Advances in Surgical Treatment of Urinary Incontinence
World Continence Week 2013

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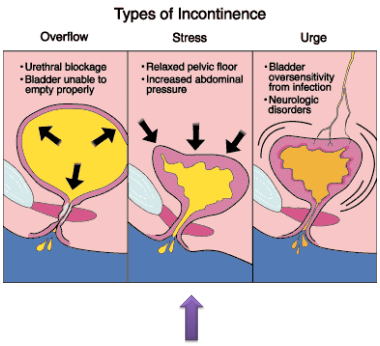
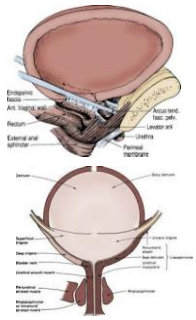
Urinary Incontinence

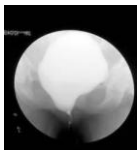
- Any involuntary loss of urine
- Demonstrated objectively
- *Social or hygienic problem*
- *US - $10 billion annually*
- Stress incontinence
  - Prevalence 8-33%
  - Treatment success variable definition (validated questionnaire, pad test, urodynamic, "improvement")

Cameron et al
Open Access Journal of Urology 2011:3 109-120

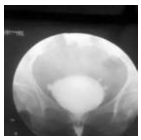


Pathophysiology of SUI





Urethral hypermobility



Intrinsic sphincter deficiency

Pelvic floor muscle training

- Reduces SUI but infrequently cures
- Biofeedback has no additional benefit
- Non-invasive and low risk
- Refer therapist for PFMT

Berghmans et al Br J Urol. 1998; 82: 181-191

Weight loss

- 1 RCT: patients with BMI > 36
- 8% reduction in BW vs control (1% reduction)
  - More patients with weight loss showed significant reduction (>70% reduction) in incontinence episodes at 6 months
  - Difficult to maintain weight loss

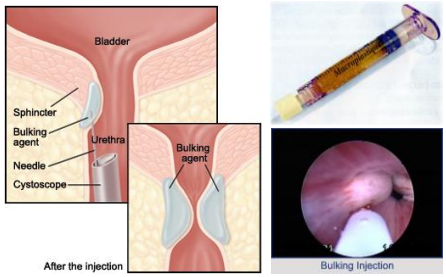
Subak et al NEJM 2009; 360: 481-490

Duloxetine

- Balanced serotonin and norepinephrine reuptake inhibitor
  - Stimulate pudenal motor neurons and increase striated sphincter contractility
- 1 RCT showed significant reduction in UI episodes (50% vs 27%)
  - Nausea is the commonest side effect
- Europe – approved for SUI
- US FDA – NOT approved

Dmochowski et al J Urol 2003; 170: 1259-1263

Urethral bulking agent



Urethral bulking agent

- "Minimal invasive" treatment ***for Intrinsic Sphincter Deficiency***
- ***Lower success rate c/w open surgery***
- Risks of allergy (collagen), migration (Teflon), erosion, retreatment
- *Collagen, almost historical* (approved in 1993)
  - Allergic 4% (skin test)
  - Reabsorption and retreatment

Cameron et al
Open Access Journal of Urology 2011:3 109-120

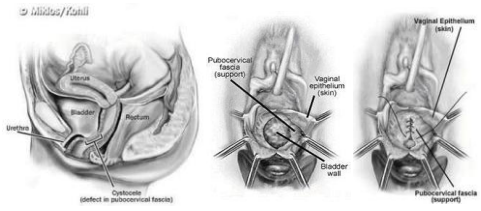
- ***Macroplastique and Coaptite (synthetic)***
  - Durable
  - No migration
- Macroplastique for ISD
  - RCT of Macroplastique vs Collagen
    - Improvement/ Cure at 12 months: 61.5%/ 36.9% (Macroplastique) vs 48%/ 24.8% (Collagen)

Keegan et al Cochrane Database Syst Rev. 2007; 3: CD003881

  - ***RCT of Pubovaginal sling vs Macroplastique***
    - ***Objective cure at 6 months: 81% after sling vs 9% after Macroplastique***

Maher et al BJOG 2005; 112: 797-801

Anterior Repair (Colporrhaphy)

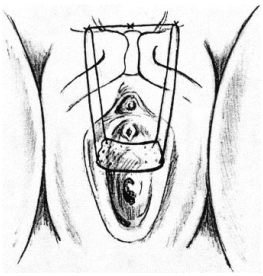


Anterior repair

- Vaginal approach to tackle urethral hypermobility and cystocele
  - Kelly's plication + cystocele repair
- 2x failure rate (29-38%) compared to retropubic suspension procedures (14-21%) at up to 5 years
- ***NOT recommended as primary treatment of SUI***

Glazener et al Cochrane Database Syst Rev. 2001; 1: CD001755

Bladder neck needle suspension



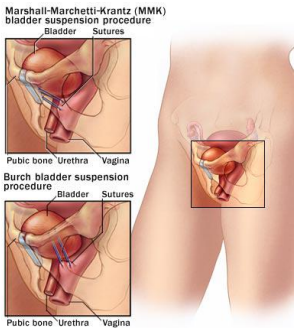
J Urol Vol.168, 2059–2062, November 2002

Bladder neck needle suspension

- Suture on needle passer passed from vagina to anterior abdominal wall
- Try to correct urethral hypermobility
- ***Failure rate high*** (29%) compared to retropubic suspension (16%) at 1 year

Glazener et al Cochrane Database Syst Rev. 2004; 2: CD003636

Open retropubic suspension



Open retropubic suspension

- Burch (anterior vaginal wall to ileo-pectineal ligament)
- MMK (bladder neck to pubic symphysis)
  - 1 year: 85-90% success
  - 5 year: 70% dry
- Burch has fewer surgical failure
- ***Effective to treat urethral hypermobility ("Gold standard")***

Lapitan et al Cochrane Database Syst Rev. 2009; 2: CD002912

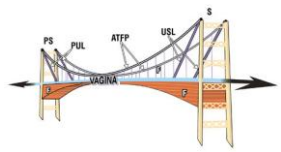
Laparoscopic Burch Colposuspension

- Lap vs Open Burch Colposuspension
  - Slightly worse cure rates in laparoscopic group
  - Fewer complications and shorter hospital stay in laparoscopic group

Dean et al Cochrane Database Syst Rev. 2009; 2: CD002912

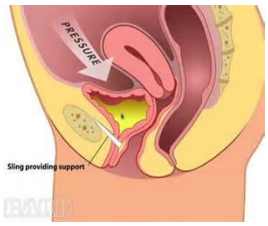
Mid-urethral Synthetic Slings

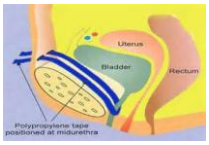
- 1990s Petros and Ulmsten et al
  - Integral theory
  - "Physiologic backboard" is created by fixation of the mid-urethra to pubic bone
  - Mid-urethral support

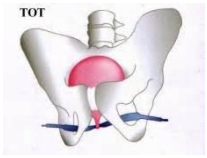


Petros and Ulmsten Acta Obstet Gynecol Scand. 1997; 166:3-8

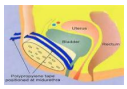
Mid-urethral support







Retropubic TVT vs SPARC



- TVT Gynecare – bottom-up approach
- SPARC (AMS) – top-down approach
  - Cochrane review 3 RCTs
  - At 12 months follow-up
    - ***TVT has higher subjective cure rates (85% vs 77%)***
    - ***TVT has higher objective cure rates (92% vs 87%)***

Ogah et al Cochrane Database Syst Rev. 2009; 4: CD006375

Transobturator TOT vs TVT-O

- ***Minimize complications related to vascular and enteric structures c/w retropubic approach***

- TOT – outside-in
- TVT-O – inside-out
  - Similar subjective and objective cure rates
  - ***TVT- O has less bladder injuries and voiding dysfunction***

Latthe et al BJOG 2007; 114:522-531

Retropubic vs Transobturator approach

…'May take RCT of 30,000 women to show the difference'

Sung et al Am J Obstet Gynecol. 2009; 21:342-347

Retropubic vs Transobturator

- 2010 multi-center trial with 12-month follow-up
  - Equivalent objective success
  - Transobturator approach has more leg weakness/ groin numbness
  - Retropubic approach has more bladder injuries and de novo voiding dysfunction

Richter et al NEJM 2010; 362:2066-2076

Retropubic vs Transobturator

- Small trial (208 patients) with varying degrees of SUI
- Mild SUI: TVT-O and TVT have same outcomes
- ***Severe SUI: all were cured by TVT but only 66% were cured with TVT-O***

Araco et al Int Urogynecol J. 2008; 19:917-926

Mini-slings

- Single vaginal incision
- Self-fixating tips to obturator muscles
- TVT vs Mini-sling
  - Mini-sling has a much higher rate of persistent stress incontnence at 6 weeks and 6 months

Kennelly et al J Urol. 2010; 184: 604-609

Burch vs TVT

- ***Small trials only***
  - Similar success
- TVT
  - Shorter operative time/ hospital stay/ costs
  - More bladder/ vaginal perforation

Ward et al BMJ 2002; 13(325): 67
Novara et al Eur Urol. 2010; 58: 218-238

- Burch
  - 8x more likely to develop pelvic organ prolapse
  - only in conjunction with other pelvic procedure e.g. abdominal sacrocolpopexy

Brubaker et al NEJM 2006; 354: 1557-1566

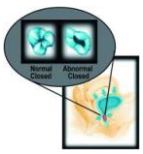
Lap Burch vs TVT

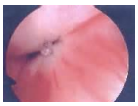
- Similar subjective cure rates
- Better objective cure rates for slings
- ***Much simpler for mid-urethral sling***

Dean et al Cochrane Database Syst Rev. 2009; 2: CD002912

Mid-urethral Slings for ISD

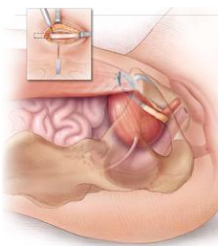
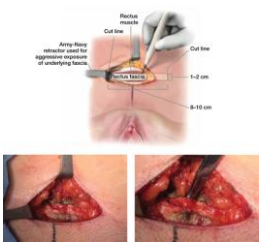
- Abdominal leak point pressure < 60cm water
- TVT vs TOT at 6 months follow-up
  - 21% in TVT group has persistent incontinence
  - 45% in TOT group has persistent incontinence
- TVT is a better option for patients with ISD



Schierlitz et al Obstet Gynecol. 2008; 112: 1253-1261

Pubovaginal Sling PVS

Pubovaginal Sling PVS

- ***Designed to treat Intrinsic Sphincter Deficiency***
- For Urethral Hypermobility: Burch vs PVS
  - Higher success for PVS
  - More voiding dysfunction/ obstruction/ urge incontinence

Albo et al NEJM 2007; 24 (356): 2143-2155

- For Urethral Hypermobility: PVS vs TVT
  - Similar success
  - Higher bladder injury rates after TVT
  - Higher rates of voiding dyfunction after PVS: needs longer hospitalization and higher self-catheterization rate

Rehman et al Cochrane Database Syst Rev. 2011; 1: CD001754

Synthetic mid-urethral slings are minimally invasive, safe and effective for female SUI with high leak point pressure (Urethral Hypermobility)

Different complication profiles

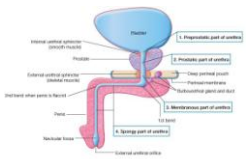
Cameron et al
Open Access Journal of Urology 2011:3
109-120

For Intrinsic Sphincter Deficiency, trial of pubovaginal sling vs mid-urethral sling is needed

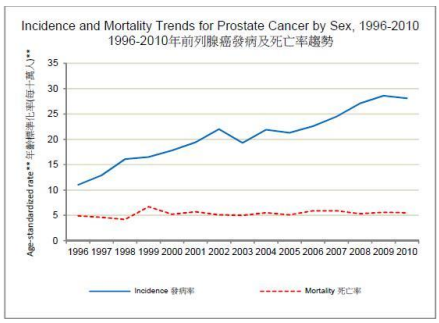
Cameron et al
Open Access Journal of Urology 2011:3
109-120

Male SUI

- Mainly iatrogenic
- Post-Radical Prostatectomy: 2-43%
  - Frequently quoted figures at 12 months
    - 0 pad: 90%
    - 0-1 pad: 10%
    - > 1 pad: 1%
- Radiotherapy: 1-16%
- TURP 1-3%



Trost et al Adv Urol. 2012: 287489

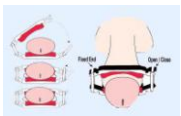


Male SUI

- No universally accepted evaluative methods
  - Subjective pad usage
  - 24-hour pad tests
  - "eye-balling"

Besides surgery

- Penile clamps



- Urethral bulking agents

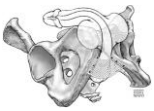
- Catheters

Before surgery

- Significant history
  - Urothelial carcinoma, urolithiasis, urethral stricture, bladder neck contracture
- Exclude infection and retention
- Normal bladder capacity and compliance
- ***No other urethral/ bladder pathologies***
- ***Hand and mental capacity***
- ***At least 6-12 months after initial events***

Trost et al Adv Urol. 2012: 287489

Male Slings

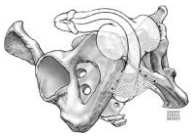


- Bone-Anchored Sling
  - Direct compression of bulbar urethra

- Retrourethral Transobturator Sling
  - Angulation of bulbar urethra
- Adjustable Retropubic Sling
- Quadratic Sling

Trost et al Adv Urol. 2012: 287489

Bone Anchored Slings



- Cure 37-67%
- Improvement 10-40%
- ***Prognostic factors***
  - ***Pre-op severity of incontinence***
  - ***? Prior radiation therapy***
- Complications
  - Infection 2-15%, erosion 0-3%, removal 0-13%
  - De novo urgency 0-14%, pain 0-73% (resolves in 4 months)

Trost et al Adv Urol. 2012: 287489

Retrourethral Transobsturator Slings

- Cure 52-74%
- Improvement 16-27%
- Complications
  - ***Temporary retention of urine*** < 2 weeks: 0-24%
  - Urethral injury: 0-3%
  - Pain: 0-34%
  - Sling removal: 0-4%

Trost et al Adv Urol. 2012: 287489

Retrourethral Transobsturator Slings

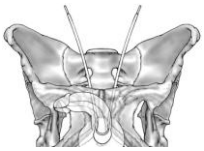
- Salvage after failed AUS
  - Cure 79%
  - Improvement 21%

Christine et al Urology 2010; 76(6): 1321-1324

- Salvage after failed slings
  - Cure 35%
  - Improvement 55%

Soljanik et al European Urology 2010; 58(5): 767-772

Adjustable Retropubic Sling

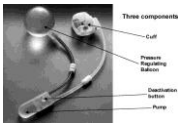


- Success 54-79%
- ***Need adjustment 10-100%***
- ***More complications***
  - Infection 5-7%, erosion 3-13%, removal 2-35%, ***bladder perforation*** 5-29%, ***retention*** 35%, pain 4-38%

Trost et al Adv Urol. 2012: 287489

Artificial Urinary Sphincter

- Popularized since 1978
- Most popular model AMS 800
  - Pump
  - Cuff of size 3.5 – 14cm
  - Reservoir in different pre-set pressures
  - Deactivation button



AUS outcomes

- Much longer mean follow-up 3 to 7.7 years
- Continent (0-1 pads)
  - 59-91%
- Complications
  - Urethral atrophy 4-10%, erosion 4-10%, infection 1-14%, mechanical failure 0-29%
- Most revisions are within first 36-48 months
- **Long-term mechanical failure rate: 36% at 10 years**

Trost et al Adv Urol. 2012: 287489

Sling or AUS

- No universally accepted standard of stratification
  - Degree of incontinence
  - Inability to function AUS
  - Prior sling or AUS
  - Patient or Surgeon preference/ expertise
  - Literature
  - Complications

AMS 800 Artificial Urinary Sphincter is the gold standard of treatment of male SUI

… since late 1990s, male sling was introduced as a surgical alternative for patients with low volume incontinence (1-3 pads/ day)

Trost et al Adv Urol. 2012: 287489

New AUS

- ZSI 375 device (Zephyr Surgical Implants, Geneva, Switzerland)
  - One-size-fit-all adjustable cuff
  - Pump and pressure-regulating tank together (pressure adjustable after insertion)
  - NO abdominal reservoir

Staerman et al BJUI 2013 Apr;111(4 Pt B):E202-6

ZSI 375 AUS

- Median follow-up 15.4 months
  - Social continence (0-1 pads/ day) 78% at 3 months, 73% at 6 months
  - Removal in 4 out of 36 patients (erosion/ infection)

Staerman et al BJUI 2013 Apr;111(4 Pt B):E202-6

…Uncommon to have complete resolution of incontinence

… patient counselling on reasonable expectations and potential complications