PFM Rehabilitation for Physical Therapists and Nurses
The Northeastern Section of the American Urological Association
November 1, 2013
Dr Beth Shelly PT, DPT, WCS, BCB PMD

Description - This 15 minutes lecture will provide information on the components of PFM strength, relaxation and coordination training for medical professionals.

Objectives
- Chose appropriate examination tools for PFM dysfunction
- List components of PFM strength training programs
- Describe PFM training principles used in patients with overactive PFM

PFM Rehabilitation
- Provided by medical professionals with training in the treatment of pelvic skeletal muscle dysfunction
- A part of the total treatment offered for urological dysfunction
- Categories and treatment
    - Underactive PFM - weakness = strength training
    - Overactive PFM - spasm = relaxation training
    - Dyssynergia / in-coordination - poor coordination and timing of PFM = coordination training
- An accurate assessment of the PFM is necessary to develop successful PFM training programs - do not prescribe exercise programs only based on the diagnosis
- Proper assessment of ability to contract the PFM is mandatory and affects the quality of interventions and the outcomes (Bo 2007)
- Exercise prescriptions are based on results of the PFM examination (Clinical guidelines 2004)

Evaluation of the PFM
- Vaginal / rectal palpation
    - Underactive PFM = manual muscle test
        - Some disagreement as to the reliability and reproducibly of muscle grading (absent, weak, moderate, strong) (Bo 2007, Messelink 2005)
        - Most experienced clinicians agree that digital palpation of the PFM contraction inside the vaginal canal is of great value in assessing the ability to perform a correct PFM contraction. (Bo 2007)
        - Vaginal palpation of the PFM contraction continues to be the gold standard for identifying a correct PFM contraction (Clinical guidelines 2004)
        - ICS terminology on PFM testing gives structure to the vaginal examination (Messelink 2005)
        - Moderate to substantial relaiblity in 10 out of 16 compents of the vaginal palpation assessment (Slieker-ten Hove 2009)

    - Overactive PFM
        - No simple inclusive test
        - Firmness and pain on palpation of the muscle should be further investigated
        - Tone scales have been proposed but poorly accepted (Lukban 2002)
- Pressure biofeedback
    - Valid and reproducible
    - Measures PFM closure pressure = underactive PFM
    - Not able to evaluate increased resting tone or spasm - not used in overactive PFM
- Surface electromyography (EMG)
    - Good reliability, reproducibility, and significant clinical predictive validity
    - Measures electrical activity of PFM with vaginal, rectal, or perianal sensors
    - Useful in identifying underactive, overactive, and dyssynergia of the PFM
    - Must have quality tracing especially for accurate assessment of overactive PFM
- Real time Imaging Ultrasound
    - Valid and reliable measurements
    - Measures PFM muscle thickness
    - Measures movement in response to PFM contraction and intra-abdominal pressure = underactive PFM
    - Measures lack of relaxation and poor timing of contraction = overactive PFM and dyssynergia

<u>Principles of training in patients with underactive PFM</u>

- Clinical application (Bo 2007)
    - A strong structural support (stiff pelvic floor) may prevent descent of the bladder neck and urethra
    - Increased PFM endurance seems to be related to decreases in UI
    - Closes the urethra during abrupt increases in intra-abdominal pressure with an well-timed, quick and strong PFM contraction
- Motor learning
    - Specificity: perform the correct contraction, search, find, learn, control
    - Overload: muscle must contract harder than it normally does in everyday activities, maximum intensity
    - Progression: individualized for ability and increased as able
    - Maintenance: program can be reduced but not terminated
- "It is no longer a question of whether PFM training programs work but what components and combinations thereof are most effective" (Dumoulin 2011, Choi 2007, Bo 2011)

<u>Components of PFM Strength Training Program</u>

- Feedback
    - Verbal instruction of PFM contraction has been shown to be ineffective in generating urethral closure force in 51% percent of patients (Bump 1991) and results in adverse bearing down in approximately 15% of patients (Bo 1988)
    - Need to provide some sort of feedback: vaginal palpation, EMG, pressure biofeedback, or imaging ultrasound
- Number of seconds contraction is held – 5 to 10 seconds (Schabrun 2011, Bo 1999)

- Amount of rest between contractions – 5 to 10 seconds, adequate rest is necessary for successful training (Schabrun 2011)
- Number of repetitions – gradually increase, at least 24 contractions per day (Choi 2007)
- Number of times repeated during the day – 2 to 3 sets per day especially if the muscle is very weak
- Patient position - supine, sitting, standing (Borello-France 2006)
- Intensity (Johnson 2001, Bo 1999)
- Resistive exercises - Vaginal weights – no significant benefit over PFM exercise alone (Herbison 2008, Bo 1999, Castro 2008)
- Frequency of visits - supervised PFM training more than 2 times per month is more effective (Dumoulin 2011)
- Group versus intensive / individual training - (Hay-Smith 2004, Janssen 2005, Bo 1990)
- Adherence – significant predictor of success (Alewijnse 2007, Dumoulin 2011)
- Length of training period – at least 6 to 8 weeks (Dinubile 1991, Choi 2007)
- Maintenance - one set of 8-12 intense contractions 2 to 7 times per week (Pollock 1998, Hayn 2000)

<u>Principles of PFM training in patients with overactive PFM</u>

- Aggressive PFM strengthening usually increases pain and dysfunction in patients with overactive PFM
- Relaxation or down training initially helps to restore normal muscle tone, increase circulation in the muscle and decrease pain
- Biofeedback to facilitate isolation of contraction/relaxation of PFM – with the focus on relaxation first can be helpful in decreasing overactive PFM and pain (Doggweilier-Wiygul 2004, Lubkan 2002, Bassotti 2004, Heah 1997)

<u>Possible treatments for Overactive PFM</u>

- General relaxation training - autosuggestion, visualization
- Diaphragmatic breathing
- Contract relax - combined with EMG relaxation training
- Perineal bulging
- Vaginal / rectal dilator insertion - combined with EMG training for more learning
- Manual therapy
    - Internal vaginal / rectal massage of the PFM
    - Treatment of sacroilliac or pubic symphysis joint dysfunction
- Modalities
    - Heat / ice
    - Electrical stimulation - TENS, intravaginal / intrarectal
    - Ultrasound
- Patient education
    - Posture
    - Skin care
    - Relaxation and stress management
    - Physiology of pain or urgency

Dyssynergia / in-coordination

- Co-contraction of PFM and Abdominal Muscles - Tranversus Abdominus contraction (Junginger 2010)
- Response of the PFM to intra-abdominal pressure - the Knack (Miller 1998)
- Paradoxical PFM contraction - obstructed defecation (Battaglia2004)
- Overflow /facilitation – adductors, abductors, external rotators of the hip (Dumoulin 2011, Culligan 2010)
- Synergy of the PFM and Respiration - contract on exhale and avoid bearing down (Miller 1998, Hodges 2007, Junginger 2010)

Resources for further learning in conservative management

International Continence Society – support and education for professionals in the field of continence http://www.icsoffice.org

Evidence-Based Physical Therapy for the Pelvic Floor: Bridging Science and Clinical Practice. Bo K, Berghmans B, Morkved S, Van Kampen M, eds. Philadelphia: Elsevier; 2007.

Therapeutic management of incontinence and pelvic pain.2nd edition.EdsHaslam J, Laycock J. Springer 2008

References

Alewijnse D, Mesters I, Metsemakers JFM, van den Borne B. Strategies to enhance adherence and reduce drop out in conservative treatment. In: Bo K, Berghmans B, Morkved S, Van Kampen M, eds. Evidence-Based Physical Therapy for the Pelvic Floor: Bridging Science and Clinical Practice. Philadelphia: Elsevier; 2007.

Battaglia E, et al. Long-term study on the effects of visual biofeedback and muscle training as a therapeutic modality in pelvic floor dyssynergia and slow-transit constipation. Dis Colon Rectum 2004;47(1):90-95.

Bassotti G, Chistolini F, Sietchiping-Nzepa F et al. Biofeedback for pelvic floor dysfunction in constipation 2004 BMJ 328(7436):393-396

Bo K, Talseth T, Holme I. Single blind, randomised controlled trial of pelvic floor exercises, electrical stimulation, vaginal cones, and no treatment in management of genuine stress incontinence in women BMJ 1999;318:487–93.

Bø K. Pelvic floor muscle training in treatment of female stress urinary incontinence, pelvic organ prolapse and sexual dysfunction.World J Urol. 2011 Oct 9. [Epub ahead of print]

Bo K, et al. Pelvic floor muscle exercise for the treatment of female stress urinary incontinence, 3: effect of two different degrees of pelvic floor muscle exercises. Neurourol and Urodynam 1990;9:489-502.

Bo K. Pelvic floor muscle training. In: Evidence-based Physical Therapy for the Pelvic Floor. Bo K, Berghmans B, Morkved S, Kampen MV (eds.). Philadelphia: Elsevier, 2007.

Bo K, Larsen S, Oseid S et al. Knowledge about and ability to perform correct pelvic floor muscle exercise in women with stress urinary incontinence. *Neurourol and Urodynam.* 1988;7(3):261-262.

Bo K, Sherburn M. Evaluation of female pelvic floor muscle function and strength. *PhysTher.* 2005;85:269-282.

Borello-France DF, Zycynski HM, Downey PA, Rause CR, Wister JA.Effect of pelvic-floor muscle exercise position on continence and quality-of-life outcomes in women with stress urinary incontinence.*PhysTher*. 2006;86:974-986

Bump RC, Hurt WG, Fantl A, Wyman JF. Assessment of Kegel pelvic muscle exercise performance after brief verbal instruction. *Am J of Obsteric and Gynecol.* 1991;165:322-329.

Castro RA, Arruda RM, Zanetti MRD, Santos PD, Sartori MFG, Girão MJBC. Single-Blind, Randomized, Controlled Trial of Pelvic Floor Muscle Training, Electrical Stimulation, Vaginal Cones, and No Active Treatment in the Management of Stress Urinary Incontinence. Clinics. 2008 August; 63(4): 465–472.

Choi H, Palmer MH, Park J. Meta-analysis of pelvic floor training: randomized controlled trials in incontinent women. *Nursing Research*.2007; 56: 226-234.

Clinical guidelines for physiotherapy management of females aged 16-65 years with stress urinary incontinence. 2004 The Chartered Society of Physiotherapy. London, UK.

Crotty K, etal. Investigation of optimal cues to instruction for pelvic floor muscle contraction: a pilot study using 2D ultrasound imaging in pre-menopausal, nulliparous, continent women. Neurourol and Urodynam 2011;30:1620-1626.

Culligan PJ, Scherer J, Dyer K, Priestley JL, Guingon-White G, Delvecchio D, Vangeli M. A randomized clinical trial comparing Pelvic Floor Muscle training to a Pilates exercise program for improving pelvic muscle strength IntUrogynecol J 2010;21:401-408.

Dinubile N. Strength Training.*Clinic in Sports Medicine*.1991; 10: 33-62.

Doggweiler-Wiygul R. Urologic myofascial pain syndromes. *Current Pain and Headache Reports* 2004;8:445-451.

Dumoulin C, Bourbonnais D, Morin M, Gravel D, Lemieux MC Predictors of success for physiotherapy treatment in women with persistent postpartum stress urinary incontinence. Arch Phys Med Rehabil 2010;91:1059-1063

Dumoulin C, Hay-Smith J. Pelvic floor muscle training versus no treatment for urinary incontinence in women: a Cochrane systematic review. *Eur J PhysRehabil Med*. 2008; 44: 47-63

Dumoulin C, Glazner C, Jenkinson D. Determining the optimal pelvic floor training regimen for women with stress urinary incontinence. Neurourol and Urodynam 2011;30:746-753.

Hayn MA, Gresco SJ, Capuano K, Byrnes A. Compliance with pelvic floor exercise program: maintaining bladder symptom relief. *UrolNurs*. 2002;20:129-131.

Hay-Smith EJ, et al. Pelvic floor muscle training for urinary incontinence in women. *Cochrane Database Syst Rev.* 2004;1:CD001407

Heah SM, Ho YH, Tan M, Leong AF. Biofeedback is effective treatment for levator ani syndrome. Dis Colon Rectum 1997;40:187–189.

Herbison, P; Dean, N. Weighted vaginal cones for urinary incontinence.*The Cochrane Review Library.*Cochrane Database of Systematic Reviews.2, 2008.

Hodges PW, Sapsford R, Pengel LHM. Postural and respiratory functions of the pelvic floor muscles.*Neurourol and Urodynam*. 2007;26(3):62-371.

Janssen CC, Lagro-Janssen AL, Felling AJ. The effects of physiotherapy for female urinary incontinence: individual compared with group treatment. BJU Int. 2001;87:201-6

Johnson VY. Effect of a submaximal exercise protocol to recondition the pelvic floor musculature.Nurs Res 2001;50:33-41.

Junginger B, Baessler K, Spasford R, Hodges PW: Effect of abdominal and pelvic floor tasks on muscle activity, abdominal pressure and bladder neck. IntUrogynecol J. 2010; 21: 69-77.

Messelink B, Benson T, Bergham B, Bo K, Corcos J, Fowler C, et al. Standardization of terminology of pelvic floor muscle function and dysfunction: report from the pelvic floor clinical assessment group of the International Continence Society. *NeurourolUrodyn*. 2005;24:374–380.

Miller JM, Ashton-Miller JA, Delancey JO. A pelvic muscle precontraction can reduce cough-related urine loss in selected women with mild SUI. *J Am Geriatr Soc.* 1998;46:870-874

Schabrun SM, Stafford RE, Hodges PW. Anal sphincter fatigue: is the mechanism peripheral or central? Neurourol and Urodynam 2011;30:1550-1556.

Shamliyan TA, Kane RL, Wyman J, Wilt TJ. Systematic Review: Randomized, Controlled Trials of Nonsurgical Treatments for Urinary Incontinence in Women. *Ann Intern Med.* 2008;148:459-473.

Slieker-ten Hove MCP, Pool-Goudzwaard AL, Eijkemans MJC, Steegers-Theunissen RPM, Burger CW, Vierhout ME. Face Validity and Reliability of the First Digital Assessment Scheme of Pelvic Floor Muscle Function Conform the New Standardized Terminology of the International Continence Society. *Neurourology and Urodynamics* 28:295–300 (2009)