Universitair Ziekenhuis Gent

Urodynamica dag:
Tracés ontleden en gereleateerde therapie

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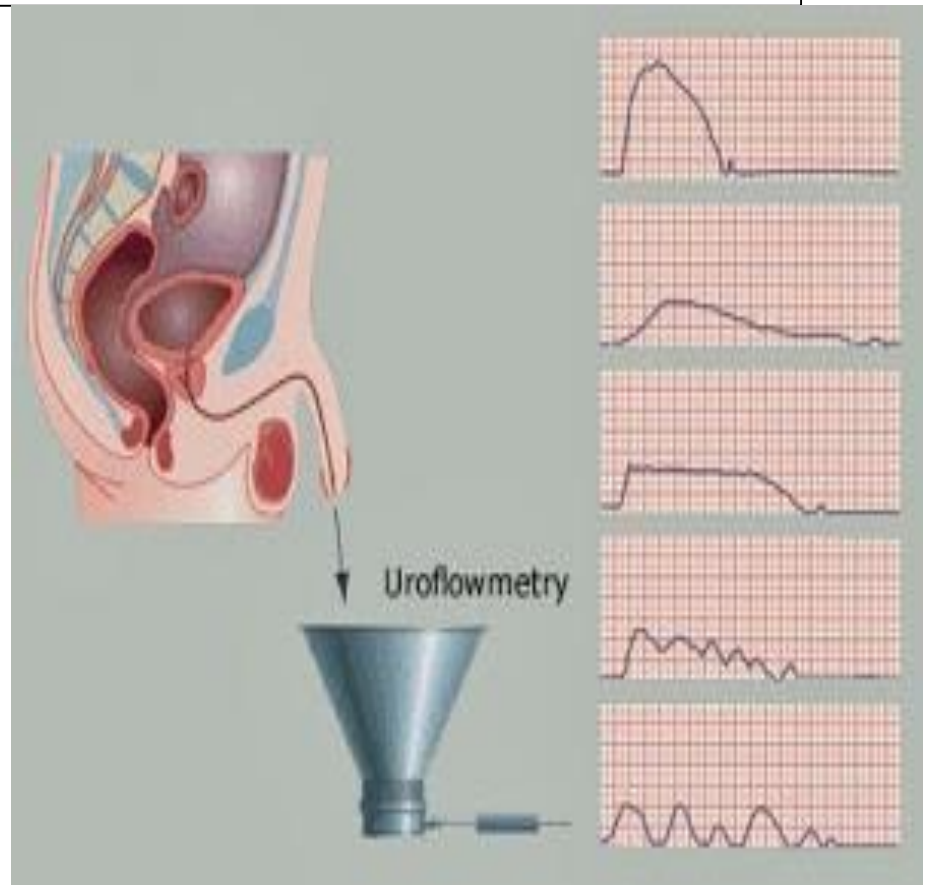
Wat is urodynamische evaluatie?

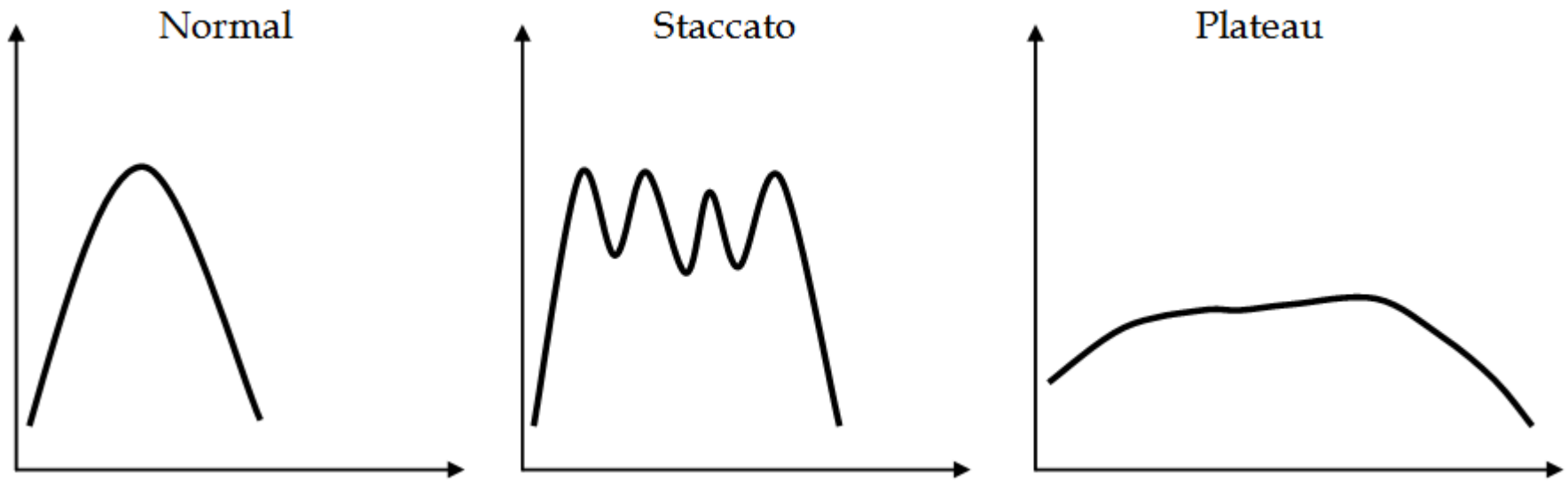
- **Evaluatie van de functie/dysfunctie van 'Lower urinary tract' (LUT)**
- **Niet invasieve urodynamische evaluatie:**
  - **Uroflowmetrie + residu meting via echo**
- **Invasieve urodynamische evaluatie**
  - **With abdominal rectal catheter**
  - **And with transurethral catheter / suprapubic catheter**
- **Video-Urodynamisch** : cystografie tegelijkertijd

1 a: Niet invasieve urodynamica: uroflowmetrie

- The voided **volume**, voiding **time**, and **peak voiding velocity** are recorded.
- Evaluation of the emptying phase
- At least 2 uroflows
- Normal curve is “bell shaped”
- Post-voiding residual urine



Uroflowmetrie: voorbeelden



Uroflowmetrie: betekenis

- **Staccato voiding ➔ dysfunctional voiding**
- **Plateau curve: obstructed flow ➔ anatomical obstruction?**

Bijkomende onderzoeken:
1 b : Invasieve urodynamica

Wat is de doel van een (video) urodynamische evaluatie?

- **Reproducing the patient's voiding complaints**
- **Offer a pathophysiologic explanation to the problem.**

Back to basics…

Filling phase of the bladder:

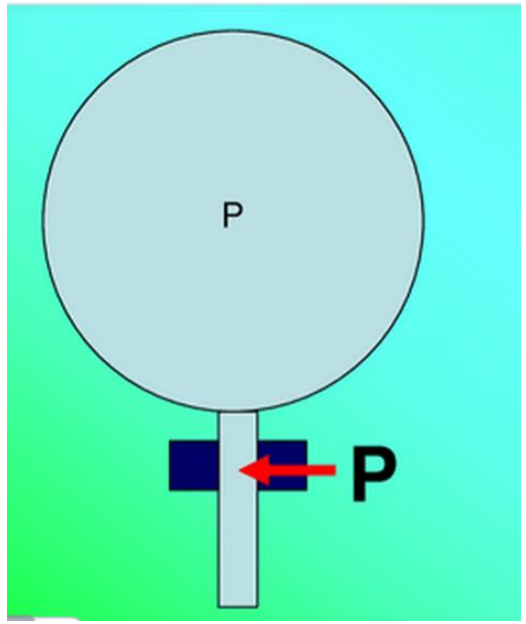
Bladder: Low pressure, compliant reservoir

Urethra: Closure pressure must > bladder pressure

Voiding phase of the bladder:

Bladder: Coordinated detrusor contraction

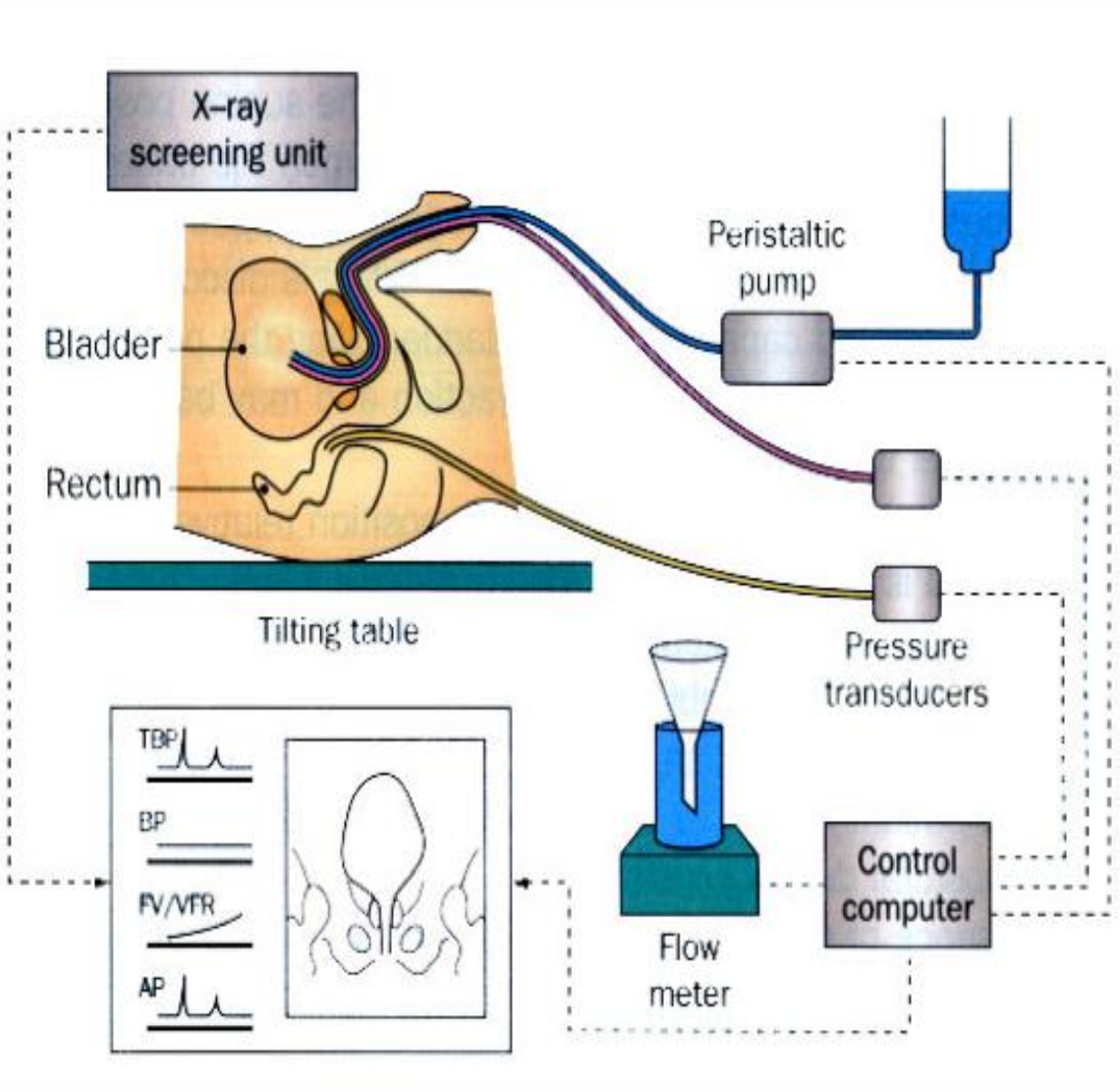
Urethra: Relaxation of sphincter



What's invasive urodynamics?

- **Measurement of detrusor pressure during controlled bladder filling and subsequent voiding with measurement of flow rate.**

- **Bladder catheter and rectal catheter are necessary**
- **The bladder is filled with contrast through the catheter**
- **Abdominal, vesical and sphincter pressures are recorded**
- **Voiding is measured**


X-ray screening unit
Peristaltic pump
Bladder
Rectum
Tilting table
Pressure transducers
TBP
BP
FV/VFR
AP
Flow meter
Control computer

Video-urodynamics

- **Information:**
  - **Storage function of the bladder**
    - Detrusor activity
    - Sensation
    - Compliance
    - Cystometric capacity
  - **Voiding function**
    - Outflow obstruction
    - Flow pattern
    - Detrusor contractility
    - Sphinter activity/relaxation

Video-urodynamics

Will answer 4 simple questions:

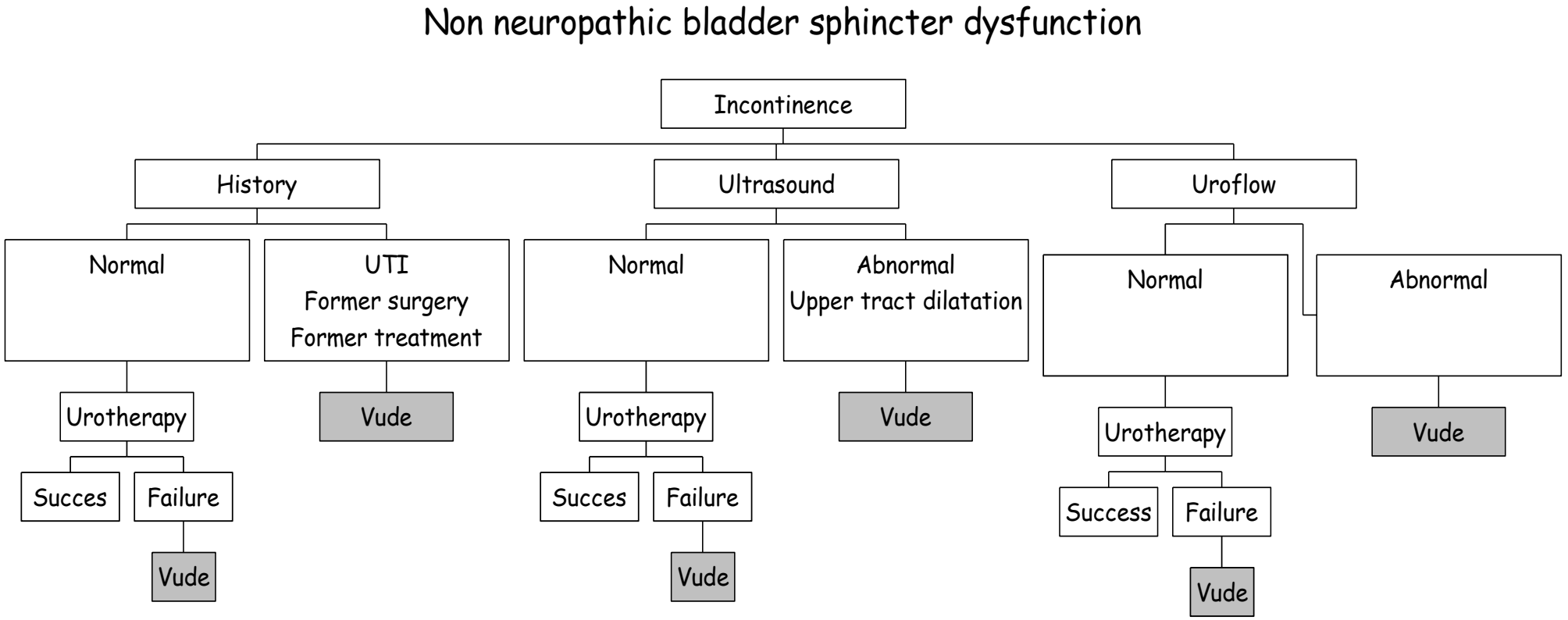
1. Is the bladder relaxed during filling?

2. Is the urethra contracted during filling?

3. Does the bladder contract adequately during voiding?

4. Does the urethra open properly during voiding?

Indications for VUD:

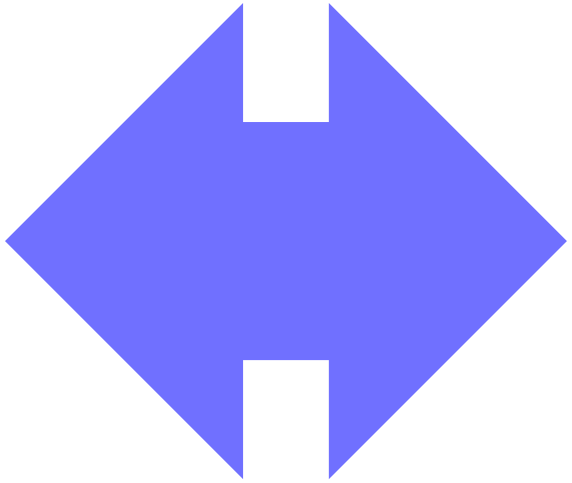


What do we need for conventional urodynamics?

- **Catheters**
  - Water filled
  - Air charged
- **(EMG electrodes)**
- **Transducer**
- **Filling pump**
- **Flow meter**
- **Computer + Printer**

Invasive urodynamic studies: different methods

- **Transurethral**
- **Natural fill**
- **Combined with VCUG and fluoroscopy**
- **Supine**
- **Urethral pressure**



- **suprapubic access**
- **Pump**
- **Not combined with VCUG and fluroscopy**
- **sitting / standing**
- **EMG pelvic floor**

Why transurethral ?

- **I am used to do it**
- **Fast and easy (compared to supra-pubic)**
- **No need for sedation and anaesthesia**
- **Despite my belief that suprapubic might be superior to evaluate the filling phase**
- **Transurethral is superior to evaluate the voiding phase when using an urethral pressure measurement**

Why not natural fill?

- Because I am not used to it
- Because I have no time
- Because in my setting it is impossible from the economical viewpoint
- Despite my belief that it is superior and has less artefacts

Why associate fluoroscopy? (V-UDS)

- VCUG extra with same invasiveness
- combines anatomic and functional information
- enables to look for anatomic anomalies during functional anomalies
  - reflux during unstable contraction
  - spinning top urethra during dysfunctional voiding

Why associate fluoroscopy? (V-UDS)

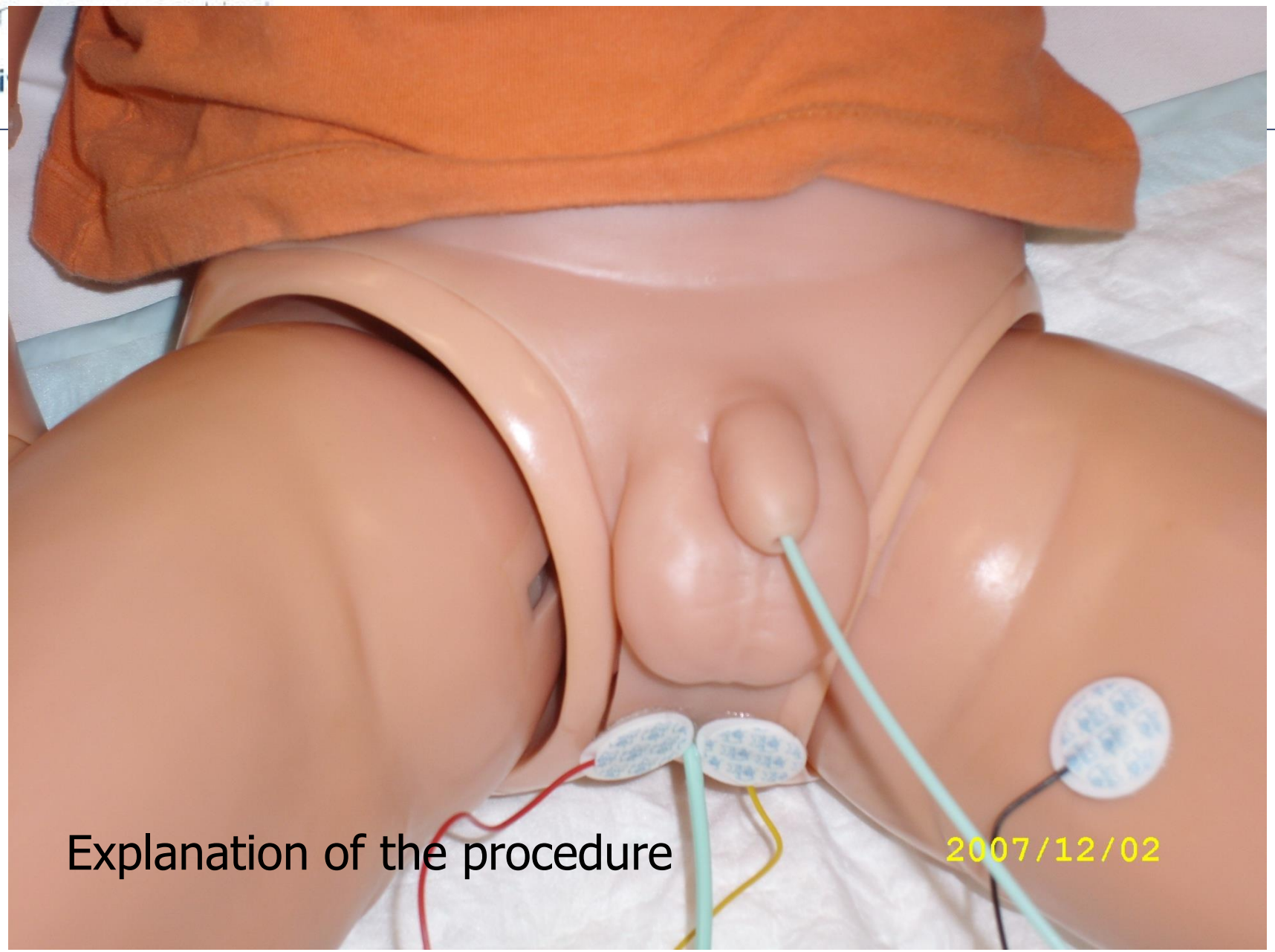
- Anatomical informations about:
  - Diverticulae
  - vesicoureteral reflux
  - obstipation and faecal impaction
  - lumbosacral spine
  - trabeculation

Why associate fluoroscopy? (V-UDS)

- Girls
  - spinning top urethra
  - vaginal voiding
  - ...
- Boys
  - valves
  - syringocele
  - meatal stenosis
  - urethral stenosis
  - urethral diverticulae
  - bladder neck dysfunction
  - …

Video-urodynamics: conditions

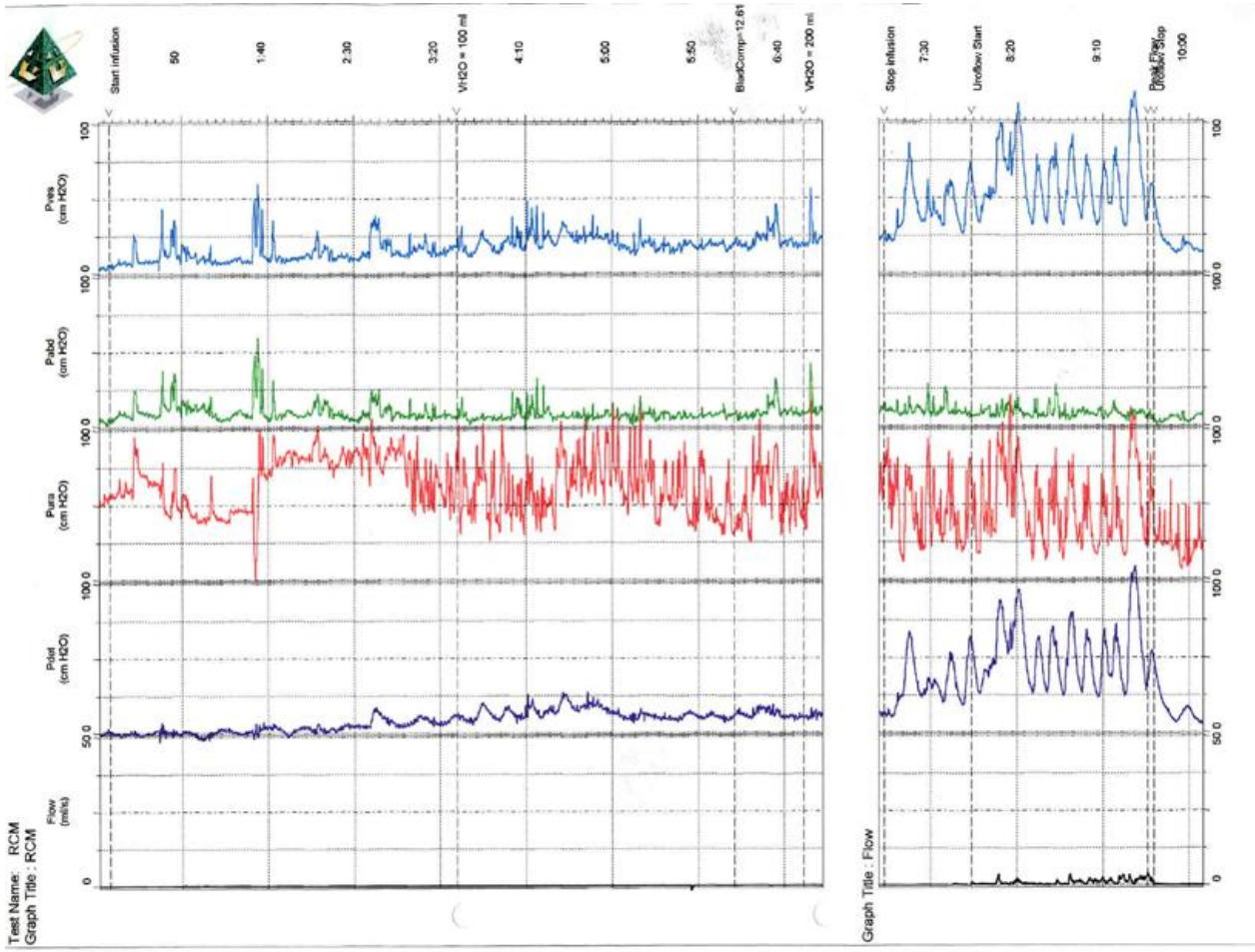
- **Adapted information**
- **Friendly environment**
- **“Patience”**


Explanation of the procedure
2007/12/02

Video-urodynamics: measured parameters

- Pves
- Pabd
- Pura (double lumen cath)
- Pdet (computed)
- Flow

- (Muscle activity (EMG))
  - Surface electrodes
  - (needle electrode)



Video-Urodynamics: Measured parameters

- **Detrusor pressure cannot be measured**
- **Is a computed measurement:**
  - Substraction of rectal (abdominal) pressure from the total bladder pressure ➔ removing the artefacts of abdominal straining

$$P\ Det = P\ ves - Pabd$$

Video-urodynamics: procedure

- Instillation of local anesthetic gel
- Radio-opaque fluid at 25° C – 36° C
- Triple lumen catheter
- Filling rate: ≤ 15ml/min
- X-ray
  - before starting procedure
    - To exclude anatomical malformations
  - during the procedure
    - Full bladder
    - Permiction
    - Post-voiding
- At least 2 procedures
  - 1 with catheter in loco during micturation
  - 1 without catheter during micturation

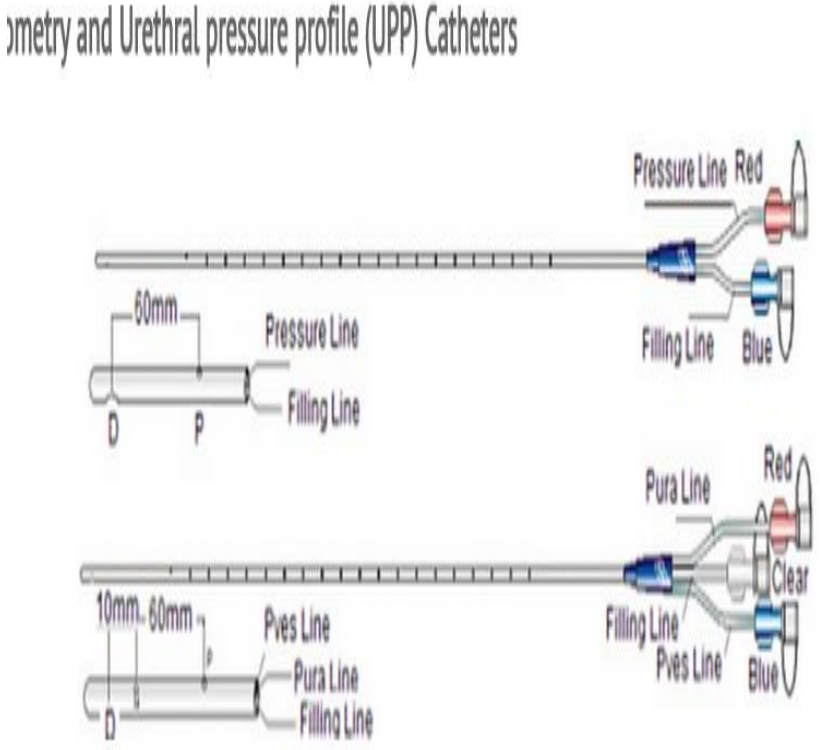
- Ice water test: evaluation of detrusor during spinal shock

Filling speed?

- **Conventional:**
  - <10% EBC/min
  - In OAB: <10ml/min.
  - At least two filling cycles,
  - When in doubt, 3 fillings.
- **Natural fill**
  - Normal fluid intake
  - Normal activities

Which catheter?

- **Many available**
- **Small Fr (5-9fr)**
- **Sterile**
- **Triple lumen for urethral pressure measurement (Pves + Pura)**
  - Water filled
  - Double lumen if asscociated with EMG
- **Place after application of local anaesthetic lubrificant**



How many cycles?

- More then 1 filling is indicated in case any anomaly is found at first filling
- Best option is to do repeated filling in all cases

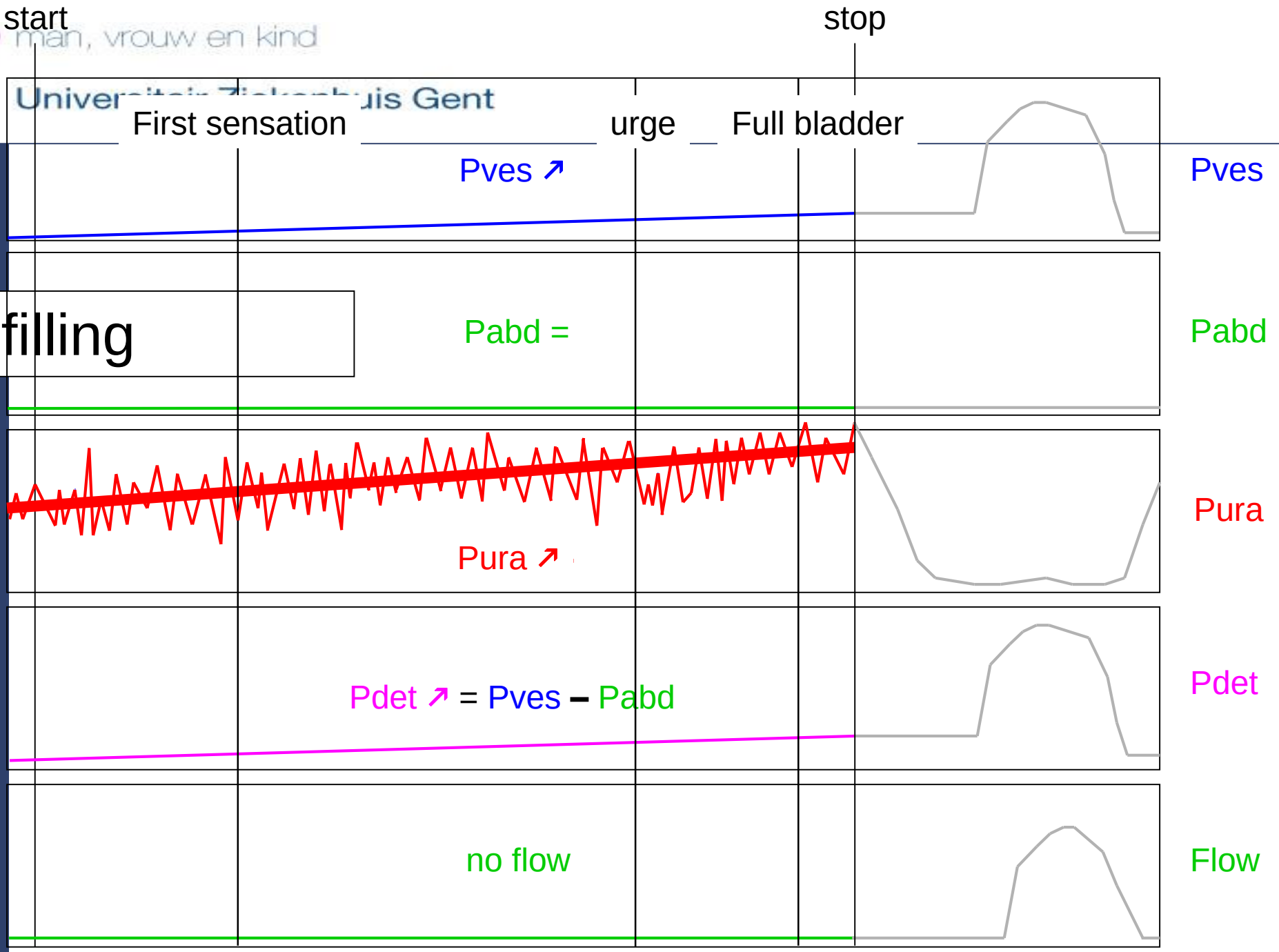
Video-urodynamics: provided information

- Detrusor:
  - stable / overactive/hyperreflex / underactive
  - Pressure ≤ 40 cm H_2O
  - Pressure during voiding ± 60 cm H_2O
- Sphincter:
  - Stable / overactive/dyssynergic
  - Primary relaxation
  - Pressure ≤ 80 cm H_2O

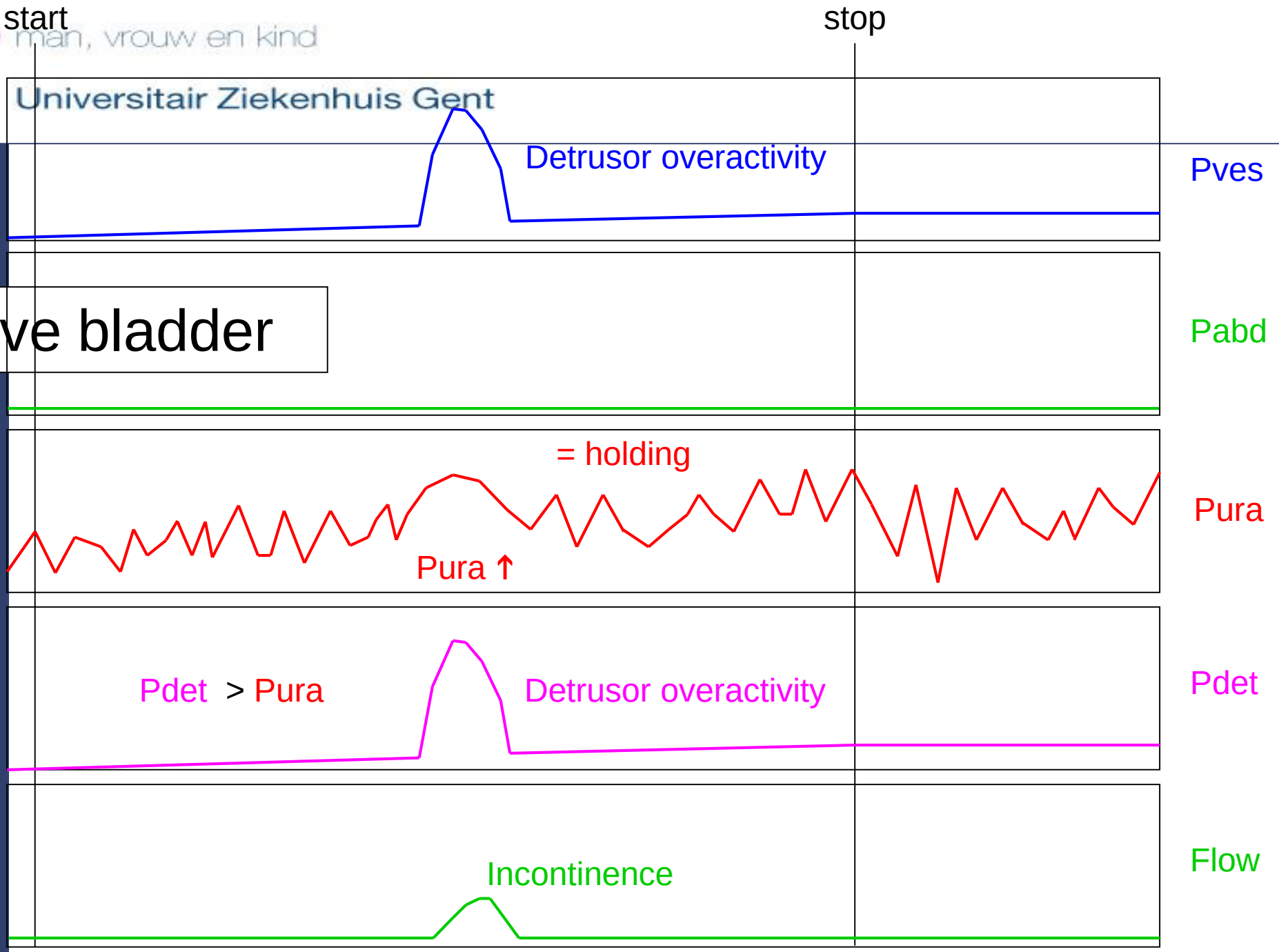
Video-urodynamics: provided information

- **Compliance: computed ΔV / Δpdet ml/cm H_2O**
  - **Dependent upon following factors:**
    - Rate of bladder filling
    - Part of the curve used to calculate the compliance
    - Shape of the bladder
    - Thickness of the bladder wall
    - Mechanical properties of the bladder wall
    - Contractile and relaxant properties of the detrusor
  - **≤ 0.05 x cystometric bladder capacity for age / cm H_2O increase of the baseline bladder pressure**

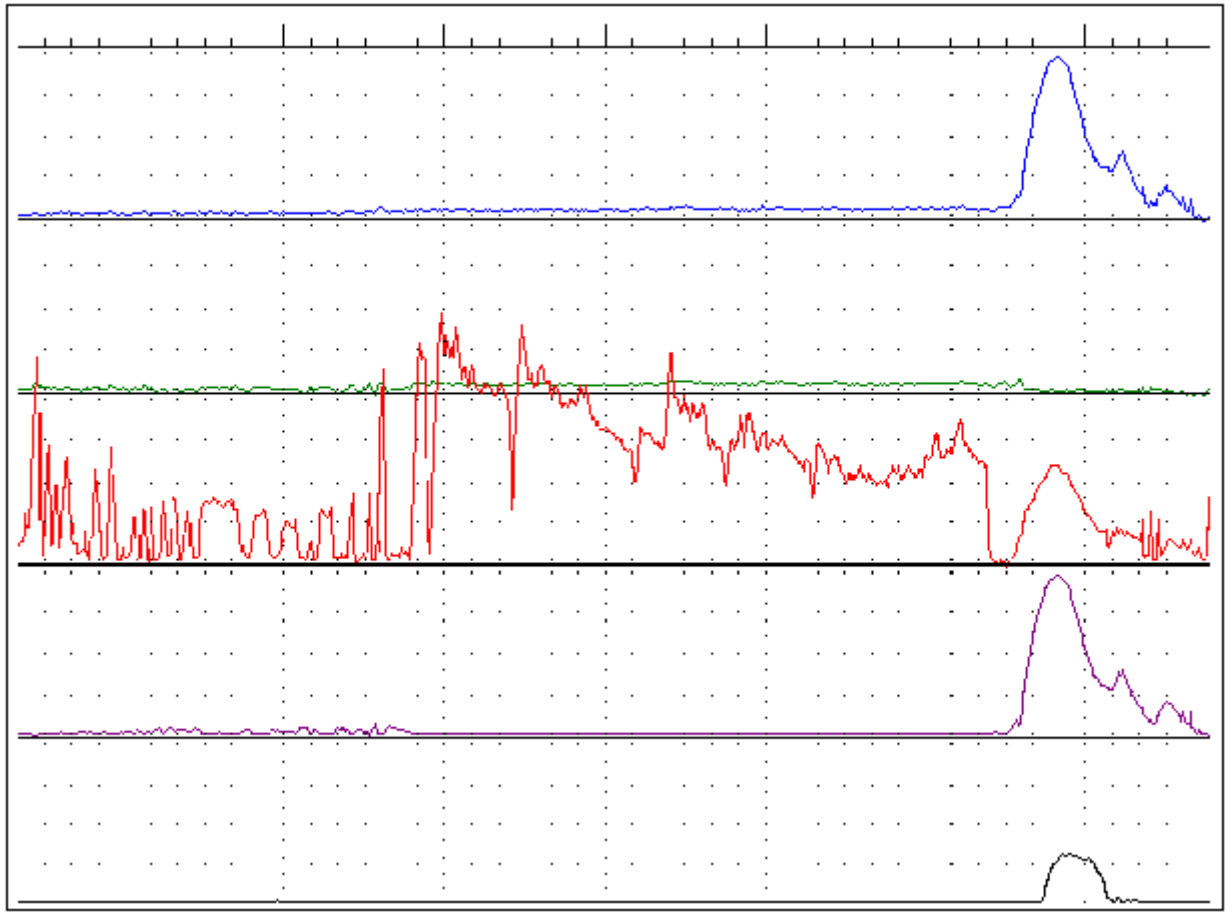
Normal filling

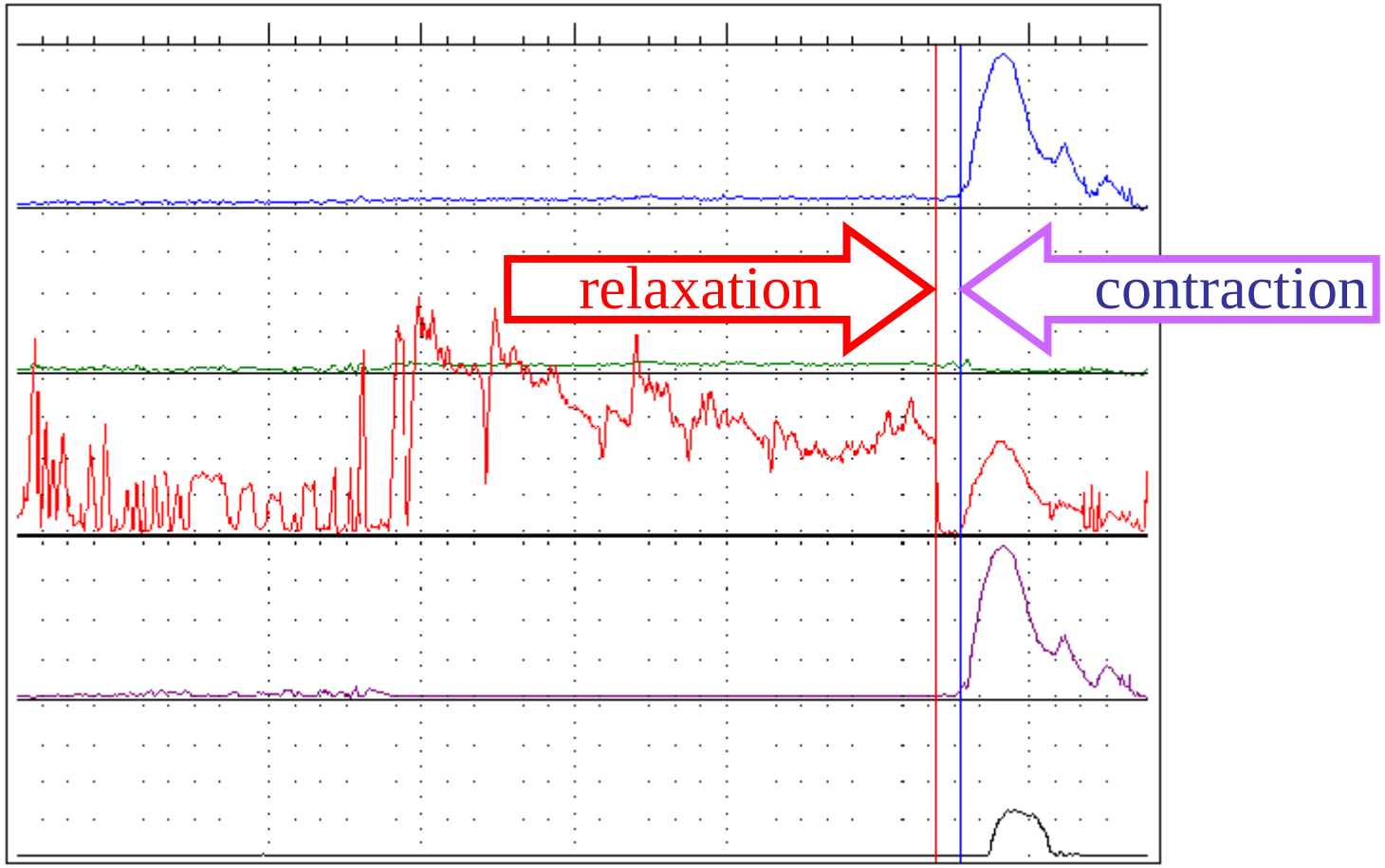


Overactive bladder

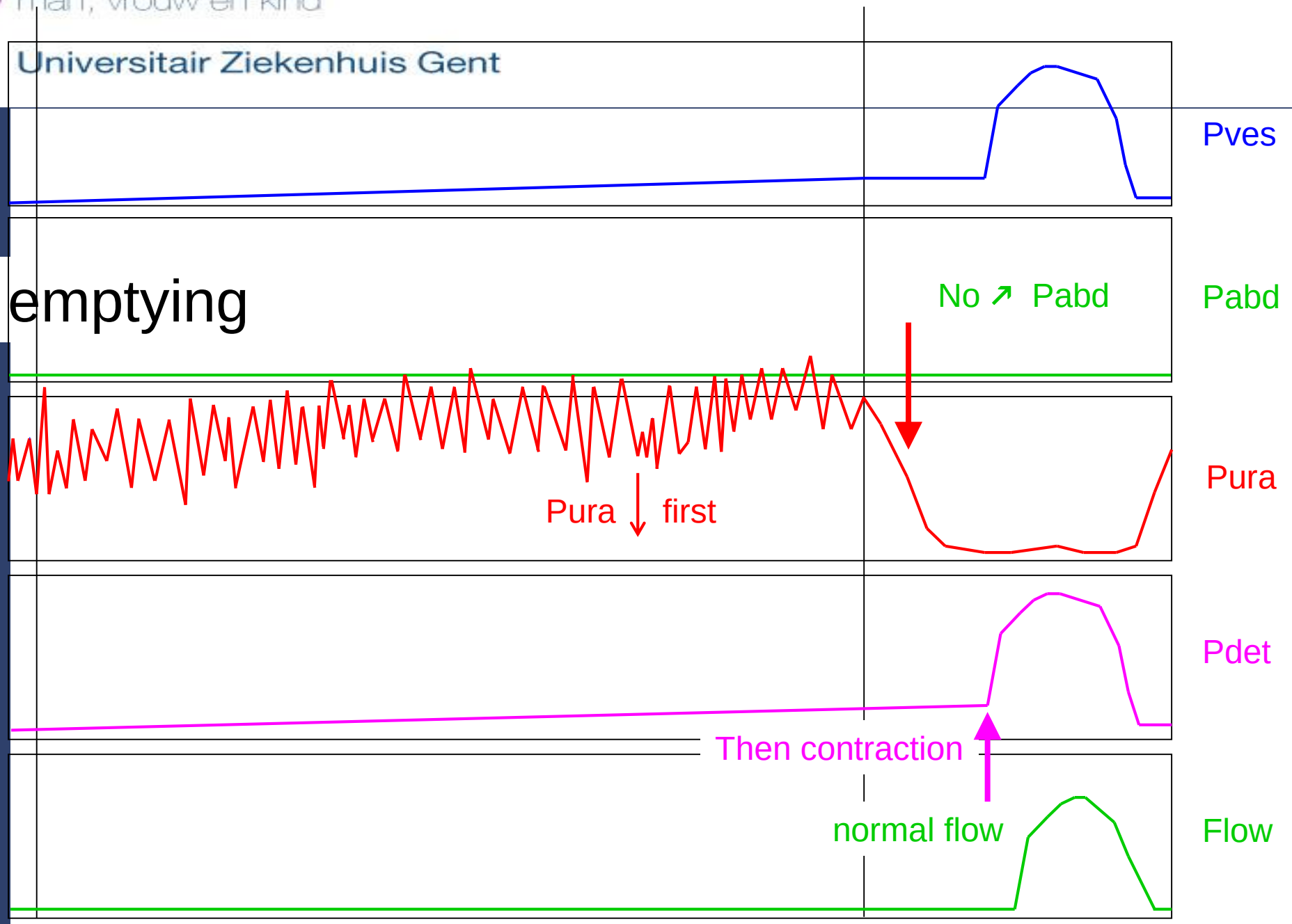


Between filling and voiding

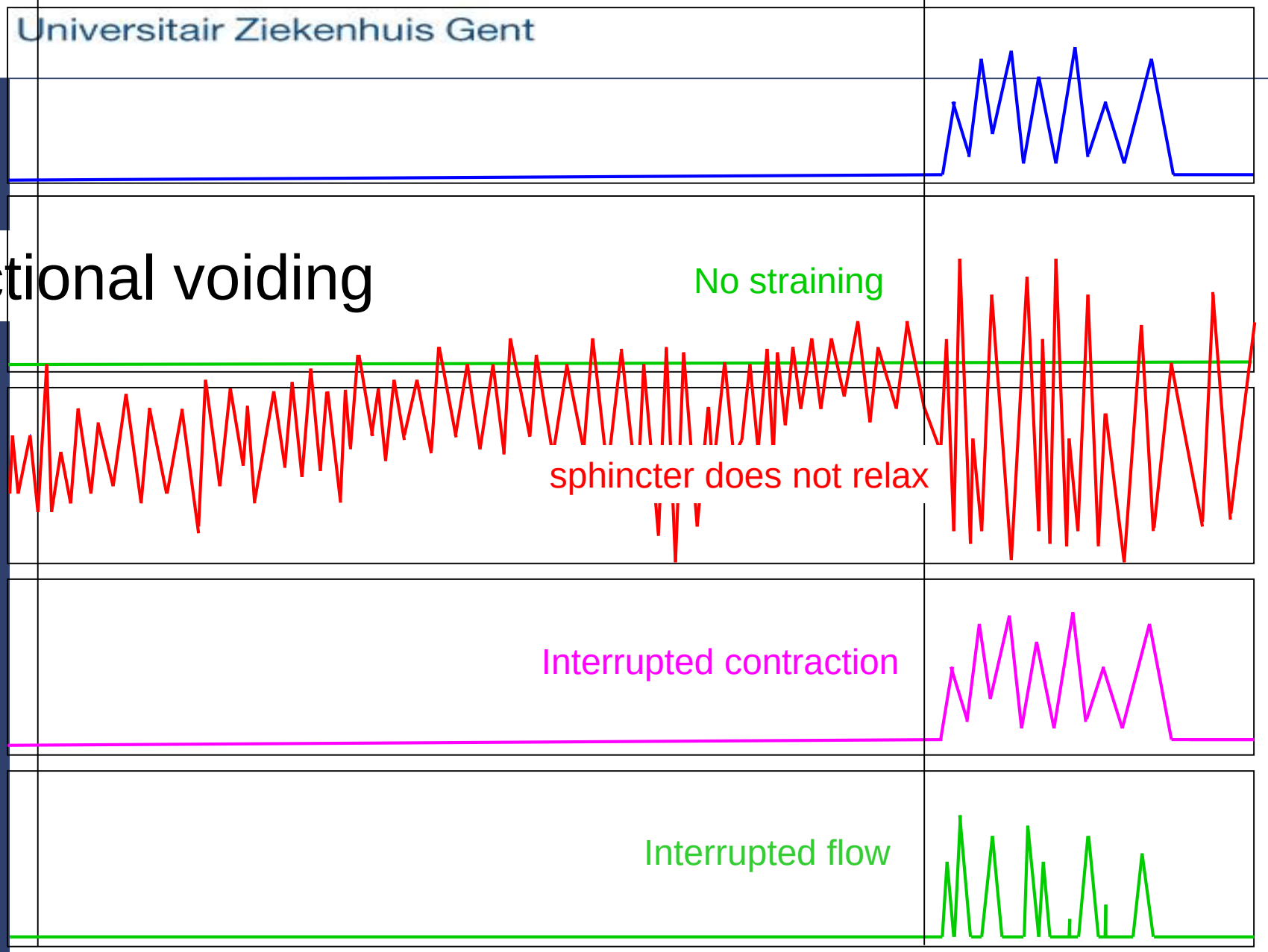


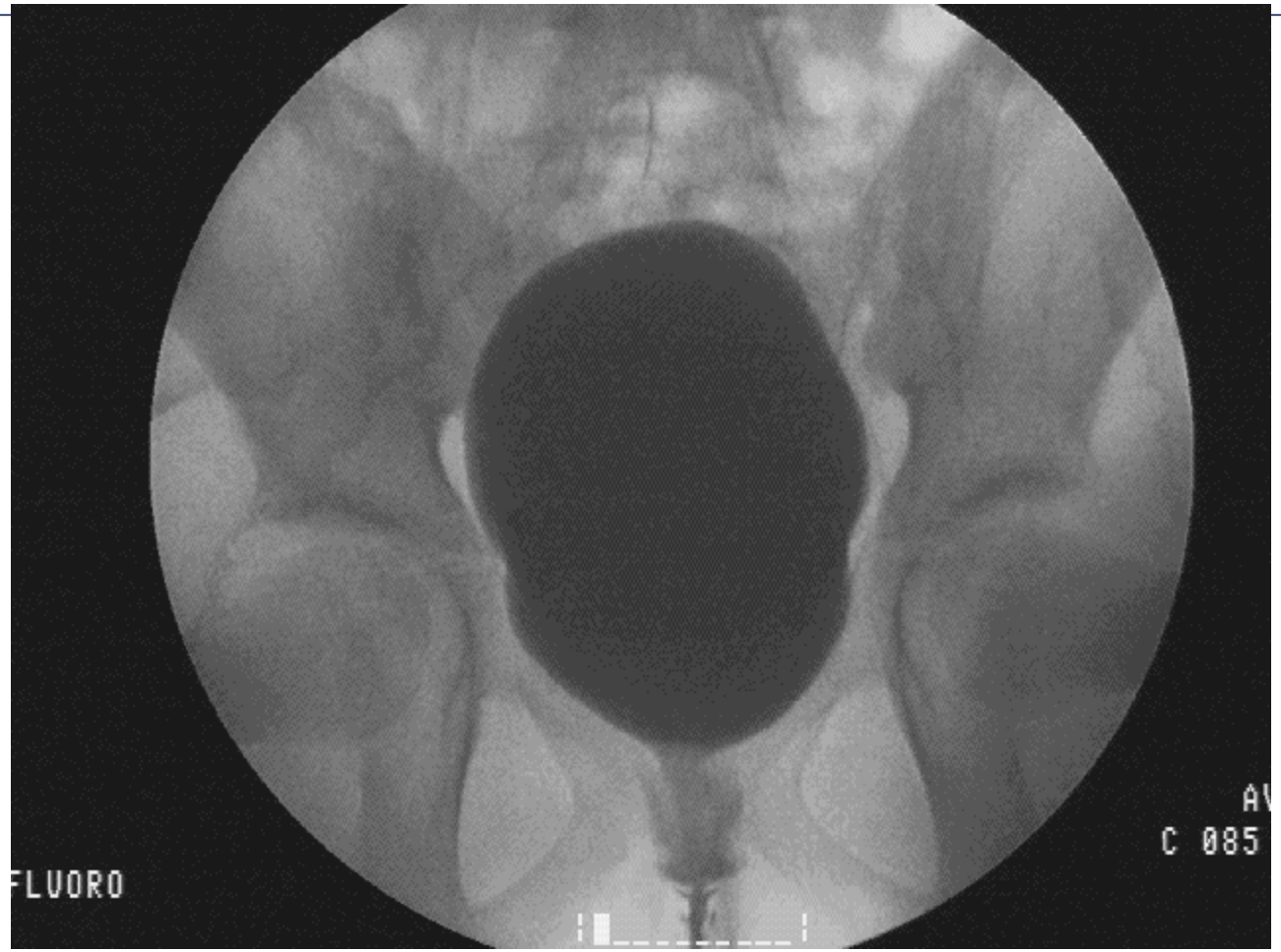

relaxation
contraction

Normal emptying

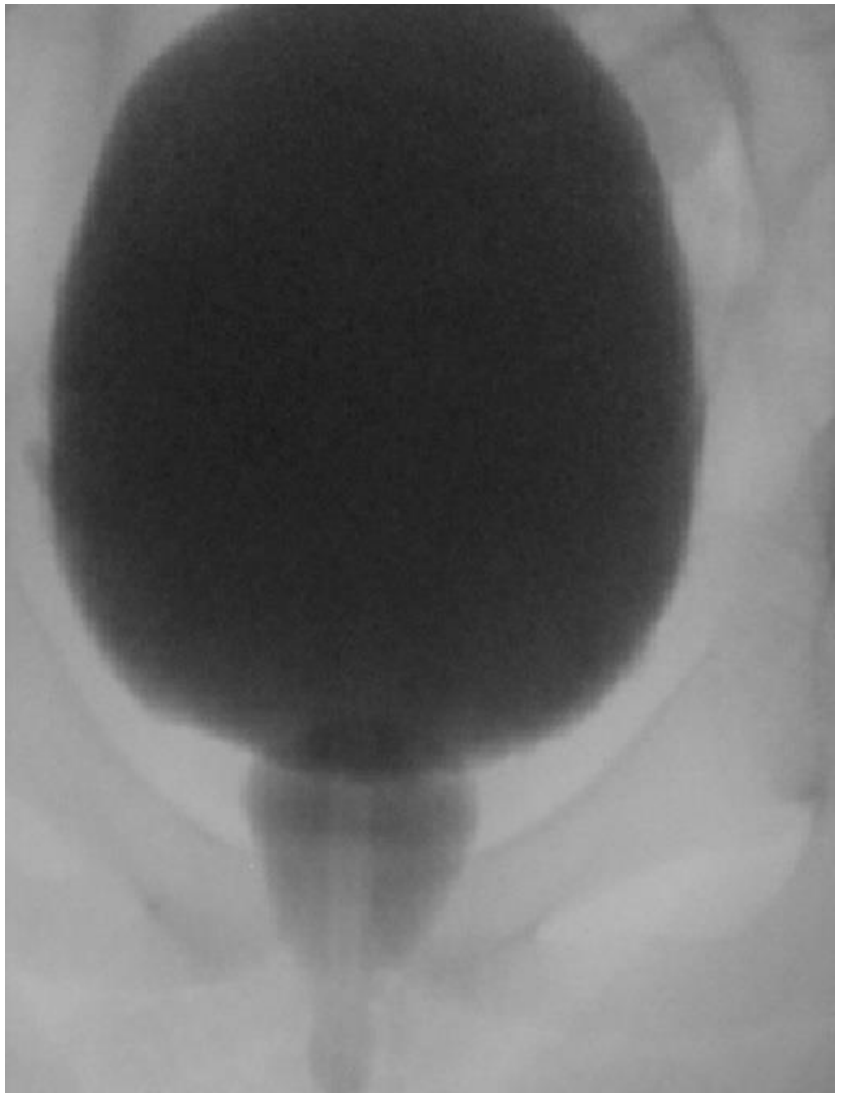


Dysfunctional voiding



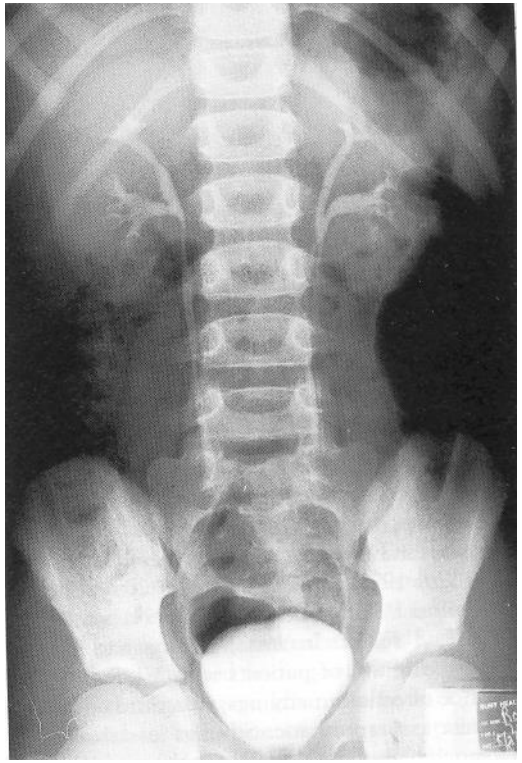


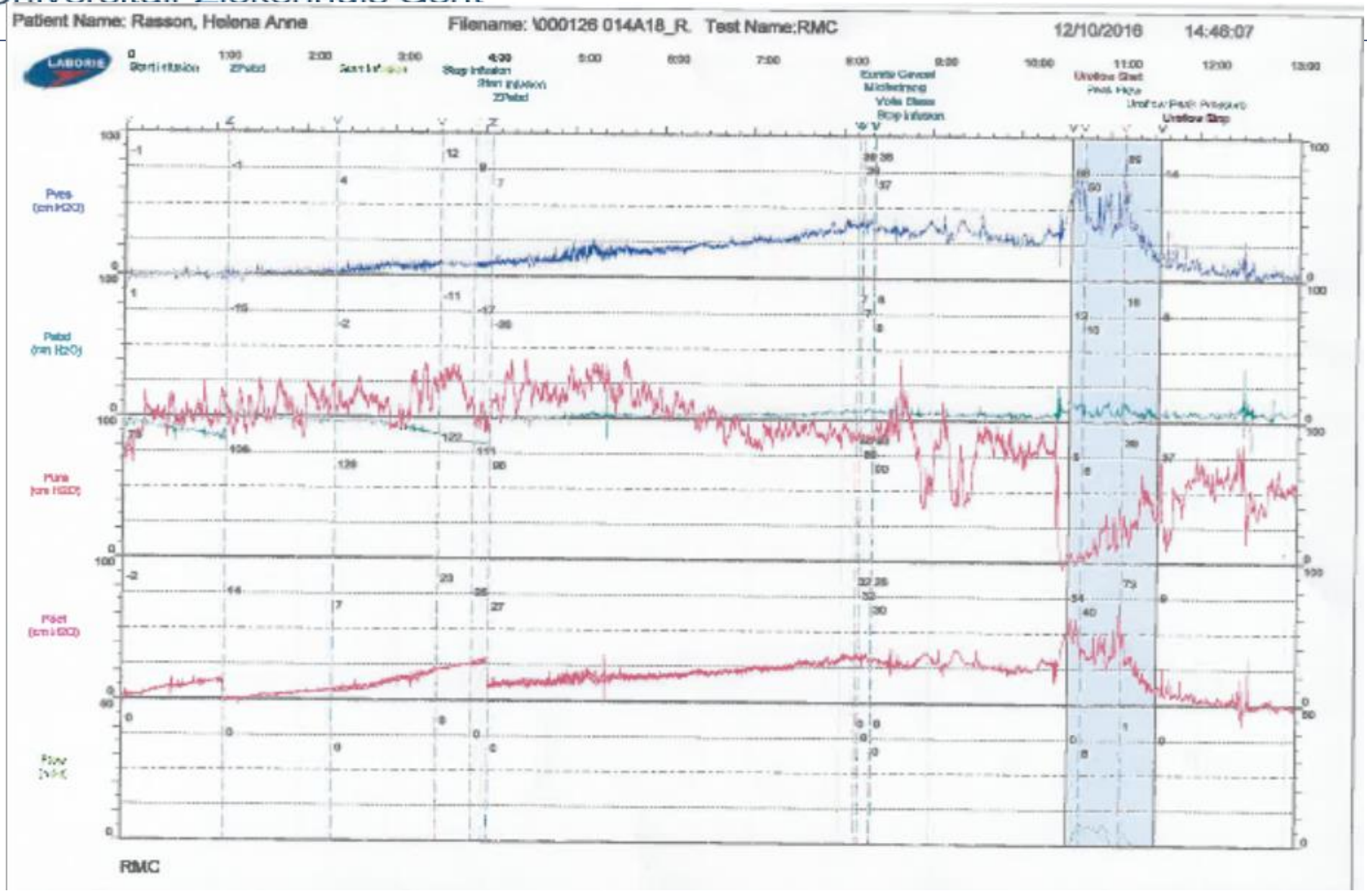
Vaginal voiding



Spinning top urethra

Vesico-ureteral reflux




Patient Name: Rasson, Helena Anne
Filename: \000126 014A18_R
Test Name:RMC
12/10/2016
14:46:07
Pves
Pabd
Pura
Pdet
Flow
RMC

Video-urodynamics: Treatment

- **Kine**
- **Medicamenteus: Anticholinergica – alpha blokkers**
- **Chirurgisch: obstructie (prostaat- strictuur- blaas augmentatie)**
- **Sondage**

Thank You !


The Urologist's favourite
keyboard short cut
P
Esc
Tv
Capslock
Ctrl
Abū Ilzjās
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