Pelvic Floor Examination Lab
# Pelvic Floor Examination

## PROCEDURES/TASKS

<table>
<thead>
<tr>
<th>EXPLANATION AND OBSERVATION</th>
<th>CHECK OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain the exam to the patient and obtain informed consent</td>
<td></td>
</tr>
<tr>
<td>Have the patient assume a hook-lying position with the head raised a little (2 pillow ~30°)</td>
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<tr>
<td>Make sure you can see the patient’s face at all times</td>
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<tr>
<td>Drape the patient appropriately</td>
<td></td>
</tr>
<tr>
<td>Ask the patient to spread their legs – shoulder width apart.</td>
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</tr>
<tr>
<td><strong>You can assist with gloved hands if needed</strong></td>
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</tr>
<tr>
<td>Therapist stand or sit to one side on the plinth</td>
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<tr>
<td>Encourage the patient to lean their thigh against you and relax</td>
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</tbody>
</table>

## OBSERVE AND IDENTITY

- Mons pubis, ischial tuberosities
- Labia majora: observe for swelling, edema, cysts, lesions, wart
- Labia minora, vestbule
- Urethra
- Clitoris
- Vaginal orifice
- Perineal body
- Anal sphincter, return: check hemorrhoids, irritation, redness

## PERINEAL PALPATION (using pelvic clock adapted from: Hollis Herman PT, DPT, MS, OCS, WCS, BCB-PMD, PRPC)

- 12 o’clock: Pubic Symphysis
- 1 & 11: Right & Left ischiocavernosus
- 2 & 10: Right & Left bulbospongiosus
- 3 & 9: Right & Left transverse perineal
- 4 & 8: Right & Left pubococcygeus
- 5 & 7: Right & Left pubococcygeus
- 6 ’clock: Coccyx

## VISUAL INSPECTION OF PELVIC FLOOR CONTRACTION

- Ask the patient to perform a pelvic floor contraction
- Can you observe a visible contraction while observing the perineum?
- Does the perineum draw in and up (anterior)?
- Is the patient pushing down (ie. Valsalva)?
- Is there obvious contribution from the adductor, gluteals, abdominals?
- Ask the patient to cough to observe for urine leakage or pelvic organ prolapse
- Check for perineal reflexes using a Qtip or piece of cotton if you suspect nerve damage
- Stroke the perianal area with a gloved fingertip or Qtip to observe contraction of the anal sphincter to confirm integrity of S2,3,&4
## Pelvic Floor Examination

### PROCEDURES/TASKS

<table>
<thead>
<tr>
<th>SENSORY TESTING – SUPERFICIAL CUTANEOUS – Q-Tip TEST</th>
<th>CHECK OFF</th>
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</thead>
<tbody>
<tr>
<td>Use a Q-tip and gently access sensation over the areas depicted in the figure to the right to assess for changes in sensation (including allodynia).</td>
<td></td>
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</tbody>
</table>

### VAGINAL PALPATION AND MANUAL MUSCLE TESTING

- Patient should be in hook-lying position (*MMT can be performed in standing and compared to supine/hookling*)
- Have the patient assume a hook-lying position
- Separate the labia and insert 1–2 fingers (index/middle fingers), palm side down to avoid the urethra. Gently exert pressure with your finger posteriorly against the vaginal musculature. Ask the patient to cough or bear down
- Observe anterior vaginal wall for bulge (cystocele, urethrocele)
- Observe for any involuntary loss of urine
- Separate your fingers in the introitus and ask the patient to bear down
- Observe for any posterior vaginal wall bulge (rectocele)

### INTERNAL PELVIC MUSCLE IDENTIFICATION/CLOCK

- *Identify areas of pain/spasm, hyper or hypotonicity (high or low tone)*

*Use the diagram to assist you locating muscles and identify where you are in the pelvis*

12 o’clock: Pubic Symphysis  
1 & 11: Right & Left ischiocavernosus  
2 & 10: Right & Left bulbospongiosus  
3 & 9: Right & Left transverse perineal  
4 & 8: Right & Left pubococcygeus  
5 & 7: Right & Left pubococcygeus  
6 o’clock: Coccyx
**MANUAL MUSCLE TESTING OF THE PELVIC FLOOR MUSCLES – see Pelvic Floor muscle assessment instruction sheets at the back of this lab manual**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Description</th>
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<tbody>
<tr>
<td>Place your finger/fingers on the right pubococcygeus muscle and ask for a muscle contraction “squeeze around my fingers”</td>
<td></td>
</tr>
<tr>
<td>Ask the patient to hold the contraction for 10 secs, count out loud</td>
<td></td>
</tr>
<tr>
<td>Note in seconds the patient’s ability to hold the contraction</td>
<td></td>
</tr>
</tbody>
</table>

**Rate the muscle strength out of 0 – 5/5 (using Modified Oxford Scale)**

(Hold contraction for 10 sec)

**Record your patient’s score out of 5 here:** /5

| Move your fingers to the posterior muscles and repeat |
| Move your fingers to the left pubococcygeus muscle and repeat, rate the strength |
| Move your fingers to the anterior muscles and repeat, rate the strength |
| Request the patient performs quick flick contractions in each quadrant |

**Rate muscle performance using the PERFECT scale**

<table>
<thead>
<tr>
<th>P</th>
<th>E</th>
<th>R</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Endurance</td>
<td>Repetitions</td>
<td>Fast</td>
</tr>
<tr>
<td>E – Every</td>
<td>C – Contraction</td>
<td>Timed</td>
<td></td>
</tr>
</tbody>
</table>

P E R F (record your patient’s scores under the PERF)

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**PROCEDURES/TASKS**

**ADDITIONAL OBSERVATIONS**

- Co-contraction from other muscles ie, gluteals, adductors, abdominals
- Ability to isolate the pelvic floor muscles from gluts, abs and adductors
- Time taken to reach peak contraction ie latency
- Time taken to return to baseline following pelvic floor contractions
- Breathing pattern during pelvic floor muscle contractions
- Patient response during exam ie re comfort level, failure to maintain eye contact, respond to questions

**TEACHING PELVIC FLOOR CONTRACTIONS MANUALLY**

- Insert one or two fingers into the vagina, instruct the patient to tighten their anus (anal sphincter) and “pull up and in” around your finger
- Instruct the patient to inhale, then exhale slowly; on exhaling the pelvic floor muscles should tighten
- Instruct the patient to perform several contractions in sequence and maintain the contractions for 5 – 10 secs
- Therapist place other hand on patient’s abdomen to monitor muscle activity while you instruct the patient to perform a submaximal pelvic floor contraction – if they have difficulty request that they perform a contract ~50% effort of their max contraction
**PALPATION OF COCCYGEUS, PIRIFORMIS AND OBTUATOR INTERNUS**

**Coccygeus:**
Insert your finger posteriorly until you can feel the coccyx. Move your finger to either right or left side to palpate the coccygeus and ask the patient to contract the pelvic floor muscles. Repeat other side.

**Piriformis:**
Move your finger superiorly along the sacral border, ask the patient to externally rotate their hip against resistance of your other hand. Palpate for contraction of the piriformis. Repeat other side.

**Obturator Internus:**
Move your finger into the 3 or 9 o’clock positions as you palpate each side of the lateral vaginal wall. Ask the patient to externally rotate their hip against resistance of your other hand. Palpate the obturator internus contraction.

**STANDING VAGINAL MUSCLE TESTING AND PELVIC ORGAN PROLAPSE ASSESSMENT**

<table>
<thead>
<tr>
<th>Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place a chuck on the floor and a step stool on the chuck</td>
</tr>
<tr>
<td>Instruct the patient to stand with one foot on the stool</td>
</tr>
<tr>
<td>Kneel on the ground in front of the patient</td>
</tr>
<tr>
<td>Place your index finger (two fingers) into the vagina palm facing posteriorly— you may have to separate the labia</td>
</tr>
<tr>
<td>Ask the patient to bear down and observe for prolapse or urine leakage</td>
</tr>
<tr>
<td>Ask the patient to put her foot back down on the floor</td>
</tr>
<tr>
<td>Perform endurance assessment muscle test in each of the four quadrants</td>
</tr>
<tr>
<td>Perform quick flicks assessment in each of the four quadrants</td>
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</tbody>
</table>
PELVIC FLOOR MUSCLE ASSESSMENT

Pelvic floor muscle assessment is the key to physical therapy for pelvic floor dysfunction. The patient’s ability to perform a volitional pelvic floor contraction can greatly affect patient symptoms and outcomes especially for those with stress urinary incontinence (SUI). Ability to perform a pelvic floor contraction appropriately ensures support for the anterior aspect of the vagina and compression of the urethra against the posterior aspect of the pubic bone.

THE MODIFIED OXFORD SCALE

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No discernible contraction.</td>
</tr>
<tr>
<td>1</td>
<td>Very weak contraction. Flicker. Slight change in tension.</td>
</tr>
<tr>
<td>2</td>
<td>Weak contraction.</td>
</tr>
<tr>
<td>3</td>
<td>Moderate contraction with some squeeze and lift.</td>
</tr>
<tr>
<td>4</td>
<td>Good contraction; squeeze and lift against resistance.</td>
</tr>
<tr>
<td>5</td>
<td>Strong contraction; squeeze and lift against strong resistance.</td>
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THE PERFECT SCHEME

The PERFECT scheme was develop by Jo Laycock (UK Physio) to assess the strength, endurance and the number of repetitions the individual can perform before fatigue sets in.

P–Power.
The power/strength of the maximum voluntary contraction (MVC) is determined from the modified Oxford scale (see previous page).

E–Endurance.
The duration of the contraction is noted, up to 10 seconds. (Type 1 slow twitch fibers – Tonic)

R–Repetitions.
This represents the number of times the maximum voluntary contraction (a product of power and endurance) can be repeated, with 4 seconds rest between each contraction, until the muscles fatigue.

F–Fast.
Assess the number of fast (1 second) contractions (TYPE 2 fast twitch fibers – phasic) before the muscle fatigues.

ECT–every contraction timed.
Every contraction timed reminds the examiner to devise an individual exercise program for each patient

For example:

PERF
3759

This represents a patient presenting with a moderate contraction (P3), held for 7 seconds (E7), repeated 5 times (R5) with 4 seconds rest between each contraction. This is followed by 9 fast (F9) contractions.
References:

1. Excepted from Introduction to Pelvic Floor Rehabilitation, Cinthia Neville, PT, DPT, WCS
2. Primal picture – Anatomy TV
3. Herman & Wallace course noted
Pelvic Floor Treatment Lab

Joint alignment and mobilization
- Lumbar
- SI
- Hip
- Knee
- Ankle

External soft tissue mobilization
*Skin rolling, myofascial release, cross friction, trigger point release, effleurage, scar mobilization*

Identify the following muscles and structures:
- Rectus abdominis
- Obturator internus
- Proximal hamstring attachment
- Piriformis
- Sacrotuberous ligament
- Sacrospinous ligament
- Adductors

(www.pamelamorrisonpt.com)
Trigger point release - tennis ball vs. foam roller

Internal soft tissue mobilization

*Trigger point release, myofascial release, cross friction, 2 finger separation, stroking, scar mobilization, transvaginal Thiele’s massage*

- Bulbospongiosus
- Levator ani
- Coccyx
- Scar mobilization if perineal tearing and/or episiotomy
Obturator Internus

Internal treatment

- **Scar mobilization**
  - Performed on adhesions, pain, or restriction in mobility of any scar
  - Can be done within weeks of surgery but stay off of scar directly until scabs have fallen off
  - Practice for 5-15 minutes daily
  - Avoid lotions or lubricants with scar mobilization
    - **Desensitization**
      - Using rough, wet towel, gently rub over the scar in all directions
      - Decreases sensitivity of the scar and helps you feel at ease with touching the scar
    - **Push and pull**
      - Place two fingers on scar and move up towards ribcage/superiorly, then inferior and side to side
      - Should feel a pulling sensation but **NOT** sharp pain
    - **Skin rolling**
      - Pinch the skin on either side of the scar, lifting the skin up
      - Roll and raise tissue as you move around the affected area
      - Look for dimples where scar may be adhered
    - **Plucking**
      - Attempt to pick up the scar with your index finger and thumb on the other side
      - Move side to side
Perineal massage

- At vaginal introitus - direct pressure applied slow and steady into the restricted area with a gloved finger
- Can use one or two fingers and lubricant
- Performed by therapist, patient, or partner
- Hold for 90 seconds or longer or until tissue softens
- Consider using heat before and/or after
- Tolerable burning sensation may be reported

Transvaginal Thiele’s massage
(Herman & Wallace: https://hermanwallace.com/blog/what-is-thiele-s-massage)
Position patient in left lateral side lying or recumbent position and place the gloved index finger into the vagina. The finger is then moved laterally, in contact with the soft tissues of the coccygeus, levator ani, and gluteus maximus muscles. The finger is moved with moderate pressure ...laterally, anteriorly, and then medially, describing an arc of 180 degrees until the fingertip lies just posterior to the symphysis pubis. The massaging strokes, applied to a patient’s tolerance, are applied 10-15 repetitions on each side with the patient being asked to bear down during the massage strokes. Dr. Thiele recommended daily massage 5-6 days, then every other day for 7-10 days, and gradually less often until symptoms are resolved.
Vaginal Weights
Resistance training for the pelvic floor
How does it work?
1. Overload: muscles should be exercised at an intensity greater than they are used on a regular basis
2. Specificity: the exercises performed must be specific for that group of muscles
3. Reversibility principles: changes in the muscles are reversible

Indications:
- stress urinary incontinence
- pelvic floor strengthening
- mild to moderate prolapse
- sexual dysfunction
- poor kinesthetic awareness of the PFM
- incoordination of the PFM with ADLs

Contraindications:
- pregnancy
- postpartum less than 6 weeks
- post-surgical less than 6 weeks
- menses
- vaginal or bladder infection
- impaired cognitive ability
- painful urination (dysuria)
- urinary retention or obstruction to urination
- IUD unless consent by patient and MD
What may impact the success of a vaginal weight?
- Patient motivation
- Significant pelvic floor weakness
- Cognitive inability
- Extra large or small vaginal opening
- Sensory deficit

Program
Insert larger end of FPT to center line slowly and gently
Start in hooklying and progress to reclining, sitting, and standing
Complete 1 rep of 6-second hold, immediately followed by 5 reps of quick kegels, then rest for a few seconds. Complete this cycle for 5-10 minutes; 3-4 times a week.

Feminine Personal Trainer
- Insert larger end to the center line (if need a small amount of vaginal lubrication, but makes it easier to slip out of place)
- Once properly positioned, perform a contraction and you should feel a lift of the FPT
- Progression:
  1. Hooklying
  2. Reclined
  3. Sitting
  4. Standing
- Perform combination of quick and endurance kegels- 1- 6 to 10 second hold, followed by 5-quick kegels
- Complete for 5-10 minutes
- Weight should not fall out

FPT instruction video:
https://www.youtube.com/watch?v=v7Y6px6cIlw&feature=youtu.be
Step Free Vaginal Cones - www.nationalincontinence.com

Kegel Exercise System: Intimate Rose Kegel Exercise Weights - Bladder Control & Pelvic Floor Exercises - Set of 6 Premium Silicone Cones with Training Kit for Women: Beginners & Advanced – Amazon $49.99

Electrical Stimulation
STM-10- See stim lab handout from Prometheus
Indications
- 12Hz: urge incontinence
- 50Hz: stress incontinence, strengthening
- 12:50: combination of both cycles used for mixed urinary incontinence
- 100Hz: pain or high tone pelvic floor dysfunction
- 200Hz: pain or high tone pelvic floor dysfunction

Contraindications
- Active infection or Genital Disease
- Severe Pelvic Pain
- Pregnancy
- Postpartum or Post Surgical (6 weeks)
- Atrophic Vaginitis
- Dyspareunia
- Menstrual Period
- Pacemaker or Cardiac Arrhythmia
- Presence of Any Known Malignancy
- History of Severe Urine Retention
- Prolapse
- Diminished sensory perception

What may impact the success of electrical stimulation
- Patient motivation
- Compliance
• Infection
• Sensory issues


Indications
• Acute pain
• Muscle stimulation
• Chronic pain

That is what TENS units are designed to do, relieve pain. But not every person is the same, so adjustments can be made to obtain optimal relief over time. There is no limit to how long or how often a TENS unit can be worn, it is at the discretion of the prescribing practitioner.

In a previous post, we discussed that there are three parts to a TENS unit waveform:

1. **Pulse Rate**
   Pulse Rate (P.R.) is also known as any and all of the following: Hertz (Hz), Frequency, or Pulses Per Second (pps).
   To simplify this, I like to think of it as “Pulses Per Second.” The Frequency of the T.E.N.S. unit waveform can range from approximately 1-250Hz depending upon the model. Pulse Rate is important because different frequency settings target different nerve groups and the setting will determine if the “Gate Theory” or “Endorphin Theory” of T.E.N.S. will be used.

2. **Pulse Width**
   Pulse Width (P.W.), is also known as any and all of the following: Microseconds (μS), and Pulse Duration.
   To simplify this, the pulse width is how wide each pulse is. It’s measured in extremely small intervals called microseconds. The Pulse Width on T.E.N.S. devices usually range from 1-250μS. Generally speaking, the higher the pulse width, the more “aggressive” the stimulation feels. If the pulse width is set high enough, it will elicit a muscle contraction, which is typically not the desired result with a T.E.N.S. unit. However, if the pulse width is too low, the patient may not perceive the stimulation.

3. **Amplitude**
   Amplitude is also known as any and all of the following: Intensity or Milliamps (mA).
   To simplify this, the amplitude is what you feel when you “turn the unit up”. This is what causes the “buzzing” sensation of the T.E.N.S. unit to go higher or lower. Portable T.E.N.S. units can range from approximately 0-100 mA. This is often set to patient comfort levels.
   I like to compare adjusting the sensation of the TENS unit to adjusting a stereo. Increasing Pulse Width (μS) would be like adjusting the bass, adjusting the Amplitude (mA) would be like adjusting the volume and adjusting the Pulse Rate (Hz) could be compared to adjusting the speed of the music.

There are two theories behind how TENS units work.

1. **Gate Theory:** It is theorized that the “Gate Theory” of TENS is attained when “High Frequency” (also known as Pulse Rate) is used (approximately 80 Hz- 150 Hz.). This works on the premise that the asymmetrical biphasic square wave output at high frequencies will “block” the pain signal from the end of the nerve to the brain, so when it reaches the brain it is not perceived as pain. This works very quickly (15 minutes, for example) but when the unit is removed from the body, the signals are no longer being blocked. The pain returns quicker than with the Endorphin Theory (discussed below). However, this works for a greater percentage of the population (approximately 80% of those who respond positively to
TENS units) especially if the patient is taking pain medication. If the patient is already taking pain medication, the release of endorphins needed for the Endorphin Theory (discussed below) will be hindered because the medications are often already chemically releasing endorphins throughout the body vs. the localization that is achieved with TENS unit endorphin release.

2. **Endorphin Theory:** It is theorized that the “Endorphin Theory” is attained when “Low Frequency” (also known as Pulse Rate) is used (approximately 1-10 Hz) or if a Burst Mode is used. Endorphins are the body’s natural pain fighting mechanism. For example, when you stub your toe, your immediate reaction is to rub it. This “rubbing” or “pulsing” sensation is what triggers localized endorphin release. Endorphins can take up to 45 minutes to reach the area when a TENS unit is applied, but once they are there, the pain relief can last up to six hours after the patient takes the TENS unit off. This works for about 20% of the population that respond positively to the TENS unit. It takes more patience, because it takes longer for the pain relief to begin than with the Gate Theory. If the patient is already on pain medication, the endorphins are already being released chemically in the body and the localized effect is hindered. If the patient is on pain medication, typically the Gate Theory will be the delivery method of choice.

1. **CONST:** also known as Constant or Continuous Mode.
This mode functions exactly how it sounds. It constantly outputs the set Pulse Rate, Pulse Width and Amplitude. The Pulse Rate determines which theory of TENS will be administered (Gate or Endorphin). A Pulse Rate set from 80-150 Hz will be the Gate Theory and a Pulse Rate of 1-10 Hz will be the Endorphin Theory. The Pulse Width and Amplitude are typically set to patient comfort (enough to feel the pulsing sensation, and just under the threshold of a muscle contraction). The patient should feel the stimulation, but it should not be painful. The Constant Mode is typically used to determine the baseline (or the best settings) for the patient, since there is no shift of the settings while it’s worn and to determine if Gate or Endorphin Theory will work best for the individual. As with most pain relief mechanisms, the patient will acclimate to the perceived sensation of the output over time. It is believed that when using the Constant Mode, the patient will acclimate more quickly because there is no modulation or change of any of the settings. Again, most practitioners will use this mode to determine the optimal comfort settings and choose a modulation mode for the patient to use long term.

2. **PR MODUL:** is also known as Pulse Rate Modulation: 50% decrease/increase of set value over a 5 second cycle.
As previously discussed, the Pulse Rate will determine whether the Gate or Endorphin Theory is used. However, using just one set Pulse Rate, as is done in the Constant Mode, lends itself to quick acclimation by the patient. The Pulse Rate Modulation Mode (varying Frequency) shifts the Hz setting 50% of the set value over 5 seconds. For example, if the Pulse Rate (Hz) is set at 100 Hz, the device will shift down to 50 Hz and up to 150 Hz over 5 seconds. This is still considered “High Frequency” TENS and will still work on the premise of Gate Theory when set this way. If the Pulse Rate is set at 5 Hz, then the Hz will shift from 3-8 Hz over 5 seconds utilizing the Endorphin Theory. The difference between Constant Mode and Pulse Rate Modulation is the shift in the Pulse Rate over time so the patient will not acclimate to the sensation as quickly. Each TENS unit will have slightly different mode settings, but by using your knowledge of the Gate and Endorphin Theories you can see which theory of TENS is being administered and adjust Pulse Width and Amplitude settings to patient comfort.

3. **PW MODUL:** Pulse Width Modulation: 50% decrease/increase of set value over a 5 second cycle.
In the Pulse Width Modulation mode, the feeling of the TENS unit output is varied utilizing a Pulse Width shift. The Pulse Rate setting (Hz) in this mode will remain constant and still determines what theory of TENS is being used, but the varying Pulse Width will, in theory, keep the patient from acclimating to the
output over time. When Pulse Width is increased, the sensation typically feels stronger. What is really happening is each individual pulse is lasting longer (duration) when the Pulse Width setting is increased. When choosing a Pulse Width setting, it is important to find the optimal comfort zone for the patient. Typically the Pulse Width is set as high as possible without generating a visible muscle contraction or discomfort.

4. **PR & PW MODUL**: also known as Pulse Rate & Pulse Width Modulation: 50% decrease in set value over a five second period.
   As the Pulse Rate (Hz) increases, the Pulse Width (us) decreases and vice versa. The Pulse Rate (Hz) setting will still determine whether the Gate or Endorphin Theory will be applied. The Pulse Width will determine how long each pulse is delivered, but both shift over time to prevent acclimation. It is typical when Pulse Rate swings to higher levels, a lower Pulse Width is needed to maintain optimal comfort and vice versa, which is why the two shift in the manner described.

5. **Cycled Burst Mode**: 2.5 seconds on. 2.5 seconds off. Adjustable Pulse Rate and Pulse Width.
   In the Cycled Burst Mode, the Pulse Rate and Pulse Width settings remain constant, but the TENS unit drops the amplitude to “0” for 2.5 seconds, then turns back on to the original amplitude setting for 2.5 seconds and repeats. Instead of utilizing low frequencies (Hz) to create the “tapping” or “rubbing” sensation to release endorphins as we discussed in the previous settings, the Cycled Burst Mode creates a “tapping” or “rubbing” sensation by pausing the amplitude output (mA) then applying output in rounds of 2.5 seconds, providing an alternative way to apply the Endorphin Theory. In this mode, the Pulse Rate setting (frequency) can be in the 80-120Hz range, but because of the way it is delivered, the pulsing or bursting sensation releases endorphins.

6. **SD1**: Strength Duration 1 Mode: Increase of set Pulse Width 40%, decrease of set Pulse Rate 45% and decrease of set Amplitude 10% over a 3 second period. Values return to original settings over the next 3 seconds.
   Strength Duration 1 Mode is specifically designed to modulate all of the waveform settings to achieve maximum comfort. When the Pulse Width shifts to higher settings (more aggressive sensation) the Amplitude (power level) drops 10% to allow the increase in the Pulse Width setting to be more comfortable to the patient. The Pulse Rate (Hz) still determines whether the Gate or Endorphin Theory will be utilized, but the shift in Frequency (Hz) shifts 40% to prevent acclimation.

7. **SD2**: Strength Duration 2 Mode: Increase of set pulse width 60%, decrease of set pulse rate 90% and decrease of amplitude 13% over a 6 second period. Values return to original settings over the next 6 seconds.


**Application of electrodes**

**Positioning**

The electrodes are self adhesive; discontinue treatment if the resident develops a skin irritation following treatment.

The electrodes are normally positioned over the area of pain but other more advanced applications may often prove better. Please consult with physio for initial set up of electrode positioning.

**Examples**

- Central neck pain
Position each set of electrodes on either side of the neck in the area of discomfort.

- **Shoulder pain**

Position each set of electrodes above and below the pain site

Position one electrode pad on the neck on the same side as the painful shoulder and the other paired electrode on the painful area; position the other electrode in a similar way

- **Knee pain**

Position electrodes around the knee joint above and below on each side

- **Lower back**

Position electrodes on either side of the back at the level of pain

If pain is out to one side position one of the paired electrodes over the site of pain next to the spine and the corresponding electrode close to the spine at the same level; position second electrode near same position.

**Hygiene and housekeeping considerations:**

- One set of electrodes per Resident
- Keep in packet with name of Resident and date of first use written on plastic packet with permanent marker
- Ultrasonic gel can be placed on the electrodes if they appear to be dry and not in adequate contact with the Resident
- Micropore can be used to tape electrodes in place
- Place TENs unit in carry case when not in use
- The 9 volt battery will require replacement depending on level of use.

**Where and when to not use TENS machines**

TENS electrodes **should NEVER be placed:**

- Across your eyes (intraocular pressure) or brain
- On the front of your neck due to the risk of acute hypotension (through a vasovagal reflex) or even a laryngospasm
- Through the chest (using a front and rear of chest wall electrode positions). Either side of your spinal column is permitted.
- Across an artificial cardiac pacemaker (or other indwelling stimulator, implantable cardioverter-defibrillators (ICDs), including across its leads) due to risk of interference and failure of the implanted device. Serious accidents have been recorded in cases when this principle was not observed.
- On open wounds or broken skin areas (although it can be placed around wounds).
- Over a malignant tumour (based on experiments where electricity promotes cell growth).
- Directly over the spinal column (although it can be placed either side of your spinal column).
- Internally, except for specific applications of dental, vaginal, and anal stimulation that employ specialised TENS units.
- Epilepsy patients
• On areas of numb skin/decreased sensation TENS should be used with caution because it's likely less effective due to nerve damage. It may also cause skin irritation due to the inability to feel currents until they are too high.

• Areas of Infection. There's an unknown level of risk when placing electrodes over an infection (possible spreading due to muscle contractions). Cross contamination with the electrodes themselves is of greater concern.

• Patients who are non compliant or have dementia

**Therapeutic exercise**

**Kegels**

**Indications**

- Stress urinary incontinence
- Urge suppression for urination or defecation
- Support for pelvic organ prolapse
- Increased resting pelvic floor resting tone
- Bladder and bowel control/emptying by coordinating abdominals with or without pelvic floor contraction
- Patient awareness of contraction vs. relaxation

**Contraindications/Precautions**

- High tone pelvic floor dysfunction
- Poor awareness of the pelvic floor
- Pelvic floor/bladder sphincter dyssynergia
- Worsening of symptoms
- Inability to relax between contractions

Where to begin:

- Quick, endurance, or both types
- Strengthening: do 50-80 repetitions of kegel exercises
- Down-training: increase time for relaxation
- **Alter the difficulty of the exercise**
  - Consider different positions: supine, sitting, standing, sit to stand, walking, running, squatting
  - Alter the work: rest interval
  - Increase the duration, number of repetitions, number of times per day
  - Consider home trainers

**Exercise progression**

**Active assisted- Kegels with accessory muscles (Janet Hulme)**

- Kegels with adduction
- Kegels with obturator internus

**Active- biofeedback**

**Resistive- vaginal or rectal weights, doing exercises against resistance or during ADLs**

May have to start with NMES for pelvic floor awareness → move to active kegels → then standing and maybe even during ADLs
Pelvic floor strengthening requires compliance, persistence for at least 4-6 months

Dropping the pelvic floor (Hollis Herman)
- Opposite of pelvic floor contractions
- Best felt or recognized as the motion felt when we start to urinate
- It’s not a huge movement
- After urinating, try to recreate the motion to start urinating
- Do not strain or push!
- Drop the pelvic floor for a count of 5 and repeat “x” number of times per day

TA progression (Beth Shelly and Shirley Sahrmann)
- See handout

Stabilizer cuff for core stabilization (http://www.physio-pedia.com/Exercises_for_Lumbar_Instability)

Multifidus isometric
(www.dianelee.ca)

Goal: Teach clients to learn to use the multifidus at will and separately from other muscles.
The multifidus is the most important stabilizer of the spinal extensor group. People with low back pain often lose the ability to contract this muscle and do not regain the ability spontaneously.
Prone-lying position or sidelying position:
Therapist palpates the multifidus.
Bulge the muscles beneath the fingers of the therapist and differentiate between erector spinae contraction (more lateral) and multifidus contraction (more central).
To differentiate between the multifidus muscle and the erector spinae muscle, it’s recommended to contract the erector spinae muscle by hyperextend the trunk. To contract only the multifidus muscle, the patient may not hyperextend the trunk.
The terms core training and core strengthening have been used interchangeably in both physiotherapy and the fitness industry for years and often the same exercises are given indiscriminately to everyone, regardless of how their core is functioning. Is core training the same as core strengthening? Are core stabilization exercises the same as core strengthening exercises? Do you know the difference? Is there a difference? There certainly is, read on.

Language is often the source of much confusion in the world and exercises for your core are no exception. Most people with back pain are now aware that they need to 'do something' about their core if their back pain is to resolve. What should you do? Turn to the best place to find information these days - Google! If you search the internet for information on the best exercises for your back pain and you search 'core exercises' and back pain you too will become confused with which exercises to do, when, how many etc. What is the core anyway? Where is it and why is it so important? What should you do about it?

Where is your core?
The word ‘core’ refers to the area of your body between your diaphragm (breathing muscle that separates your chest from your abdomen) and your pelvic floor. It includes all the joints of the lumbar spine as well as those of the low thorax (chest) and the pelvis. There are many muscles that support this region and in addition to the pelvic floor and breathing diaphragm, the transversus abdominis (deepest abdominal) and the multifidus (deepest back muscle) are known to be important.

What do we know about how the core should function?
Recent research has shown that the deep muscles function differently from the superficial muscles (oblique abdominals, rectus abdominis and long back muscles) in that they not only prepare us for movement but they work no matter what we do, they are not movement or direction dependent. In health, they work like a harmonious chord in synergy with one another varying their levels of activation as they anticipate the impending loads that are about to load the trunk. The timing and amplitude of their contraction is vitally important if they are to provide control to the joints of the back and pelvis. Exercises for the core that focus on timing and co-activation with other muscles of the core are called core training exercises. Exercises that then take a well-timed and co-activated core and load it are called core strengthening exercises. Now you know the difference.

Why is the timing and co-activation of the core important?
Research has shown that it is the timing, or synergy, of co-contraction of the core muscles that is effected by back or pelvic pain or by the fear of back pain. Clinically, it appears that visceral pain (from the bowel, uterus and/or bladder) can also inhibit optimal function of the core. Current motor control theory suggests that the problem stems from a disruption in communication between your brain and the core muscles (motor planning problem). Since you cannot strengthen a muscle that your brain is not using, your current core strengthening exercises may merely be reinforcing a non-optimal pattern of muscle activation that you already have. Furthermore, this inhibition or delay in timing of contraction DOES NOT improve once the pain has resolved. One study followed people from their very first episode of acute low back pain for several years and found that some people still had discordant or non-synergistic muscle patterns. In addition, they continued to have frequent episodes of acute low back pain!
Core training exercises focus on restoring the timing and sequencing of your deep muscles. For the lumbopelvic region these include transversus abdominis, multifidus, the pelvic floor and breathing diaphragm. Since this system is anticipatory and prepares you for movement, we cannot give you 'doing' exercises as your brain will fire the big superficial doing muscles. Instead, we use preparatory cues and images where you imagine guy wires and connections to increase the activation of these deep muscles before you then move. We use our hands to feel for the right contractions, teach you how to feel with your hands the right contraction yourself, and then teach you to feel internally (bring awareness) the right contraction.

Ultrasound imaging is a powerful biofeedback tool that we also use to help you engage the right muscles at the right time. Efficiency, or effort, to move is also a useful way to know if you are activating your muscles in the right sequence. You can easily feel the difference in the effort it takes to lift your leg when you compare an optimal sequencing strategy with a non-optimal one.

Once you can activate the deep muscle system synergistically, it is time for core strengthening exercises. By adding loads through the trunk, leg or arms you will functionally strengthen an optimal pattern for stabilization that gives you stability but doesn't limit your mobility. This pattern of muscle activation can, and should, be integrated into any exercise you do. If you continue to use non-optimal strategies, such as inappropriate core strengthening exercises, while an underlying deep core muscle deficit is present, you will end up reinforcing the non-optimal pattern. Over time this can lead to tissue break down, pain or an inability to function at the level you used to. For some, the clue that their body isn't working well is the onset of low back pain. For others, the pain can be remote such as knee pain, plantar fasciitis or perhaps shoulder pain; everything ultimately connects to your core! So now you know the difference between core training and core strengthening. It does matter and it will make a difference.

- See more at: http://dianeelee.ca/article-core-training-versus-strengthening.php#sthash.Ep7Sa7uL.dpuf

Diastasis Recti Assessment and Treatment
To Measure:
Patient lies in hooklying
Instruct patient to lift head and shoulder blades off the floor
Measure in finger widths at 3 locations:
  - At umbilicus
  - 4 cm above umbilicus
- 4 cm below umbilicus
Recheck on a weekly basis or each PT visit if less often

Diastasis Recti Correction:
(www.mommymysmetime.com)

Alternative treatment for diastasis recti
- Abdominal binder
Belly Bandit (www.buybuybaby.com)
• Kinesiotaping
• Surgery

Lower extremity exercises (i.e. squats, lunges)
Stretching
• Adductors
• Piriformis
• Hamstrings
• ITB
• Quadriceps
• Hip flexors

• Happy baby pose
Vaginal Dilator Therapy
Dilators come in different sizes
Complete pelvic floor examination to determine your starting point
Instructions:
- ✓ Spread vaginal lubrication over dilator
- ✓ In hooking position, slowly, gently slide dilator through the vaginal introitus
- ✓ First, try to get the dilator at least 2/3 to fully inserted
- ✓ Second, try to move dilator around
- ✓ Third, slide dilator in and out of vagina
- ✓ Practice for 10 minutes daily
- ✓ Be sure to wash dilator and hands

Crystal Wand/ Therawand
Used for trigger point release

Using the Pelviwand® to Treat Female Pelvic Floor Muscle Dysfunction

By Dr. Pamela Morrison Wiles, PT, MS, DPT, BCB-PMD, IMTC

The curved design of the Pelviwand® is perfect for ease of use intravaginally to treat pelvic floor muscle dysfunction. The Pelviwand® has been used as a sexual device to stimulate the G-spot. Because of the brilliant design it has been employed as a massage tool by physical therapists and patients for those suffering with sexual pain or pelvic pain.

The Pelviwand® is tapered on one end allowing for easier vaginal insertion. Once inserted, the user can easily manipulate the Pelviwand® with the elongated handle to gently massage pelvic floor muscles that are tender, tight, or have trigger points. Users should use gentle strokes or sustained hold stretching with the Pelviwand® to perform
the massage and pain relieving techniques to the pelvic floor muscles. Massaging scar tissue (i.e. episiotomy scar) in the perineum may also be beneficial to alleviate scar pain, sensitivity, tightness, or painful intercourse.

**Useful for women with:**

- Pelvic floor muscle dysfunction (i.e. pain, overactivity, shortening, trigger points)
- Vaginismus
- Painful scar tissue
- Tight vaginal opening
- Anorgasmia

- Apply a generous amount of lubricant on the tapered end tip of the Pelviwand®.
- Assume a comfortable semi-reclined position with your knees bent. An alternative position may be standing with one leg raised on a footstool.
- Separate your labia majora and find your vaginal opening.
- Gently insert the tapered end into the vaginal opening.
- Orient yourself to the vaginal opening and pelvic floor muscles as a clock to identify painful or tight muscles.
- Turn the Pelviwand® to the 9 or 3 o’clock position to begin strokes.
- Since the pelvic floor muscles surround the vaginal opening, strokes are best performed from 11 to 7 o’clock and 1 to 5 o’clock.
- Avoid applying strokes to 12 or 6 o’clock due to sensitive structures such as the urethra and rectum unless otherwise directed by your practitioner.
- Perform gentle strokes for several minutes on each side until relief is felt.
- Trigger point release and lengthening can be achieved by holding sustained pressure on the painful pelvic floor muscle(s) with the tapered end of the Pelviwand®.
- Always use with caution and consult with a physical therapist that specializes in pelvic floor rehabilitation prior to use.
- Use daily or how prescribed by your health care provider

Theracane- amazon
Biofeedback Lab Procedures: Pathway PR 20

A. Electrode care and Use
   1. Keep the electrodes in sealed bag
   2. Show patient/lab partner the electrode in the sealed bag until ready to use
   3. Wear gloves while handling the electrode
   4. Remove the electrode from the bag
   5. Wash the electrode holding it under running water, use regular soap, rinse and dry.
   6. Always wash the electrode before and after each use.
   7. Squeeze some lubricant onto a tissue and dip the tip of the electrode onto it
   8. Don’t use too much lubricant or the electrode will slip out.
   9. Insert the electrodes with the tabs facing in the correct direction/the patient can insert themselves with instruction as they may be doing this at home

B. Biofeedback – Assessment – Patient should not see screen
   1. Connect Channel A to pelvic floor electrodes, Channel B to external oblique abdominal muscles
   2. Perform first assessment in supine
   3. Assess resting Tone – evaluate for 2 minutes on continuous mode
   4. Program the unit for Endurance Assessment - see Special Functions flow sheet
   5. Assess Endurance” work 10 sec. Rest 20 sec, 5 reps
   6. Program the unit for Quick Flick Assessment
   7. Assess Quick Flick: work 3 sec, Rest 6 sec, 5 reps
   8. Perform same tests in standing position
   9. Record average score for all tests

C. Assessment scores: use the space below to record your scores

   1. Average resting tone _____________ µv (microvolts)
   2. Average endurance _____________ µv (microvolts)
   3. Average quick flick _____________ µv (microvolts)

D. Biofeedback (treatment): Patient is instructed to view biofeedback monitor
   A. Endurance exercise Session
      1. Program endurance exercise: set work rest cycle; usually 5 sec, rest 10sec, 10 reps – 20 reps
      2. Set Channel A goal “above tone” so that patient must achieve goal to hear audio feedback
      3. Use average score from evaluation to set goal
      4. Set Channel B goal “below tone” so that patient must keep abdominal “quiet” or low in order to hear audio feedback.
      5. Talk patient/lab partner through entire exercise session, counting out loud and giving verbal cues.
   B. Quick Flick Exercise Session:
      1. Program quick flick session: work 3 sec, rest 6 sec, 10 reps – 20 reps
2. Goals same as endurance session
   C. Cough practice
      1. Use same parameters as quick flick session
      2. Instruct patient/lab partner to use the “knack” and contract pelvic floor muscles prior to cough (laugh, sit to stand etc.,)

         C. Resting tone (goal 3.5 µv or less)
            1. Set the unit to continuous monitoring
            2. Help the patient/lab partner find position of most comfort
            3. Practice bulging, pushing out gently

         D. Facilitate the pelvic floor
            1. Set the unit to continuous mode and observe the pelvic floor
            2. Place a pillow or ball between the knees and adduct
            3. Wrap a theraband around the knees and open knees apart (abduct)
            4. Posterior pelvic tilt
            5. Anterior pelvic tilt
            6. Contract gluteus maximus

         E. Use the space to record your scores
            1. Average resting tone ______________ µv (microvolts)
            2. Average endurance ______________ µv (microvolts)
            3. Average quick flick ______________ µv (microvolts)

3. Verbal cueing for Contraction
   a. Diaphragmatic breathing instructions
   b. Contract pelvic floor during exhale
   c. Lift the pelvic floor muscles upward and inwards
   d. Pull the pubic bone and coccyx together, sitting bones towards each other
   e. Squeeze like you’re trying not to pass gas, trying to stop the flow of urine

4. Verbal cueing for Relaxation
   a. Allow pelvic floor to drop down
   b. Push out as if trying to pass gas
   c. Release the tension in the pelvic floor
Incontinence Treatment Lab – Electrical Stimulation

STM-10 Features:

- Microprocessor controlled
- Auto step-through program
- Four duty cycles: 5/5, 5/10, 10/10, 10/20
- Four frequencies: 12.5Hz, 50Hz, 100Hz, 200Hz
- Six treatment times: 5, 10, 15, 20, 25 or 30 min.
- Time used display for patient compliance
- Protocol storage
- Tactile buttons for enhanced control
- Convenient 9V battery
- Economical and dual purpose Pathway™ vaginal and rectal EMG/stimulation sensors

1. Wash Electrode with soap and water or just warm water.
2. Insert electrode – vaginal or anal.
3. Connect to device
4. Press the “ON” button and the “INC” button at the same time to program the unit.
5. Select duty cycle “5:5”
6. Wait for the unit to cycle to frequency selection
7. Select 50Hz (typical for stress incontinence)
8. Wait for the unit to cycle to “treatment time”
10. Increase intensity until a strong but comfortable contraction is felt
11. Try to contract the Pelvic floor muscles with the stimulation
12. Feel the stimulation while supine, prone, sitting and standing

Now change the frequency to 12 Hz – (typically used for urge incontinence)

You will have to turn the unit Off then On again and go through steps 1 – 12
Ultrasound imaging Lab

Sonographic Imaging of Bladder and PFM as a group

Imaging in the Transverse Plane

Transabdominal ultrasound imaging can be performed in the supine, crook-lying (supine with hips and knees flexed), sitting, and standing positions. Reliability data have been reported for images gathered in crook lying, however, it has yet to be established for the other positions

1. Have your partner lie in hooklying or supine – if comfortable.

2. Expose the partners abdomen and drape appropriately as Fig 1 shows below

3. Place some gel on the transducer/probe.

4. Look for a marker on the probe (the circle on the images below indicate the marker location)

For transverse plane transabdominal ultrasound imaging of the bladder base, the transducer is placed in a transverse orientation, across the midline of the abdomen, immediately superior to the pubic symphysis. The angle of the transducer is manipulated until it is approximately 60° from the vertical and aimed towards the base of the bladder
RA – Rectus Abdominus
PFM – Pelvic Floor muscles
MPFD – midline pelvic floor density

- Marker on transducer

5. If your partner has sufficient fluid in the bladder you should get an image similar to the one above.

6. Ask your partner to perform a “Kegel”. What do you see during the contraction?

RA – Rectus abdominus, PFM – pelvic floor muscles; MPFD – midline pelvic floor density

If your partner can perform and appropriate PFM (Kegel) contraction you should note a cranial encroachment of the bladder by the PFM and MPFD.

7. Have your partner cough/laugh. What do you see?
Any activity which causes and increase in intra abdominal pressure (IAP) will cause a caudal motion of the bladder (see image above) If this load is not met by resistance from the PFM and fascia the individual could present with stress urinary incontinence and/or lumob pelvic pain.

8. Have your partner perform a Valsalva. What do you see

Imaging in the Sagittal Plane

For sagittal plane transabdominal ultrasound imaging of the bladder base, the ultrasound transducer is placed in a midline sagittal orientation immediately superior to the pubic symphysis on the lower abdomen. The angle of the transducer is manipulated until it points posterior and inferior to the symphysis pubis (towards the posteroinferior region or base of the bladder), allowing for a clear image of the bladder and the proximal aspect of its neck

NOTE: The marker on the transducer, which indicates the left side of the screen, should be oriented towards the patient's head
9. Have you partner perform a “kegel. What do you see?

10. Have your patient cough/laugh. What do you see?

11. Have your partner perform a Valsalva. What do you see?

Sonographic Imaging of abdominal muscles

Rectus Abdominus

To image the rectus abdominus place US transducer in the transverse plane between the pubis and umbilicus

You should see an image similar to photo (cats eyes).

M – Midline fascia – linea alba
a. Ask your partner to slowly lift their head off the table. What do you see?

A. RA at rest
B. RA during contraction – see change in muscle depth between arrows.

b. If your image doesn’t look like the above image let me know?

c. When could imaging the RA be beneficial, especially for women?

LA – Linea Alba
* - markers at the myofascial junction showing the inter recti distance

Top photo – Control subject
Bottom photo – post natal subject

d. Why has the inter recti distance increased?
Imaging Transversus abdominus and the obliques

ST - Subcutaneous Tissue; EO - External oblique; IO - Internal oblique;
TrA – Transversus abdominus

Position the probe in the transverse plane as shown in the photo

Tasks:

1. Watch muscle function of your partner during quiet breathing. Do you see any muscle contractions?

Several researchers have noted that the activity of the middle fibers of the TrA should be minimal during quiet breathing, and that no obvious activity should be seen in the IO. However, when there is either increased respiratory drive elastic loading through the thorax, TrA (followed by IO) is the first abdominal muscle recruited to assist respiration. Consequently, you may notice a change in muscle architecture facilitated by an increase in depth, decrease in length of the TrA (of IO) corresponding to expiration, during quiet breathing. These changes can be indicated of hyperactivity of the muscle and/or breathing dysfunction.

Additionally, the muscles of the abdomen are encased in fascia which has several attachments and a fixed volume similar to a balloon filled with water. Therefore increases in pressure driven by inspiration will result in the muscle layer architectural changes – a change in depth which may be falsely mistaken for a muscle contraction. Because of this great care should be taken to observe if your partners’
predominant breathing pattern is abdominal, lateral costal or apical. Look for changes in depth and length of the muscle in addition to respiratory rate, depth of respiration.

FYI...A study by US Army Baylor Dept of Physical (2009) showed that individuals with unilateral lumbopelvic pain demonstrated smaller increases in muscle thickness for the TrA and the IO when compared with asymptomatic individuals during the ASLR. TrA should fire prior to the superficial lateral abdominals and remain tonically active throughout the ASLR. This preactivation of the TrA happens in milliseconds and may not be apparent to the naked eye, however you should be able to note if the muscle can remain tonically active.

Now increase the load on the lumbo-pelvic area. For example a resisted arm lift, and asymmetric straight leg raise (ASLR).

1. What do you see?
2. Which muscles fire first?
3. Can your partner maintain the contraction during the ASLR?
4. Does the bladder stay centered during the ASLR?

2. Assess your partners ability to volitionally activate the pelvic floor muscles (PFM) and the Transversus abdominus (TrA), Internal obliques (IO) and rectus abdominus (RA)

3. Can you partner activate their PFM, TrA, IO? Don’t forget you need to image the bladder to see if the PFM are contracting

If not how would you teach these muscles?

Try these:

“Slowly and gently draw your lower abdominal wall in towards your spine”
“Slowly and gently contract the muscles that slow the flow of urine”
“Slowly and gently draw your vagina or testicles up into your abdomen”
“Slowly and gently think about closing your rear passage”

When the TrA contracts it will appear thicker (between white arrow) and move towards the right of the screen
References:

1. Hu et al. Muscle activity during the active straight tleg raise (ASLR), and the effects of a pelvic belt on the ASLR and on treadmill walking. *J Biomech.* 2009 Oct 3


