

Are there «alternative» exercises to PFMT for female SUI & POP?

POGP, Liverpool-2016

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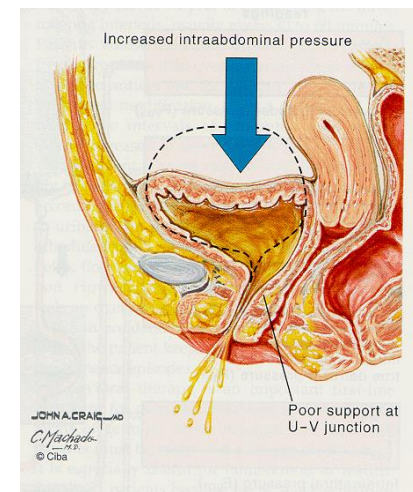
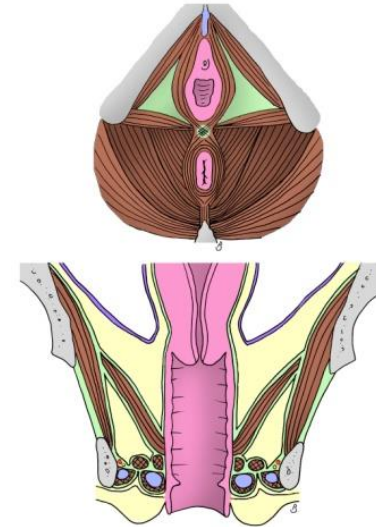
**Dept of Obstetrics &
Gynecology**



WHY PFMT?

During **voluntary** PFM contraction

- Levator hiatus constriction (urethra, vagina, anus) **25%** (Brækken et al -09)
- ↑ **MUCP: 11.1 (10.7)-23.2 (8.4) cm H₂O** (Miller et al-04, Bø & Talseth -97)
- Muscle length: **21%** shortening (Brækken et al -09)
- Forward and upward movement: **1 cm** (Bø et al 2001, Brækken et al 2008)
- Resistance to downward movement
- Inhibition of detrusor contraction



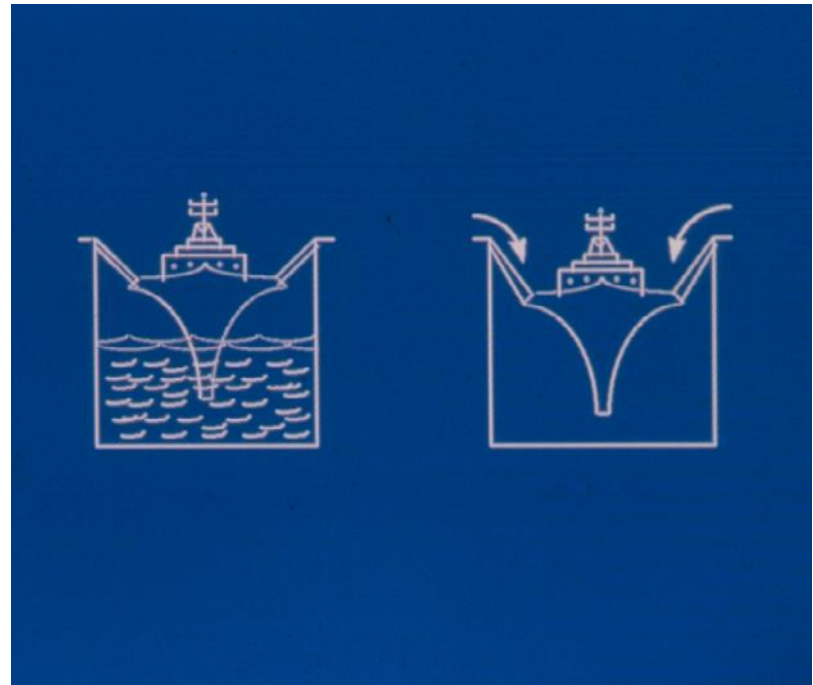
The "Knack" Miller et al 1998

- 27 women. Mean age 68.4 (5.5) years with mild to moderate SUI
- 1 week of voluntary PFM contraction before and during cough
- Results:
Reduced urine loss from medium/ deep cough by average 98% and 73%



Optimal function of the PFM?

- Form a **structural support** (location, cross sectional area, stiffness)
- Give quick and strong **unconscious** co-contraction before/during increase in abdominal pressure
- Prevent descent of internal organs during increase in intra-abdominal pressure
- Relax before and during voiding/defecation



Aim of strength training for the PFM

- Increase MUCP
- Increase structural support
 - Constrict levator hiatus
 - Reduce muscle length
 - Hypertrophy of muscle
 - Build firm muscle & connective tissue
- Automatic function



Morphological changes Brækken et al,

Obstet Gynecol -10

- **RCT (n=109) Diff between PFMT and control**
- ↑Muscle thickness: 1.9 mm (95% CI: 1.1-2.7) **15.6%**
- ↓Hiatal area: 1.8 cm² (95% CI: 0.4-3.1) **6.3%**
- ↓Muscle length: 6.1 mm (95% CI: 1.5-10.7) **4.2%**
- ↑Pos bladder neck: 4.3 mm (95% CI: 2.1-6.5)
- ↑Pos rectal amp: 6.7 mm (95% CI: 2.2-11.8)

- ↓Hiatal area and muscle length during straining, indicating automatic function and increased PFM stiffness?

Evidence for different methods of PFMT

ICI -09, -13, Cochrane -01, -11,-12

- PFMT

- Alone

level A

- With resistance device

no add. effect

- With vaginal cones

" "

- With biofeedback

" "

- Electrical stimulation

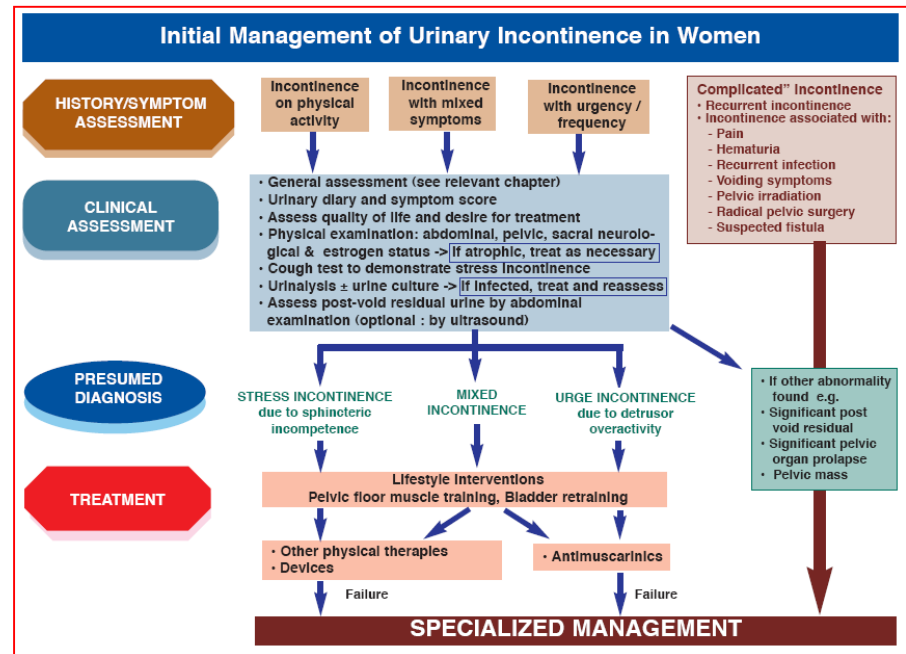
?

- Combination

no add. effect

Consistent and clear consensus & recommendations for SUI/MUI

- US Clinical Practice Guideline-96 **First line**
- Cochrane Library
 - > 80 RCTs
 - Hay- Smith et al-09, Herbison & Dean-09, Dumoulin & Hay- Smith-10, Herderschee-11, Hay-Smith et al -11 **First line**
- NCC-WCH -06: Level A: High quality studies. Supervised PFMT for at least 3 months **First line**
- Imamura et al -10: **First line**
- ALL ICI including-16: Level 1, Grade A: **First line**



“Alternative” exercises to PFMT?



New model for PFM-training

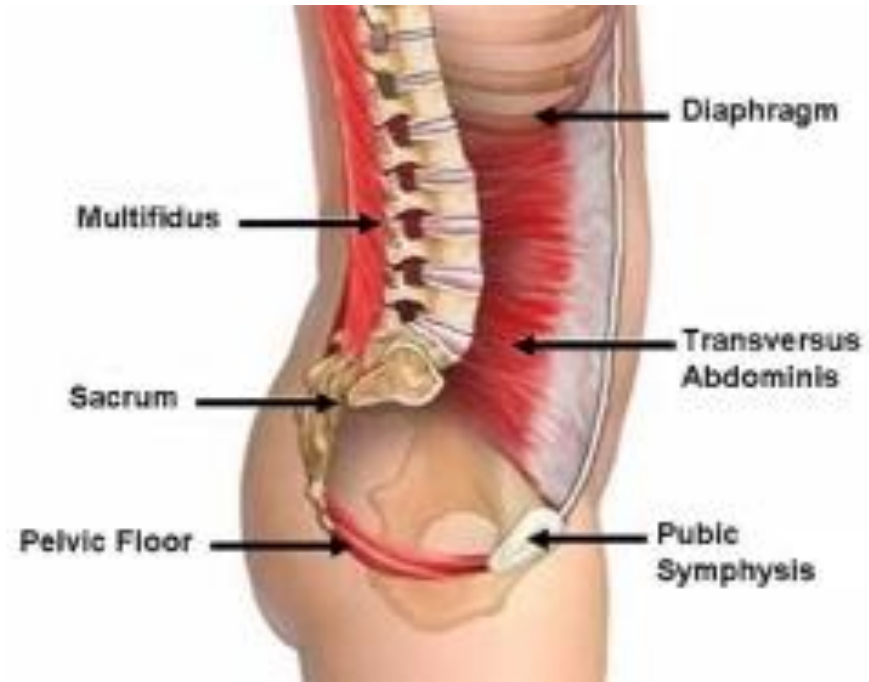
Sapsford: Physiotherapy 2001, Manual Therapy 2004

- "Abdominal muscle training to rehabilitate the PFM may be useful in treating urinary and fecal incontinence"

Sapsford & Hodges -01

- "The findings of this study indicate that exercise of the abdominal muscles may be beneficial in maintaining PFM coordination, support, endurance and strength"

Sapsford & Hodges-01



PFMT versus PFMT + TrA

Dumoulin et al, Obstet Gynecol 2004

- Single blind RCT at least 3 months postpartum, 8 weeks intervention, once a week with PT, 5 days a week at home
 - A: PFMT + el.stim, n= 20
 - B: A + TrA, n= 23
 - C: Control (massage!), n= 19
- Results:
 - 70% cure rate in both treatment groups. No cure in control, but improved QoL (disease specific)
 - no additional effect of adding TrA to PFMT

Retraining diaphragmatic, deep abdominal and PFM co-ordinated function” Hung et al 2010

- Single blind RCT. History of SUI or MUI, 4 month intervention **following vaginal palpation**
 - Alternative: 8 visits with PT: diaphragmatic breathing, tonic activation of TrA and PFM, muscle strengthening of TrA/ PFM/ IO, functional expiratory patterns like coughing /sneezing, impact activities such as jumping and running
 - PFMT: Oral instruction and usual information on UI, PFMT and bladder hygiene

Results

Hung et al 2010

- Sign more patients subjectively cured/improved in "alternative" group
- No difference change in pad test, number of voids, number of leaks, PFM strength (vaginal squeeze pressure)
- Sign diff between groups at post-test in "number of activities affected" and "avoiding activity due to needing a toilet"

Limitations Hung et al 2010

- Significantly more with urgency in "alternative" group
- Amount of leakage and numbers of leaks at baseline: **mean 0 g and 0!**
- "Alternative" includes PFM contractions
- PFMT is far from optimal
- Huge difference in dosage and attention
- Conclude that this is promising for **those who cannot accept palpation!!!?**

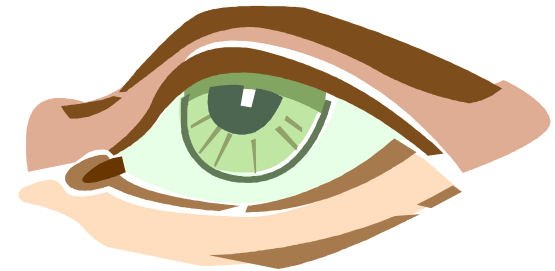
Additional effect of adding abdominal training to PFMT? Sriboonreung et al-09

- 68 women with SUI
- Randomized to 12 weeks of:
 - 1. PFMT every day
 - 2. PFMT 3 days/week
 - 3. PFMT + abdominal training 3 days/week
- Results
 - No difference in pad test or satisfaction

“Paula method of circular muscle exercises”

Liebergall-Wischnitzer -05, -09

- Theory: activity of distant sphincters affects other muscles
- Method: Single blind RCT, 59 women with SUI or MUI
 - Paula: Individual 45 min/weekly including PFMT, daily 15-45 min at home for **12 weeks**
 - PFMT: group training 30 min/weekly for **4 weeks**, daily 15 min at home, phoned by PT every second week



“Paula method” results

- RCT, 63 women with SUI and MUI
 - Both groups sign reduction in pad test: Paula: mean 5.4g (95% CI:2.08-8.65, p=0.002)
 - No change in PFM strength (manometry)
 - QoL ↑ 8.6 points out of 110, p=0.02 in Paula only
 - No comparison between groups Liebergall-Wischnitzer -05
- RCT, 240 with SUI: Paula or PFMT
 - No sign diff in pad test, QoL
 - Number with <1 g: 65.2% in Paula, 50% in PFMT, p=0.04 Liebergall-Wischnitzer -09
- LIMITATIONS
 - Protocol difference, dosage + attention
 - Paula includes PFMT
 - Drop out 21.4% in PFMT, 31.7% in Paula

Can the "Paula method" facilitate PFM contraction?

- Experimental study with 4D perineal ultrasound, power calculation Bø et al -11
 - 17 pregnant or postpartum women
 - Results
 - Sign reduction of LH area and muscle length only after PFM contraction
 - Conclusion: No facilitation of PFM during constriction of the mouth
- Experimental study with surface EMG Resende et al-11
 - 34 healthy nulliparous women
 - Results
 - No activation during Paula
 - No additional effect of adding Paula to PFM
 - Conclusion: No activation during Paula

Pilates

Culligan et al 2010

- Following **vaginal palpation and assessment of PFM strength**: 1- h individual sessions twice weekly for 12 weeks
 - Pilates including instruction of PFM contraction
 - PFMT including biofeedback, vaginal manipulation, massage, neuromuscular re-education, manual therapy focusing strictly on the pelvic floor (!?)
- Results: no difference in change of PFM strength 6.2 (SD 7.5) versus 6.6 (SD 7.4) cm H₂O or PFM dysfunction
- Conclusion: results are encouraging and may eventually lead to widespread use of Pilates-based exercise programs to treat and prevent pelvic floor dysfunction (**how many ?**)
- RCT comparing Pilates with and without PFM contraction
 - Significant better strength and CSA in Pilates + voluntary contraction Torelli et al-16

Other studies on Pilates

- 26% of Pilates and yoga instructors report UI Bø et al-11
- Pilates and Yoga exercise without PFM precontraction descended bladder neck of 0-17 mm, 50% descended also with precontraction Baessler & Junginger -10
- 30 sedentary women compared with 30 Pilates exercisers: no difference in PFM strength Ferla et al-16
- Pilates exercise low increase in IAP in 20 healthy females during 11 exercises Calman et al-15



General fitness activities?

- Physically active women report less UI (Milsom et al-08)
 - Selection bias
 - Are they dry because they exercise or exercise because they are dry?
 - Effect via weight reduction?



Two opposite hypotheses on exercise and the PFM

Bø, Sports Med 2004

- General exercise training strengthens the PFM and decreases the levator hiatus
 - ↓UI, FI and POP?
 - Negative influence on vaginal delivery?
- General exercise training overloads, stretches and weakens the pelvic floor
 - ↑UI, FI and POP?



UI in female athletes

- **28%** varsity athletes Nygaard et al -94
- **41%/16%** elite athletes Bø & Sundgot- Borgen -01
- **52%** athletes and dancers Thyssen et al -02
- **80% /51%** of trampolinists Eliasson et al -02/05:
- **28%** athletes, 9.8 in physically active controls, 9.8% in sedentary Caylet et al-06
- **31%** elite athletes, 18% controls Vitton et al-11



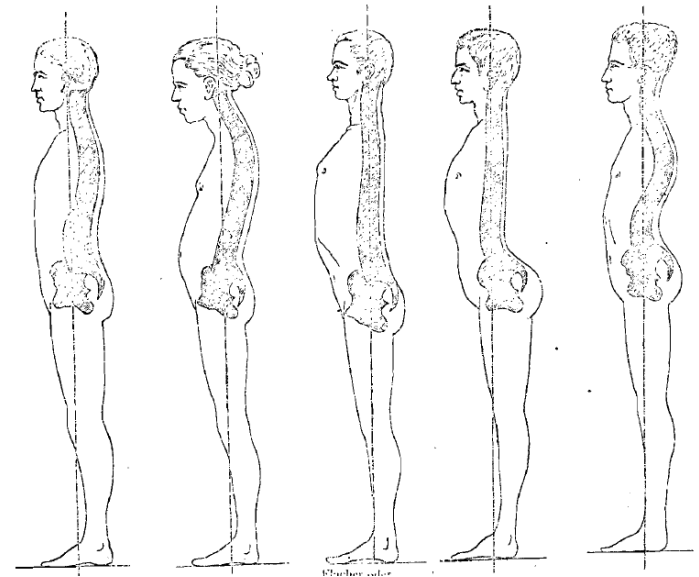
Take a deep breath!?

- Increased PFM EMG activity in expiration
(n=7) Hodges et al-07
- Pos correlation PFM strength & forced expiratory flow, CS study
Talasz et al-10
- Disorders of breathing & continence associated with LBP Smith et al -06, -09
- Meaning what?
- No change in IAP with holding/ exhaling during abdominal or other exercise O'Dell -07



Improve your posture!

- «Poor posture can lead to dysfunction of the pelvic floor» Carriere -06
- «Non-optimal strategies for posture, movement and/or breathing create failed load transfer which can lead to UI» Lee et al-08
- «Global postural re-education», better results than PFMT Fozzatti et al -10
 - non-randomized
 - different dosage & attention



Staffel 1889

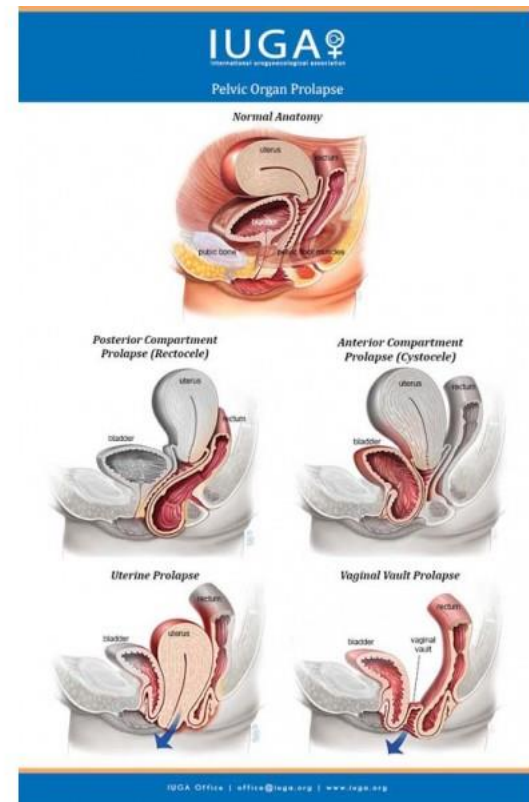
Is balance impaired in women with SUI?

- 16 women with SUI, 13 without (Smith et al-08)
 - Force platform. Center of pressure (COP). Surface EMG of PFM, abd, erector spina
- Results
 - Women with SUI greater COP displacement and ↑trunk muscle EMG
- 12 women with/18 without POP (Jacomio et al-14)
- Results:
 - no difference COP
- Meaning what?
Causative?
 - Can balance training cure SUI? **Need RCT**



Treatment options for POP

- Watchful waiting for 5 years [Miedel et al 2011](#)
 - 47% unchanged POP-Q stage
 - 40% regression
 - 13% progression
- Pessary:
 - Level of evidence: 2B [Cundiff et al 2007](#)
- Surgery:
 - Only comparison of surgical methods
 - Level of evidence: 1-4, A-D [Brubaker et al, ICI 2009](#)
- PFMT
 - Level of evidence: 1A [Moore et al, ICI, 2013](#)



11 RCTs on PFMT to treat POP



- Piya-Anant -03
- Ghrobi -08
- Hagen -09
- Brækken -10
- Stupp -11
- Kashyap -13
- Frawley -12
- Hagen -14
- Wiegersma -14
- Alves-15
- Due-16

■ Results

- Typically lift of one stage
- Improved symptoms
- Effect on co-morbidity

- ***No complications/
side effects!***

Hypopressive exercise?



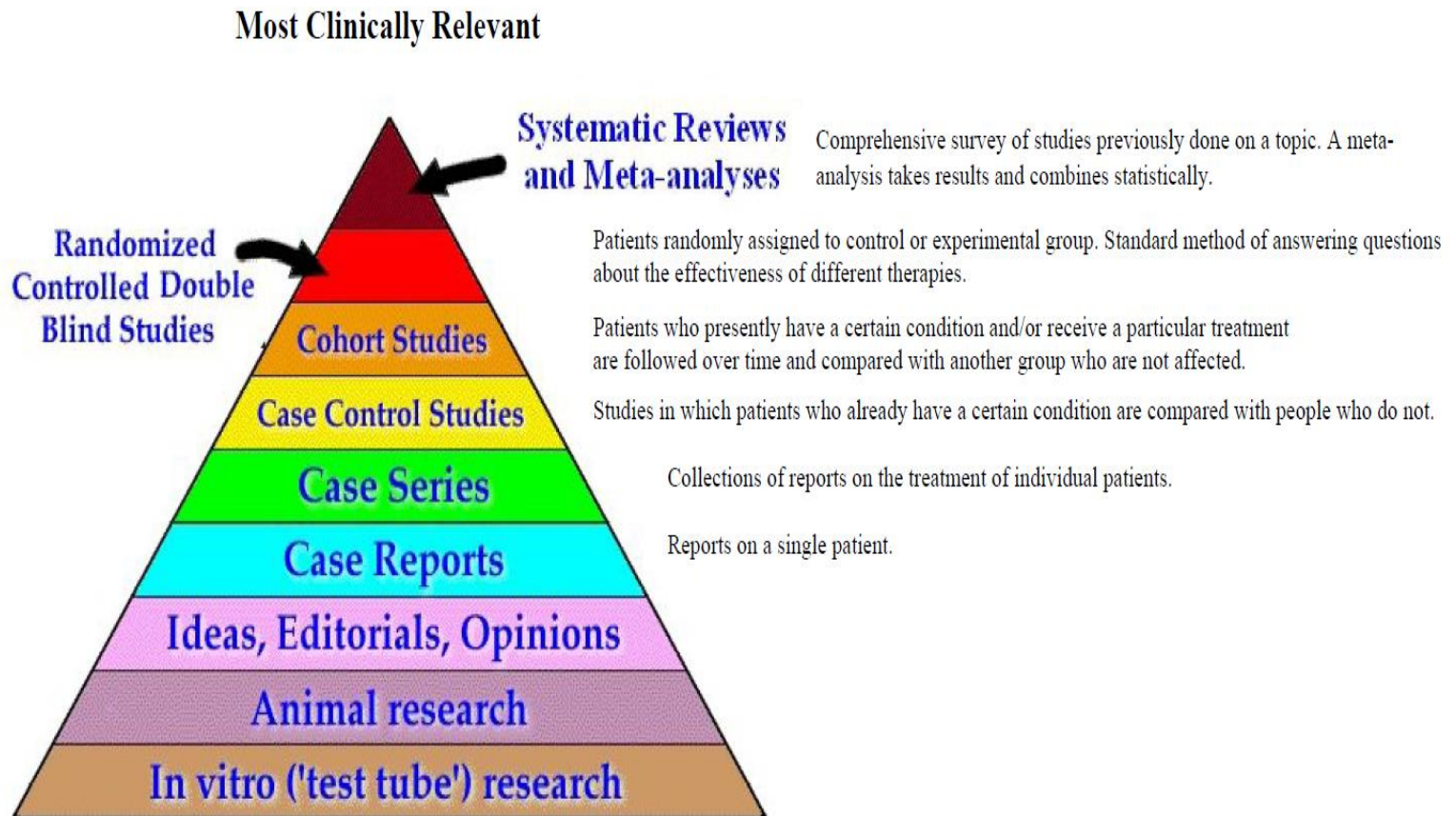
Hypopressive Technique

- 36 nullipara PTs assessed with surface EMG
 - HT sign less effective than PFM
 - HT + PFM not diff from PFM alone
 - HT activated TrA more than PFM, but adding PFM to HT sign increased TrA Stupp et al-11
- Single blind RCT: 58 women with POP stage II randomised to PFMT, PFMT +HT or C (lifestyle only)
 - No effect of adding HT regarding PFM strength, endurance or CSA Resende et al -12, Bernardes et al -12

When and how should new therapies become clinical practice?

Bø & Herbert Physiotherapy, 2009

EBM Evidence Pyramid



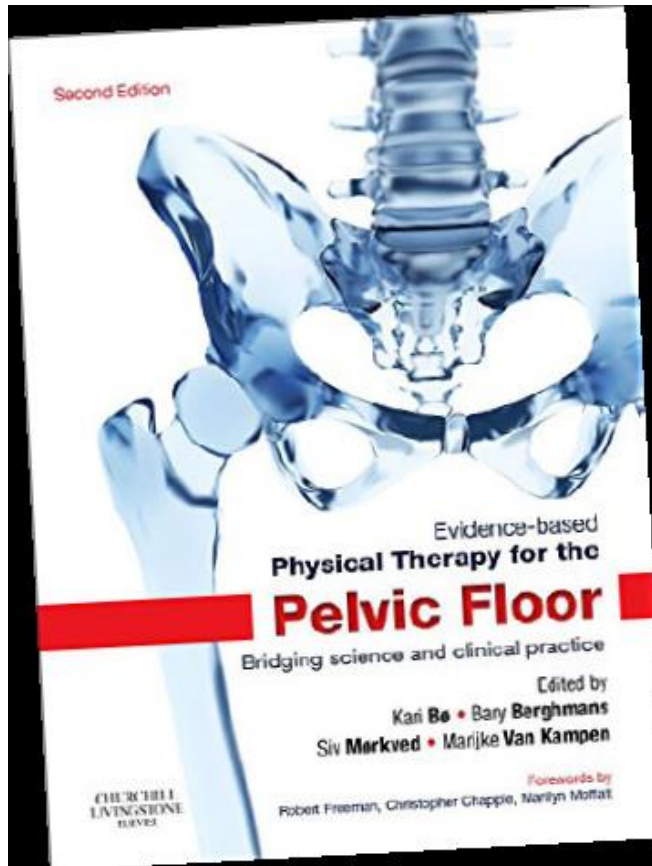
Protocol for implementation of new therapies

Bø & Herbert, Physiotherapy-09

1. Clin obs/lab studies
 2. Clin exploration
 3. Pilot studies
 4. RCTs
 5. Refinement
(additional RCTs,
dose – response)
 6. Active dissemination
(courses, pragmatic studies)
- Development phase
- Testing phase
- Implementation phase

How does PFMT work?

Bø, Int Urogyn J - 04, Elsevier-07, -15



- Conscious pre-contraction before and under increase in abdominal pressure (the "KNACK")
 - EVIDENCE!
- "Functional" training
 - NO EVIDENCE, BUT COMMON IN PT PRACTICE?
- Strength training
 - STRONGEST EVIDENCE!
- Indirect training of the TrA?
 - NO EVIDENCE, BUT *some* PTs LOVE IT!
- "Alternative exercise"
 - NO EVIDENCE

Thank you for your attention!