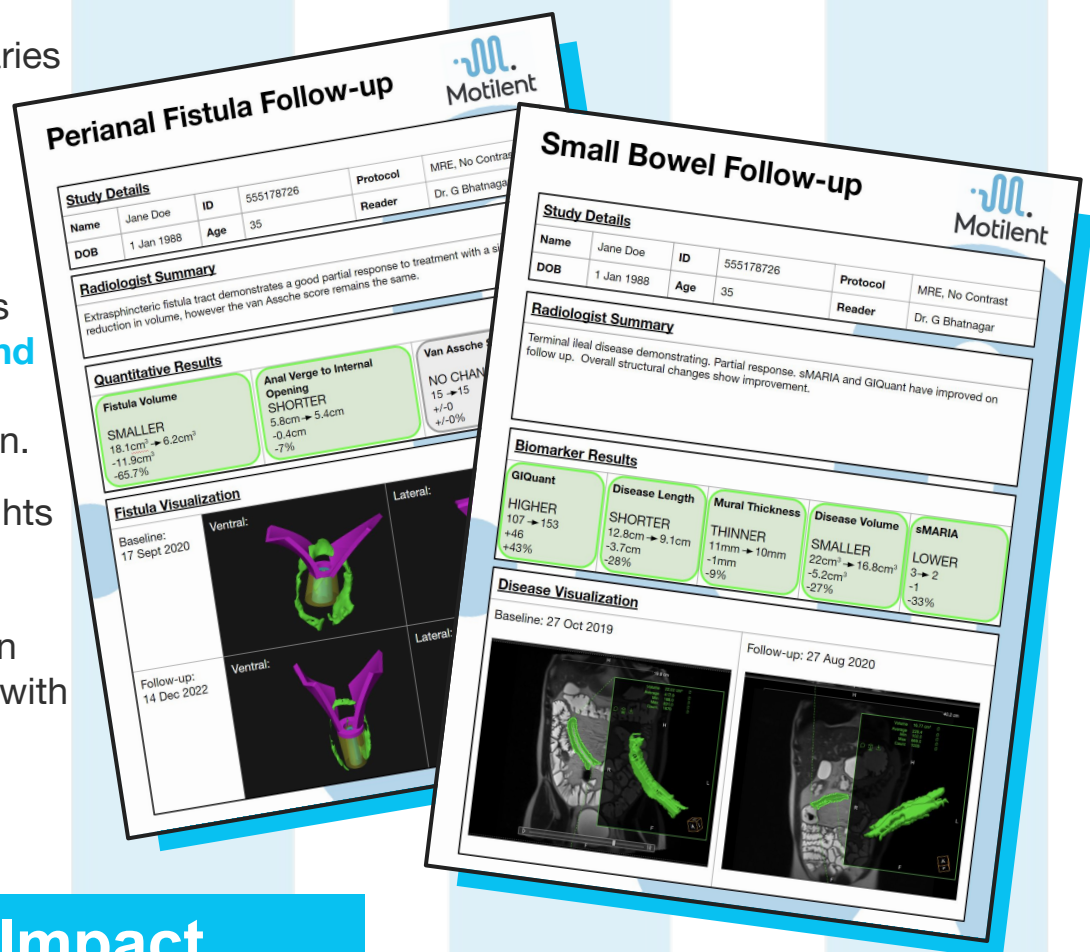
Motient Reports ensure your care team have the **latest quantified metrics** available so every patient in your practice receives cutting edge care.

Detailed Assessments

Radiologist Summaries bring **specialist interpretation** of disease state to the forefront.

Quantitative Results **compare before and after** metrics for directional indication.

Visualization highlights diseased areas to **isolate pertinent areas** for discussion and demonstration with patients.



Immediate Impact

Motilent reports provide a **clear, consistent, and concise** summary of findings for direct before-and-after comparisons. Illustrate the **impact of care** decisions and procedures to patients in an intuitive way with Motilent Reports so they are able to **see the results** of their care journey.

Perianal Fistula Follow up

Study Details

Name	Jane Doe	ID	555178726	Protocol	MRE, No Contrast
DOB	1 Jan 1988	Age	35	Reader	Dr. G Bhatnagar

Radiologist Summary

Extrasphincteric fistula tract demonstrates a good partial response to treatment with a significant reduction in volume, however the Van Assche score remains the same.

Quantitative Results

Fistula Volume

SMALLER

18.1cm³ → 6.2cm³

-11.9cm³

-65.7%

Anal Verge to Internal Opening

SHORTER

5.8cm → 5.4cm

-0.4cm

-7%

Van Assche Score

NO CHANGE

15 → 15

+/-0

+/-0%

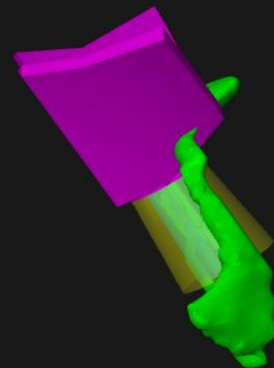
Fistula Visualization

Baseline:
17 Sept 2020

Ventral:

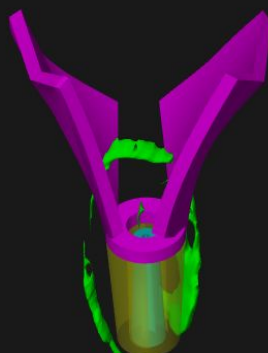


Lateral:

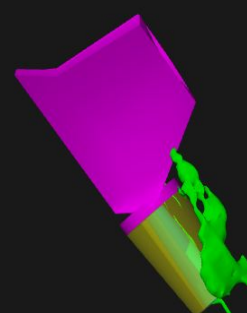


Follow-up:
14 Dec 2022

Ventral:



Lateral:



Small Bowel Follow-up

Study Details

Name	Jane Doe	ID	555178726	Protocol	MRE, No Contrast
DOB	1 Jan 1988	Age	35	Reader	Dr. G Bhatnagar

Radiologist Summary

Terminal ileal disease demonstrating. Partial response. sMARIA and GIQuant have improved on follow up. Overall structural changes show improvement.

Biomarker Results

GIQuant

HIGHER
107 → 153
+46
+43%

Disease Length

SHORTER
12.8cm → 9.1cm
-3.7cm
-28%

Mural Thickness

THINNER
11mm → 10mm
-1mm
-9%

Disease Volume

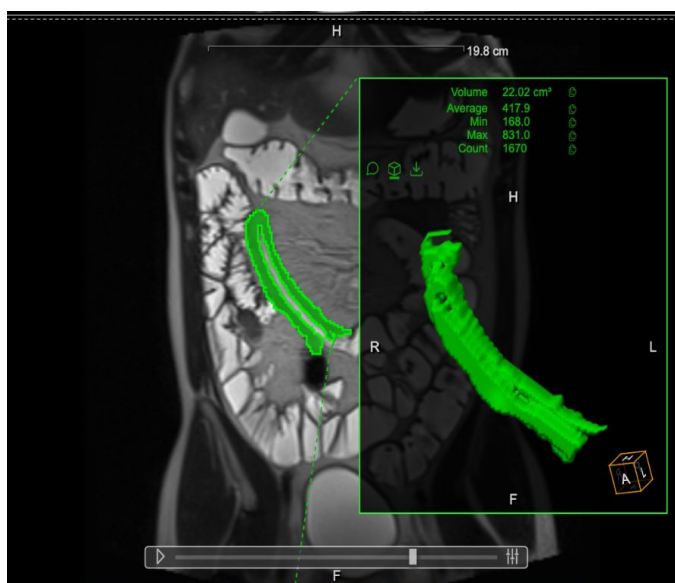
SMALLER
22cm³ → 16.8cm³
-5.2cm³
-27%

sMARIA

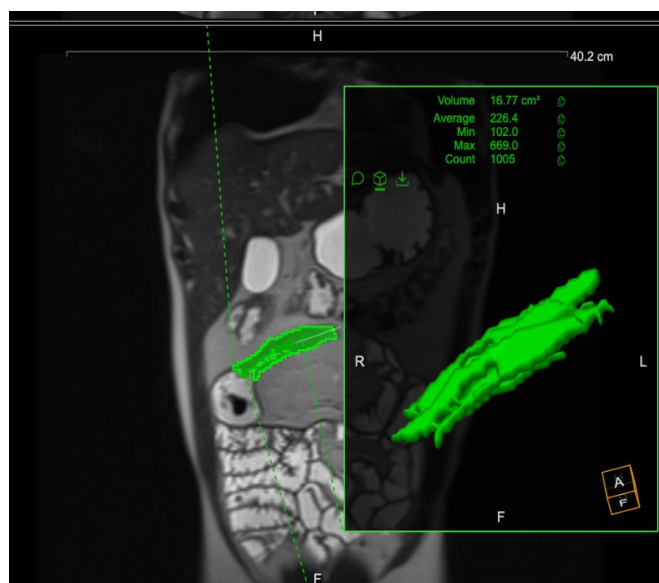
LOWER
3 → 2
-1
-33%

Disease Visualization

Baseline: 27 Oct 2019



Follow-up: 27 Aug 2020



Gastric Physiology

Going beyond patient symptoms



Gastric **emptying**, **accommodation** and **bowel wall motion (motility)** can be summarised in a convenient report.

Generate a **structured report** for gastric physiology based on MRI.

Ideal for **young patients** and complex multifactorial disease.

Quantitative reporting for complex patients



Gastric Physiology Report

Patient Name: 1721390471

Published by: HCP1

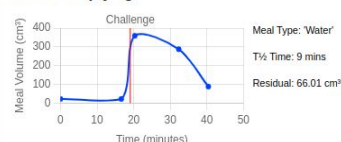
Patient Demographics

Name: 1721390471
ID: 1721390471
Sex: O
Date of Birth: 06/08/1979
Age at Time of Scan: 36

Published by: HCP1
Publish Date: 14/4/2023
Publish Time: 14:02
Creation Date: 4/4/2023
Creation Time: 15:32
Time Spent on Report: 18m

Report Breakdown

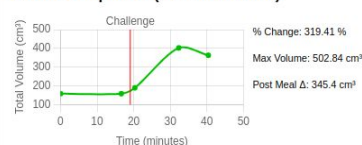
Gastric Emptying



Gastric Wall Motion



Gastric Compliance (Accommodation)



Further reading:

“Gastric Motility: Comparison of Assessment with Real-Time MR Imaging or Barostat Measurement—Initial Experience.” DeZwart et al. Radiology 2002

“Simultaneous Measurement of Gastric Emptying of a Soup Test Meal Using MRI and Gamma Scintigraphy.” Khalaf et al. Diagnostics. 2020

“Measurement of fasted state gastric antral motility before and after a standard bioavailability and bioequivalence 240 mL drink of water: Validation of MRI method against concomitant perfused manometry in healthy participants.” Heissam et al. PLOS. 2020

Investigational use

Problem:

Functional patients continue to represent a major problem for GI clinics, making up **>50%** of the workload.

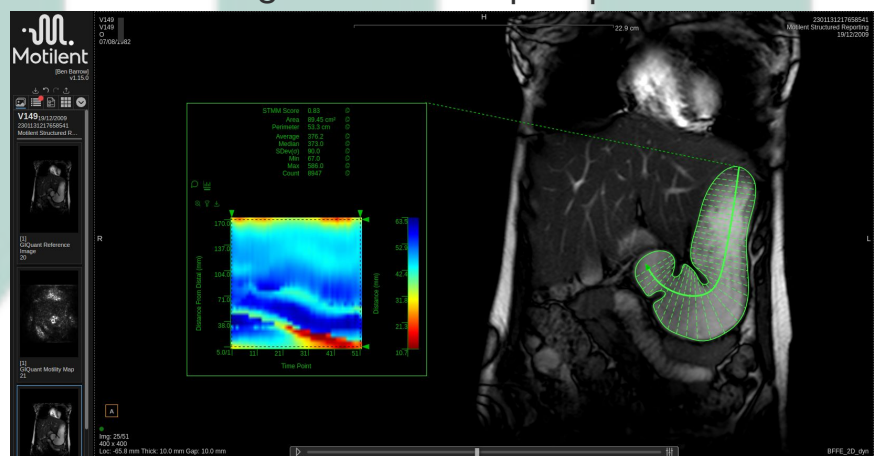
The lack of **objective** testing to separate functional and organic disease is a key barrier to effectively managing patients.

Disparate techniques like scintigraphy and manometry provide a partial picture that often fails to influence care.

A new advance:

MRI is validated against various standards for measuring accommodation, emptying and bowel wall motion (motility).

Motilent's gastric physiology report brings all this data into one place for phenotyping and helping in the management of complex patients.



Colon Physiology

Understanding the colon beyond symptoms



The gut is complex and increasingly we're asking **how the bowel moves** in disease areas like gastroparesis, functional constipation, ileus, and even ulcerative colitis.

To allow this movement to be objectively measured, we developed **Spatio-Temporal Motility Mapping** (STMM).

Both the stomach and colon produce a range of **contractile patterns**, and cine MRI is great for observing these, especially where there are no obvious changes in structure (e.g. thickening).

This is particularly interesting in adults and children with constipation where a range of factors may contribute to the constipated 'phenotype.' For example, you could have a discoordinated colon (similar to atrial fibrillation), or a static colon.

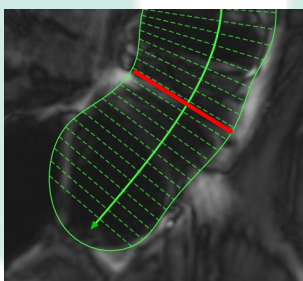
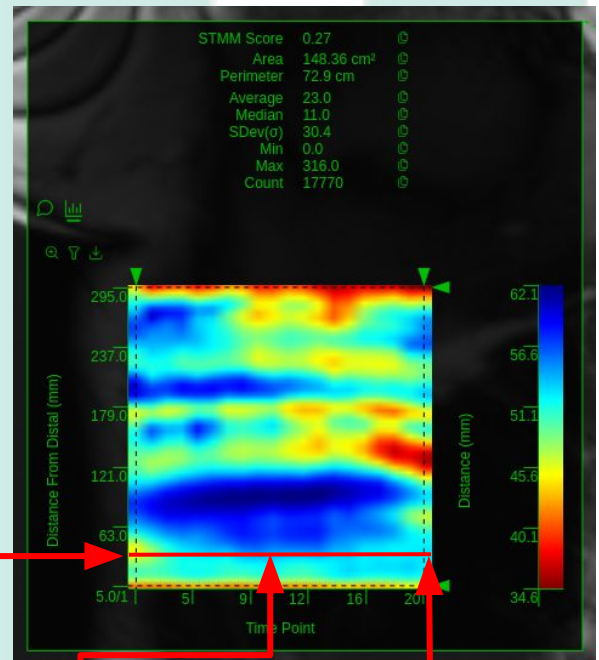
STMM can help **distinguish** between the two.

Case study

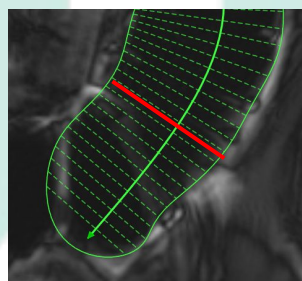
Over the course of this cine MRI sequence, the colon is seen to dilate, and then contract. It is however **difficult to quantify** the rate at which this happens.

Using STMM, the **frequency and the magnitude of the contraction** can be quantified from the heatmap, showing the length of the contraction in time, and the change in the diameter of the colon.

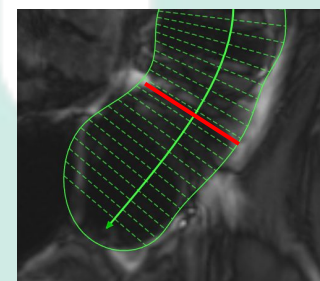
In this case, the heatmap shows the diameter of the colon has changed by 6mm across a contraction cycle!



t=0



t=0.5 Colon has dilated



t=1 Colon has contracted

Investigational use

There is a disconnect in how we study disease in animal models and how we **evaluate** patients in trials and then the clinic.

Motilent and **Minerva** have been working hard to cross the translational gap by taking state-of-the-art clinical tests and applying them in the preclinical setting.

We've developed a range of MRI sequences and protocols to **evaluate** the digestive tract for motility disorders and IBD. Sadly, we have not (yet) taught rats to complete patient reported outcome questionnaires.

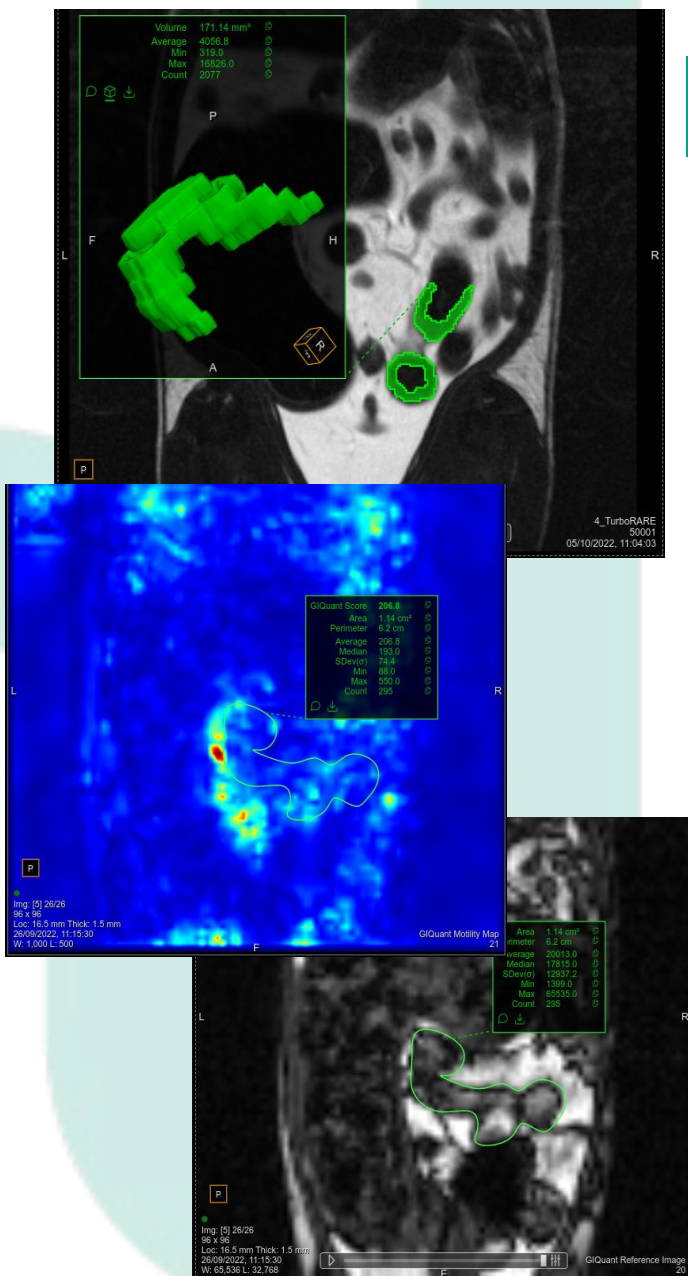
Case study

High resolution imaging enables detailed bowel wall assessment for IBD models. Dynamic imaging allows **visualization** of peristalsis across the stomach, small bowel and colon along with other measures including **gastric emptying** and **accommodation**.

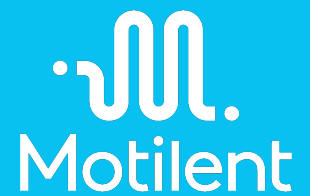
Rat model (left) scanned with oral contrast to replicate human Magnetic Resonance Enterography - allowing good bowel wall **visualisation** and **measurement**.

All of our MR-based techniques are applicable in these data: including GIQuant which is used here to produce a **quantitative** heatmap of bowel peristalsis.

GIQuant has been **validated** in the preclinical model showing a dose-dependent response to pharmacological agents such as neostigmine.



What our users say



*"Dynamic 'cine' MRI offers a new and potentially powerful perspective on gastrointestinal function, especially in conditions like Crohn's where hypo-motility is related to disease activity. Objective assessment of this data with **GIQuant** could represent an important advance in how we quantify this in the clinic.*

— Prof Stuart Taylor University College London Consultant Radiologist

*"**Entrolytics** is the only product I've found which excels at state-of-the-art IBD reporting, and multi-centre clinical research. It has the potential to help me deliver objective insights, as opposed to opinion alone, to my gastroenterologists and surgeons, without adding to the burden of my existing caseload. I am desperate to get it into use in my clinical workstream."*

— Dr Gauraang Bhatnagar is Radiology Lead at Motilent, and an Academic and Clinical Radiologist in Surrey, UK

*"**STMM** is a great tool as it provides rich information about the size and coordination of contractions in the stomach and colon without having to use invasive probes"*

— Heather Fitzke, MSc PhD University College London



The University of
Nottingham



NHS
Great Ormond Street
Hospital for Children
NHS Foundation Trust

KU LEUVEN



Contact Us

To find out more or request a free demo of
any of the products shown, visit

motilent.io

or email

info@motilent.io

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IDEALondon, 69 Wilson Street, London, EC2A 2BB.

Registered in England and Wales under registration number 08730130.

Regulatory

ISO 13485:2016 | Certificate Number MD 690580

CE 690579 Design, development and manufacture of a magnetic resonance imaging analysis tool for assessing bowel wall motion in persons with, or suspected to have, Crohn's Disease

GIQuant is a 510(k) cleared class II medical device (K211356).

GIQuant is a post-processing software integrated into existing medical imaging workflows that is intended to derive motion related parameters from abdominal data obtained during magnetic resonance imaging (MRI).

GIQuant is designed to aid trained physicians in advanced image assessment, treatment consideration, and monitoring of therapeutic response. The information provided by GIQuant should not be used in isolation when making patient management decisions.

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