



## Exercise programs for the pelvic floor – evidence for an optimal program?


ICS Barcelona PT-Roundtable 2013

**Kari Bø**  
 Professor, PhD  
 PT, Exercise Scientist

Norwegian School of Sport Sciences  
 Dept of Sports Medicine

Akershus University Hospital  
 Dept of Obstetrics & Gynecology


Kari Bø

Affiliations to disclose:

Funding for speaker to attend:  
Enter X in appropriate box



Self-funded

Institution (non-industry) funded

Sponsored by company:


## Pelvic floor rehabilitation

- Pelvic floor muscle training
  - With or without biofeedback
  - With or without adjuncts such as cones, resistance devices etc
- Electrical stimulation

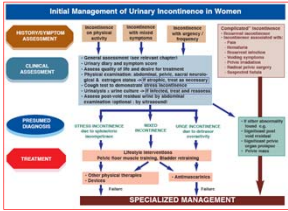
## Effect of PFMT: Kegel, LA, USA 1947

- Genital relaxation after childbirth
  - Nerve injury
  - Overstretching of muscles
  - Tearing of fascias
- Method: "tightening" of PFM
- Results: 84% "complete relief"





## Consistent consensus & recommendations for PFMT on SUI

- US Clinical Practice Guideline-96 **First line**
- Cochrane Library
  - > 60 RCTs
  - Hay- Smith et al-09, Herbison & Dean-09, Dumoulin & Hay- Smith-10, Henderschee-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, included-13: Level 1, Grade A: **First line**



## Problems with systematic reviews / meta-analysis

- Heterogeneity
  - Populations
  - Outcome measures
  - Diagnosis
    - SUI, Mixed, Urge?
  - **INTERVENTION: dose-response issues**
    - Type of exercise
    - Frequency
    - Intensity
    - Duration
    - Adherence

## PFMT versus no /inactive control treatment

Dumoulin & Hay-Smith, Cochrane 2010

- 14 RCTs or quasi in 836 women with SUI, UUI or MUI
- Results
  - More likely to be cured/ improved
  - Better QoL
  - Fewer UI episodes and less UI
- ↑ effect in SUI and with supervised training



## Can PFMT cure (pad test) SUI?

- Henalla et al 1989: 65% cured/ >50% reduc
- Bø et al 1990: 60% positive UCP
- Henalla et al 1990: 50% cured/ >50% reduc
- Ramsay et al 1996: 70/77% cured
- Glavind et al 1996: 58% cured
- Wong et al 1997: 55% cured
- Bø et al 1999: 44% cured
- Aksac et al 2003: 75/80% cured
- Mørkved et al 2001: 69/50%, 67/65% cured
- Dumoulin et al 2004: 70/70/0% cured
- Felicissimo et al-2010: 37/35% cured

## Different approaches for PFMT for UI?

Hay-Smith et al, Cochrane 2011

- 21 RCTs or quasi with 1490 women
- Results
  - 90% with combined group and individual supervision reported improvement vs 57% in those with individual only
- Insufficient evidence to make any strong recommendations; **weekly visits!**



## RCT on the effect of two different PFM training programs for urodynamic SUI

Bø et al -90

- 52 women with clinically and urodynamically proven GSI
- Mean age 45.9 years (24-64)
- Duration of symptoms: 11.7 years (1-35)
- 49 parous, 14 postmenopausal
- 5 previous surgery for SUI



## RCT on two degrees of PFM training

Bø et al 1990

- Home training + intensive training with PT once a week (n=23)
- 52 women
  - Home training (n=29)

## RCT on two degrees of PFM training programs

Bø et al-90

- "Home" training
  - Individual education anatomy/physiology
  - Vaginal palpation, observation, strength measurement
  - 8-12 contr. X 3 / day, hold 6-8 sec., **DIARY**
  - Motivation, measurement of PFM strength **once a month (7 visits with PT)**

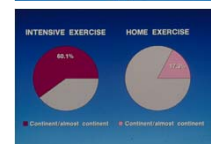
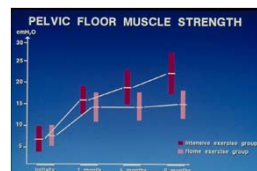


## RCT on two degrees of PFM training programs Bø et al -90

- "Intensive training"
  - Whole "home" training program
  - 45 min PFM exercise class once a week
    - Positions with legs apart
    - Strong verbal motivation for maximum contraction
    - 3-4 fast contr. on top of each sustained contr. (intensive contraction)
    - Strength training of back/abdominal, relaxation, stretching, ergonomics



## RCT on two degrees of PFM training Bø et al 1990

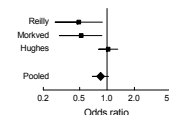
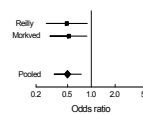


## More is better than less...

- Bø et al -90
- Nygaard et al -96
- Glavind et al -96
- Wong et al -97
- Gallo et al -97 (only adherence)
- Goode et al -03
- Sugoya et al -03 (motivational device)
- Zanetti et al -07
- Konstantinidou et al -07

## Antenatal PFMT: yes or no?

Herbert & Bø, BMJ 2005



## Antenatal preventive PFMT Hughes et al 2001

- 1169 primiparous women, r:
  - one session of PT
  - control
- Results:
  - 68% response rate at 6 months postpartum
  - >60% SUI, >45% urge antenatally
  - No difference between groups
- Conclusion: no effect of PFMT antenatally
- MY conclusion: no effect of **ONE SESSION OF PFMT** antenatally

## Biofeedback?



## Feedback Shumway-Cook & Woollacott 1995

All the sensory information that is available as the result of a movement that a person has produced

- **intrinsic:** from the person
- **extrinsic:** from the outside (therapist) concurrent or terminal palpation & observation of PFM

## Biofeedback:

- A group of experimental procedures where an **external sensor** is used to give an indication on bodily processes, usually in purpose of changing the measured quality

Schwartz & Beatly 1977

## "Biofeedback" is not a treatment!

- It is a response to a treatment
- The actual treatment has to be specified

## Results of RCTs on biofeedback for SUI

Herderschee et al -11, Cochrane review

- 24 trials, 17 contributed to analysis
- Conclusion: *may* provide benefit in addition to PFMT
- Problems with dose response issues
  - Studies finding effect of biofeedback also are training more/have more attention than the comparison PFMT group



## Glavind et al 1996

- 40 women with SUI
  - "physiotherapy" = 2-3 times
  - "physiotherapy" & biofeedback (2-3 times) + (4 times)
- Outcome: pad test/ questionnaire
- Results: 6 drop outs (5/1)  
Sign. better results with biofeedback (2-3/7)

## Cones

- Position/placement
- Contraction of gluteal, hip adductor and external rotators

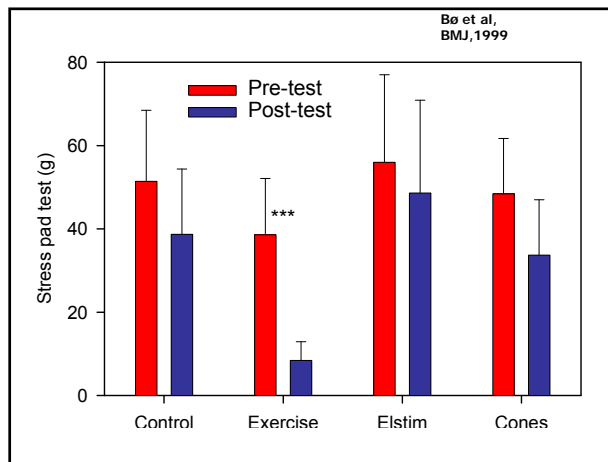
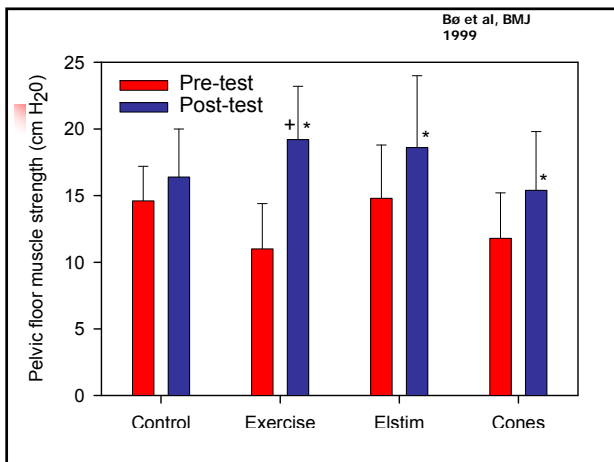


### RCT's on cones Herbison & Dean 2009

- 17 controlled studies with 1484 women
- 6 of 17 abstracts only
- Results:
  - Better than no treatment
  - Little evidence on difference between cones and PFMT alone or el.stim
  - Little evidence for adding cones to PFMT
- Conclusion
  - Some evidence that cones are more effective than no treatment
  - Problems with drop out and adherence
  - Can be offered as treatment option to women who find it acceptable

### Evidence for different methods of PFMT ICI -13

- PFMT
  - Alone level A
  - With resistance device no add. effect
  - With vaginal cones " "
  - With biofeedback (?) " "
- Electrical stimulation ?
- Combination no add. effect



### Conscious contraction before and during coughing

- "The KNACK"
- "Instant control"



### 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%



## Ability to contract PFM correctly

- >30% not able to contract (Benvenuti et al 1987, Bø et al 1988, Hesse et al 1990)
- Only 49% increased urethral pressure during contraction (Bump et al 1991)
- 25% were straining instead of contracting (Bump et al 1991)



## "The Knack"

- Strength of the contraction??
- Dosage?
- Will practising "the Knack" increase strength and volume?
- Does it help in other situations?
- Does it become an automatic function?

## "Functional training"

- Conscious low load co-contraction during all daily activities where leakage may occur Carriere -04
- Motor learning
  - Cognitive phase
  - Associative
  - Autonomous Hodges -03



## Functional training ?

- Single task? The "Knack"
- Is it possible during multiple tasks?
- No basic studies, case-control studies or RCTs to support!
- Knowledge today that strength training does not need to be followed by "functional" training to be effective

## Strength training of the PFM

- Structural support
  - Lifting into higher anatomical location
  - Hypertrophy of muscles
  - "Stiffness" in connective tissue
- Closing of levator hiatus
- Automatic contraction?



## Morphological changes Brækken et al,

Obstet Gynecol -10

- RCT (n=109) Diff between exercise and control
- ↑Muscle thickness: 1.9 mm (95% CI: 1.1-2.7) 15.6%
- ↓Hiatal area: 1.8 cm<sup>2</sup> (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 valsalva, indicating increased PFM stiffness?



## PFM training protocols for SUI

- Only 4/36 RCTs described "skill training" (voluntary contraction during cough)
- Type of exercise: PFM
- Intensity?: 3-40 sec
- Repetitions: 8-12 x 3/day - >200
- Frequency: every day
- Duration: 6 weeks-6 months
- Adherence: few reports

## Can PFMT be taught in exercise classes?

- YES! Be et al-00, 99, Markwed et al -97, 03, Kim et al-07, -11, Konstantinidou et al-07, Felcissimo et al-10, Stafne et al -12
  - After individual instruction & follow-up
- Group versus individual: no diff Lamb et al -09, Camargo et al -09, Pereira et al-11
- Does it work without individual assessment?
  - No (high drop-out/low adherence) Be & Haakstad-10
  - Yes Spanish study-12



*Cost-effective, motivating, social, additional exercise & health promotion*

## Recommendations for effective strength training Pollock et al, ACSM -98, ACSM -06, Haskel -07, Garber et al-11

- specificity
- 8-12 slow velocity close to maximum contractions (fewer repetitions better to optimize strength and power)
- 3 sets / day
- 2-3 (4) days a week
- > 5/6 months



## ACSM 2011 Garber et al 2011, MSSE, 43,7:1334-59

- Frequency: 2-3 times/week with 48 hours rest between sessions
- Intensity
  - Endurance: <50% of 1 RM (light/mod)
  - Power: 20-50% of 1 RM (light for older)
  - Strength:
    - 40-50% of 1 RM for novice older adults and novice sedentary adult
    - 60-70% of 1 RM (mod/hard) for novice/intermediate exercises
    - ≥ 80% of 1 RM (hard/very hard for experience weight lifters)

## ACSM 2011 Garber et al 2011, MSSE, 43,7:1334-59

- Repetitions:
  - 10-15 reps for strength in novice, middle aged and older adults
  - 8-12 reps for strength and power
  - 15-20 reps for muscular endurance
- Sets:
  - Single sets for novice and older
  - 2-4 sets to improve strength and power
  - ≤ 2 sets for muscular endurance
- Rest: 2-3 min between sets

## Response to exercise training

- Genetics and hereditary factors
- Floor and ceiling effect: Untrained have the highest potential
- Physiological adaptations will occur



## Keys to success for PFMT to treat SUI

- Thorough individual assessment of correct contraction
- Information, feedback and motivation
- Teach precontraction before rise in IAP!
- Supervized individual *or* group training with encouragement of MVC
- Should there be follow-ups?
- Few visits with PT will be very costly in the long run if it is too little to make a worthwhile change!

