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NORMATIVE DATA ON URETHRAL RELAXATION IN 52 CONSECUTIVE FEMALE PATIENTS: DERIVATION OF A NUMERICAL CLASSIFICATION PARAMETER AND CORRELATION WITH CLINICAL PRESENTATION.

Hypothesis / aims of study
The ICS defines urethral relaxation incontinence[1], but not urethral relaxation.
There is a paucity of data in the literature.
As a unit which routinely performs urethral pressure profiles, we are aware of a spectrum of time-varying maximum urethral pressure.
The aim of this study was to establish some normative data on urethral relaxation, devise a quantitative approach and correlate the data if possible with clinical findings.

Study design, materials and methods
Fifty three patients from the routine urodynamics clinic had a three minute urethral pressure measurement taken at the maximum value.
The data were characterised by a single experienced observer into four catergories: “stable”, “small amplitude, rapid variation”, “large amplitude, rapid variation” and traces showing “one slow U shaped relaxation in pressure”
Two examples are shown in Fig 1.

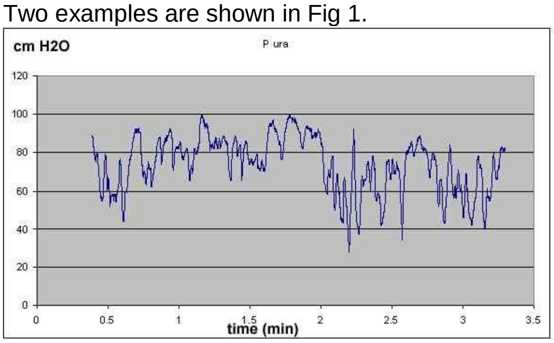


Fig 1.a) Rapidly varying large amplitude trace

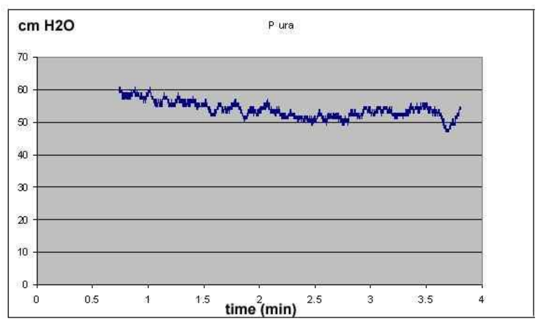
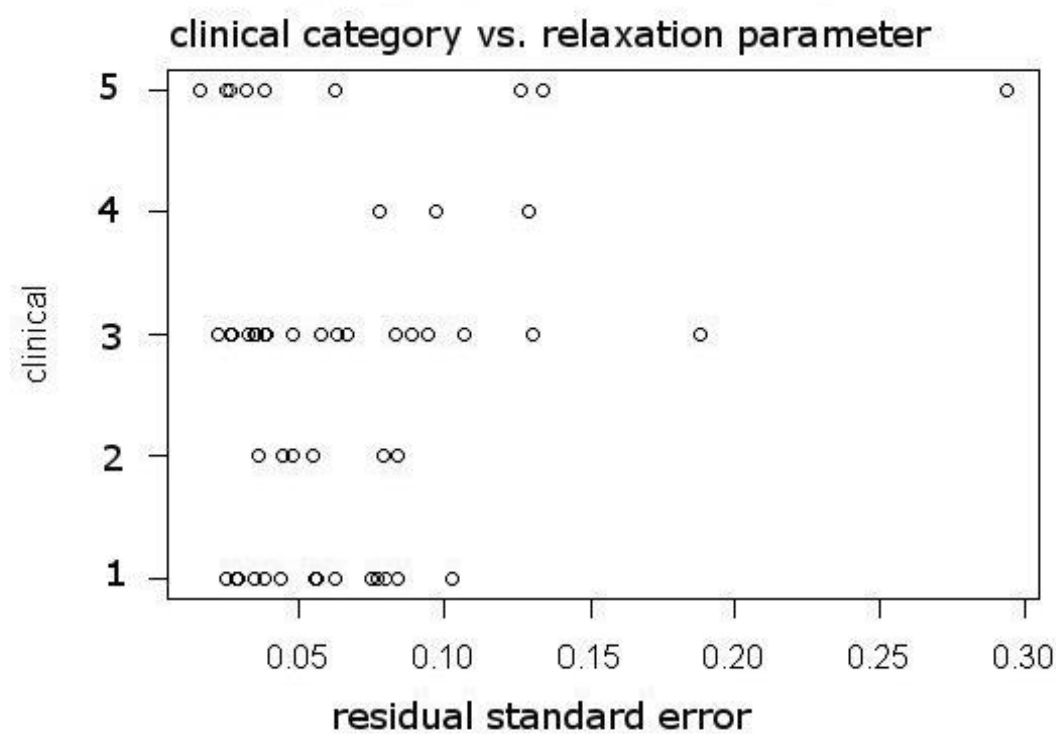


Fig 1.b) Stable trace with monotonic drift (probably due to catheter movement)

Since these are very subjective categories, numerical characterisation was attempted.
The data were analysed in [R][2] the open source statistics package.
A linear model was fitted to compensate for temporal drift in the position of the catheter – a monotonic change. The residual standard error (hereafter known as the relaxation parameter) from this fit was used as a measure of urethral pressure variability.
Independently and blinded from the urethral pressure data, a single experienced clinician classified the clinical history into five categories: (1) Urinary Stress Incontinence (2) Urgency Frequency Syndrome (3) Urge Urinary Incontinence (4) Voiding Symptoms (5) Mixed Urinary Incontinence
Results
Pressure variation:
In terms of the pressure variation, the residual standard error correlated well with the observer’s classification.
Of the twenty nine highest values, twenty had been categorised as variable. Of the twenty four lowest values, only one had been categorised as variable.
The model at present does not separate traces with one slow U shaped relaxation in pressure from rapid variations. A change from a linear fit to a polynomial may allow this.
Clinical assessment:
Figure 2 shows the plot of the five clinical categories against the relaxation parameter.
Of the clinical categories, 1 and 2 have low values of the relaxation parameter.
Categories 3 and 5 (incontinence) include some of the most variable urethral pressures.



Interpretation of results
An analytical tool for analysing urethral relaxation now exists and it correlates well with intuitive assessment of the traces.
This is a rudimentary attempt to correlate the relaxation with clinical condition. It is perhaps interesting that among the patients who are incontinent are those with the highest values of the relaxation parameter.

Concluding message
There is a paucity of data on urethral relaxation. This study has demonstrated the possibility of an objective numerical index. Loose correlation with clinical presentation has been shown.

References
1. Abrams P, Cardoza L, Fall M, et alThe Standardisation of Terminology of Lower Urinary Tract Function: Report from the Standardisation Sub-Committee of The International Continence Society.Neurology and Urodynamics 21:167178 (2002)
2. http://www.r-project.org/

Disclosures
Funding: none **Clinical Trial:** No **Subjects:** HUMAN **Ethics not Req'd:** mathematical analysis of routine technique **Helsinki:** Yes **Informed Consent:** Yes