"Incontinence doesn’t kill you – it just takes away your life."

Anonymous

Statistics...

- 85% of incontinent Americans are women, 15% men
- One-third of men and women ages 30-70 believe that incontinence is a normal part of aging
- Approximately 80% improve or are cured with pelvic floor muscle therapy alone or in combination with adjunctive therapies
- Moderate weight loss can improve bladder symptoms in overweight women. Loss of 5-10% of body weight can decrease incontinence episodes as much as 50-60%
Statistics...

- Women that undergo a hysterectomy have a 40% increased risk of urinary incontinence (Brown, 2000)
- 1/3 of all constipation is from a dysfunctional pelvic floor (Force, 2005; Markwell, 2003)
- Approximately 30% of men report urinary incontinence after radical prostatectomy (Pondier, et al., 1999)
- At least half of nursing home residents are incontinent of urine, and many experience bowel incontinence as well
- Over 50% of patients who are told to do “Kegels” do them incorrectly

National association for continence www.nafc.org

Facts...

- Failure to treat voiding and defecation dysfunction not only impairs quality of life, but also leads to more costly complications including falls, urinary tract infections, skin breakdown, prolonged acute care stays, and increased skilled nursing facility admissions.

SUNA / WOON/Continence Coalition, Pelvic Muscle Rehabilitation Using Biofeedback (Kane et al., 1994; Bergstrom, 1992; Kohn et al., 1991), (Baker et al., 1995), (Tromp et al., 1998), (Johansson et al., 1996; Tinetti et al., 1995; Haalboom et al., 1999).

Statistics...

- In 1995, according to Wagner and Hu, the total US expenditure for Urinary Incontinence alone for persons over 65 years of age was approximately $27.8 billion. This figure represents a 16.8% increase over 1984 estimates and exceeds the combined costs to Medicare of dialysis and coronary bypass surgery.

Urinary incontinence is associated with a 30% increase in functional decline, and a 2-fold increased risk of falls, depressive symptoms and nursing home placement (Holroyd-Leduc JM et al., 2004; Brown JS et al., 2000; Chiarelli PE, 2009; Thom DH et al., 1997; Johnson TM II et al., 2000; Nakanishi N et al., 1999).

Prevalence of constipation in the institutionalized elderly suggest as high as 50%, with 74% using daily laxatives. The elderly, often underestimate their stool frequency and may frequently plan their day around their bowel movements and treatments often precipitate loose stools and incontinence (HarariD, et al., 1994; Talley NJ, 2004; Primrose WR et al., 1987).

Many have the erroneous belief that incontinence is a normal part of aging and do not seek treatment. Shame and embarrassment of symptoms, think the symptoms are not worth mentioning or they do not want to be a bother, generational difference in attitudes about disclosure of personal matters, lack of knowledge of what healthcare has to offer them for symptom relief.
The pelvic floor

- Sling of muscles that supports the pelvic organs
- Attaches to bones of the front, back and sides of the lower pelvis
- Functions (4 S's):
  1. Sphincteric: to help control urination, bowel movements, and gas (sphincter around urethra and anal canal)
  2. Support: provides “shelf” to the bladder, uterus (in women) and rectum/colon
  3. Sexual
  4. Stabilization: works with the core musculature

The pelvic floor - female

The pelvic floor - male
Normal Bladder Function

- Bladder holds 2 cups of urine (400-600cc)
- Urinating 6-8 times per day or once every 2-5 hours
- 1st sensation to urinate when bladder is approximately half full (200-300 cc)
- Complete emptying of the bladder
- No leaking of urine at any time
- Waking 0-1 time during the night

Abnormal Bladder Function

- Urinate more frequently than every 2 hours
- Wake up more than once a night
- Difficulty making it to the toilet on time
- Leaking of urine with a strong urge
- Leaking of urine with coughing, sneezing, lifting, laughing, walking/running, squatting
- “Triggers” make you feel you can’t wait to get to the toilet (i.e. water running)

Abnormal Bladder Function (continued)

- Need to strain or push to pass urine
- Bladder feels somewhat full after urinating
- Difficulty starting the urine stream
- Urine stream starts and stops
Normal Events of Bladder Continence

- Bladder stores urine
- Bladder remains relaxed
- Sphincter and pelvic floor muscles squeeze

Transition stage
- Recognize signal of fullness (can ignore or go)
- To quiet, squeeze the sphincter and pelvic floor muscles

Emptying
- Bladder muscle squeezes
- Sphincter and pelvic floor muscles relax

Risk Factors/Causes of Dysfunction

- Organ dysfunction (prostate enlargement, hyper/hypoactive)
- Dietary irritants, smoking
- Broken pelvic bones
- Pelvic organ prolapse
- Obstetric/child birth injury
- Pelvic surgery (prostatectomy, hysterectomy)
- Adhesions
- Obesity
- Pelvic floor muscle weakness/coordination
- Cancer/cancer treatment
- Medications (anticholinergics in the elderly)
- Neurologic diagnosis
- Diabetes
- Cognitive impairment

Bladder and Bowel Dysfunction

<table>
<thead>
<tr>
<th>Bladder Storage Disorder</th>
<th>Bladder Voiding Disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>INCONTINENCE</td>
<td>RETENTION</td>
</tr>
<tr>
<td>Bowel Storage Disorder</td>
<td>Sowel Voiding Disorder</td>
</tr>
<tr>
<td>INCONTINENCE</td>
<td>CONSTIPATION</td>
</tr>
</tbody>
</table>
Pelvic Floor Muscle Dysfunction

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
<th>Symptoms</th>
<th>Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal PFM</td>
<td>PFM is able to contract and relax on command and in response to increased intra-abdominal pressure as appropriate</td>
<td>Normal urinary, bowel and sexual functioning</td>
<td>Strong or normal voluntary and involuntary contraction and complete relaxation</td>
</tr>
<tr>
<td>Underactive PFM</td>
<td>PFM is unable to contract when needed</td>
<td>Urinary or fecal incontinence, pelvic organ prolapse</td>
<td>Absent voluntary and involuntary PFM contraction</td>
</tr>
<tr>
<td>Overactive PFM</td>
<td>PFM is unable to relax and may contract during functions such as defecation or micturition</td>
<td>Obstructive voiding or defecation, dyspareunia</td>
<td>Absent voluntary PFM relaxation</td>
</tr>
<tr>
<td>Non-functioning PFM</td>
<td>No PFM action palpable</td>
<td>Any PFM symptom may be present</td>
<td>Non-contracting, non-relaxing PFM</td>
</tr>
</tbody>
</table>

Bladder and Bowel Dysfunction

- **Bladder Storage Disorder**
  - INCONTINENCE
  - RETENTION
- **Bowel Storage Disorder**
  - INCONTINENCE
  - CONSTIPATION

Types of Incontinence

- Stress
- Urge
- Mixed
- Overflow
- Functional
- Neurogenic Bladder
Stress Incontinence
- Leaking of urine with activity or physical exertion that causes increase intra-abdominal pressure
- Due to weakness of **pelvic floor muscles**

Urge Incontinence
- Strong urge to urinate that may or may not cause urinary leakage
- Often accompanied by increased frequency (>8 bathroom visits in 24 hours) and feeling of "small" bladder
- "Triggers" signal urge
- Same as "overactive bladder"
  - Bladder "squeezes" when you don't want it to
Mixed Incontinence
- Combination of stress and urge
- Most women have components of both
- Men rarely have stress incontinence except in the case of prostate removal

Overflow Incontinence
- Loss of a small amount of urine when the bladder becomes overfilled
- Reduced/slow/hesitant urine stream from possible obstruction
- Bladder still feels full due to decreased bladder strength to "squeeze" and empty

Functional Incontinence
- Loss of urine due to decreased ability to reach the toilet in time due to leg weakness, arthritis/pain, balance difficulties or inability to move without assist etc.
Neurogenic Bladder

- The bladder does not empty properly due to a neurological condition.

  - Overactive bladder symptoms (spastic bladder):
    - Having to urinate too often and in small amounts
  - Underactive bladder symptoms (flaccid bladder):
    - Bladder becomes too full and you leak urine (overflow incontinence)
    - Problems starting to urinate or emptying all the urine from the bladder (urinary retention)
    - Unable to tell when the bladder is full

Prolapse

- Dropping of the bladder, uterus, rectum, or all of the above
- Physiologically caused by weakening of the pelvic tissues/muscles
- Causes: chronic coughing, chronic constipation and heavy lifting
- May cause heaviness, feeling of falling out, pressure in the pelvis, back, tailbone, or back pain
- Worse in evening, especially in upright
- Symptoms may include:
  - Urinary incontinence, urgency, frequency
  - Dribbling after urination, not emptying bladder completely
  - Straining for or incomplete bowel movement
  - Pessaries
  - Estrogen creams

Prolapse and pelvic floor exercises

- A randomized controlled trial of pelvic floor muscle training for stages I and II pelvic organ prolapse reveals intervention women (Hagen, S et al. (2008)):
  - Had significantly greater improvement than controls in prolapse symptoms
  - Were significantly more likely to have improved prolapse stage
  - Were significantly more likely to say their prolapse was better
Long term efficacy in older women

- Pelvic floor muscle rehabilitation for urinary incontinence remains highly effective for up to five years in older women (27.5% improved, 57.5% stable, 12% declined).
- Most women (72.5%) continued the home program five years after therapy was completed; these patients all in the improved and stable categories.
- Only 45.5% of the non-adherent patients were in the improved or stable categories (Simard & Tu, 2010).

PFME (Pelvic floor muscle exercise) vs Behavioral training

- In an assessor-blinded randomized controlled trial of 83 older community dwelling women (65 and older) comparing pelvic floor muscle training to behavioral training reveals:
  - Both groups improved however the pelvic floor muscle training group reported significantly lower amounts of leakage, improved symptoms, and greater perception of change.
  - Behavioral training consisted of: education on normal bladder control, skin care, fluids, toileting position, relaxation (no pelvic floor exercise instruction) (Sherburn, M et al. 2011).

Prostate

- The urethra is surrounded by the prostate gland (normal being the size of a walnut).
- Obstruction can result when the gland enlarges.
- 75% of men over the age of 50 have benign prostatic hypertrophy (BPH).
- Symptoms may include:
  - Hesitant, weak or starting and stopping urine stream
  - Dribbling after urination
  - Overflow incontinence
  - Straining to void
  - Urgency/frequency daytime, nocturia (excessive nighttime voids)
  - Urine still left in the bladder after voiding
  - Bladder infection
  - Blood in the urine
- (www.pelvicrehab.com)
Prostatectomy

- Symptoms s/p prostatectomy may include:
  - Leakage of urine with increased abdominal pressure (stress incontinence)
  - Leakage of urine with strong urge (urge incontinence)
  - Difficulty getting and maintaining an erection

Risk factors for male incontinence after Prostatectomy

- Age
- Presurgical sphincter control/pelvic floor function
- Dissection technique
- Resection of neurovascular bundles
- Prior TURP

Radiation for prostate cancer

- May cause fibrotic changes in surrounding tissue which may alter sphincter functions and muscle function for continence (urinary and fecal)
Rehabilitation

- **Pre-op**
  - Education on mechanism of continence and surgery effects
  - Role of abdominals and valsalva
  - Pelvic floor eval and home program at submax level

- **Post-op**
  - Bladder training and diet modifications
  - Pelvic floor exercises when okayed by MD
  - Individualized therapy depending on amount of leaking and symptoms still present
    - Evaluation the same as a women only done anally
    - Must emphasize importance of isolation of contraction, may need to perform at a submax level

**PFME for Men**

- Pelvic floor exercises can result in improved urinary continence, erectile function and climacturia (orgasm associated incontinence) after radical prostatectomy according to a recent case series (3 patient participants) (Sighinolfi, M et al., 2009)
PFME for Men

- 102 incontinent males s/p radial retropubic prostatectomy for clinically localized prostate cancer
- 50 patients were placed in a treatment group and 52 in a control group
- 88% in the treatment group achieved continence at 3 months whereas 56% in the control group

(Van Kampen, M et al., 2000)

Normal Bowel Function

- Bowel movement 3x/week to 3x/day
- No leaking of stool at any time
- Consistency soft and formed
- Intact sensation to indicate presence of stool (urge)

Abnormal Bowel Function

- Bowel movement less than 3x/week or greater than 3x/day
- Hard consistency
- Watery consistency
- Stool incontinence with increased abdominal pressure or with urge
- Leakage or stool seepage after a bowel movement
Normal Events of Bowel Continence

1. **Morning reflex**: Eating and drinking, along with gravity cause movement of stool, sphincter and pelvic floor muscles squeeze
2. **Awareness**: Urge in fullness of stool, and voluntary squeeze of the pelvic floor muscles occurs to slow/stop movement of the stool until conditions are appropriate
3. **Evacuation**: Muscles of the bowels contract to move stool out and the sphincter and pelvic floor muscles relax
4. **Completion**: Muscles of the bowels relax, sphincters and pelvic floor muscles squeeze closed

Ten D’s of constipation in the elderly

1. Drugs (side effects)
2. Defecatory dysfunction
3. Degenerative disease
4. Decreased dietary intake
5. Dementia (attention)
6. Decreased mobility/activity
7. Dependence on others for assistance
8. Decreased privacy
9. Dehydration
10. Depression
11. Dexterity
12. Decreased sensation

(Bouras, E & Tangalos, E, 2009)
The Musculoskeletal Connection

<table>
<thead>
<tr>
<th>Bladder Storage Disorders</th>
<th>Bladder Voiding Disorders</th>
<th>Bowel Storage Disorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urge incontinence</td>
<td>Urinary retention</td>
<td>Fecal incontinence</td>
</tr>
<tr>
<td>Stress incontinence</td>
<td>Vaginismus</td>
<td></td>
</tr>
<tr>
<td>Mixed incontinence</td>
<td>Vulvodynia</td>
<td></td>
</tr>
<tr>
<td>Over Active Bladder (OAB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bowel Voiding Disorders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constipation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anismus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proctalgia Fugax/Chronic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proctalgia</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Physical/Occupational Therapy Evaluation

- History
  - Medical (i.e. surgery, childbirth, fractures, comorbidities)
  - Medications
  - Procedures

- Functional status
  - Detailed description of symptoms
  - Diary/Urge scale/Bristol scale
  - Timing and cause or triggers of occurrences
  - # of pads used
  - Sleep
  - Diet (foods/fluids/fiber)
  - Pain
  - Dyspareunia/sexual dysfunction
Physical/Occupational Therapy Evaluation

- External musculoskeletal assessment
  - Clock assessment
  - Symmetry
  - Redness/skin integrity
  - Scars
  - Atrophy
  - Discharge
  - Cough reflex
  - Contract/relax/evacuation
  - Hemorrhoids/redness
Pelvic Floor Musculature

- 3 layers
  - Superficial (ishiocavernosus, bulbospongiosus, superficial transverse perineal)
  - Urogenital diaphragm (membranous portion of urethra)
  - Pelvic diaphragm (pubococcygeus, iliococcygeus, ishiococcygeus, obturator internus and piriformis)

Male Pelvic Floor vs Female Pelvic Floor

Female Pelvic Floor
Female Pelvic Floor

Male Pelvic Floor

Male Pelvic Floor
Physical/Occupational Therapy Evaluation

- Internal musculoskeletal assessment
  - Muscle Layer evaluation
  - Muscle pain
  - Length vs spasm
  - Strength/coordination (contraction, lift and anterior movement and evacuation, bulging)
  - Paradoxical contraction
  - Phasic (quick fibers)/Tonic (slow fibers)
  - Cystocele/urethracele/rectocele
  - EAS vs Puborectalis strength and relaxation

---

Oxford Manual Muscle Test

<table>
<thead>
<tr>
<th>Muscle Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Zero</td>
</tr>
<tr>
<td>1</td>
<td>Trace</td>
</tr>
<tr>
<td>2</td>
<td>Poor</td>
</tr>
<tr>
<td>3</td>
<td>Fair</td>
</tr>
<tr>
<td>4</td>
<td>Good</td>
</tr>
<tr>
<td>5</td>
<td>Strong</td>
</tr>
</tbody>
</table>

- 0: No palpable contraction
- 1: Flicker
- 2: Palpable contraction, no lift
- 3: Contraction and lift post and ant
- 4: Strong contraction and lift from ant, post, and side walls
- 5: Stronger list and compression with inferior deflection of the finger

---

Internal Musculoskeletal Assessment

Diagram of muscles:
Biofeedback

- Biofeedback is a technique by which information about a normally unconscious physiological process is presented to the patient and the therapist as a visual, auditory or tactile signal. The signal is derived from a measurable physiological parameter, which is subsequently used in an educational process to accomplish a specific therapeutic result. The signal is displayed in a quantitative way and the patient is taught how to alter it and thus control the basic physiological process.” (J.T Anderson et al, 1992)

Research

- Numerous studies demonstrate levels 4 and 5 (out of 5) efficacy of biofeedback for urinary incontinence in females.
- It is better than no treatment (i.e., control) (Burgio et al., 1998; Burns et al., 1993; Daugherty et al., 2002; McDowell et al., 1999), better than or equal to other behavioral treatments (e.g., pelvic floor exercises) (Burns et al., 1993; Glavind, Nahr, Walters, 1996; Sherman, Davis, Wong, 1997; Sung, Hong, Choi Baik, Yoon, 2000; Weatherall, 1999; Wyman, Pard, McClus, Bump, 1998) and better than drug (i.e., oxybutynin chloride) treatment (Burgio et al., 1998) in both young and old females.
- Combining drug and behavioral therapy in a stepped program can produce added benefit for those not satisfied with the outcome of single treatment (Burgio, Locher, Goode, 2000).
Palsson et al. (2004) have reviewed the evidence showing that biofeedback is efficacious for constipation, fecal incontinence, anal pain, and other functional anorectal disorders. They found that the average probability of successful treatment outcome for patients treated with biofeedback was 67% for functional fecal incontinence and 62% for constipation.
Advantages of Biofeedback

- Quality and intensity of pelvic floor muscle contraction and relaxation clearly visualized
- Provides ability to compare treatment sessions and assess progress
- Hand held units available for home use within guidelines

65 year-old, dx: urinary retention s/p mid-urethral sling and hysterectomy; urodynamic testing indicated normal functioning bladder.
Male Case Example

- Preoperative robotic prostatectomy and umbilical hernia repair
- Seen 15 days prior to surgery
- 67 year old male, dx with prostate cancer 2 years prior, now decided to have treatment
- Medical hx: HTN, mild compromised erectile function, urinary frequency
- Tried taking Flomax without much improvement

Male Case Example

- History given at therapy evaluation: Intermittent urine stream, frequent urination, night time frequency impacting sleep cycle.
- Frequency of urination: Daytime 5-6x and night time 5-7x
- No incontinence
- Small voids
- Daily BMs
- Fluid intake: 5 sodas per day and 2 cups of water

Male Case Example
Male Case Example

Biofeedback recording 1
Biofeedback recording 2
Biofeedback recording 3

Male Case Example

- Dietary changes
- Incontinence s/p surgery, body mechanics and decreasing intraabdominal pressures to avoid leakage
- Erectile dysfunction s/p surgery

Treatment of Bladder Storage Disorders

- Pelvic brace
- Urge control
- Strengthening (fast and slow twitch muscle fibers)
  - Vaginal weights
  - Accessory muscle use
- Relaxation training
- Dietary modification
- Timed toileting
- Electrical Stimulation
  - Strengthening, Urge control, Fatiguing
Treatment of Bowel Storage Disorders

- Constipation?
- Dietary modification, fiber
- Strengthening
- Timed toileting, habit training
- Long holds for 30 seconds or greater or ramping contraction for urge control
- Mirror
- Sensory training

Treatment of Bladder Voiding Disorders

- PVR
- Relaxation
- Double voiding
- Splinting
- Auditory or non-auditory goal work with biofeedback
- Stretching to increase tissue flexibility
  - Dilators

Treatment of Bowel Voiding Disorders

- Dietary modification (laxative/suppository use)
  - Power pudding
- Toileting posture
- Abdominal colon massage
- Hot/warm drink
- Timed toileting
- Evacuation maneuver
- Manual therapy, dilators, stretching
- Relaxation/tension release
  - Use of quick flick vs long holds
- Tuning into the pelvic floor one time per hour
Top Ten Tips for Good Bladder Health

1. Eliminate common irritants: Caffeine, carbonation, acidic juices
2. Drink 6-8, 8 ounce glasses of water per day
3. Have a daily bowel movement
4. Relax and take your time on the toilet to empty the bladder completely
5. Squeeze before you cough
6. Do not rush to the toilet with a strong urge, calm the urge with 5 squeezes first
7. Do not strain
8. Do not urinate less than every 2 hours or wait more than 5 hours
9. Limit fluid intake 2 hours before bed
10. Elevate legs 2 hours before bed and complete 30 ankle pumps every 10 minutes

Top Ten Tips for Good Bowel Health

1. Drink 6-8, 8 ounce glasses of water per day
2. Have a warm drink each morning to use natural reflexes to have a bowel movement
3. Sit on the toilet daily in the morning to have a bowel movement
4. Eliminate caffeine due to its dehydrating qualities which makes the stool hard
5. Place a stool under your feet when sitting on the toilet and lean into forearms
6. Relax and distract yourself
7. Do not strain
8. Massage the abdomen right to left in a circular pattern prior to sitting on the toilet to stimulate
9. Eat 25-35 grams of fiber daily, power pudding
10. Never ignore an urge to go

Questions?
References


