Methodological Validation of a minimally invasive pelvic floor investigation
Anal Acoustic Reflectometry

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**Why do we need a new Investigation?**

- Gold standard is Anal Manometry;
  - Does not correlate with severity
    - Bordeianou et al., Dis Col Rec 2008, Hornung et al., BJS 2012, Zutshi et al., Inter J Col Dis 2010
  - Can not distinguish between FI & Continent
    - Felt-Bersma et al., Dis Col Rec 1990
  - Can not distinguish between subgroups of FI
    - Hornung et al., BJS 2012
  - No agreed methodology, units or normal ranges
    - Rao et al., Neurogastroent Mot 2002
  - Distorts the anal canal and therefore unable to investigate the opening and closing function
What is Anal Acoustic Reflectometry (AAR)?
How does AAR work?
AAR Parameters at Rest

- Opening pressure
- Opening elastance
- Hysteresis
- Closing elastance
- Closing pressure

**Graph:**
- **Y-axis:** Pressure (cm H₂O)
- **X-axis:** Cross-Sectional Area (mm²)
What we already know?

* **Repeatable and reproducible**
  * Mitchell et al., Dis Col Rec 2011

* **Distinguish between continent & faecally incontinent**
  * Unlike manometry
  * Mitchell et al., Dis Col Rec 2012

* **Able to distinguish between different symptomatic subgroups**
  * Unlike manometry
  * Hornung et al., BJS 2012

* **Correlates with symptom severity**
  * Hornung et al., BJS 2012
Aim

* AAR Method has been criticised
  * Performed along side other anorectal investigations
  * Catheter free technique
    * Assess opening and closing function
    * Anal canal distorted by prior investigation?

* Hypothesis
  * Prior manometry examination does not affect the results of AAR?
Method

* Prospective
* Randomised
* N = 30
* Single tertiary referral Unit
Results

- Women 23
- Median age 63 (30-84)
- FI 67% Continent 30% ODS 3%
- Mean Vaizey Score 11.6
Results

<table>
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<th>Man 1&lt;sup&gt;st&lt;/sup&gt;</th>
<th>Man 2&lt;sup&gt;nd&lt;/sup&gt;</th>
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<tr>
<td>MSP1</td>
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</table>

(Parametric data*, paired t test, non parametric data Wilcoxon signed rank test)

* No significant difference seen between 1<sup>st</sup> and 2<sup>nd</sup> order variables
Conclusion

* Prior manometry examination does not affect the results of AAR variables.

* This study has shown that AAR and manometry can be performed in any order with reliable results.
Many Thanks

Any Questions?
AAR Equipment
Advantages of AAR

* Dynamic assessment of anal sphincter
* Minimal distortion to anal canal
* Entire length of anal canal assessed
  * therefore acoustic parameters based on most functional part of sphincter
Current & Future Studies

* How does the anal canal respond to different filling rates?
* What specific muscles does AAR measure?
  * Isolation of the IAS
* Can AAR predict success of SNS & PTNS?
How do you see this investigation being integrated into the current service?

- After a period of current research
- Short term – used alongside manometry to allow for a period of research and training
- Long term – replace manometry and allow the clinician to target treatment
Questions?

- Why do you call it minimally invasive? – AAR v Manometry v BET v proctogram v tSNS trial
- What about HRAM?