Conservative management for postprostatectomy urinary incontinence (Review)

Campbell SE, Glazener CMA, Hunter KF, Cody JD, Moore KN



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[Intervention Review]

Conservative management for postprostatectomy urinary incontinence

Susan E Campbell[2], Cathryn MA Glazener[3], Kathleen F Hunter[1], June D Cody[4], Katherine N Moore[5]

[1]Faculty of Nursing, University of Alberta, Edmonton, Canada. [2]School of Nursing Sciences, Faculty of Medicine and Health Sciences, University of East Anglia, Norwich, UK. [3]Health Services Research Unit, University of Aberdeen, Aberdeen, UK. [4]Cochrane Incontinence Review Group, University of Aberdeen, Foresterhill, UK. [5]Faculty of Nursing, University of Alberta, Alberta, Canada

Contact address: Kathleen F Hunter, Faculty of Nursing, University of Alberta, 3rd Floor Clinical Sciences Building, Edmonton, Alberta, T6G 2G3, Canada. kathleen.hunter@ualberta.ca.

Editorial group: Cochrane Incontinence Group.
Publication status and date: New search for studies and content updated (conclusions changed), published in Issue 1, 2012.
Review content assessed as up-to-date: 24 August 2011.

Citation: Campbell SE, Glazener CMA, Hunter KF, Cody JD, Moore KN. Conservative management for postprostatectomy urinary incontinence. *Cochrane Database of Systematic Reviews* 2012, Issue 1. Art. No.: CD001843. DOI: 10.1002/14651858.CD001843.pub4.

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ABSTRACT

Background

Urinary incontinence is common after both radical prostatectomy and transurethral resection of the prostate (TURP). Conservative management includes pelvic floor muscle training with or without biofeedback, electrical stimulation, extra-corporeal magnetic innervation (ExMI), compression devices (penile clamps), lifestyle changes, or a combination of methods.

Objectives

To assess the effects of conservative management for urinary incontinence after prostatectomy.

Search methods

We searched the Cochrane Incontinence Group Specialised Register (searched 24 August 2011), EMBASE (January 1980 to Week 48 2009), CINAHL (January 1982 to 20 November 2009), the reference lists of relevant articles, handsearched conference proceedings and contacted investigators to locate studies.

Selection criteria

Randomised or quasi-randomised controlled trials evaluating conservative interventions for urinary continence in men after prostatectomy.

Data collection and analysis

Two or more review authors assessed the methodological quality of trials and abstracted data. We tried to contact several authors of included studies to obtain extra information.

Main results

Thirty-seven trials met the inclusion criteria, 33 amongst men after radical prostatectomy, three trials after transurethral resection of the prostate (TURP) and one trial after either operation. The trials included 3399 men, of whom 1937 had an active conservative intervention. There was considerable variation in the interventions, populations and outcome measures. Data were not available for

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many of the pre-stated outcomes. Men's symptoms improved over time irrespective of management. Adverse effects did not occur or were not reported.

There was no evidence from eight trials that pelvic floor muscle training with or without biofeedback was better than control for men who had urinary incontinence after radical prostatectomy (e.g. 57% with urinary incontinence versus 62% in the control group, risk ratio (RR) for incontinence after 12 months 0.85, 95% confidence interval (CI) 0.60 to 1.22) as the confidence intervals were wide, reflecting uncertainty. However, one large multicentre trial of one-to-one therapy showed no difference in any urinary or quality of life outcome measures and had narrower confidence intervals. There was also no evidence of benefit for erectile dysfunction (56% with no erection in the pelvic floor muscle training group versus 55% in the control group after one year, RR 1.01, 95% CI 0.84 to 1.20). Individual small trials provided data to suggest that electrical stimulation, external magnetic innervation or combinations of treatments might be beneficial but the evidence was limited.

One large trial demonstrated that there was no benefit for incontinence or erectile dysfunction from a one-to-one pelvic floor muscle training based intervention to men who were incontinent after transurethral resection of the prostate (TURP) (e.g. 65% with urinary incontinence versus 62% in the control group, RR after 12 months 1.05, 95% CI 0.91 to 1.23).

In eight trials of conservative treatment of all men after radical prostatectomy aimed at both treatment and prevention, there was an overall benefit from pelvic floor muscle training versus control management in terms of reduction of UI (e.g. 10% with urinary incontinence after one year versus 32% in the control groups, RR for urinary incontinence 0.32, 95% CI 0.20 to 0.51). However, this finding was not supported by other data from pad tests. The findings should be treated with caution, as most trials were of poor to moderate quality and confidence intervals were wide.

Men in one trial were more satisfied with one type of external compression device, which had the lowest urine loss, compared to two others or no treatment. The effect of other conservative interventions such as lifestyle changes remains undetermined as no trials involving these interventions were identified.

Authors' conclusions

The value of the various approaches to conservative management of postprostatectomy incontinence after radical prostatectomy remains uncertain. It seems unlikely that men benefit from one-to-one pelvic floor muscle training therapy after transurethral resection of the prostate (TURP). Long-term incontinence may be managed by external penile clamp, but there are safety problems.

PLAIN LANGUAGE SUMMARY

Conservative management for men with urinary incontinence after prostate surgery

The prostate is a male sex gland that surrounds the outlet of the bladder. Two main diseases of the prostate (cancer of the prostate, and benign (non cancerous) prostatic enlargement) can be treated by surgery but some men suffer leakage of urine (urinary incontinence) afterwards. Conservative treatment of the leakage, such as pelvic floor muscle training with or without biofeedback or anal electrical stimulation are thought to help men control this leakage. The review of trials found that there was conflicting evidence about the benefit of therapists teaching men to contract their pelvic floor muscles for either prevention or treatment of urine leakage after radical prostate surgery for cancer. However, information from one large trial suggested that men do not benefit from seeing a therapist to receive pelvic floor muscle training after transurethral resection (TURP) for benign prostatic enlargement. Of three external compression devices tested, one penile clamp seemed to be better than the others but needs to be used cautiously because of safety risks. More research of better quality is needed to assess conservative management.

BACKGROUND

Description of the condition

It is not uncommon for men to have urinary incontinence (UI) after prostatectomy. The reported frequency varies depending on the

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type of surgery and surgical technique (Grise 2001; Peyromaure 2002), the definition and quantification of incontinence (Grise 2001; Peyromaure 2002), the timing of the evaluation relative to the surgery, and who evaluates the presence or absence of incontinence (physician or patient) (Donnellan 1997; McCammon 1999).

The prevalence of urinary incontinence after radical prostatectomy is widely reported, ranging from 2% to 60%, albeit at varying times after operation (Milsom 2009). For example, in one study at three months after radical prostatectomy (Donnellan 1997), 51% were subjectively wet (self-report) but 36% were wet on pad testing (objective). By 12 months, 20% were subjectively still wet, but only 16% were classed as wet using objective criteria. Because of the extensive nature of the dissection needed to remove the whole prostate, nerve damage is common and erectile dysfunction frequently occurs.

After transurethral resection of the prostate (TURP) for benign prostate disease, UI is less common at three months after operation (e.g. 10% needing to wear pads), but longer term data are not available (Emberton 1996). This is a less invasive operation than a radical prostatectomy, and usually does not involve damage to pelvic nerves. Due to these clinical differences, we have therefore analysed data relating to TURP separately.

After both types of operation, the problem tends to improve with time: it declines and plateaus within one to two years postoperatively (Hunskaar 2002). However, some men are left with incontinence that persists for years afterwards.

Continence mechanisms

Urinary continence depends on a complex interaction of smooth and striated muscle fibres blended together to form the continence mechanism. Considerable debate has existed in the literature as to whether incontinence after prostatectomy is due to an effect on the detrusor (bladder) muscle or on the sphincter, as commonly these abnormalities coexist (Peyromaure 2002). New detrusor overactivity and intrinsic sphincter deficiency due to sphincteric injury (Ficazzola 1998; Groutz 2000; McGuire 1990) or weakness (Majoros 2006) are cited as the most important causes of persistent incontinence after radical prostatectomy. Debate continues on whether detrusor overactivity is a primary or secondary factor. Whereas some report overactivity as the primary cause of postprostatectomy incontinence (Golubuff 1995; Leach 1995) others argue strongly that even if other factors play a role, intrinsic sphincter deficiency is the primary cause of UI after radical prostatectomy (Aboseif 1996; Chao 1995; Groutz 2000; Gudziak 1996; Kondo 2002; Majoros 2006; Winters 1997).

Risk factors for postprostatectomy UI after radical prostatectomy include pre-existing abnormalities of detrusor contractility (Leach 1995) and older age (Diokno 1997; Kondo 2002) (possibly due to progressive reduction in sphincter striated muscle cells with age, (Strasser 1997)). Other risk factors include previous TURP (Jacobsen 2007); pre-operative radiotherapy (Kondo 2002; Rainwater 1988); trauma; spinal cord lesion; new obstruction due to recurrence, bladder neck contracture, or urethral stricture (Litwiller 1997); Parkinson's disease (Kondo 2002); dementia; and medications (Khan 1991). A surgeon's inadequate skill and expertise (Eastham 1996) and having surgery in a hospital which performs fewer than 20 radical prostatectomies a year may also be a factor (Albertsen 1997).

After TURP, UI is thought to most likely be due to pre-existing abnormalities of bladder function such as poor compliance or detrusor overactivity, rather than direct sphincter injury (Abrams 1991), possibly because removal of the prostatic tissue removed some of the protective mechanism for continence.

Description of the intervention

Many of the treatments in current practice for postprostatectomy UI are 'conservative,' which is usually considered not to involve drugs or surgery. Five categories of conservative management are considered in this review, singly and in combination when appropriate.

1. Pelvic floor muscle training (PFMT)

This involves any method of training the pelvic floor muscles to contract, including teaching performance of an accurate voluntary pelvic floor muscle contraction using biofeedback, and coordinating and timing the contraction against increases in intra-abdominal pressure, often called functional PFMT.

Traditionally, biofeedback involves the use of equipment to provide visual or auditory feedback about the pelvic floor muscle function to enable one to train, strengthen and increase endurance and coordination of the pelvic floor muscle contractions. Simple auditory biofeedback can also be provided by the therapist informing the patient when a contraction is felt through digital anal examination during the pelvic floor muscle contraction.

The theoretical basis of PFMT is that repeated, volitional contractions of selected pelvic floor muscles may improve their strength and efficiency during periods of increased intra-abdominal pressure. In a systematic review of the literature on female UI, Berghmans and colleagues noted that a pelvic floor muscle contraction may raise the urethra and press it towards the symphysis pubis, prevent urethral descent, and improve structural support of the pelvic organs (Berghmans 1998). They further pointed out that PFMT may result in hypertrophy of the periurethral striated muscles thereby increasing the 'external mechanical pressure on the urethra'.

2. Electrical stimulation (non-invasive) delivered via surface electrodes

Two types of non-invasive electrical stimulation are recognised.

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Anal electrical stimulation

Any type of electrical stimulation using a non-invasive surface anal probe designed for the therapy. The intention of electrical stimulation is to facilitate contraction of the periurethral striated muscle.

Sticky patch electrodes, also called transcutaneous electrical nerve stimulation (TENS)

Transcutaneous electrical nerve stimulation is a low intensity, sensory nerve stimulation used for detrusor overactivity, delivered at various sites, using patch electrodes. Sites include the sacral dermatomes (Hasan 1996), dorsal penile nerve (Nakamura 1984), hamstring and quadriceps muscle (Okada 1998), and the posterior tibial or perineal nerves (McGuire 1983).

3. Lifestyle adjustment

This includes fluid adjustment, diet, caffeine elimination, physical exercise, weight loss and cessation of smoking.

4. Extra-corporeal magnetic innervation

This involves the use of a magnetic chair to stimulate contraction of the pelvic floor muscles (Galloway 2000).

5. External penile compression devices (penile clamp)

These devices use an external clamp to achieve non-surgical compression of the urethra.

Timing of the intervention

Conservative treatment can be started before or after surgery. In general when it is delivered to all men (whether before or after) the aim is to prevent the development or persistence of UI. We have therefore distinguished between treatment of all men who do have UI ('Treatment'), as opposed to a mixed population of men some of whom do not have UI ('Prevention').

Why it is important to do this review

The uncertainty about the benefit of conservative treatment for men with urinary incontinence after prostate surgery was confirmed in the initial Cochrane review, first published in 1999 (Moore 1999b) and updated in 2001 (Moore 2001). The review originally only considered post-operative PFMT, biofeedback and electrical stimulation. In a subsequent update (Hunter 2004), the review was broadened to include trials evaluating lifestyle adjustment, external penile compression devices and extracorporeal magnetic innervation. The most recent update also included trials on men after TURP (Hunter 2007) but still did not provide reliable evidence on the effects of conservative treatment. The current update includes 18 new trials.

OBJECTIVES

To determine the effects of conservative management for UI after transurethral, suprapubic, laparoscopic, radical retropubic or perineal prostatectomy, including any single conservative therapy or any combination of conservative therapies. Pharmacological agents will be considered in separate reviews. The use of the term 'sham therapy' in this review means any therapy that could not influence the pelvic floor muscles such as placing an electrical stimulation probe in the anus but not turning it on.

The following comparisons were made for treatment and/or prevention of UI after prostatectomy:

Radical prostatectomy

Treatment (of men with UI after radical prostatectomy)

(1) Treatment of UI after radical prostatectomy: PFMT plus or minus biofeedback versus no treatment or sham therapy or verbal instruction;
(2) Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim)/perineal electrical stimulation/transcutaneous electrical nerve stimulation (TENS)/extracorporeal magnetic innervation (ExMI)) versus no treatment/sham treatment;
(3) Treatment of UI after radical prostatectomy: lifestyle interventions versus no treatment/sham treatment;
(4) Treatment of UI after radical prostatectomy: combinations of treatments versus no treatment/sham treatment;
(5) Treatment of UI after radical prostatectomy: one treatment versus another active treatment;

Prevention (of UI in men after radical prostatectomy)

(6) Prevention of UI after radical prostatectomy: PFMT plus or minus biofeedback versus no treatment or sham therapy or verbal instruction;
(7) Prevention of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim)/perineal electrical stimulation/transcutaneous electrical nerve stimulation (TENS)/extracorporeal magnetic innervation (ExMI)) versus no treatment/sham treatment;
(8) Prevention of UI after radical prostatectomy: lifestyle interventions versus no treatment/sham treatment;

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(9) Prevention of UI after radical prostatectomy: combinations of treatments versus no treatment/sham treatment;
(10) Prevention of UI after radical prostatectomy: one treatment versus another active treatment;

TURP

Treatment (of men with UI after TURP)

(11) Treatment of UI after TURP: PFMT plus or minus biofeedback versus no treatment or sham therapy or verbal instruction;
(12) Treatment of UI after TURP: electric or magnetic energy (e.g. anal electrical stimulation (EStim)/perineal electrical stimulation/transcutaneous electrical nerve stimulation (TENS)/extracorporeal magnetic innervation (ExMI)) versus no treatment/sham treatment;
(13) Treatment of UI after TURP: lifestyle interventions versus no treatment/sham treatment;
(14) Treatment of UI after TURP: combinations of treatments versus no treatment/sham treatment;
(15) Treatment of UI after TURP: one treatment versus another active treatment;

Prevention (of UI in men after TURP)

(16) Prevention of UI after TURP: pre or post-operative PFMT plus or minus biofeedback versus no treatment or sham therapy or verbal instruction;
(17) Prevention of UI after TURP: electric or magnetic energy (e.g. anal electrical stimulation (EStim)/perineal electrical stimulation/transcutaneous electrical nerve stimulation (TENS)/extracorporeal magnetic innervation (ExMI)) versus no treatment/sham treatment;
(18) Prevention of UI after TURP: lifestyle interventions versus no treatment/sham treatment;
(19) Prevention of UI after TURP: combinations of treatments versus no treatment/sham treatment;
(20) Prevention of UI after TURP: one treatment versus another active treatment;

Containment of Urinary Incontinence from any cause.

(21) external penile compression devices (penile clamps) versus no treatment or sham treatment.
We have not listed all possible comparisons here. As and when new trials address new comparisons these will be added to the review.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised or quasi-randomised controlled trials of conservative management to prevent or treat UI after TURP or radical prostatectomy were sought. Trials amongst men having a radical prostatectomy were analysed separately from those in men having a TURP.

Types of participants

Men undergoing a prostatectomy for either benign prostatic hyperplasia or prostate cancer. Studies involving men experiencing UI prior to prostatectomy were excluded.

Types of interventions

PFMT; biofeedback (verbal or machine-mediated); electrical stimulation via a surface electrode (e.g. anal probe electrical stimulation; sticky patch electrode; transcutaneous electrical nerve stimulation (TENS)); extra-corporeal magnetic innervation (ExMI); lifestyle adjustment; and external penile compression devices. These interventions can be compared with no treatment or with each other, alone or in combination.

Types of outcome measures

Primary outcomes

1. Participant reported observations of incontinence and lower urinary tract symptoms (LUTS)

- Self report of UI (number not cured or improved)
- Number of pad/clothing changes (pad changes per 24 hours)
- Frequency of UI from self-report or diary (incontinent episodes per 24 hours)
- Frequency of micturitions per 24 hours
- De novo urge symptoms

2. Quantification of symptoms

- Standardised pad test (24 hour or 1 hour) measuring grams of urine lost

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Secondary outcomes

1. Participant satisfaction

- Self report of satisfaction with method

2. Health status measures

- Impact of UI e.g. Incontinence Impact Questionnaire (Uebersax 1995)
- General health status e.g. Short Form 36 (Ware 1993)
- Quality of life e.g. European Organisation for Research and Treatment of Cancer (EORTC QLQ-C30), version 2 (Aaronson 1988; Aaronson 1993)
- Symptom inventory e.g. International Prostate Symptom Score (IPSS) (Barry 1992)

3. Adverse effects

4. Health economics outcomes

- Cost of intervention
- Resource implications of differences in outcome
- Economic analysis (cost effectiveness, cost utility)

5. Other outcomes

- Non pre-specified outcomes judged important when performing the review.

Search methods for identification of studies

We did not impose any language or other limits on the searches. Details of the search methods used for the previous versions of this review can be found in Appendix 1.

Electronic searches

This review has drawn on the search strategy developed for the Incontinence Review Group. Relevant trials were identified from the Group's Specialised Register of controlled trials which is described, along with the group's search strategy, under the Incontinence Group's module in *The Cochrane Library*. The register contains trials identified from MEDLINE, CINAHL, the Cochrane Central Register of Controlled Trials (CENTRAL) and handsearching of journals and conference proceedings. The Incontinence Group Specialised Trials Register was searched using the Group's own keyword system, the search terms used were:
({design.cct*} OR {design.rct*})
AND
({topic.urine.incon.postprost*})
(All searches were of the keyword field of Reference Manager 12, ISI ResearchSoft).
Date of the most recent search of the register for this review: 24 August 2011.
The trials in the Incontinence Group Specialised Register are also contained in CENTRAL.
Extra specific searches were also performed for this update of the review. These are detailed below:

- EMBASE (January 1980 to Week 48 2009) was searched on 3 December 2009;
- CINAHL (January 1982 to 20 November 2009) was searched on 7 December 2009.

The search strategies used to search these databases can be found in Appendix 2.

Searching other resources

Reference lists of relevant articles

The reference lists of relevant articles were searched for other possibly relevant trials.

Contact with investigators in the field

We contacted investigators to ask for other possibly relevant trials, published or unpublished.

Data collection and analysis

Comparisons of the outcomes of the chosen interventions with no treatment, with each other, and in combination were planned *a priori* for the review update. Data were not available for all planned comparisons. There was considerable diversity in the length of time interventions were carried out and in the timing of outcome measurements relative to randomisation. The data were therefore reported at three monthly time points.

Selection of studies

The list of abstracts for each update was reviewed independently by two review authors and results compared. The full text article of references or abstracts identified as potentially relevant by either reviewer were retrieved and reviewed by both. Reference lists of relevant review articles were reviewed to identify any further trials. References were assessed based on the population, interventions, control management, outcomes and overall study design. Using the full text of the potentially relevant published studies and abstracts, the same two review authors independently reviewed the studies for relevance and inclusion. Authors were contacted for further data and/or clarification of methods. Disagreements were

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resolved through discussion; third party arbitration was not required.

Attempts were made to contact authors of trial reports if clarification was necessary. Studies were excluded from the review if they made comparisons other than those pre-specified or if data were unavailable. Excluded studies are listed with reasons for their exclusion.

Data extraction and management

Data for the trials were extracted independently by two review authors using a standard form developed for this purpose. The following information was included:

- study method and characteristics (design, method of randomisation, inclusion/exclusion criteria, withdrawals/dropouts);
- participants (type of surgery, age, timing of randomisation, baseline incontinence or not);
- type of intervention, timing (before or after surgery, or both) and duration of therapy, co-interventions;
- control (no treatment or sham therapy or other active treatment);
- outcomes (types of outcome measures, reported outcomes, adverse events).

Extracted data were compared by two review authors for completeness and accuracy, and cross checked by another review author if necessary. Disagreements were resolved through discussion and review of the trial report. New data were entered using RevMan5 software.

Assessment of risk of bias in included studies

The risk of bias of the trials was assessed using the Cochrane 'Risk of bias' tool.

The following methodological parameters were recorded:

1) identification of study as randomised or quasi-randomised;

2) description of inclusion/exclusion criteria;

3) potential for selection bias (method of sequence generation, adequacy of random allocation concealment) rating;

4) potential for bias around the time of treatment or during outcome assessment (blinding);

5) potential for selection bias in analysis (description of withdrawals/dropouts/lost to follow up, analysis on intention to treat).

Data synthesis

Included trial data were processed as described in the Cochrane Collaboration Handbook (Higgins 2011).

For dichotomous outcomes, data were summarized (e.g. number of people for whom an outcome is present or not) and risk ratios (RR) calculated with their 95% confidence intervals (CI). For continuous outcomes, each trial was summarised using the mean value for each group and SDs, and combined as weighted mean differences (WMD) if the same scale (e.g. pad test in grams of urine) was used for the outcome measurement in more than one trial. A fixed-effect model was used to calculate the summary statistic and the 95% confidence intervals. Heterogeneity was assessed visually and using the Chi^2 test for heterogeneity and the I^2 statistic (Higgins 2003). Forest plots were examined and potential sources influencing heterogeneity identified. Possible sources of heterogeneity were explored statistically through subgroup analysis. Where synthesis was deemed not appropriate, a narrative overview was planned.

RESULTS

Description of studies

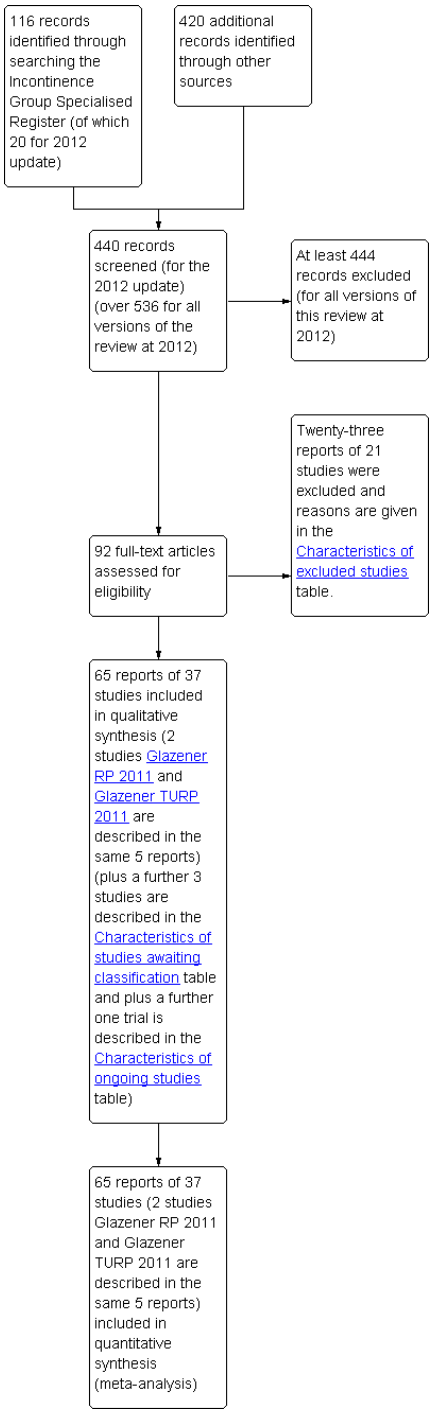
See: Characteristics of included studies; Characteristics of excluded studies; Characteristics of studies awaiting classification; Characteristics of ongoing studies.

Results of the search

For the current update (2012), sources and numbers of potentially eligible titles were: Cochrane Incontinence Group Specialised Register (20); updated search of EMBASE (387); and CINAHL (33), for a list of 440 possibly relevant articles and abstracts. After assessment 18 potentially relevant trials for addition to the review were identified, and one trial was updated. One review author (KH) contacted authors for further data and/or clarification of methods. Overall 65 reports of 37 studies are included in the qualitative synthesis (2 studies Glazener RP 2011 and Glazener TURP 2011 are described in the same 5 reports) (plus a further 3 studies are described in the Characteristics of studies awaiting classification table and additionally a further one trial is described in the Characteristics of ongoing studies table). Twenty-three reports of 21 studies were excluded and reasons are given in the Characteristics of excluded studies table. The flow of the literature through the assessment process is shown in the PRISMA diagram (Figure 1).

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Figure 1. PRISMA study flow diagram



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New included trials

One trial (Yokoyama 2004) which was previously excluded as the data was not in a usable format for inclusion in tables of comparison has now been included. Eighteen additional trials were included in this update (Centemero 2009; Glazener RP 2011; Glazener TURP 2011; Goode 2009; Koo 2009; Liu 2008; Manassero 2007; Mariotti 2009; Nowak 2007; Overgard 2008; Perissinotto 2008; Ribeiro 2008; Robinson 2008; Robinson 2009; Seleme 2008; Tibaek 2007; Tobia 2008; Yamanishi 2006), bringing the total number of included trials to thirty seven. One previously included trial published as an abstract was updated with data from a full publication (Dubbelman 2004). Two trials are awaiting further information from authors (Delmastro 2010; Marchiori 2010) and one trial is ongoing (Voorham 2010).

Included studies

Types of populations

Thirty-three trials involved patients undergoing radical prostatectomy (Bales 2000; Burgio 2006; Centemero 2009; Dubbelman 2004; Filocamo 2005; Floratos 2002; Franke 1998; Glazener RP 2011; Goode 2009; Hoffman 2005; Joseph 2000: Koo 2009; Liu 2008; Manassero 2007; Mariotti 2009; Mathewson-Chapman 97; Moore 1999; Moore 2004; Moore 2008; Nowak 2007; Opsomer 1994; Overgard 2008; Parekh 2003; Perissinotto 2008; Ribeiro 2008; Robinson 2008; Robinson 2009; Seleme 2008; Tobia 2008; van Kampen 1998; Wille 2003; Yamanishi 2006; Yokoyama 2004; Zhang 2007); three trials involved patients after TURP (Glazener TURP 2011; Porru 2001; Tibaek 2007); and one trial included one patient after TURP (Joseph 2000; however this trial has been analysed within the radical group). The trials included 3399 men, of whom 1937 had an active conservative intervention.

Continence status of populations:

- Twenty-one trials enrolled only men with post operative UI (diagnosis of UI varied with recruitment time), (Dubbelman 2004; Floratos 2002; Franke 1998; Glazener RP 2011; Glazener TURP 2011; Goode 2009; Hoffman 2005; Joseph 2000; Koo 2009; Liu 2008; Manassero 2007; Moore 1999; Moore 2004; Moore 2008; Opsomer 1994; Robinson 2009; Seleme 2008; van Kampen 1998; Yamanishi 2006; Yokoyama 2004; Zhang 2007)
- Sixteen others included ALL men who underwent surgery, some of whom may have been dry or become dry spontaneously (Bales 2000; Burgio 2006; Centemero 2009; Filocamo 2005; Mariotti 2009; Mathewson-Chapman 97; Nowak 2007; Overgard 2008; Parekh 2003; Perissinotto 2008; Porru 2001; Ribeiro 2008; Robinson 2008; Tibaek 2007; Tobia 2008; Wille 2003).

This variation in continence status has led to different populations being studied separately: those with persistent UI and those with all men undergoing surgery (many of whom are likely to recover continence spontaneously). The comparisons were therefore structured to reflect this: trials which included only men with postoperative incontinence were deemed to be trials of treatment, while trials in which all men were treated (irrespective of continence status) were deemed to be trials of 'prevention'.

As the populations and the type and timing of interventions varied so greatly among the trials, the decision was made by the authors to also identify the timing of the recruitment to the trials and the timing of the intervention (before or after surgery):

- only post operative treatment for urinary incontinence (Dubbelman 2004; Floratos 2002; Franke 1998; Glazener RP 2011; Glazener TURP 2011; Goode 2009; Hoffman 2005; Joseph 2000; Koo 2009; Liu 2008; Manassero 2007; Mariotti 2009; Moore 1999; Moore 2008; Nowak 2007; Overgard 2008; Ribeiro 2008; Robinson 2009; Seleme 2008; van Kampen 1998; Yokoyama 2004; Zhang 2007) or containment (Moore 2004); and
- pre-operative recruitment of all men undergoing surgery which included a pre-operative intervention with or without a post-operative intervention (Bales 2000; Burgio 2006; Centemero 2009; Filocamo 2005; Mathewson-Chapman 97; Parekh 2003; Perissinotto 2008; Porru 2001; Robinson 2008; Tibaek 2007; Tobia 2008; Wille 2003; Yamanishi 2006).

Trials involving post TURP patients only (Glazener TURP 2011; Porru 2001; Tibaek 2007) were analysed separately from the trials amongst men having radical prostatectomy.

One very small trial included one patient having a TURP while the rest were radical prostatectomy (Joseph 2000) but this was included in the radical prostatectomy group for analysis. Also, as all the men in this trial were incontinent for some time after surgery, they may represent a group with persistent (long term) UI. There are many potentially confounding variables in this trial, acknowledged by the author.

Time of recruitment of participants to the trial also varied:

- Preoperatively (Bales 2000; Burgio 2006; Centemero 2009; Mathewson-Chapman 97; Moore 2008; Nowak 2007; Overgard 2008; Parekh 2003; Perissinotto 2008; Robinson 2008; Tibaek 2007; Tobia 2008; Wille 2003),
- Within days or up to two weeks postoperatively or after catheter removal (Dubbelman 2004; Filocamo 2005; Floratos 2002; Franke 1998; Glazener RP 2011; Glazener TURP 2011; Hoffman 2005; Koo 2009; Liu 2008; Manassero 2007; Mariotti 2009; Porru 2001; Ribeiro 2008; Robinson 2009; van Kampen 1998; Yamanishi 2006).
- Weeks to months after surgery (Goode 2009; Joseph 2000; Moore 1999; Moore 2004; Opsomer 1994; Seleme 2008; Zhang

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2007).

Types of interventions

In the included trials, there was considerable variation in the type and intensity of interventions. Table 1 gives the exact details of the interventions used in each trial. The duration of the treatment varied from four weeks up to one year. The interventions included:

- PFMT alone (Centemero 2009; Dubbelman 2004; Filocamo 2005; Glazener RP 2011; Glazener TURP 2011; Goode 2009; Perissinotto 2008; Porru 2001; Tobia 2008).
- PFMT plus biofeedback (Bales 2000; Burgio 2006; Floratos 2002; Franke 1998; Joseph 2000; Manassero 2007; Mathewson-Chapman 97; Moore 1999; Moore 2008; Overgard 2008; Parekh 2003; Ribeiro 2008; Robinson 2008; Robinson 2009; Tibaek 2007).
- Electrical stimulation with PFMT (Hoffman 2005; ; Wille 2003; Yamanishi 2006).
- Electrical stimulation with PFMTand biofeedback (Goode 2009; Mariotti 2009; Opsomer 1994; Seleme 2008; Wille 2003; Zhang 2007).
- Extracorporeal magnetic innervation (ExMI) with PFMT (Koo 2009; Liu 2008; Nowak 2007).
- Extracorporeal magnetic innervation (ExMI) with PFMT or electrical stimulation with PFMT (Yokoyama 2004).
- Penile compression (Moore 2004).
- No trials testing lifestyle changes alone were identified.

Types of outcome measures

There was lack of consistency in the reporting of outcome measures. In terms of the primary outcomes of interest in this review these included:

- number of men with incontinence: for radicals (Bales 2000; Burgio 2006; Centemero 2009; Dubbelman 2004; Filocamo 2005; Floratos 2002; Franke 1998; Glazener RP 2011; Goode 2009; Manassero 2007; Mariotti 2009; Mathewson-Chapman 97; Moore 1999; Moore 2004; Opsomer 1994; Overgard 2008; Parekh 2003; Tobia 2008; van Kampen 1998; Yamanishi 2006): and for TURP (Glazener TURP 2011; Porru 2001; Tibaek 2007);
- number not cured (Zhang 2007) (assumed to indicate number of incontinent men);
- time until continent (Mariotti 2009);
- number of pad changes over 24 hours (Floratos 2002; Koo 2009; Mathewson-Chapman 97; Ribeiro 2008) or number of men using pads (Glazener RP 2011; Glazener TURP 2011);
- number of incontinence episodes per day (Glazener RP 2011; Glazener TURP 2011; Goode 2009);
- pad test weights, grams of urine lost in: 24 hours (Joseph 2000; Koo 2009; Mariotti 2009; Mathewson-Chapman 97; Moore 1999; Moore 2008; Overgard 2008; Ribeiro 2008; Yamanishi 2006); 1 hour (Floratos 2002; Hoffman 2005); 20 minutes (Wille 2003);
- number with severe incontinence (pad test weight > 150 g) (Centemero 2009);
- quality of life (condition-specific such as incontinence scores): ICIQ-short form score (Centemero 2009; Glazener RP 2011; Glazener TURP 2011; Ribeiro 2008; Yamanishi 2006); severity of UI (Zhang 2007); I-QoL (Seleme 2008); ICI-Q-SF (Liu 2008); IIQ (Ribeiro 2008); ICIQ-short form QoL score (Glazener RP 2011; Glazener TURP 2011; Yamanishi 2006); EPIC-UI (Goode 2009);
- pelvic floor muscle strength (Overgard 2008);
- carrying out PFMT or compliance (Glazener RP 2011; Glazener TURP 2011; Goode 2009; Overgard 2008; Zhang 2007);
- erectile dysfunction (Glazener RP 2011; Glazener TURP 2011).

Excluded studies

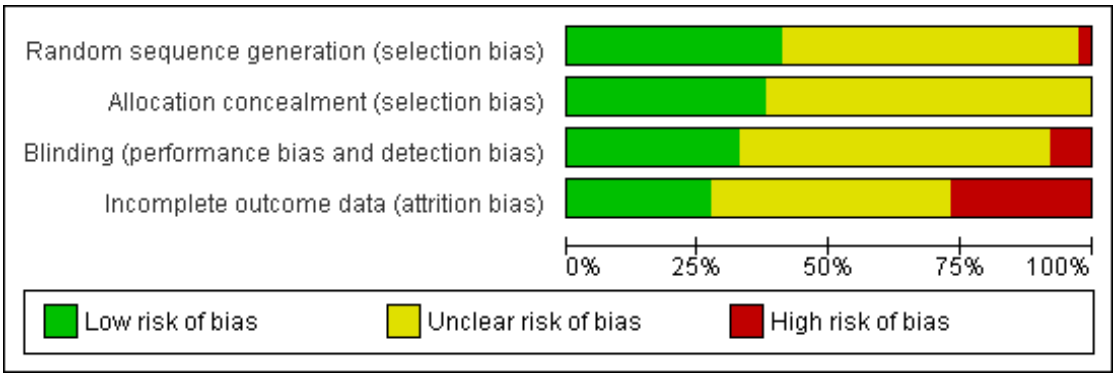
In total 20 studies were excluded (see Table of Excluded studies). Most of the studies were not RCTs, or did not provide enough information for this to be assessed.

Risk of bias in included studies

The assessment criteria of the Cochrane Collaboration assume that the avoidance of bias is best achieved by: a randomised trial with an adequate method of random sequence generation, secure concealment of allocation prior to formal entry; adequate blinding of patients, health care providers and outcome assessors; description of reasons and numbers of withdrawals and dropouts; and analysis on an intention to treat basis. None of the early trials fulfilled all these criteria. However recent trials have fared much better in terms of secure concealment of allocation and blinding but overall this continues to be problematic in many trials (Figure 2; Figure 3).

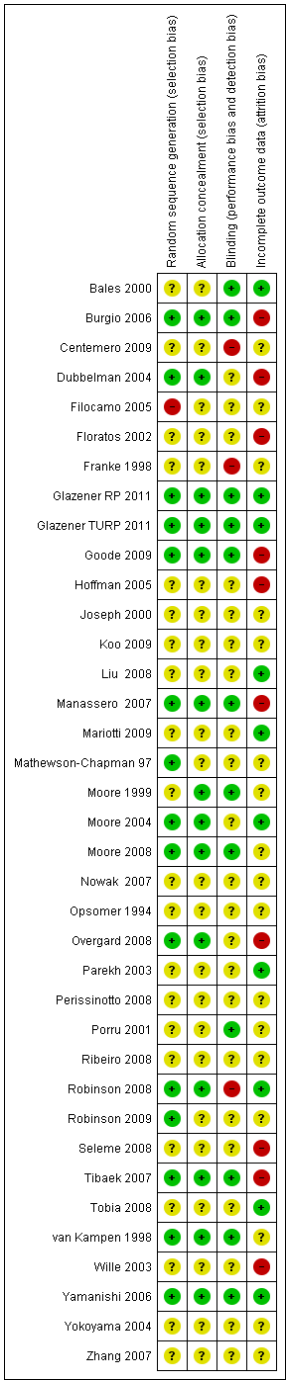
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Figure 2. Methodological quality graph: review authors' judgements about each methodological quality item presented as percentages across all included studies.



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Figure 3. Methodological quality summary: review authors' judgements about each methodological quality item for each included study.



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Allocation

Although all trials were identified as randomised controlled trials only 15 trials (Burgio 2006; Dubbelman 2004; Glazener RP 2011; Glazener TURP 2011; Goode 2009; Manassero 2007; Mathewson-Chapman 97; Moore 2004; Moore 2008; Overgard 2008; Robinson 2008; Robinson 2009; Tibaek 2007; van Kampen 1998; Yamanishi 2006) described a method of adequate sequence generation (e.g. computer generated random numbers) and only 14 trials (Burgio 2006; Dubbelman 2004; Glazener RP 2011; Glazener TURP 2011; Goode 2009; Manassero 2007; Moore 1999; Moore 2004; Moore 2008; Overgard 2008; Robinson 2008; Tibaek 2007; van Kampen 1998; Yamanishi 2006) adequately described a technique of allocation concealment (e.g. sealed envelopes or computerised randomisation).

Blinding

Blinding was not described in most trials. In complex interventions such as physical therapy it is not possible to blind either the clinicians or the participants from the intervention, and we did not class this as increasing risk of bias. However, some trialists did indicate an attempt to minimize bias in intervention or outcome measure. Bales 2000; Glazener RP 2011; Glazener TURP 2011; Goode 2009; Manassero 2007; Porru 2001; Tibaek 2007; and van Kampen 1998 had outcome assessors who were not involved in the provision of the intervention or were not aware of allocation when entering data. Burgio 2006; Moore 1999 and Moore 2008 indicated that a single therapist, blinded to control group outcomes, provided all treatment. Yamanishi 2006 used a sham device for the control group but there was no statement of whether assessors were aware of this or not.

Incomplete outcome data

Several trials gave no description or did not report dropouts (Centemero 2009; Koo 2009; Perissinotto 2008; Ribeiro 2008; Robinson 2009; Seleme 2008; Yamanishi 2006; Yokoyama 2004) or did not have withdrawals or dropouts (Bales 2000; Liu 2008; Moore 2004; Tobia 2008). All others reported the number of withdrawals or dropouts, although the reasons were not consistently reported and few, except Moore 2008 and Robinson 2008, discussed how this was dealt with in the analysis. In one trial, outcomes beyond 8 weeks were not available for the control group because all the men were treated and data were not available for over a third of the men in the other two intervention groups (Goode 2009). Two trials were thought to be at risk of bias because of differential dropout from the randomised groups (Dubbelman 2004; Manassero 2007).

Four trials (Nowak 2007; Perissinotto 2008; Robinson 2008; Robinson 2009) did not provide any usable data at all. Three of these trials (Nowak 2007; Perissinotto 2008; Robinson 2009) did not report how many men were randomised to each group.

Effects of interventions

Radical prostatectomy: treatment of incontinent men after surgery

1. Post-operative PFMT with or without biofeedback versus no treatment or sham therapy or verbal instruction (Comparison 1)

Nine trials (Dubbelman 2004; Floratos 2002; Franke 1998; Manassero 2007; Glazener RP 2011; (Goode 2009); Moore 1999; Moore 2008; van Kampen 1998) compared PFMT with or without biofeedback to no treatment (sham or verbal instruction) amongst men who had urinary incontinence after radical prostatectomy.

Differences between trials

All the men were incontinent at baseline.

In one trial (Manassero 2007) there was evidence of unexplained differential dropout from the control group (13 of 53 men, while there were no dropouts from the 54 in the intervention group). The missing men have therefore been assumed to be dry for the purpose of an intention to treat analysis. The other trials have been analysed as reported since dropouts (if any) were balanced between the groups.

Sources of heterogeneity:

(1) Definition of incontinence varied with each trial:

- more than 1 gram urine on one hour pad test (Dubbelman 2004);
- more than 8 grams urine loss on 24 hour pad test (Moore 2008)
- more than 2 grams urine loss on one hour (van Kampen 1998) or 24 hour pad test (Moore 1999);
- men who were not pad free (Franke 1998);
- a visual analogue score of 10 = completely incontinent and 0 = completely continent (Manassero 2007); or
- no leakage on bladder diaries (Goode 2009).

(2) The type of PFMT regimens differed between the trials:

- Four trials (Dubbelman 2004; Goode 2009; Manassero 2007; Moore 1999) evaluated PFMT alone (without biofeedback);

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- Three trials evaluated PFMT with biofeedback, verbal (Manassero 2007; Moore 2008) or electrostimulation (van Kampen 1998);
- Two trials (Floratos 2002; Franke 1998) used PFMT with biofeedback via perineal patch (surface) EMG.

Formal PFMT post-operative sessions directed by a therapist ranged from twice a week for 12 weeks (Moore 1999); three times a week for three weeks (Floratos 2002); in up to nine sessions (Dubbelman 2004); weekly for 24 weeks (Moore 2008); four sessions over eight weeks (Goode 2009); five sessions over 16 weeks (Franke 1998); or as long as the incontinence persisted (van Kampen 1998).

(3) Control interventions differed between the trials and included:

- Information (verbal or written) about PFMT only (Dubbelman 2004; Floratos 2002; Moore 1999; Moore 2008);
- No treatment (Manassero 2007);
- Sham placebo PFMT and contact with therapist (van Kampen 1998);
- Monitoring of urinary incontinence only (e.g. by bladder diary or phone calls) (Franke 1998; Goode 2009).

(4) The participants differed between the trials:

Two trials (Goode 2009; Moore 1999) recruited subjects with persistent incontinence (some longer than one year) post-operatively, and these participants may differ from those enrolled pre-operatively (Moore 2008, but still incontinent at four weeks after surgery) or from those recruited within a week or two of catheter removal (Dubbelman 2004; Floratos 2002; Glazener RP 2011; Manassero 2007; van Kampen 1998) or up to 6 weeks after radical prostatectomy (Franke 1998).

Incontinence in men and incontinence episodes

Because there was clinical and statistical heterogeneity of the trials included in this comparison (see below), meta-analysis was carried out using a random-effects model, therefore widening the confidence interval. There were no significant differences at any time period in the incontinence rates, and the confidence intervals were wide (e.g. RR for incontinence up to 12 months RR = 0.91, 95% CI 0.73 to 1.14, Analysis 1.1.3; and after 12 months, 57% with UI versus 62% in the control group, RR = 0.85, 95% CI 0.60 to 1.22, Analysis 1.1.4). Only two trials (Manassero 2007; van Kampen 1998) favoured the treatment: of these, only one (van Kampen 1998) used biofeedback. The estimates from the other trials had confidence intervals that did not rule out clinically important effects.

The meta-analysis was dominated by the Glazener RP 2011 trial, which was a large pragmatic multicentre trial conducted in a context where information on PFMT was widely available. This showed no good evidence to support one-to-one training by a therapist (e.g. RR for UI after 12 months 0.98, 95% CI 0.87 to 1.09, Analysis 1.1.4, Glazener RP 2011). This one large trial had narrow confidence intervals, which did not include a clinically significant difference, prespecified to be 15%. The only other large trial (Moore 2008) was in line with the Glazener RP 2011 findings but with wider confidence intervals (RR 1.02, 95% CI 0.70 to 1.48, Analysis 1.1.4, Moore 2008). While the men received only four therapy sessions in three months in one of these trials (Glazener RP 2011), men in the other trial were seen weekly for up to six months (Moore 2008).

In one large trial (Glazener RP 2011), men did not report differences in incontinence episodes at any time period, based on urinary diary data (e.g. after 12 months MD 0.1, 95% CI -0.82 to 1.02, Analysis 1.2).

Use of pads

Use of pads could be considered to be a measure of more severe incontinence. There was no statistically significant difference in the number of men using pads in one large trial (40% in intervention group versus 42% in control group after 12 months, RR 0.94, 95% CI 0.72 to 1.22, Analysis 1.3; Glazener RP 2011). Floratos 2002 used number of pad changes over 24 hours as the outcome measure, with no statistically significant difference in the mean difference (MD) between treatment and control groups at any time period (Analysis 1.4).

Urinary incontinence score and effect on quality of life

In one large trial (Glazener RP 2011), there was no evidence of a difference in the ICIQ-score (a composite score of frequency, amount and effect of UI on quality of life) at any time period after the intervention up to or beyond one year (MD after 12 months -0.5, 95% CI -1.35 to 0.35, Analysis 1.5) or quality of life as a single score from 0 to 10 (-0.30, 95% CI -0.73 to 0.13, Analysis 1.6).

Erectile dysfunction

PFMT has been used as a treatment for erectile dysfunction. Over half the men in one large trial were unable to achieve erection at 12 months after prostate surgery (Glazener RP 2011). There was no statistically significant difference in the number of men achieving erection (RR 1.01, 95% CI 0.84 to 1.20, Analysis 1.8) (Glazener RP 2011).

Pad tests

Two trials (Moore 1999; Moore 2008) reported 24-hour pad test results and one (Floratos 2002) reported a one-hour pad test. Dubbelman 2004 and van Kampen 1998 also measured urine loss on a 24 hour pad test, but did not report standard deviations and therefore these data could not be included in the meta-analysis. Amongst the two trials which gave 24-hour pad test data, there were no statistically significant differences between the groups at

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3, 6 or 12 months, or after 12 months (Analysis 1.9). Similarly, using a 1-hour pad test (Floratos 2002), there were no statistically significant differences between the groups up to 6 months (Analysis 1.10). In the smaller trials (Moore 1999; Moore 2008; Floratos 2002) the standard deviations were often larger than the means, suggesting highly skewed data.

Compliance with treatment

In one large trial, men in the intervention group were more likely to be carrying out PFMT at 12 months after the intervention (RR 0.69, 95% CI 0.53 to 0.88, Analysis 1.11), suggesting that the intervention had changed reported behaviour. Attendance at therapy sessions was also high (Glazener RP 2011).

2. Post-operative interventions using electric or magnetic energy (e.g. post-operative anal electrical stimulation, perineal electrical stimulation, transcutaneous electrical nerve stimulation (TENS), extracorporeal magnetic innervation (ExMI) versus no treatment or sham treatment (Comparison 2)

Three trials were identified which addressed this comparison (Goode 2009; Moore 1999; Yamanishi 2006). These trials compared anal electrical stimulation with oral (verbal) PFMT: in Goode's trial they also received biofeedback. The control group in Moore's trial received oral information about PFMT only; in Yamanishi's the control group also received sham electrical stimulation; and in Goode's trial the control men completed bladder diaries and were seen every 2 weeks for eight weeks before starting active treatment.

Number of incontinent men

In the short term (less than three months), there were fewer incontinent men in the intervention groups in three trials (76% versus 90% in the control groups, RR 0.84, 95% CI 0.74 to 0.94, Analysis 2.1.1) (Goode 2009; Moore 1999; Yamanishi 2006). They also had fewer incontinence episodes (MD -1.29, 95% CI -1.61 to -0.97, Analysis 2.2.1) (Goode 2009). However, the data were too few to be reliable in the longer term.

Pad test

There were no statistically significant differences between the groups on grams of urine lost (24 hour pad test) at any of the time points (Analysis 2.4). Standard deviations were large, indicating skewed distribution of data, and the confidence intervals were wide.

Urinary Incontinence Score

Men in the intervention group in one trial (Yamanishi 2006) had lower (better) urinary incontinence scores using a quality of life outcome combined with amount and frequency of urine lost (e.g. MD -3.9, 95%CI -7.15 to -0.65, Analysis 2.5.3, at one year), though this did not quite reach statistical significance when quality of life was analysed on its own (Analysis 2.6).

Time until continence achieved

Men achieved continence on average about 5 months sooner in the intervention group of one trial (MD -4.11 months, 95% CI -6 to -2.23, Analysis 2.7; Yamanishi 2006).

3. Post-operative lifestyle adjustment versus no treatment or sham treatment (Comparison 3)

No trials were identified.

4. Post-operative combinations of treatments versus no treatment or sham treatment (Comparison 4)

One trial reported using PFMT with anal electrical stimulation as well as biofeedback (Opsomer 1994). Incontinent men (incontinence defined as loss of more than 1 gram of urine on pad test) at six weeks after radical prostatectomy were randomised to two sessions of biofeedback and electrical stimulation (type unspecified) in addition to continuing the PFMT taught to both groups. The data were few, with cure rates based on only four men having incontinence at 3 to 6 months (Analysis 4.1). Pad test results were not reported in a form that could be used and attempts to contact the author were unsuccessful.

5. Post-operative use of one treatment versus another active treatment (Comparison 5)

Eight trials comparing one active treatment to another were identified (Floratos 2002; Goode 2009; Hoffman 2005; Joseph 2000; Koo 2009; Moore 1999; Seleme 2008; Zhang 2007).

- PFMT plus anal electrical stimulation (EStim) (Hoffman 2005; Moore 1999).
- PFMT plus perineal electrical stimulation (EStim) (Hoffman 2005).
- PFMT plus visual biofeedback (Joseph 2000; Zhang 2007).
- PFMT plus visual biofeedback plus support group (Zhang 2007).
- PFMT plus oral (verbal) biofeedback (Joseph 2000).
- PFMT plus biofeedback plus electrical stimulation (Estim) (Goode 2009; Seleme 2008).
- PFMT alone (Goode 2009; Hoffman 2005; Koo 2009; Moore 1999; Seleme 2008).
- Extracorporeal Magnetic Innervation (ExMI) (Koo 2009)

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Number of incontinent men

Two small trials provided this outcome (Moore 1999; Zhang 2007). The definition of incontinence varied with each trial: no urine loss recorded in bladder diaries (Goode 2009); less than 8 grams urine loss on 24 hour pad test (Moore 1999); and use of pad or brief (Zhang 2007). There was no difference in the incontinence rates in the trials at any time period, but confidence intervals were wide (up to 3 months, Analysis 5.1; 3 to 6 months, Analysis 5.2; 6 to 12 months Analysis 5.3).

Pad tests and other outcomes

In one small trial (Seleme 2008) men receiving PFMT plus biofeedback plus electrical stimulation reported better quality of life than those receiving PFMT alone (Analysis 5.6).

Two men in one trial (Goode 2009) had an adverse event with electrical stimulation (haemorrhoidal irritation, Analysis 5.8).

For the majority of the comparisons there were no statistically significant differences between the groups, standard deviations were large, indicating skewed distribution of data, and the confidence intervals were wide. However, men having extracorporeal magnetic innervation (ExMI) had less urine loss on the 24 hour pad test at 3 to 6 months in one small trial (compared to PFMT alone, MD -36 g, 95% CI -55 to -17, Analysis 5.12.3) and used fewer pads per day (MD -0.5, 95% CI -0.79 to -0.21, Analysis 5.13.1; Koo 2009).

Radical prostatectomy: prevention of UI in all men having surgery, intervention before and/or after prostatectomy

6. Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction (Comparison 6)

Eight trials addressed this comparison (Bales 2000; Burgio 2006; Filocamo 2005; Mathewson-Chapman 97; Overgard 2008; Parekh 2003; Ribeiro 2008; Tobia 2008).

Differences between trials

The participants were not selected because of their incontinence so include a mixed population of men with and without incontinence after surgery.

Sources of heterogeneity:

(1) The type of PFMT regimens differed between the trials:

- PFMT plus biofeedback (Bales 2000; Burgio 2006; Mathewson-Chapman 97; Parekh 2003; Ribeiro 2008);
- PFMT alone (Filocamo 2005; Overgard 2008; Tobia 2008).

Biofeedback was delivered via surface electrodes (Bales 2000), via digital or anal probe (Burgio 2006; Mathewson-Chapman 97; Parekh 2003). In one trial (Ribeiro 2008) the type of biofeedback was not described.

(2) Control interventions differed between the trials and included:

- no treatment (Filocamo 2005; Mathewson-Chapman 97; Parekh 2003; Tobia 2008);
- postoperative verbal instruction on PFMT only (Bales 2000; Overgard 2008; Ribeiro 2008);
- usual care with simple instructions to interrupt the stream when voiding (Burgio 2006).

(3) The timing of the interventions relative to surgery also varied:

- one trial delivered an intervention before surgery only (Tobia 2008);
- four trials delivered their intervention before and after surgery (Bales 2000; Burgio 2006; Parekh 2003; Mathewson-Chapman 97);
- three trials delivered their intervention after surgery only (Filocamo 2005; Overgard 2008; Ribeiro 2008).

Number of men with urinary incontinence

Data describing urinary incontinence were reported by seven of the eight trials. While there was no statistically significant difference in the short term (Analysis 6.1.1), there was an overall benefit from PFMT in reduction of UI up to one year (RR for UI 0.55, 95% CI 0.34 to 0.89, Analysis 6.1.3) and after one year (RR 0.32, 95% CI 0.20 to 0.51, Analysis 6.1.4). The data were driven mainly by two trials (Filocamo 2005; Overgard 2008) which did not include biofeedback. One of these trials did not disclose details of allocation concealment (Filocamo 2005) and the other was small (Overgard 20080. The remaining trials showed conflicting results, and there was statistically significant heterogeneity, hence the use of a random-effects model.

Pad changes and pad tests

In the four trials which reported these outcomes (Filocamo 2005; Mathewson-Chapman 97; Overgard 2008; Ribeiro 2008) there was statistical heterogeneity. One small trial favoured PFMT (Ribeiro 2008) but using a random-effects model there was only a significant difference at 6 to 12 months (MD -15 g less urine loss on 24 hour pad test with treatment, 95% CI -18 to -11, Analysis 6.3.3). The findings from the Filocamo 2005 and Overgard 2008 trials (no significant difference in pad weights) is in contrast to their report of fewer incontinent men with active treatment (Analysis 6.1.4). However, the standard deviations (SD) were large and the confidence intervals were wide.

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Other outcomes

One small trial (Ribeiro 2008) reported that the urinary incontinence score and the quality of life score favoured treatment up to 6 months (Analysis 6.4; Analysis 6.5). Initially (until 6 months) men in the intervention arm were more likely to be adhering to treatment (carrying out sufficient PFMT, Analysis 6.7.2). However, the trials were small and each outcome was only reported in one trial. One trial (Filocamo 2005) reported the number of men having artificial sphincter surgery one year after operation, but they were few (Analysis 6.8).

7. Prevention of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim)/perineal electrical stimulation/transcutaneous electrical nerve stimulation (TENS)/extracorporeal magnetic innervation (ExMI)) versus no treatment/sham treatment (Comparison 7)

One small trial was identified (Mariotti 2009) which reported three outcomes. The intervention was delivered postoperatively to all men at catheter removal. Men in the intervention received:

- PFMT plus electrical stimulation (EStim) plus biofeedback (BF)

The control intervention was:

- Verbal and written PFMT instructions.

The data favoured the intervention arm in terms of number of incontinent men (Analysis 7.1); 24 hour pad test (Analysis 7.2); and time till continence was regained (Analysis 7.3).

8. Prevention of UI after radical prostatectomy: lifestyle interventions versus no treatment/sham treatment (Comparison 8)

No trials were identified.

9. Prevention of UI after radical prostatectomy: combinations of treatments versus no treatment/sham treatment (Comparison 9)

No trials were identified.

10. Prevention of UI after radical prostatectomy: one treatment versus another active treatment (Comparison 10)

Three trials were identified (Centemero 2009; Nowak 2007: Wille 2003):

- Centemero 2009 compared PFMT before and after surgery with PFMT delivered after surgery only;
- Nowak 2007 compared extracorporeal magnetic innervation (ExMI) versus PFMT alone but did not provide any useable data;
- Wille 2003, a three arm trial, compared PFMT plus electrical stimulation versus PFMT plus electrical stimulation plus anal probe biofeedback versus PFMT alone.

Incontinence

There were fewer incontinent men at 3 and 6 months when PFMT was delivered both before and after surgery, compared with after surgery only in one small trial (Analysis 10.1; Analysis 10.2; Centemero 2009). However, this did not reach significance when considering severe incontinence (Analysis 10.3; Analysis 10.4), or quality of life (Analysis 10.7; Analysis 10.8).

Pad tests

At 6 months (but not at 3 months), Wille 2003 found that PFMT plus anal electrical stimulation both with and without extra biofeedback were both better than PFMT alone using a 20 minute pad test (MD g urine lost -3 g, 95% CI -6 to -0.5 in both comparisons, Analysis 10.6.1 and Analysis 10.6.2), while there was little to choose between the two more intensive interventions (Analysis 10.6.3). However, the trial was small, the SDs large and the confidence intervals wide.

TURP: treatment of incontinent men, after surgery

11. Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction (Comparison 11)

One large trial compared PFMT with or without biofeedback to no treatment (sham or verbal instruction) amongst men who had urinary incontinence after transurethral resection of the prostate (TURP) (Glazener TURP 2011). All the men were incontinent at randomisation, six weeks after surgery, and received four one-to-one sessions with a trained therapist over a three-month period.

Incontinence in men and incontinence episodes

There were no significant differences at any time period in the incontinence rates, (e.g. RR for incontinence up to 12 months RR = 1.04, 95% CI 0.90 to 1.20 ,Analysis 11.1.3; and after 12 months, 65% with UI versus 62% in the control group, RR = 1.05, 95% CI 0.91 to 1.23, Analysis 11.1.4).
In one large trial (Glazener TURP 2011), men did not report differences in incontinence episodes at any time period, based on urinary diary data (e.g. after 12 months MD 0.2, 95% CI -0.27 to 0.67, Analysis 11.2).

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Use of pads

Use of pads could be considered to be a measure of more severe incontinence. There was no statistically significant difference in the number of men using pads in one large trial (16% in intervention group versus 18% in control group after 12 months, RR 0.93, 95% CI 0.56 to 1.56, Analysis 11.3; Glazener TURP 2011).

Urinary incontinence score and effect on quality of life

In one large trial (Glazener TURP 2011), there was no evidence of a difference in the ICIQ-score (a composite score of frequency, amount and effect of UI on quality of life) at any time period after the intervention up to or beyond one year (e.g. MD after 12 months -0.1, 95% CI -0.89 to 0.69, Analysis 11.4) or quality of life as a single score from 0 to 10 (MD -0.1, 95% CI -0.51 to 0.31, Analysis 11.5).

Erectile dysfunction

PFMT has been used as a treatment for erectile dysfunction. About a quarter of the men in one large trial were unable to achieve erection at 12 months after prostate surgery (Glazener TURP 2011). There was no statistically significant difference between the groups in the number of men achieving erection (RR 1.22, 95% CI 0.86 to 1.72, Analysis 11.6) (Glazener TURP 2011).

Compliance with treatment

In one large trial, men in the intervention group were more likely to be carrying out PFMT at 12 months after the intervention (RR 0.44, 95% CI 0.36 to 0.54, Analysis 11.7), suggesting that the intervention had changed reported behaviour. Attendance at therapy sessions was also high (Glazener TURP 2011).

12. Treatment of UI after TURP: electric or magnetic energy (e.g. anal electrical stimulation (EStim)/perineal electrical stimulation/transcutaneous electrical nerve stimulation (TENS)/extracorporeal magnetic innervation (ExMI)) versus no treatment/sham treatment (Comparison 12)

No trials were identified.

13. Treatment of UI after TURP: lifestyle interventions versus no treatment/sham treatment (Comparison 13)

No trials were identified.

14. Treatment of UI after TURP: combinations of treatments versus no treatment/sham treatment (Comparison 14)

No trials were identified.

15. Treatment of UI after TURP: one treatment versus another active treatment (Comparison 15)

No trials were identified.

TURP: prevention of UI in all men having surgery, intervention before and/or after prostatectomy

16. Prevention of UI after TURP: pre or post-operative PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction (Comparison 16)

Two small trials enrolled men before TURP for benign prostatic hyperplasia (Porru 2001; Tibaek 2007). Men in the intervention groups in both trials received one session with a therapist before surgery to teach correct contractions (using verbal biofeedback) and were expected to practice PFMT afterwards. In the second trial (Tibaek 2007) men also attended three group teaching sessions. The control groups received information only.

There were no statistically significant differences between the groups in the number of men with incontinence at less than three months or 3 to 6 months, but the confidence intervals were wide (Analysis 16.1).

17. Prevention of UI after TURP: electric or magnetic energy (e.g. anal electrical stimulation (EStim)/perineal electrical stimulation/transcutaneous electrical nerve stimulation (TENS)/extracorporeal magnetic innervation (ExMI)) versus no treatment/sham treatment (Comparison 17)

No trials were identified.

18. Prevention of UI after TURP: lifestyle interventions versus no treatment/sham treatment (Comparison 18)

No trials were identified.

19. Prevention of UI after TURP: combinations of treatments versus no treatment/sham treatment (Comparison 19)

No trials were identified.

20. Prevention of UI after TURP: one treatment versus another active treatment (Comparison 20)

No trials were identified.

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Containment of UI (all men with residual UI)

21. External penile compression devices (penile clamps) versus no treatment or sham treatment (Comparison 21)

One trial compared three different penile compression devices (Cunningham clamp, U-Tex Male Adjustable Tension Band and C3 penile compression device) with a control period of no device (Moore 2004). A randomised block assignment was used with a multiple period crossover design, so that each of the 12 participants had a control period of no device and three periods in which the different devices were used.

All external compression devices reduced the weight of urine lost on a four-hour pad test compared to the control period (P<0.05, Analysis 21.2), but none completely eliminated urine loss. Satisfaction was based on ease of application, comfort and efficacy. The device preferred by the largest number of men (Analysis 21.1) was also that with the lowest urine loss (the Cunningham clamp) (Analysis 21.2).

However, this was also the device with the greatest reduction in systolic blood flow velocity (P < 0.05 versus control period, Analysis 21.3; Analysis 21.4), raising the possibility of safety issues if applied too tightly. In the trial, men were able to judge when to release the device, and the authors recommended that its use should therefore be limited to men who are cognitively intact, are aware of bladder filling, have normal genital sensation and intact penile skin, and have sufficient manual dexterity to open and close the device (Moore 2004).

DISCUSSION

This review incorporates a broad array of possible interventions under the umbrella term of conservative management of post-prostatectomy UI. The populations studied included men undergoing prostatectomy for both benign (TURP) and malignant (radical prostatectomy) disease. The interventions were delivered pre-operatively, postoperatively or both. In some trials, all the men were incontinent at baseline, while at least some were dry in other trials which recruited all men having surgery (these were classed as 'prevention of incontinence' trials). Seven trials (Goode 2009; Joseph 2000; Moore 1999; Moore 2004; Opsomer 1994; Seleme 2008; Zhang 2007) included men who had been incontinent for a considerable time after surgery while the rest recruited men around the time of surgery. More recent trials have focused on the pre-operative or post-operative period immediately after catheter removal. It is acknowledged that UI after prostatectomy will resolve over time in many men.

Conservative interventions tend to be resource-intensive strategies that require people, equipment and clinic space, so administrators will look for evidence of efficacy. Funding has been an issue given the inconclusive nature of the evidence to date. For example, in the United States, the centres for both Medicare and Medicaid Services have considered whether to withdraw funding for biofeedback and pelvic floor electrical stimulation in the treatment of UI of any etiology based on a lack of evidence regarding effectiveness. Through a lobbying effort from service providers and manufacturers, these modalities continued to be covered in the United States (Thompson 2002). However, as controversy about funding is likely to continue, there is a need for continued research in the area to determine which groups of patients are most likely to benefit from conservative interventions.

The findings of this review should continue to be treated with caution. The effectiveness of conservative measures in the longer term, or in men with persistent urinary incontinence, remains inconclusive.

Summary of main results

Thirty-seven trials met the inclusion criteria, 33 trials amongst men after radical prostatectomy, three trials after TURP and one small trial which included one man with benign disease but was classed as a radical trial. There was considerable variation in the interventions, populations and outcome measures. Given this clinical heterogeneity it was decided to differentiate the trials and the comparisons, by type of surgery (TURP or radical prostatectomy), and by whether the intervention was partly preventative (in that not all men were incontinent, for example if all men before or after surgery were recruited, N = 16 trials) or treatment only (when all included men were incontinent at baseline, N = 20 trials), or containment (extra penile compression devices, N = 1 trial).

Treatment trials for urinary incontinence after radical prostatectomy

Twenty-one trials investigated the effects of PFMT versus no treatment or a variety of other means of stimulating the pelvic floor muscles. There was considerable clinical and statistical heterogeneity in the populations, and timing and frequency of the interventions, hence a random-effects model was chosen for most of the comparisons where meta-analysis was possible. Only two trials (Manassero 2007; van Kampen 1998) showed a statistically significant benefit from active treatment versus no-treatment control groups, and the other trials showed conflicting results. There was differential dropout from the control group in the Manassero 2007 trial (these men were assumed to be dry for analysis purposes). Because of the heterogeneity a random-effects model was used which led to wider confidence intervals.

Overall there was not enough evidence to say whether or not PFMT with or without biofeedback was effective as the confidence intervals were wide (e.g. number of men with incontinence in the intervention groups 193/339 (57%) versus 203/326 (62%) in the

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control groups: RR for incontinence after 12 months 0.85, 95% CI 0.60 to 1.22, Analysis 1.1.4).

The meta-analysis was dominated by the Glazener RP 2011 trial, which was a large pragmatic multicentre trial conducted in a context where information on PFMT was widely available. This showed no good evidence to support one-to-one training by a therapist (e.g. RR for UI after 12 months 0.98, 95% CI 0.87 to 1.09, Analysis 1.1.4, Glazener RP 2011). This one large trial had narrow confidence intervals, which did not include a clinically significant difference, prespecified to be 15%. The only other large trial (Moore 2008) was in line with the Glazener RP 2011 findings but with wider confidence intervals (RR 1.02, 95% CI 0.70 to 1.48, Analysis 1.1.4, Moore 2008). The findings in these two trials concurred despite different intensities of intervention: while men in the Glazener RP 2011 trial had four therapy sessions over three months, in the Moore 2008 trial, men were seen weekly for up to six months. Data from quality of life measures, use of pads and pad tests supported the finding of no differences between intervention and control groups.

Three small trials provided data to suggest that electrical stimulation was better than control interventions (in one trial including sham electrical stimulation) in terms of less incontinence, regaining continence more quickly and better quality of life, at least in the short term up to six months. However, less information was available in the longer term.

Individual small trials provided data to suggest that extracorporeal magnetic innervation (ExMI) or combinations of treatments might be beneficial but the evidence was limited.

Prevention trials for urinary incontinence after radical prostatectomy

Twelve trials, some of which enrolled men before surgery and others all men as soon as the catheter was removed, included a mixed population of men with and without incontinence after surgery. Again a random-effects model was chosen to compensate for the considerable clinical and statistical heterogeneity between the trials. Including the information from the quasi-randomised trial Filocamo 2005, the chance of incontinence appeared to be lower in the intervention groups in two trials with data after 12 months (number of men with UI after one year 10.2% versus 32.1% in control groups, RR 0.32, 95% 0.20 to 0.51, Analysis 6.1.4).

The meta-analysis of prevention trials included a number of small trials with wide confidence intervals apart from Filocamo 2005 which was out of line with the others. This was the only large trial to favour the intervention group. The worry is that this trial may have been biased by the use of predictable block randomisation (according to information supplied by the authors), and there was no information about concealment of allocation. There was little information about the comparability of the groups at baseline such as the number dry after catheter removal or age. It is therefore unclear as to whether this result is reliable as a basis for making policy.

One small trial (Ribeiro 2008) suggested that men were more likely to be carrying out PFMT, at least soon after the intervention (Analysis 6.7) though this was not reflected in significant differences in higher anal squeeze pressures (Analysis 6.6). One small trial (Mariotti 2009) reported that adding electrical stimulation and biofeedback to PFMT was beneficial. One further small trial (Wille 2003) found that PFMT plus anal electrical stimulation with and without extra biofeedback were both better than PFMT alone at 6 months, but there was little to choose between the two more intensive interventions (Analysis 10.6).

Treatment trials for urinary incontinence after TURP

One large trial addressed this comparison (Glazener TURP 2011) in a trial which compared four sessions of one-to-one therapy with standard management in a context where information about PFMT was widely available. There were no differences between the groups in any outcome measures except for performance of PFMT, suggesting that the intervention had changed behaviour but not incontinence or other clinical outcomes.

Prevention trials for urinary incontinence after TURP

Two small trials enrolled men before TURP to receiving a minimal PFMT intervention before and after surgery. There were no statistically significant differences between the groups and the confidence intervals were wide (Analysis 16.1).

Containment of urinary incontinence

One alternative intervention, a clamp fitted to the shaft of the penis, can be used to control unwanted leakage. Men in one trial reported a preference for one type of external compression device compared to two others or no treatment: a Cunningham clamp fitted to the shaft of the penis proved satisfactory to 10 of 12 men with intractable UI (Moore 2004). This may be a viable alternative for some cognitively capable men providing they take into account safety issues such as adequate sensation and ability to remove the device when it feels too tight or the bladder is full.

Men whose incontinence cannot be otherwise controlled can use absorbent pads (Fader 2007; Fader 2008) or a variety of external sheath devices with leg bags. An alternative is an indwelling urinary catheter (Jahn 2007; Moore 2007; Niël-Weise 2005).

Lifestyle changes

The effect of other conservative interventions such as lifestyle changes remains undetermined as no trials involving these interventions were identified.

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Quality of life

There may be some enhancement of quality of life in men after prostatectomy through the support provided by attending a clinic or therapist offering these interventions (Moore 1999). Nine trials included in this review presented some information about quality of life (Burgio 2006; Centemero 2009; Hoffman 2005; Glazener RP 2011; Glazener TURP 2011; Moore 1999; Ribeiro 2008; Seleme 2008; Zhang 2007) but none provided enough evidence, alone or in meta-analysis, to draw conclusions about the effect of the interventions on quality of life.

Overall completeness and applicability of evidence

Few trials used the primary outcomes of interest, patient reported symptoms and the standardised pad test. Most used a variety of subjective outcomes derived from patient reported symptoms to define continence. There were no trials which examined lifestyle adjustments in alleviating UI after prostatectomy.

Attrition bias may have played a role in the results of some of the included trials and therefore affected the outcome of this review. One of the smaller trials (Franke 1998) lost half of the randomised participants by the end of the data collection period. Although most of those trials that lost participants provided an explanation of these losses, none accounted for the missing data in their primary analyses. The intention to treat principle mandates, at minimum, that patients stay in the group to which they are randomised (Juni 2001), which the included trials appeared to do. It is also suggested that primary outcomes for all patients randomised to groups should be recorded or estimated if not available. Three of the included trials (Filocamo 2005; Parekh 2003; Moore 2008) reported an analysis using the intention to treat principle, and one trial (Burgio 2006) used survivor analysis in the original trial analysis. In one trial where there was clear evidence of differential dropout (Manassero 2007), the review authors elected to assume that the men whose data were missing were continent. However, attrition bias may have affected a number of the other trials which did not present relevant data or discuss the issue.

In 21 trials in this review, men who were all incontinent were analysed together. However, in seven of these trials (Goode 2009; Joseph 2000; Moore 1999; Moore 2004; Opsomer 1994; Seleme 2008; Zhang 2007), men had longstanding or persistent incontinence. It is possible that they might respond differently to the interventions compared to men recruited around the time of prostate surgery.

Quality of the evidence

The majority of trials in this area continue to be of modest quality (Figure 2, Figure 3). Data were not available in all the trials for many of the pre-stated outcomes. Confidence intervals have tended to be wide except for the more recent large trials, and it continues to be difficult to reliably identify or rule out a useful effect.

All trials claimed to be randomised, but only 14 of the 37 provided details of adequate concealment of randomisation (Burgio 2006; Dubbelman 2004; Goode 2009; Manassero 2007; Glazener RP 2011; Glazener TURP 2011; Moore 1999; Moore 2004; Moore 2008; Overgard 2008; Robinson 2008; Tibaek 2007; van Kampen 1998; Yamanishi 2006). Blinding to intervention was not possible, and blinding of outcome assessment appeared to be absent in many trials as it was not discussed. Therefore, many of the included trials, especially the early ones, were vulnerable to selection, detection and attrition bias. However, because of the nature of the complex intervention, it was not possible to blind the participants or the care-givers from knowledge of the intervention (performance bias) and this was not classified as increasing risk of bias.

The trials also suffered from the lack of standardised outcome measures. Definitions of incontinence, measurement of quality of life and types of pad tests (20 minute, 1 hour, 24 hour, number of pads, weight of pads, number of men using pads and so on) varied in almost every trial.

AUTHORS' CONCLUSIONS

Implications for practice

In keeping with conclusions from earlier versions of this review, at this point there remains no clear support that conservative management of any type for postprostatectomy UI is either helpful or harmful, whether delivered as treatment to men who are incontinent or as prevention to all men undergoing radical prostatectomy. However, the individual result of one large multicentre trial on its own did have narrow confidence intervals which did not include a clinically significant difference (of 15%) in the rate of incontinence between the groups. It seems unlikely that men benefit from one-to-one PFMT therapy after TURP.

Three small trials provided data to suggest that electrical stimulation was better than control interventions (in one trial including sham electrical stimulation) at least in the short term up to six months. Individual small trials provided data to suggest that extracorporeal magnetic innervation (ExMI) or combinations of treatments might be beneficial but the evidence was limited.

No trials have tested the effect of lifestyle changes alone. Long-term UI may be managed by absorbent pads or external penile clamps, but there are safety problems with clamps.

Implications for research

Urinary incontinence after prostatectomy is a distressing problem and, although conclusive evidence does not exist, conservative approaches form part of current management. Well-designed clinical trials are still needed to clarify the role of these therapies. In

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addition, men with persistent severe urinary incontinence could consider surgical treatment e.g. with an artificial urinary sphincter or male sling. However, these surgical options should also be tested by RCT as there is currently not enough evidence to support their use (Silva 2011).

As there are known differences in the cause and prevalence of UI between men after TURP and after radical prostatectomy, these groups of men should continue to be studied separately. 'Prevention' trials in all men having surgery should be evaluated separately from treatment trials of men who all have urinary incontinence after surgery.

Most of the trials included in this review used very different protocols of intervention type, timing and intensity. In order to determine the effects of specific protocols and modalities, large adequately powered trials using common protocols and common standardised outcome measures are needed. Replication studies using similar protocols in different populations would also assist in identifying the populations in which specific conservative management approaches may be effective.

Definitions and measurement of outcomes varied in the included trials. Future trials must attempt to use broadly accepted definitions, such as those of the International Continence Society. The primary outcome measure should be the participant's self-reported urinary incontinence or its effects on his quality of life. Other objective measures such as the pad test or urinary diaries can be used to determine if continence has been achieved. Researchers must also focus on either the 1 hour or 24 hour pad test, as the results of these two measurements are not equivalent.

Lastly, authors should be encouraged to ensure appropriate measures are taken to avoid the risk of bias from selection, performance, detection and attrition bias, in particular adequate sequence generation and secure concealment of allocation for randomisation, and blinding of outcome measurement, and to report these adequately, using the guidelines of the CONSORT statement.

ACKNOWLEDGEMENTS

Katherine Moore was supported by a postdoctoral fellowship from the Leverhulme Trust, London, England in 1998 thereby allowing the time for the original review (first published 1998). Authors of seven trials (Burgio 2006; Dubbelman 2004; Filocamo 2005; Floratos 2002; Hoffman 2005, Joseph 2000; Wille 2003) generously shared further data so that their trials could be included in this analysis. We thank Neil Scott for the translation of a German language article (arranged by Sheila Wallace) as well as Matthew Tripp for another. Peter Herbison provided expertise in the area of statistics and assisted in interpreting data provided by authors.

REFERENCES

References to studies included in this review

Bales 2000 *{published data only}*

Bales G, Gerber G, Minor T, Mhoon D, McFarland J, Hyung L, et al.Effect of preoperative biofeedback/pelvic floor training on continence in men undergoing radical prostatectomy. *Urology* 2000;**56**:627–30. [MEDLINE: 20473784]

Burgio 2006 *{published and unpublished data}*

* Burgio KL, Goode P, Urban D. Umlauf M, Locher J, Bueschen A, Redden D. Preoperative biofeedback-assisted behavioural training to reduce post-prostatectomy incontinence: A randomized controlled trial. *Journal of Urology* 2006;**175**(1):196–201.

Burgio KL, Goode P, Urban D. Umlauf M, Locher J, Bueschen A, Redden D. Preoperative biofeedback-assisted behavioural training to reduce post-prostatectomy incontinence: A randomized controlled trial [abstract]. Neurourology and Urodynamics. 2005; Vol. 24, issue 5/6: 477.

Centemero 2009 *{published data only}*

Centemero A, Rigatti L, Andrea L, Gallina A, Lughezzani G, Montorsi F, et al.Effectiveness of pre-operative pelvic floor muscle training for post-prostatectomy early incontinence recovery (Abstract number 1642). *Journal of Urology* 2009; **181**(4 (Suppl 1)):591. [: 34592]

Centemero A, Rigatti L, Giraudo D, Lazzeri M, Lughezzani G, Zugna D, et al.Preoperative pelvic floor muscle exercise for early continence after radical prostatectomy: a randomised controlled study. *European Urology* 2010;**57**(6): 1039–43.

Dubbelman 2004 *{published and unpublished data}*

Dubbelman Y, Groen J, Wildhagen M, Rikken B, Bosch R. The recovery of urinary continence after radical retropubic prostatectomy: a randomized trial comparing the effect of physiotherapist-guided pelvic floor muscle exercises with guidance by an instruction folder only. *BJU International* 2010;**106**(4):515–22.

Dubbelman YD, Groen J, Bosch R. Post prostatectomy incontinence: Significance of the pre-operative urethral pressure profile and the role of physiotherapy [abstract]. *Neurourology and Urodynamics* 2004;**23**(5-6):471.

Filocamo 2005 *{published and unpublished data}*

Del Popolo G, Filocamo MT, Li Marzi V, Cecconi F, Marzocco M, Tosto A, et al.Effectness of early pelvic floor rehabilitation treatment for post-prostatectomy incontinence [abstract]. International Continence Society

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Meeting 2005.
* Filocamo MT, Li Marzi V, Del Popolo G, Cecconi F, Marzocco M, Tosto A, et al.Effectiveness of early pelvic floor rehabilitation treatment for post-prostatectomy incontinence. *European Urology* 2005;**48**(5):734–8.

Floratos 2002 ***{published data only}***
Foratos DL, Sonke GS, Rapidou CA, Alivizatos GJ, Deliveliotis C, Constantinides CA, et al.Biofeedback versus verbal feedback as learning tools for pelvic muscle exercises in the early management of urinary incontinence after radical prostatectomy. *British Journal of Urology International* 2002;**89**(7):714–9.

Franke 1998 ***{published data only}***
* Franke JJ, Gilbert WB, Grier J, Koch MO, Shyr Y, Smith JA, Jr. Early post-prostatectomy pelvic floor biofeedback. *Journal of Urology* 2000;**163**(1):191–3. [MEDLINE: 20067833]
Franke JJ, Grier J, Koch MO, Smith JA. Biofeedback-enhanced pelvic floor exercises in the early post prostatectomy period. *Journal of Urology* 1998;**159**(Suppl 5):37.
Zermann D, Wunderlich H, Reichelt O, Schubert J. Re: early post-prostatectomy pelvic floor biofeedback [Letter]. *Journal of Urology* 2001;**164**(3):783–4.

Glazener RP 2011 ***{published data only}***
Dorey G, Glazener C, Buckley B, Cochran C, Moore K. Developing a pelvic floor muscle training regimen for use in a trial intervention. *Physiotherapy* 2009;**95**(3):199–209.
Glazener C, Boachie C, Buckley B, Cochran C, Dorey G, Grant A, et al.A randomized controlled trial of conservative treatment (pelvic floor muscle training and bladder training) for urinary incontinence in men after prostate surgery (MAPS) (Abstract number 200). *Neurourology and Urodynamics* 2010;**29**(6):1093–4.
* Glazener C, Boachie C, Buckley B, Cochran C, Dorey G, Grant A, et al.Conservative treatment for urinary incontinence in Men After Prostate Surgery (MAPS): two parallel randomised controlled trials. *Health Technology Assessment (Winchester, England)* 2011;**15**(24):1–290.
Glazener C, Boachie C, Buckley B, Cochran C, Dorey G, Grant A, et al.Urinary incontinence in men after formal one-to-one pelvic-floor muscle training following radical prostatectomy or transurethral resection of the prostate (MAPS): two parallel randomised controlled trials. *Lancet* 2011;**378**(9788):328–37.
Hagen S, Glazener C, Cochran C, Campbell L. Continence care for men having prostate surgery: advice and care before and after radical prostatectomy and transurethral resection of prostate (Abstract number 96). *Neurourology & Urodynamics* 2009;**28**(7):690–1.

Glazener TURP 2011 ***{published data only}***
Dorey G, Glazener C, Buckley B, Cochran C, Moore K. Developing a pelvic floor muscle training regimen for use in a trial intervention. *Physiotherapy* 2009;**95**(3):199–209.
Glazener C, Boachie C, Buckley B, Cochran C, Dorey G, Grant A, et al.A randomized controlled trial of conservative treatment (pelvic floor muscle training and bladder training) for urinary incontinence in men after prostate surgery (MAPS) (Abstract number 200). *Neurourology and Urodynamics* 2010;**29**(6):1093–4.
* Glazener C, Boachie C, Buckley B, Cochran C, Dorey G, Grant A, et al.Conservative treatment for urinary incontinence in Men After Prostate Surgery (MAPS): two parallel randomised controlled trials. *Health Technology Assessment (Winchester, England)* 2011;**15**(24):1–290.
Glazener C, Boachie C, Buckley B, Cochran C, Dorey G, Grant A, et al.Urinary incontinence in men after formal one-to-one pelvic-floor muscle training following radical prostatectomy or transurethral resection of the prostate (MAPS): two parallel randomised controlled trials. *Lancet* 2011;**378**(9788):328–37.
Hagen S, Glazener C, Cochran C, Campbell L. Continence care for men having prostate surgery: advice and care before and after radical prostatectomy and transurethral resection of prostate (Abstract number 96). *Neurourology & Urodynamics* 2009;**28**(7):690–1.

Goode 2009 ***{published data only}***
Goode P, Burgio K, Johnson T, Roth D, Clay O, Burkhardt J, et al.Behavioral therapy with or without biofeedback and pelvic floor electrical stimulation for persistent post-prostatectomy incontinence - a randomized controlled trial (Abstract number 87). *Neurourology & Urodynamics* 2009; **28**(7):681–2.
Goode PS, Burgio KL, Johnson TM, Clay OJ, Roth DL, Markland AD, et al.Behavioral therapy with or without biofeedback and pelvic floor electrical stimulation for persistent postprostatectomy incontinence: a randomized controlled trial. *JAMA* 2011;**305**(2):151–9. [: SR–INCONT40806]

Hoffman 2005 ***{published and unpublished data}***
Hoffmann W, Liedke S, Dombo O, Otto U. Electrical stimulation to treat postoperative incontinence: Therapeutic benefit in regard to quality of life [Die Electrostimulation in der Therapie der posopertiven Harninkontinenz. Therapeutischer Nutzen unter Berucksichtigung der Lebensqualitat]. *Urologe* 2004;**44**:33–40.

Joseph 2000 ***{published and unpublished data}***
Joseph AC, Chang MK. Comparison of behavior therapy methods for urinary incontinence following prostate surgery: a pilot study. *Urologic Nursing* 2000;**20**(3):203–4.

Koo 2009 ***{published data only}***
Kim YH, Hwang EG, Shin JH, Kim YW, Lim JS, Na YG, Song KH, Sul CK. Effect of extracorporeal magnetic innervation (ExMI) pelvic floor therapy for urinary incontinence after radical prostatectomy. Urology. 2009; Vol. 74 (Suppl 4A):S227.
Koo D, So SM, Lim JS. Effect of Extracorporeal Magnetic Innervation (ExMI) pelvic floor therapy on urinary incontinence after radical prostatectomy [Korean]. *Korean Journal of Urology* 2009;**50**(1):23–7.

Liu 2008 ***{published data only}***
Liu F. [Extracorporeal magnetic innervation in the treatment of urinary incontinence after radical prostatectomy]. *Journal*

Copyright © 2012 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

of Clinical Rehabilitative Tissue Engineering Research 2008; **12**(17):3289–92.

Manassero 2007 *{published data only}*
Manassero F, Traversi C, Ales V, Pistolesi D, Panicucci E, Valent F, et al.Contribution of early intensive prolonged pelvic floor exercises on urinary continence recovery after bladder neck-sparing radical prostatectomy: results of a prospective controlled randomized trial. *Neurourology & Urodynamics* 2007;**26**(7):985–9.

Mariotti 2009 *{published data only}*
Mariotti G, Sciarra A, Gentilucci A, Salciccia S, Alfarone A, Pierro GD, et al.Early recovery of urinary continence after radical prostatectomy using early pelvic floor electrical stimulation and biofeedback associated treatment. *Journal of Urology* 2009;**181**(4):1788–93.
Sciarra A, Salciccia S, Gentilucci A, Alfarone A, Di Pierro GB, Mariotti G, et al.Early recovery of urinary continence after radical prostatectomy using early pelvic floor electric stimulation and biofeedback associated treatment.. *Journal of Urology* 2009;**181**(4 Suppl 1):680.

Mathewson-Chapman 97 *{published data only}*
Mathewson-Chapman M. *The effect of pelvic muscle exercises with biofeedback for urinary incontinence post-prostatectomy. [Unpublished PhD dissertation]*. Gainsville: University of Florida, 1995.
* Mathewson-Chapman M. Pelvic muscle exercise/ biofeedback for urinary incontinence after prostatectomy: an education program. *Journal of Cancer Education* 1997; **12**(4):218–23. [MEDLINE: 98103187]

Moore 1999 *{published and unpublished data}*
Moore KN. *The effect of urinary incontinence on the quality of life following radical prostatectomy [Unpublished PhD Thesis]*. Edmonton: University of Alberta, 1997.
Moore KN, Griffiths DJ, Hughton A. A randomised controlled trial of pelvic muscle exercises or pelvic muscle exercises plus electrical stimulation for post radical prostatectomy urinary incontinence [abstract]. *Neurourology & Urodynamics* 1998;**17**:424–6.
* Moore KN, Griffiths DJ, Hughton A. Urinary incontinence after post radical prostatectomy: A randomised controlled trial comparing pelvic muscle exercises with pelvic muscle exercises plus electrical stimulation. *British Journal of Urology International* 1999;**83**:57–65.

Moore 2004 *{published data only}*
Moore KN, Schieman S, Ackerman T, Drus H, Metcalfe JB, Voaklander DC. Assessing the comfort, safety and patient satisfaction with three commonly used penile compression devices. In press 2004.

Moore 2008 *{published and unpublished data}*
Moore KN. The effectiveness of biofeedback assisted pelvic floor muscle exercises in the treatment of incontinence post radical prostatectomy. [Personal Communication] (as supplied 11 May 2006). Data on file.
Moore KN, Valiquette L, Chetner MP, Byrniak S, Herbison GP. Return to continence after radical retropubic prostatectomy: A randomized trial of verbal and written instructions versus therapist-directed pelvic floor muscle therapy. *Urology* 2008;**72**(6):1280–6. [: SR–INCONT26907]

Nowak 2007 *{published data only}*
Nowak M, Jordan M, Haberl S, Herwig R, Kuehhas F, Brausi M, et al.Prospective study of extracorporeal magnetic innervation pelvic floor therapy (EXMI) versus standard pelvic floor training following radical prostatectomy: Impact on timing and magnitude of recovery of continence (Abstract number 482). *European Urology Supplements* 2007;**6**(2):143.

Opsomer 1994 *{published data only}*
Opsomer RJ, Castille Y, Abi Aad AS, van Cangh PJ. Urinary incontinence after radical prostatectomy: Is professional pelvic floor training necessary?. *Neurourology & Urodynamics* 1994;**13**(4):382–4.

Overgard 2008 *{published data only}*
Lazzeri M. Editorial Comment on: Does Physiotherapist-Guided Pelvic Floor Muscle Training Reduce Urinary Incontinence After Radical Prostatectomy? A Randomised Controlled Trial. *European Urology* 2008;**54**(2):445–6.
Morkved S, Overgard M, Lydersen S, Angelsen A. Does pelvic floor muscle training with follow up instructions by a physiotherapist reduce urinary incontinence after radical prostatectomy? - A randomised controlled trial (Abstract number 15). *Neurourology & Urodynamics* 2008;**27**(7): 587–8.
Novara G. Editorial Comment on: Does Physiotherapist-Guided Pelvic Floor Muscle Training Reduce Urinary Incontinence After Radical Prostatectomy? A Randomised Clinical Trial. *European Urology* 2008;**54**(2):447.
Overgard M, Angelsen A, Lydersen S, Morkved S. Does physiotherapist-guided pelvic floor muscle training reduce urinary incontinence after radical prostatectomy?: A randomised controlled trial. *European Urology* 2008;**54**: 438–48.

Parekh 2003 *{published data only}*
Parekh AR, Feng Mi, Kirages D, Bremner H, Kaswick J, Aboseif S. The role of pelvic floor exercises on post-prostatectomy incontinence. *Journal of Urology* 2003;**170**: 130–3.

Perissinotto 2008 *{published data only}*
Perissinotto MCR, D'Ancona CAL, Campos RM, Lucio AC, Silva JrW. Physiotherapeutic for treatment of post radical prostatectomy urinary incontinence (Abstract number 265). Proceedings of the International Continence Society (ICS), 38th Annual Meeting, 2008 Oct 20-24, Cairo, Egypt. 2008.

Porru 2001 *{published data only}*
Porru D, Campus G, Caria A, Madeddu, Cucchi A, Rovereto B, et al.Impact of early pelvic floor rehabilitation after transurethral resection of the prostate. *Neurourology and Urodynamics* 2001;**20**:53–9.

Ribeiro 2008 *{published data only}*
Ribeiro LS, Prota C, Gomes CM, Dall'Oglio MF, Bruschini H, Srougi M. Effect of early postoperative pelvic-floor

Copyright © 2012 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

biofeedback on continence in men undergoing radical prostatectomy: A randomized, controlled trial (Abstract number 1412). *Journal of Urology* 2008;**179**(4 Suppl S): 483.
Ribiero LS, Prota C, Gomes CM, Boldarine MP, Nakano E, Dall'Oglio M, et al.Early pelvic-floor biofeedback training promotes long-term improvement of urinary continence after radical prostatectomy (Abstract number 1882) [.]. *Journal of Urology* 2009;**181**(4 Suppl):680. [: SR–INCONT42736]

Robinson 2008 ***{published data only}***
Robinson JP, Bradway CW, Nuamah I, Pickett M, McCorkle R. Systematic pelvic floor training for lower urinary tract symptoms post-prostatectomy: a randomized clinical trial. *Internatonal Journal of Urological Nursing* 2008;**2**(1):3–13.

Robinson 2009 ***{published data only}***
Robinson J, Weiss R, Avi-Itzhak T, McCorkle R. Pilot-testing of a theory-based pelvic floor training intervention for radical prostatectomy patients (Abstract number 88). *Neurourology & Urodynamics* 2009;**28**(7):682–3.

Seleme 2008 ***{published data only}***
Seleme M, Ribeiro V, Moreno A, Berghmans B, Bendhack M. Efficacy of physiotherapy after radical prostatectomy (Abstract number 256). Proceedings of the International Continence Society (ICS), 38th Annual Meeting, 2008 Oct 20-24, Cairo, Egypt. 2008.

Tibaek 2007 ***{published data only}***
Tibaek S, Klarskov P, Hansen BL, Thomsen H, Andresen H, Jensen CS, et al.Pelvic floor muscle training before transurethral resection of the prostate: A randomized, controlled, blinded study. *Scandinavian Journal of Urology & Nephrology* 2007;**41**(4):329–34.
Tibaek S, Klarskov P, Lund Hanzen B, Thomsen H, Andresen H, Schmidt Jensen C, et al.Pelvic floor muscle training before transurethral resection of the prostate (Abstract number 31).. *Neurourology and Urodynamics* 2006;**25**(6):546–7. [: 26614]

Tobia 2008 ***{published data only}***
Tobia I, Gonzalez MS, Martinez P, Tejerizo JC, Gueglio G, Damia O, et al.[Randomized study on urinary continence after radical prostatectomy with previous kinesic perineal physiotherapy]. [Spanish]. *Archivos Espanoles de Urologia.* 2008;**61**(7):793–8.

van Kampen 1998 ***{unpublished data only}***
Van Kampen M, De Weerdt W, Van Poppel H, Baert L. Urinary incontinence after radical prostatectomy can be treated by pelvic floor re-education and predicted by measuring urine loss at catheter withdrawal: a controlled study. Proceedings of the International Continence Society (ICS), 29th Annual Meeting; 1999 Aug 22-26; Denver, Colorado. 1999:246–7. [: 9919]
Van Kampen M, De Weerdt W, Van Poppel H, De Ridder D, Feys H, Baert, L. The efficacy of physiotherapy on the degree and the duration of incontinence after radical prostatectomy: a randomised controlled study [abstract]. *Neurourology & Urodynamics* 1998;**17**(4):49–50.
van Kampen M, De Weerdt W, Van Poppel H, De Ridder D, Feys H, Baert L. *The efficacy of physiotherapy on the degree and the duration of incontinence after radical prostatectomy: a randomised controlled study. [Unpublished doctoral thesis]*. Belgium: University of Leuven, 1998.
* Van Kampen M, De Weerdt W, Van Poppel H, De Ridder D, Feys H, Baert L. Effect of pelvic floor re-education on duration and degree of incontinence after radical prostatectomy: a randomised controlled trial. *Lancet* 2000; **355**(9198):98–102. [MEDLINE: 20137631]

Wille 2003 ***{published and unpublished data}***
* Wille S, Sobottka A, Heidenreich A, Hofmann R. Pelvic floor exercises, electrical stimulation and biofeedback after radical prostatectomy: Results of a prospective randomized trial. *Journal of Urology* 2003;**170**(2, Part 1):490–3.
Wille S, Sobottka A, Olbert P, Heidenreich A, Hofmann R. Impact of electrical stimulation or biofeedback on quality of life after radical prostatectomy: Results of a prospective randomized trial (Abstract number 167). *Journal of Urology* 2004;**171**(4 Supplement):44. [: {27408}]

Yamanishi 2006 ***{published data only}***
Yamanishi, T, Mizuno, T, Watanabe, M, Honda, M, Yoshida, K.-I. Randomized, placebo controlled study of electrical stimulation with pelvic floor muscle training for severe urinary incontinence after radical prostatectomy.. *Journal of Urology* 2010;**184**(5):2007–12. [: 40344]
Yamanishi K, Mizuno T, Sakakibara R, Uchiyama T, Ito Y, Yamamoto T, et al.A randomized, placebo-controlled, double-blind study of electrical stimulation with pelvic floor muscle training for the treatment of urinary incontinence after radical prostatectomy (Abstract number 30). *Neurourology & Urodynamics* 2006;**25**(6):545–6.

Yokoyama 2004 ***{published data only}***
Yokoyama T, Nishiguchi J, Watanabe T, Nose H, Nozaki K, Fujita O, Inoue M, et al.Comparative study of effects of extracorporeal magnetic innervation versus electrical stimulation for urinary incontinence after radical prostatectomy. *Urology* 2004;**63**(2):264–267.

Zhang 2007 ***{published data only}***
Zhang AY, Galanek J, Strauss GJ, Siminoff LA. What it would take for men to attend and benefit from support groups after prostatectomy for prostate cancer: a problem-solving approach. *Journal of Psychosocial Oncology* 2008;**26** (3):97–112.
Zhang AY, Strauss GJ, Siminoff LA. Effects of combined pelvic floor muscle exercise and a support group on urinary incontinence and quality of life of postprostatectomy patients. *Oncology Nursing Forum Online* 2007;**34**(1): 47–53.
Zhang AY, Strauss GJ, Siminoff LA. Intervention of urinary incontinence and quality of life outcome in prostate cancer patients. *Journal of Psychosocial Oncology* 2006;**24**(2):17–30.

References to studies excluded from this review

Copyright © 2012 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Bennett 1997 *{published data only}*

Bennett JK, Foote JE, Green BG, Killorin EW, Martin SH. Effectiveness of biofeedback/electrostimulation in the treatment of post prostatectomy urinary incontinence [abstract]. Proceedings of the Urodynamics Society Annual Meeting. 1997.

Bocker 2002 *{published data only}*

Bocker B, Smolenski UC. [Physikalische therapie der beckenbodeninsuffizienz– methodenvergleich]. *Journal fur Urologie und Urogynakologie* 2002;**2**:20–7.

Ceresoli 2002 *{unpublished data only}*

Ceresoli A, Kartalas Goumas J, Colombo F, Barbetti E, Dell'Aglio F, Bonacina P, et al.Daily transcutaneous electrical nerve stimulation (DTENS) after radical perineal prostatectomy: A free cost effective biofeedback technique in the treatment of post operative urinary incontinence (abstract). Proceedings of the 32nd Annual Meeting of the International Continence Society; 2002 Aug 28-30; Heidelberg, Germany. 2002.

Chang 1998 *{published data only}*

Chang PL, Tsai LH, Huang ST, Hsieh ML, Tsui KH. The early effect of pelvic floor muscle exercise after transurethral prostatectomy. *Journal of Urology* 1998;**160**(2):402–5.

Cornel 2005 *{published data only}*

Cornel EB, de Wit R, Witjes JA. Evaluation of early pelvic floor physiotherapy on the duration and degree of urinary incontinence after radical retropubic prostatectomy in a non-teaching hospital. *World Journal of Urology* 2005;**23**: 353–5.

Cornu 2011 *{published data only}*

Cornu JN, Merlet B, Ciofu C, Mouly S, Peyrat L, Sebe P, et al.Duloxetine for mild to moderate postprostatectomy incontinence: preliminary results of a randomised, placebo-controlled trial. *European Urology* 2011;**59**(1):148–54. [: SR–INCONT41370]

Crevenna 2003 *{published data only}*

Crevenna R, Zoch C, Kellani M, Quittan M, Fialka-Moser V. Implementation of a physical rehabilitation group for post-prostatectomy urinary incontinence patients and its effects on quality of life. *Physikalische Medicin Rehabilitationsmedizin Kurotmedizin* 2003;**13**(6):339–44.

Del Popolo 2006 *{published data only}*

Del Popolo G, Filocamo M, Li Marzi V, Cecconi F, Marzocco M, Nicita G. Stress incontinence after radical prostatectomy: a randomized controlled trial on combination of duloxetine and rehabilitation versus rehabilitation alone (Abstract number 29). *Neurourology & Urodynamics* 2006;**25**(6):544–5.

Filocamo 2007 *{published data only}*

Filocamo MT, Li Marzi V, Del Popolo G, Cecconi F, Villari D, Marzocco M, et al.Pharmacologic treatment in postprostatectomy stress urinary incontinence. *European Urology* 2007;**51**(6):1559–64. [: 23000]

Griebling 1999 *{published data only}*

Griebling TL, Kreder KJ, Sueppel CA, See WA. Timing of biofeedback and pelvic floor muscle exercise training for men undergoing radical prostatectomy. Proceedings of the 29th Annual Meeting of the International Continence Society; 1999 Aug 22-26; Denver, Colorado. 1999.

* Sueppel C, Kreder K, See W. Improved continence outcomes with preoperative pelvic floor muscle strengthening exercises. *Urologic Nursing* 2001;**21**:201–10.

Hotston 2006 *{published data only}*

Hotston MR, Hurley K, Patel S, Persad R. The use of duloxetine for stress incontinence after prostatectomy. *BJU International* 2006;**98**(4):916–7.

Ip 2004 *{published data only}*

Ip V. Evaluation of a patient education tool to reduce the incidence of incontinence post-prostate surgery. *Urologic Nursing* 2004;**24**(5):401–7.

Kahihara 2006 *{published data only}*

Kahihara CT, Ferreira U, Pedro RN, Matheus WE, Netto NR. [Early versus delayed physiotherapy in the treatment of post-prostatectomy male urinary incontinence]. *Archivos Espanoles de Urologia* 2006;**59**(0004-0614 (Print), 8): 773–8.

McGlynn 2004 *{published data only}*

McGlynn B, Al-Saffar N, Begg H, Gurun M, Hollins G, McPhee S, et al.Management of urinary incontinence following radical prostatectomy. *Urologic Nursing* 2004;**24** (6):475–82.

Nehra 2001 *{published data only}*

Nehra A, Rovner E, Wein A, Lange P, Ellis W, Keane R, et al.Interim analysis of a multi-center study of extracorporeal magnetic innervation (ExMI) for the treatment of urinary incontinence following radical prostatectomy (Abstract). Proceedings of the 31st Annual Meeting of the International Continence Society; 2001 Sept 18-21; Seoul, Korea. 2001.

Pemberton 2006 *{published data only}*

Pemberton P, Brooks A, Eriksen CM, Frost S, Graham S, Greenman L, et al.A comparative study of two types of urinary sheath. *Nursing Times* 2006;**102**(7):36–41.

Pulker 2002 *{published data only}*

Pulker E. Long term results of physiotherapy in men with urinary stress incontinence after radical prostatectomy (Abstract). Proceedings of the 32nd Annual Meeting of the International Continence Society; 2002 Aug 28-30; Heidelburg, Germany. 2002.

Salinas Casado 1991 *{published data only}*

Salinas Casado J, Varela E, Prieto Chaparro L, Virseda Rodriguez M, Salomon S, Guerrero A, et al.Results of perineal electric stimulation in stress urinary incontinence [Resultatos de la estimulacion electrica perineal en la incontinencia urinaria de esfuerzo]. *Archivos Espanoles di Urologia* 1991;**44**(4):437–40.

Salinas Casado 1996 *{published data only}*

Salinas Casado J, Virseda Chamorro M, Salomon Mohamed S, Bravo de Rueda C, Aristizabal JM, Resel Estevez L. Results of electrical stimulation in the treatment of post-prostatectomy urinary incontinence. *Actas Urologicas Espanolas* 1996;**20**(6):544–50.

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Seki 2005 *{published data only}*
Seki N, Kai N, Takano N, Naito S, Kawajiri M, Kira J, Tobimatsu S. Efficacy of high-frequency magnetic stimulation of the sacral root in patients with stress urinary incontinence following radical prostatectomy [abstract]. 35th Annual Meeting of International Continence Society; 2005 Aug 29 - Sep 2; Montreal, Canada.

Zermann 1999 *{published and unpublished data}*
Zermann DH, Ishgooka M, Wunderlich H, Wilhelm S, Schubert J. Post-prostatectomy incontinence and pelvic floor dysfunction (abstract). Proceedings of the 29th Annual Meeting of the International Continence Society; 1999 Aug 22-26; Denver, Colorado. 1999.
* Zermann DH, Ishigooka M, Wunderlich H, Reichelt O, Schubert J. A study of pelvic floor function pre-and post radical prostatectomy using clinical neurourological investigations, urodynamics and electromyography. *European Urology* 2000;**37**:72–8.

References to studies awaiting assessment

Delmastro 2010 *{published data only}*
Delmastro F, Marchisio C, Lamberti G, Giraudo D. Urinary incontinence after radical prostatectomy: a randomized controlled trial comparing preoperative intensive pelvic muscle exercises with or without proprioceptive training (Abstract). *Neurourology and Urodynamics* 2010;**29**(2S): 62–3. [: SR–INCONT39878]

Marchiori 2010 *{published data only}*
Marchiori D, Bertaccini A, Manferrari F, Ferri C, Martorana G. Pelvic floor rehabilitation for continence recovery after radical prostatectomy: role of a personal training re-educational program. *Anticancer Research* 2010;**30**(2): 553–6. [: SR–INCONT39639]

Park 2011 *{published data only}*
Park S-W, Park C-S, Kim T-N, Lee W, Nam J-K. The effects of a 12-week's combined exercise intervention on physical function and mental health after radical prostatectomy in elderly patients with prostate cancer: a prospective, randomised controlled study (Abstract number 1309). *Journal of Urology* 2011;**185**(4S):e524. [: SR–INCONT42511]

References to ongoing studies

Voorham 2010 *{published data only}*
Voorham-Van Der Zalm PJ, Stoetman AM, Putter H, Bevers RFM, Pelger RCM. Effect of preoperative pelvic floor physiotherapy versus standard care on incontinence in men undergoing radical laparoscopic prostatectomy: an ongoing study (Abstract number 590). Proceedings of the Joint Meeting of the International Continence Society (ICS) and the International Urogynecological Association, 2010 Aug 23-27, Toronto, Canada. 2010. [: SR–INCONT40184]

Additional references

Aaronson 1988
Aaronson NK, Bullinger M, Ahmedzai S. A modular approach to quality-of-life assessment in cancer clinical trials. In: Scheurlen H, Kay R, Baum M editor(s). *Recent results in cancer: Clinical trials, a critical appraisal*. New York: Springer-Verlag, 1988:231–49.

Aaronson 1993
Aaronson NK, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez NJ, et al.The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. *Journal of the National Cancer Institute* 1993;**85** (5):365–76.

Aboseif 1996
Aboseif SR, O'Connell HE, Usui A, McGuire EJ. Collagen injection for intrinsic sphincteric deficiency in men. *Journal of Urology* 1996;**155**:10–3.

Abrams 1991
Abrams PH. Investigation of post prostatectomy problems. *Urology* 1991;**15**:209–12.

Albertsen 1997
Albertsen PC, Lu-Yao GL, Warren J. Risk of complication and readmission associated with radical prostatectomy in community practice: A Medicare claims analysis. *Journal of Urology* 1997;**157**(Suppl 4):93.

Barry 1992
Barry MJ, Fowler FJ, O'Leary MP, Bruskewitz RC, Holtgrewe HL, Mebust WK, et al.The American Urological Association Symptom Index for benign prostatic hyperplasia. *Journal of Urology* 1992;**48**:1549–57.

Berghmans 1998
Berghmans LC, Hendriks HJ, Bo K, Hay-Smith EJ, de Bie RA, van Waalwijk van Doorn ES. Conservative treatment of stress urinary incontinence in women: a systematic review of randomized clinical trials. *British Journal of Urology* 1998;**82**:181–91.

Chao 1995
Chao R, Mayo ME. Incontinence after radical prostatectomy: Detrusor or sphincter causes?. *Journal of Urology* 1995;**154**:16–8.

Diokno 1997
Diokno A. Post prostatectomy urinary incontinence. Proceedings of the First International Conference for the Prevention of Incontinence, Simon Foundation, USA and The Continence Foundation, UK. Marlow, England, June 25–27, 1997.

Donnellan 1997
Donnellan SM, Duncan HJ, MacGregor RJ, Russell, JM. Prospective assessment of incontinence after radical retropubic prostatectomy: objective and subjective analysis. *Urology* 1997;**49**(2):225–30.

Eastham 1996
Eastham JA, Kattan MW, Rogers E, Goad JR, Ohori M, Boone TB, et al.Risk factors for urinary incontinence after

Copyright © 2012 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

radical prostatectomy. *Journal of Urology* 1996;**156**(5): 1707–13.

Emberton 1996
Emberton M, Neal DE, Black N, Fordham M, Harrison M, McBrien MP, et al.The effect of prostatectomy on symptom severity and quality of life. *British Journal of Urology* 1996; **77**(2):233–47. [: 9925]

Fader 2007
Fader M, Cottenden Alan M, Getliffe K. Absorbent products for light urinary incontinence in women. *Cochrane Database of Systematic Reviews* 2007, Issue 2. [DOI: 10.1002/14651858.CD001406.pub2; : CD001406]

Fader 2008
Fader M, Cottenden Alan M, Getliffe K. Absorbent products for moderate-heavy urinary and/or faecal incontinence in women and men. *Cochrane Database of Systematic Reviews* 2008, Issue 4. [DOI: 10.1002/14651858.CD007408; : CD007408]

Ficazzola 1998
Ficazzola MA, Nitti VW. The etiology of post-radical prostatectomy incontinence and correlation of symptoms with urodynamic findings. *Journal of Urology* 1998;**160**: 1317–20.

Galloway 2000
Galloway N, El-Galley R, Sand P, Appell R, Russell H, Carlan S. Update on extracorporeal magnetic innervation (ExMI) therapy for stress urinary incontinence. *Urology* 2000;**56**(6A):82–6.

Golubuff 1995
Golubuff ET, Chang DT, Olsson CA, Kaplan SA. Urodynamics and the etiology of post-prostatectomy urinary incontinence: The initial Columbia experience. *Journal of Urology* 1995;**153**:1034–7.

Grise 2001
Grise P, Thurman S. Urinary incontinence following treatment of localized prostate cancer. *Cancer Control* 2001; **8**(6):532–9.

Groutz 2000
Groutz A, Blaivais JG, Chaikin DC, Weiss JP, Verhaaren M. The pathophysiology of post-radical prostatectomy incontinence: a clinical and video urodynamic study. *Journal of Urology* 2000;**163**(6):1767–70.

Gudziak 1996
Gudziak MR, McGuire EJ, Gormley EA. Urodynamic assessment of urethral sphincter function in post-prostatectomy incontinence. *Journal of Urology* 1996;**156**: 1131–4.

Hasan 1996
Hasan ST, Robson WA, Pridie AK, Neal DE. Transcutaneous electrical nerve stimulation and temporary S3 neuromodulation in idiopathic detrusor instability. *Journal of Urology* 1996;**155**:2005–11.

Higgins 2003
Higgins JPT, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. *British Medical Journal* 2003;**327**:557–60.

Higgins 2011
Higgins JPT, Green S, (editors). Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [updated March 2011]. The Cochrane Collaboration, 2011. Available from www.cochrane-handbook.org. Chichester, UK: John Wiley & Sons, Ltd.

Hunskaar 2002
Hunskaar S, Burgio K, Diokno AC, Herzog AR, Hjalmas K, Lapitan MC. Epidemiology and natural history of urinary incontinence. Incontinence: 2nd International Consultation on Incontinence. Plymouth, UK: Health Publications, 2002:165–200.

Jacobsen 2007
Jacobsen NE, Moore KN, Estey E, Voaklander D. Open versus laparoscopic radical prostatectomy: a prospective comparison of postoperative urinary incontinence rates. *Journal of Urology* 2007;**177**(2):615–9.

Jahn 2007
Jahn P, Preuss M, Kernig A, Langer G, Seifert-Huehmer A. Types of indwelling urinary catheters for long-term bladder drainage in adults. *Cochrane Database of Systematic Reviews* 2007, Issue 3. [DOI: 10.1002/ 14651858.CD004997.pub2; : CD004997]

Juni 2001
Juni P, Altman DG, Egger M. Assessing the quality of randomized controlled trials. In: Egger M, Davey Smith G, Altman DG editor(s). *Systematic Reviews in Health Care: Meta-analysis in context*. 2nd Edition. London: BMJ Books, 2001:87–108.

Khan 1991
Khan Z, Mieza M, Starer P, Singh VK. Post-prostatectomy incontinence. A urodynamic and fluoroscopic point of view. *Urology* 1991;**38**(5):483–8.

Kondo 2002
Kondo A, Lin TL, Nordling J, Siroky M, Tammela T. Conservative management in men. Incontinence: 2nd International Consultation on Incontinence. Plymouth, UK: Health Publications, 2002:553–68.

Leach 1995
Leach GE. Post-prostatectomy incontinence: the importance of bladder dysfunction. *Journal of Urology* 1995;**153**(3 Pt 2):1038.

Litwiller 1997
Litwiller SE, McIntire DD, Schnitzer B, Roehrborn CG. Risk factors for incontinence following radical prostatectomy in a community practice setting [abstract]. Urodynamics Society Meeting. New Orleans, April 1997.

Majoros 2006
Majoros A, Bach D, Keszthelyi A, Hamvas A, Romics I. Urinary incontinence and voiding dysfunction after radical

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retropubic prostatectomy (prospective urodynamic study). *Neurourology and Urodynamics* 2006;**25**:2–7.

McCammon 1999
McCammon KA, Kolm P, Main B, Schellhammer PF. Comparative quality of life analysis after radical prostatectomy or external beam radiation for localized prostate cancer. *Urology* 1999;**54**(3):509–16.

McGuire 1983
McGuire EJ, Shi-Chun Z, Horwinski ER, Lytton B. Treatment of motor and sensory detrusor instability by electrical stimulation. *Journal of Urology* 1983;**129**:78–9.

McGuire 1990
McGuire EJ. Editorial comment: Pathophysiology of urinary incontinence after radical prostatectomy. *Journal of Urology* 1990;**143**:978.

Milsom 2009
Milsom I, Altman D, Lapitan MC, Nelson R, Sillen U, Thom D. Epidemiology of urinary (UI) and faecal (FI) incontinence and pelvic organ prolapse (POP).. *Incontinence: 4th International Consultation on Incontinence*. Paris, France: Health Publication Ltd, 2009:35–112.

Moore 2007
Moore Katherine N, Fader M, Getliffe K. Long-term bladder management by intermittent catheterisation in adults and children. *Cochrane Database of Systematic Reviews* 2007, Issue 4. [DOI: 10.1002/14651858.CD006008.pub2; : CD006008]

Nakamura 1984
Nakamura M, Sakurai T. Bladder inhibition by penile electrical stimulation. *British Journal of Urology* 1984;**56**: 413–5.

Niël-Weise 2005
Niël-Weise Barbara S, van den Broek Peterhans J. Urinary catheter policies for long-term bladder drainage. *Cochrane Database of Systematic Reviews* 2005, Issue 1. [DOI: 10.1002/14651858.CD004201.pub2; : CD004201]

Okada 1998
Okada N, Igawa Y, Ogawa A, Nishizawa O. Transcutaneous electrical stimulation of thigh muscles in the treatment of detrusor overactivity. *British Journal of Urology* 1998;**81**: 560–4.

Peyromaure 2002
Peyromaure M, Ravery V, Boccon-Gibod I. The management of stress urinary incontinence after radical prostatectomy. *British Journal of Urology International* 2002; **90**(2):155–61.

Rainwater 1988
Rainwater LM, Zincke H. Radical prostatectomy after radiation for cancer of the prostate: feasibility and prognosis. *Journal of Urology* 1988;**140**(6):1455–9.

Silva 2011
Silva LA, Andriolo RB, Atallah ÁN, da Silva EMK. Surgery for stress urinary incontinence due to presumed sphincter deficiency after prostate surgery. *Cochrane Database of Systematic Reviews* 2011, Issue 4. [DOI: 10.1002/14651858.CD008306.pub2]

Strasser 1997
Strasser H, Steinlechner M, Bartsch G. Morphometric analysis of the rhabdosphincter of the male urethra. *Journal of Urology* 1997;**157**(Suppl 4):177.

Thompson 2002
Thompson DL. The national coverage decision for reimbursement for biofeedback and pelvic floor electrical stimulation for treatment for urinary incontinence. *Journal of Wound, Ostomy and Continence Nursing* 2002;**29**:11–9.

Uebersax 1995
Uebersax JS, Wyman JF, Shumaker SA, McClish DK, Fantl JA. The Continence Program for Women Research Group. Short forms to assess life quality and symptom distress for urinary incontinence in women: The Incontinence Impact Questionnaire and the Urogenital Distress Inventory. *Neurourology and Urodynamics* 1995;**14**:131–9.

Ware 1993
Ware JE. Measuring patients' views: the optimum outcome measure. *British Medical Journal* 1993;**306**(6890):1429–30.

Winters 1997
Winters JC, Rackley RR, Fralick RA, Simich SC, Appell RA. Urodynamic findings in post-prostatectomy incontinence [Abstract 398]. *Journal of Urology* 1997;**157**(Suppl 4):102.

References to other published versions of this review

Hunter 2004
Hunter KF, Moore KN, Cody DJ, Glazener CMA. Conservative management for postprostatectomy urinary incontinence. *Cochrane Database of Systematic Reviews* 2004, Issue 2. [DOI: 10.1002/14651858.CD001843.pub2]

Hunter 2007
Hunter KF, Moore KN, Glazener CMA. Conservative management for postprostatectomy urinary incontinence. *Cochrane Database of Systematic Reviews* 2007, Issue 2. [DOI: 10.1002/14651858.CD001843.pub3]

Moore 1999b
Moore KN, Cody DJ, Glazener CM. Conservative management for post prostatectomy urinary incontinence. *Cochrane Database of Systematic Reviews* 1999, Issue 4. [DOI: 10.1002/14651858.CD001843]

Moore 2001
Moore KN, Cody DJ, Glazener CM. Conservative management for post prostatectomy urinary incontinence. *Cochrane Database of Systematic Reviews* 2001, Issue 2. [DOI: 10.1002/14651858.CD001843]

* *Indicates the major publication for the study*

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CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Bales 2000

Methods	Randomised: yes Method of allocation: not stated Blinding: Outcome assessment nurse not involved in intervention. Dropouts: None mentioned.
Participants	Recruitment: pre-operative Included: all men undergoing radical prostatectomy N=100 consecutive patients with stage T1c-T2c prostate cancer undergoing radical retropubic prostatectomy by a single surgeon randomised into 2 groups
Interventions	Pre-operative intervention. Group A (50) intervention: 2-4 weeks prior to surgery, participants underwent a 45 minute session with nurse trained in biofeedback. Patients were instructed to perform graded PFMT. Contractions of 5-10 seconds, 10-15 repetitions were performed with biofeedback (surface electrodes used to measure muscle strength). Advised to practice the exercises 4 times per day until surgery Group B (50) control: No biofeedback training. Written and brief verbal instructions from a nurse on how to perform PFMT (isolate muscle that stops urine flow, practice 4 times per day, 10-15 repetitions) Both groups: Encouraged to perform PME 4x per day after catheter removal 2 weeks post op Length of follow-up: 6 months
Outcomes	Main outcome: Time to return of continence measured by number of pads used Secondary outcomes: Quality of life measured by Hopkins Symptom Checklist (SCL-90-R) and Medical Outcomes Study Short Form Health Survey (SF-36) Continence definition: use of 1 pad or less per day Data collection: at 1, 2, 3, 4, and 6 months postoperatively There was no significant difference in incontinence between the groups
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Unclear risk	"Randomised"
Blinding (performance bias and detection bias) All outcomes	Low risk	Outcome assessment nurse not involved in intervention Blinding to intervention not possible

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Bales 2000 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	Low risk	No dropouts

Burgio 2006

Methods	Randomised: yes Method of allocation: stratified by age and tumour differentiation, then randomised using computer generated random numbers, block size of 4 to ensure equity of number in each group. Blinding: Intervention providers and bladder diary scorers were blinded. Dropouts: 6 participants in the intervention group, and 7 in the control were excluded after randomisation as surgery was cancelled. At 6 months, 6 in the intervention and 4 in the control were lost to follow-up
Participants	Recruitment: pre-operative Included: all men undergoing radical prostatectomy N=125 volunteer patients randomised, 13 excluded after randomisation Analysis on N=112 men aged 53-68 who underwent radical prostatectomy for prostate cancer. To be eligible, the men had to be ambulatory, continent and identified at least 1 week prior to their surgery
Interventions	Pre-operative intervention. Group A (57) intervention: Single session of biofeedback (rectal probe to measure intra-abdominal rectal pressure and external anal sphincter contraction) assisted behavioural training. Feedback and verbal instruction used to teach control of pelvic muscles. Taught to contract sphincter during 2-10 seconds periods separated by 2-10 seconds of relaxation, dependent on ability. Written instructions for daily at home practice of 45 PFM exercises daily (3 sessions of 15 exercises each time). Additionally instructed to slow or interrupt voiding once daily. Encouraged to exercise daily preoperatively, then resume when catheter removed post-operatively Group B (55) control: usual care of brief verbal instructions post operatively to interrupt the voiding stream plus any instruction from physician Length of follow-up: 6 months
Outcomes	Main outcome: Continual and/or episodic urine loss using bladder diaries, incontinent pads or other products Secondary outcomes: Impact of incontinence and quality of life pre-operatively and at follow-up contacts by IIQ, SCL-90-R and SF-36 Continence definition: 3 consecutive weekly 1 day diaries showing no leakage or a 7 day diary showing no leakage Data collection: One day bladder diaries mailed in each week. Questionaire on bladder control, lifestyle and 7 day bladder diary at 6 weeks, 3 months and 6 months post surgery Time to continence was significantly reduced in the intervention group. The intervention group had a significantly smaller proportion of those with severe or continual leakage at 6 months, and stress type urine loss. No differences on quality of life, return to work or activities between the groups

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Burgio 2006 (*Continued*)

Notes	Analysis by "intention to treat". Additional data supplied to KFH by author	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Stratified by age and tumour differentiation, then randomised using computer generated random numbers, block size of 4 to ensure equity of number in each group
Allocation concealment (selection bias)	Low risk	Computer allocated
Blinding (performance bias and detection bias) All outcomes	Low risk	Intervention providers and bladder diary scorers were blinded Blinding to intervention not possible
Incomplete outcome data (attrition bias) All outcomes	High risk	6 and 4 lost to follow up at 6 months. 6 and 7 excluded after randomisation as surgery cancelled

Centemero 2009

Methods	Randomised: yes Method of allocation: 100 consecutive patients Blinding: No
Participants	Number of men 100 Recruitment: pre-operative Included: all men undergoing radical prostatectomy Excluded: impaired mental status, BMI.27, diabetes mellitus, neurological-rheumatic-immune disease, neck-urethral surgery, prior catheterisation. post operative catheterisation time longer than 6 days Aged: 48-68 years
Interventions	Group A (50) intervention: PFMT both pre and post-operatively. A structured PFMT program 30 and 15 days before surgery, previous physiotherapist evaluation to provide the patients with feedback about the quality of pelvic floor muscle function, PC test (endurance and contraction quality), breathing coordination, typify muscle contraction as tonic and modify incorrect physical attitudes. This was also repeated after the procedure Group B (50) intervention: PFMT post-operatively only (no details as to whether this is the same as the treatment pre-op above) Duration of treatment: not stated Length of follow-up: at one and three months
Outcomes	UI at - 1 month: A 29/50 , B 41/50.

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	3 month: A 19/50, B 31/50. 24 hour pad test, number of subjects with pad test weight of >150g 1 month: A 15/50 (30%), B 20/50 (40%). 3 month: A 10/50 (20%), B 16/50 (32%). Quality of life measured by the ICS male sf questionnaire, mean score 1 month: A 16, B 18, P = 0.2. 3month: A 15, B 17, P = 0.18. Satisfaction scale (PGI-I) used only for Group A and 75% reported extreme satisfaction for pre-operative PFMT
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Unclear risk	No description
Blinding (performance bias and detection bias) All outcomes	High risk	"All patients were operated by the same surgeon and evaluated by the same physiotherapist and urologist at the 1 and 3 month follow-up dates."
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No description. It appears that there were was no loss to follow-up

Dubbelman 2004

Methods	Randomised: yes
Participants	Recruitment: post-operative Included: men incontinent post radical prostatectomy (>= 1 gm urine loss on 1-hour pad test), one week after catheter removal Excluded: Preoperative UI N=66 men completing the trial, 33 in intervention group, 33 in control All participants had a radical retropubic prostatectomy and lived within 75 km of hospital Age range 61-67 years.
Interventions	Post-operative intervention A (35) intervention: 9 or less sessions of physiotherapy guided pelvic floor exercises after surgery plus information folder B (44) control: Exercise instruction through information folder only Length of follow up: 6.5 months Dropouts: A 1, B 2 due to stricture; + A 1, B 3 refused further measurements; + B 5 withdrew consent or 1 did not understand

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Dubbelman 2004 (*Continued*)

Outcomes	Continence definition: Incontinence defined as loss of at least 1 gram of urine on 1-hour pad test and 4 grams on the 24 hour pad test Main outcome: urinary incontinence on both 1 hour (>1 gm) and 24 hour (>4 gm) pad tests Secondary outcome: Urodynamic study (urethral pressure profilometry) Data collection: 1 and 26 weeks after catheter removal. Number of wet men at 6 months: A: 17/33, B: 20/33 No significance difference in continence rates between the groups
Notes	Sample size required 96 men in each arm Other data presented as median (IQR)

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Random number generator to achieve 1:1 ratio
Allocation concealment (selection bias)	Low risk	Sealed envelopes, sequentially numbered, opened by trial nurse after result of pad test was known
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Blinding to intervention not possible Blinding of pad test weighing not mentioned
Incomplete outcome data (attrition bias) All outcomes	High risk	13 dropped out (of which 2 from intervention group)

Filocamo 2005

Methods	Randomised: yes Method of allocation: Block randomisation, block size of 4 for 2 groups (A&B) with only one permutation code (ABBA) Blinding: not described Dropouts: At 12 months, 2 participants dropped out of the control group. Intention to treat: yes
Participants	Recruitment: post-operative Included: all men undergoing RRP N= 300 consecutive men post RRP, randomised after catheter removal to 2 groups. Intervention group: N= 150 Control group N=150
Interventions	Post-operative intervention. Group A (150) intervention: Formal instruction (3 treatment sessions plus at home exercises) in PFMT using verbal explanation, palpation and visualization of the base of the penis with a mirror, in different positions and prior to sneezing, coughing or lifting

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Filocamo 2005 (*Continued*)

	Group B (150) control: No formal instruction. Length of follow-up: 12 months
Outcomes	Main outcome: urine loss on 1 hour and 24 hour pad tests plus number of pads used daily Continence definition: 0-1 pads per day Data collection: 1, 3, 6, and 12 months. Wet (leakage or use of pads): 1 month: A 145/150, B 147/150 3 months: A 115/150, B 129/150 6 months: A 35/150, B 102/150 12 months: A 16/150, B 49/148 Surgical implantation of artificial urinary sphincter: A 2/150, B 3/148
Notes	74% of the intervention group achieved continence at 3 months compared to only 30% of the control (a significant difference favouring intervention) Differences between the groups declined between 6-12 months, with most participants achieving continence in 1 year

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	High risk	Block randomisation, block size of 4 for 2 groups (A&B) with only one permutation code (ABBA)
Allocation concealment (selection bias)	Unclear risk	Not stated
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description of blinding of pad test or data entry from questionnaires Blinding to intervention not possible
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	2 dropped out of control group but none from intervention

Floratos 2002

Methods	Randomised: yes Method of allocation: randomised 2:1 to intervention: control groups. Blinding: Not mentioned Dropouts: 1 participant randomised to intervention unable to follow intervention protocol (unable to attend clinic. Provided with control invention Intention to treat: yes
Participants	Recruitment: post-operative Included: men incontinent post radical prostatectomy one week after catheter removal N = 42 consecutive patients

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Floratos 2002 (*Continued*)

Interventions	Post-operative intervention. Group A (28) intervention: Initiated after catheter removal. Intervention group received 15 treatment sessions (3 times per week for 30 minutes) of PFMT with EMG (surface) biofeedback in clinic Group B (14) control: Instruction with verbal feedback and an information pamphlet with instructions to perform PME 50-100 times daily at home Length of follow-up: 6 months
Outcomes	Main outcome: incontinence episodes measured by 1 hour pad test and continence questionnaire (pads used, number of incontinence episodes) Continence definition: Incontinence defined as a urine loss of > 1 gm on the 1 hour pad test. 2 or more pads/day a not deemed a "socially acceptable continence rate" Data collection: baseline, 1, 2, 3 and 6 months. Level of incontinence in both groups declined over the 6 months of the study. Control group had less urine loss and appeared to regain continence sooner, but the difference was not significant
Notes	Additional data supplied to KFH by author.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Unclear risk	Randomized 2:1 to intervention: control groups
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description
Incomplete outcome data (attrition bias) All outcomes	High risk	1 dropped out of intervention group but followed control intervention - unclear if analysed as control

Franke 1998

Methods	Randomised: yes Method of allocation: not stated Blinding: none Dropouts: 2 with gravitational incontinence consistent with intrinsic sphincter deficiency Intention to treat: not clear.

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Franke 1998 (*Continued*)

Participants	Recruitment: post-operative Included: men incontinence post radical prostatectomy at 6 weeks post surgery N= 30 men: 6 weeks post radical prostatectomy with post void residual of <50ml; no previous TURP, no urinary tract infection, no neurological conditions
Interventions	Post-operative intervention. Group A (13): Intervention: biofeedback (perineal patch EMG) enhanced PFMT; exercise treatment sessions at 6, 7, 9, 11, and 16 weeks postoperatively Group B (10): Control: completed bladder diary but did not have any other intervention Length of follow-up: 12 months.
Outcomes	Main outcome: urine loss measured by voiding diary, 48 hour pad test (reported as mean grams of urine lost in 24 hours), and incontinence questionnaire Continence definition: Not clear. Participants described as "completely dry" or with "significant incontinence" Data collection: 6, 12 and 24 weeks There were no significant differences between treatment or control groups on any of the outcome measures at any of the measurement intervals
Notes	Numbers in the groups unclear as 5 withdrew from the study after initial randomisation. Not clear how many were in each group prior to follow-up at 6 weeks

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Unclear risk	"Randomised"
Blinding (performance bias and detection bias) All outcomes	High risk	None
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	5 men withdrew after initial randomisation. Drop outs from 25 left at 6 weeks appears to be 10

Glazener RP 2011

Methods	RCT
Participants	Recruitment: post-operative Included: men with persistent urinary incontinence at 6 weeks after radical prostatectomy Excluded: radiotherapy planned; unable to comply with study or intervention; previous formal PFMT Age (mean, SD): A 62.4 (5.8); B 62.3 (5.6)

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Glazener RP 2011 (*Continued*)

Interventions	A (205): one-to-one therapy sessions including PFMT and BT if OAB/urgency symptoms + PFMT and Lifestyle leaflet Duration of treatment: 4 sessions in 3 months starting 6 weeks after surgery B (206): control group with standard care + Lifestyle leaflet only, no individual PFMT instruction or sessions
Outcomes	UI defined as positive response to ICIQ-short form questionnaire UI at 3 months: A 172/200, B 176/198 UI at 6 months: A 158/197, B 158/197 UI at 9 months: A 144/191, B 157/194 UI at 12 months: A 148/196, B 151/195 Severe UI at 12 months: A 74/196, B 78/195 UI episodes at 12 months from diaries (mean (SD N): A 3 (3.8) 105, B 2.9 (3) 106 ICI-Q score at 12 months (mean (SD N): A 4.9 (4.1) 196, B 5.4 (4.5) 195 QoL due to UI at 12 months (mean (SD N): A 1.4 (2) 193, B 1.7 (2.3) 193 Use of pads at 12 months: A 63/159, B 68/161 Men not doing PFMT at 12 months: A 63/191, B 91/189 Erectile dysfunction (no erection): A 105/189, B 105/190 QALYs virtually identical Cost: NHS intervention cost was £181 higher in intervention group (95% CI 107 to 255) Other outcomes: use of other protection, catheters, sheath catheters, urinary frequency, nocturia, faecal incontinence, urgency, constipation, EQ5D, SF12
Notes	Low drop out rates ICI-Q score: 0= no UI, no effect on QoL; 21 = maximum amount, frequency and effect on QoL QoL due to UI measured using ICIQ-SF: 0=no effect, 10=maximum effect Compliance with therapy high

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer generated, minimised on centre, age and pre-existing urinary incontinence
Allocation concealment (selection bias)	Low risk	Remote computer allocation
Blinding (performance bias and detection bias) All outcomes	Low risk	Blinding to intervention not possible. Outcomes from questionnaires completed by men, data entry clerks blinded to group
Incomplete outcome data (attrition bias) All outcomes	Low risk	No differential dropout from the groups

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Glazener TURP 2011

Methods	RCT
Participants	Recruitment: post-operative Included: men with persistent urinary incontinence at 6 weeks after transurethral resection of the prostate (TURP) Excluded: radiotherapy planned; channel TURP for palliation for prostate cancer; unable to comply with study or intervention; previous formal PFMT Age (mean, SD): A 68.2 (7.7); B 67.9 (8.1)
Interventions	A (220): one-to-one therapy sessions including PFMT and BT if OAB/urgency symptoms + PFMT and Lifestyle leaflet Duration of treatment: 4 sessions in 3 months starting 6 weeks after surgery B (222): control group with standard care + Lifestyle leaflet only, no individual PFMT instruction or sessions
Outcomes	UI defined as positive response to ICIQ-short form questionnaire UI at 3 months: A 142/205, B 132/208 UI at 6 months: A 140/199, B 129/201 UI at 9 months: A 133/197, B 131/202 UI at 12 months: A 126/194, B 125/203 Severe UI at 12 months: A 48/194, B 49/203 UI episodes at 12 months from diaries (mean (SD N): A 1.4 (2.3) 175, B 1.2 (2.2) 179 ICI-Q score at 12 months (mean (SD N): A 3.9 (3.7) 194, B 4 (4.3) 203 QoL due to UI at 12 months (mean (SD N): A 1.2 (1.9) 190, B 1.3 (2.2) 199 Use of pads at 12 months: A 24/146, B 24/136 Men not doing PFMT at 12 months: A 66/188, B 154/193 Erectile dysfunction (no erection): A 52/177, B 43/178 QALYs virtually identical Cost: NHS intervention cost was £209 higher in intervention group (95% CI 147 TO 271) Other outcomes: use of other protection, catheters, sheath catheters, urinary frequency, nocturia, faecal incontinence, urgency, constipation, EQ5D, SF12
Notes	Low drop out rates ICI-Q score: 0= no UI, no effect on QoL; 21 = maximum amount, frequency and effect on QoL QoL due to UI measured using ICIQ-SF: 0=no effect, 10=maximum effect Compliance with therapy high

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer generated, minimised on centre, age and pre-existing urinary incontinence
Allocation concealment (selection bias)	Low risk	Remote computer allocation

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Glazener TURP 2011 (*Continued*)

Blinding (performance bias and detection bias) All outcomes	Low risk	Blinding to intervention not possible. Outcomes from questionnaires completed by men, data entry clerks blinded to group
Incomplete outcome data (attrition bias) All outcomes	Low risk	No differential dropout from the groups

Goode 2009

Methods	Randomised controlled trial
Participants	Recruitment: postoperative Included: men incontinent 1 to 16 years after radical prostatectomy (mean years since operation: A 5.1, B 3.9, C 5.1) N = 208 (prior to drop out). Analysis of 172 men at 8 weeks Age between 51 to 84 years % of men with prior PFMT instruction: A 36%, B 56%, C 47% % of men using antimuscarinics: A 16%, B 20%, C 28% % of men with urgency UI: A 1%, B 3%, C 2% % of men with stress UI: A 44%, B 47%, C 44% % of men with mixed UI: A 54%, B 50%, C 54%
Interventions	A (70): Behavioural therapy with PFMT alone for 8 weeks B (70): Behavioural therapy with biofeedback and electrical stimulation for 8 weeks C (68): Control, no treatment for 8 weeks, then offered choice of intervention A or B Behavioural therapy consisted of pelvic floor muscle exercises and bladder control strategies in both groups Dropouts: A 19 at 6 months, 23 at 12 months; B 22 at 6 months, 36 at 12 months; C 3 at 8 weeks Length of follow up: 12 months for groups A and B C transferred to treatment at 8 weeks so no further follow up possible
Outcomes	Frequency of UI, mean accidents in a week Number of continent men at 8 weeks: A 11/70, B 12/70, C 4/68 Incontinence episodes per day at 8 weeks (mean, SD, N): A 1.86 (0.56) 58; B 1.71 (0.54) 54; C: 3 (1.17) 64 Change in quality of life at 8 weeks using EPIC UI sub scale (bigger change is better, mean, SD, N): A 13.1 (15.5) 58; B 12.3 (14.6) 54; C 2.9 (12.4) 64 Adverse events: A 0/70, B 2/70 (haemorrhoidal irritation), C 0/68 Patient's Global Perceptions of Improvement (much better): A 90%, B 91%, C 10% Completely satisfied with treatment progress: A 47%, B 47%, C not reported Compliance with PFMT and bladder control strategies at 8 weeks: A 100%, B 93% Compliance at 6 months: A 82%, B 84% Compliance at 12 months: A 91%, B 81%
Notes	Some baseline differences between groups, did not quite reach statistical significance High dropout rates No data available for control group after 8 weeks as all received treatment

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Goode 2009 (*Continued*)

Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Stratified by site, type and frequency of UI, generated by computer programme
Allocation concealment (selection bias)	Low risk	Sealed envelopes, opened sequentially
Blinding (performance bias and detection bias) All outcomes	Low risk	Blinding to intervention not possible. Outcomes from questionnaires completed by men, data entry staff blinded to group
Incomplete outcome data (attrition bias) All outcomes	High risk	Analysis and reported tables on 172 men.

Hoffman 2005

Methods	Randomised: yes Method of allocation: computerized randomisation. Blinding: unclear Dropouts: 1 participant from each intervention group had dropped out by discharge; 15 dropouts from the perineal group, 31 from the anal group and 5 from the control group dropped out by 3 months. Intention to treat: no
Participants	Recruitment: post-operative Included: men incontinent post radical prostatectomy in an inpatient rehabilitation program N= 180 men (prior to drop-outs) Randomly assigned to 3 groups (sixty in each group)
Interventions	Post-operative intervention. Group A (60) intervention: perineal E Stim plus physiotherapy (PFMT) Group B (60) intervention: anal E Stim plus physiotherapy (PFMT) Group C (60) control: PFMT alone. Length of follow-up: 3 months
Outcomes	Main outcome: urine loss measure on 1 hour pad test. Secondary outcomes: Quality of life (QLQ-C30) Continence definition: Self reports of incontinence. Data collection: admission and discharge from the rehabilitation program and at 3 months after discharge All groups improved on continence and quality of life. Use of E stimulation was only of additional value in a compliant subgroup. Perineal E stimulation was better accepted than anal
Notes	Additional data supplied to KFH by author.

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Hoffman 2005 (*Continued*)

Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Computerized randomisation
Allocation concealment (selection bias)	Unclear risk	"computerised randomisation"
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description
Incomplete outcome data (attrition bias) All outcomes	High risk	1 participant from each intervention group had dropped out by discharge; 15 drop-outs from the perineal group, 31 from the anal group and 5 from the control group dropped out by 3 months

Joseph 2000

Methods	Randomisation: yes Method of allocation: Not described. Blinding: None. Dropouts: 3 did not return to clinic for all appointments, one had other health problems Intention to treat: No.
Participants	Recruitment: post-operative Included: men incontinent post radical prostatectomy or post TURP. UI of at least 6 months duration N= 11 patients at least 6 months post surgery (4 radical retropubic, 6 radical peritoneal, 1 TURP)
Interventions	Post operative intervention. Group A (6): Intervention: Instruction in PFMT including biofeedback with visual feedback as well as verbal to assist in identifying and discriminating muscles Group B (5): Comparator: Instruction in PFMT, squeezing of finger during digital rectal exam Both: weekly visit for a total of 4 clinic visits Length of follow-up: 12 months
Outcomes	Main outcome: urine loss measure by standardised pad test, bladder diary, subjective estimation of degree of incontinence Secondary outcomes: Leak point pressure measured by video-urodynamics, Joseph Continence Assessment Tool Continence definition: subjective evaluation by participants Data collection: baseline, 3, 6, and 12 months. No differences between the groups. Improvement seen in all patients at 12 months

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Joseph 2000 (*Continued*)

Notes	Data not published in article. Raw data supplied to reviewer (KFH) who calculated means and standard deviations. These were reviewed by a second reviewer (KNM)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Unclear risk	"Randomised"
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Blinding to intervention not possible
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	3 dropouts

Koo 2009

Methods	Randomised: yes
Participants	Recruitment: post operative. Included: men with UI after radical prostatectomy. Randomised: N = 32.
Interventions	A (16) intervention: extracorporeal magnetic innervation (ExMI), treatment sessions were for 20 minutes twice weekly for 8 weeks B (16) control: PFMT alone. Duration of treatment not specified Length of follow-up: six months.
Outcomes	24 hour pad test, g of urine. Baseline:A 655, B 646 1 month: A 147, B 187 2 months: A 33, B 81, P=0.001 3 months: A 9 (SD 28), B 45 (28), P=0.001 6 months: Less than 10gms in both groups Number of pads used daily Baseline: A 4.2, B 4.1 I month: A 1.5, B 1.8 2months: A 0.6, B 0.9, P=0.033 3 months: A 0.1 (0.42), B 0.6 (0.42), P=0.002 6 months: A 0, B 0.1 Quality of life measured by I-QoL
Notes	Awaiting further translation - information from abstract only SDs imputed using P values

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Koo 2009 (*Continued*)

Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Unclear risk	No description
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No description

Liu 2008

Methods	Randomised controlled clinical trial.
Participants	Recruitment: post operative Included: men with UI after radical prostatectomy. Randomised: N= 24
Interventions	Group A (12) intervention: Extracorporeal magnetic innervation (ExMI), the frequency of the pulse field was 10Hz for 10 minutes, followed by a 3 minute rest and a second treatment of 50Hz for 20 minutes. This was done twice a week Group B (12) control: PFMT alone, instructions given to carry out 20mins x 3 a day Duration of treatment: six weeks. Length of follow up: 1, 3 and 6 months.
Outcomes	Main outcome measures: Quality of life scale and the ICI-Q-SF 1 month: Both scores were decreased with no significant differences between the groups At 3 and 6 months: Both scores decreased with group A having a significantly lower (better) score than group B (P <0.05)
Notes	Information from abstract, awaiting translation of paper.

Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Quote "randomly assigned"
Allocation concealment (selection bias)	Unclear risk	No description

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Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description
Incomplete outcome data (attrition bias) All outcomes	Low risk	All 24 patients included in the final analysis

Manassero 2007

Methods	Randomised: prospective randomised controlled trial. Method of allocation: Computer generated random numbers. Blinding: Blinded outcome assessors, not instructors. Dropouts: 12 excluded as the couldn't attend regularly for PFMT. 33 continent after surgery and were not randomised. 13 lost to follow up in the control group (5 social reasons and 8 non responders) Intention to treat: No.
Participants	Recruitment: post-operative. Included: men incontinent, (UI >2g/24 hour pad test), post radical prostatectomy who were able to attend hospital Excluded: those with a history of preoperative incontinence, significant perioperative complications, rectal lesion, infection, psychiatric neurological disorders, inability to contract PF muscles or weak contraction with increased detrusor activity Mean age: A 66.8 (6.3 years), B 67.9 (5.5 years).
Interventions	Group A (54) Intervention: PFMT re-education program, verbal feedback The training program involved active PFE. Verbal feedback of the contraction was used to instruct the patients to correctly and selectively contract their pelvic muscles while relaxing the abdominal muscles. The strength of the pelvic floor muscles was measured by digital anal control using a score of 0 to 5 (0 = no contraction, 5 = good contraction against strong resistance) Initially home practice comprised 45 contractions (3 sessions of 15) per day at home, progressively increasing the number until 90 per day. This was taught by two experienced urologists Group B (53) Control: No treatment. Duration of treatment: Up to a year or until incontinence ceased Length of follow-up: 1, 3, 6 and 12 months.
Outcomes	UI at - 1 month: A 83.3% (45/54), B 97.5% (39/40), P=0.04. 3months: A 53.7% (29/54), B 77.5% (31/40), P = 0.03. 6months: A 33.3% (18/54), B 60% (24/40), P = 0.01. 12months: A 16.6% (9/54), B 52.5% (21/40), P <0.01. Subjective assessment of continence using VAS: P = 0.01 at 12 months Quality of LIfe (single question): P = 0.03 at 12 months.
Notes	ITT analysis used for data entry, assuming that all 13 men who dropped out of the control group were dry, because of differential drop out of 13 men from B vs none from

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	A with no explanation for difference between groups If unable to contract anal sphincter or strength 2 or less, not randomised. These men were given electrical stimulation treatment at home with anal probe

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer generated random numbers.
Allocation concealment (selection bias)	Low risk	Stratified on volume of urine lost on pad test
Blinding (performance bias and detection bias) All outcomes	Low risk	Blinded outcome assessors. Blinding of intervention not possible
Incomplete outcome data (attrition bias) All outcomes	High risk	Differential drop out of 13 from control group, ITT analysis used for data entry by reviewers

Mariotti 2009

Methods	Randomised: yes
Participants	Randomised post operatively. Included: radical prostatectomy, all men after catheter removal Age: Group A mean, 61.86 years, Group B, 61.43 years.
Interventions	Intervention post operative. Group A (30) intervention: PFMT plus electrical stimulation and biofeedback twice a week for 6 weeks ES - a surface electrodes was inserted into the anus and pulsed, the intensity was adequate to induce visual lifting of the levator ani and pubococcygeus muscle, considering the level of comfort to the patient Biofeedback - via surface electrodes both perineal and abdominally Group B (30) control: Instructions to conduct PFMT - verbal and written instructions at catheter removal and follow up visits Duration of treatment: 6 weeks. Length of follow up: 3 and 6 months.
Outcomes	24 hour pad test: g/24hrs, mean (SD). 3 months: A 16.67 (30.55), B 136.67 (152.62), P = 0.000. 6 months: A 3.47 (14.67), B 27.83 (55.98), P = 0.0004. ICS-male questionnaire, number of men incontinent, n/N. 3 months: A 6/30, B 20/30. 6 months: A 1/30, B 10/30.

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Mariotti 2009 (*Continued*)

	Time to regain continence: A 8 (6.49) weeks, B 13.88 (8.32) weeks, P = 0.003
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Consecutive patients
Allocation concealment (selection bias)	Unclear risk	Quote - "Randomized fashion"
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description
Incomplete outcome data (attrition bias) All outcomes	Low risk	No dropouts

Mathewson-Chapman 97

Methods	Randomised: yes, block procedure Method of allocation: unclear Blinding: none Dropouts: 2 - not accounted for. Intention to treat: not clear.
Participants	Recruitment: pre-operative Included: all men undergoing radical prostatectomy N= 53 men Randomised pre-operatively.
Interventions	Pre and post-operative intervention. Group A (27) Intervention: Pre-operatively received further instruction and practice with PME protocol Home exercises and biofeedback (anal probe) (Incare 8900); practiced at home 3 times a week, starting with daily 15 PFMT and increasing by 10 every 4 weeks to a maximum of 35 PFMT Group B (24) Control: Post-operatively no further interventions until week 5 when pelvic muscle strength was assessed Both: Pre-operatively, both groups received 30 minutes' prostate education programme and baseline 'perineal muscle evaluation' (not defined); as well all were taught to contract the perineal muscle and hold for a few seconds prior to standing, lifting or coughing and limit the amount of tea, chocolate, alcohol and over-the-counter medications Length of follow-up: 12 weeks.
Outcomes	Main outcome: urine loss measured by 24 hour pad test, frequency of micturitions (self-recorded bladder diary),

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Mathewson-Chapman 97 (*Continued*)

	number of pads used; days to achieve continence from baseline Secondary outcomes: Perineal muscle strength (method not described) Continence definition: self report of return of continence Data collection: Three day bladder diaries at weeks 2, 5, 9 and 12. 24hour pad test at weeks 5 and 12
Notes	Inclusion of other modalities such as caffeine limitation and using perineal muscles during any event which increased abdominal stress may have masked any treatment benefit

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Block procedure
Allocation concealment (selection bias)	Unclear risk	No description
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description Blinding to intervention not possible
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	2 dropouts

Moore 1999

Methods	Randomised: yes Method of allocation: sealed envelopes. Blinding: physiotherapist blinded to results of control group. Dropouts: 5 Intention to treat: yes.
Participants	Recruitment: post-operative Included: men incontinent post radical prostatectomy. Median duration of UI 8 weeks post surgery, range 4-200 weeks N= 63 men (53 completed study) Randomised to 3 groups.
Interventions	Post-operative intervention. Intervention: Group A (18) intervention: PFMT alone; Group B (19) intervention: PFMT plus rectal electrical stimulation treated by one physiotherapist 30 minutes twice a week for 12 weeks. Intervention groups also did home exercises 3x/day gradually working up to 30 minutes per session lying, standing, sitting; strength, endurance, speed and control with maximum contractions of 5-10 seconds, 10-20 second relaxation and 12-20 repetitions; submaximum contractions at 65-75% of maximum strength with hold 20-30 seconds

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Moore 1999 (*Continued*)

	and equal rest time, 8-10 repetitions; speed was sets of quick repetitive contractions in a 10 second time span; control involved gradual recruitment to maximum contraction in 3 stages with 5 second hold at each stage and a slow release with rest 15-30 seconds Group C (21) control: oral and written information about PFMT pre and post- operatively (standard treatment) Length of follow-up: 24 weeks.
Outcomes	Main outcome: urine loss measured by 24 hour pad test Secondary outcomes: quality of life measures (Incontinence Impact Questionnaire, European Organization for the research and treatment of Cancer-EORTC QLQ C-30, version 2), physical symptom inventory (adapted from Herr 1994) Continence definition: < or = 2 gm urine/ 24 hours Data collection: baseline, 12, 16 & 24 weeks after baseline.
Notes	Intervention perhaps administered too early - all subjects improved at the same rate; wide range of severity of urinary incontinence at study entry and size of SD of pad test results also may have resulted in Type II error

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Low risk	Sealed envelopes
Blinding (performance bias and detection bias) All outcomes	Low risk	Physiotherapist blinded to results of control group Blinding to intervention not possible
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	5 dropouts

Moore 2004

Methods	Randomised: yes (order of product testing: in 3s to treatment block of 4 periods (1 no device, 3 with devices) Block, multiple period crossover design using Latin square configuration; Method of allocation: sealed envelopes. Blinding: Research assistant not involved in study chose envelope; but research assistant and participants could not be blinded to intervention Dropouts: None Intention to treat: Not discussed.
Participants	Recruitment: post-operative Included: men incontinent post radical prostatectomy who required continuous pad protection for stress incontinence Inclusion criteria: normal perineal and penile sensation, intact penile skin, sufficient

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	manual dexterity Exclusion criteria: overactive bladder, neurological disorders affecting sensation or circulation, cognitive impairment N = 12 men
Interventions	Post-operative intervention. Each participant had 4 periods (each lasted 1 day) Group A: No device Group B: C3 device Group C: U-Tex device Group D: Cunningham clamp.
Outcomes	Main outcome: 4 hour pad test. Secondary outcomes: resistive index , cavernosal flow None of the devices completely eliminated urine loss when applied at a comfortable pressure. Each device showed improvement in terms of urine lost, with Cunningham clamp having the lowest mean loss. Cunningham clamp significantly lowered flow, but ranked positively by participants
Notes	Unable to blind participants and research assistant to intervention. Sample size calculation given and required size achieved.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Block, multiple period crossover design using Latin square configuration
Allocation concealment (selection bias)	Low risk	Sealed envelopes, research assistant not involved in study chose envelope
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description Blinding to intervention not possible
Incomplete outcome data (attrition bias) All outcomes	Low risk	No dropouts

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Moore 2008

Methods	Randomised: yes Method of allocation: computer generated list of numbers; group allocation placed in sealed opaque envelopes; opened by subject after initial post-op instruction session with therapist. Blinding: data entry by clerk blinded to group; therapist blinded to outcome of non-intervention group; pads weighed by third party Dropouts: control = 7; treatment = 12
Participants	Recruitment: post-operative (but approached before surgery) Included: men incontinent after radical prostatectomy (> 8 grams urine lost on 24 hour pad test) at 4 weeks post surgery N=217 men from 3 centres with early stage prostate cancer Inclusion criteria: English speaking, living within 1 hour drive of research centre
Interventions	Post-operative intervention. Group A (106) intervention: Maximum 24 weekly, 30-minute treatment protocol (30 min biofeedback-assisted PFMT) and home exercise protocol of 2-3 times a day Group B (99) control: verbal and written information on PFME and weekly telephone contact by a urology nurse Both: At 4 weeks post surgery, both groups received standardized verbal and written instruction about PFMT and recovery after radical prostatectomy by one dedicated physiotherapist or registered nurse at each site Length of follow-up: 12 months
Outcomes	Main outcome: grams of urine loss on 24 hour pad test (>8gm defined as incontinence) Definition of continence: <8 gm of urine loss on 24 hour pad test; subjective continence defined as yes/no Secondary outcome: IPSS, IIQ-7 (Incontinence Impact Questionnaire), voiding diary, and subjective continence All measures obtained at baseline (preoperatively) and at 4, 8, 12, 28 weeks and 1 year post operatively 24 hour pad test, mean (SD) N: 12 weeks: A 115 (300) 93, B 72 (144) 82 16 weeks: A 76 (259) 94, B 61 (194) 80 28 weeks: A 45 (142) 87, B 35 (101) 74 12 months: A 47 (215) 89, B 8 (10) 78 Dry at 8 weeks: A 20/101 (20%), B 20/88 (23%) Dry at 12 weeks: A 30/93 (32%), B 23/82 (28%) Dry at 16 weeks: A 41/94 (44%), B 32/80 (40%) Dry at 28 weeks: A 41/87 (47%). B 37/74 (50%) Dry at 12 months: A 53/89 60%, B 47/78 60% (<8 gm on pad test) No significant differences between groups on continence or on symptom and quality of life measures or diary at any time point post operatively Cost: A: 400 Canadian dollars; B 240 Adverse events: none in either group The majority of men reported a low impact of incontinence as per the IIQ-7 and fewer LUTS at 12 months than at baseline on the IPSS. The majority were very satisfied with treatment and support from the continence nurse

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Moore 2008 (*Continued*)

Notes	Groups comparable at pre-op baseline on PSA, Gleason score, IPPS, IIQ, pad test and voiding diary

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer generated list of random numbers, random blocked allocation to groups
Allocation concealment (selection bias)	Low risk	Group allocation placed in sealed opaque envelopes; opened by participant after initial post-op instruction session with therapist
Blinding (performance bias and detection bias) All outcomes	Low risk	Data entry by clerk blinded to group; therapist blinded to outcome of non-intervention group; pads weighed by third party Blinding to intervention not possible
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Dropouts: control = 7; treatment = 12

Nowak 2007

Methods	Randomised: yes.
Participants	Recruitment: pre-operative. Included: men undergoing radical prostatectomy. Aged: 59 to 72 years.
Interventions	Group A intervention: Extra corporeal magnetic innervation (EXMI) based pelvic floor device Group B control: PFMT alone. Treatment initiated one week after catheter removal. Duration of treatment: 10 weeks. Length of follow up: 12 months.
Outcomes	On first day following catheter removal 16.8% of patients were continent Subsequent follow-up data unclear if N = 105 or 88 subjects. Group numbers not stated UI at: 4 weeks: A 49%, B 56%. 3 months: A 36%, B 50%. 6 months A 18%, B 32%. Twenty minute pad test at 12 months, significantly better in Group A at 12 months, P =0.004 QoL score and urinary symptom inventory also carried out, numbers not given

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Notes	No useable data.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Unclear risk	No description
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	One patient withdrew from Group A.

Opsomer 1994

Methods	Randomised: yes Method of allocation: method not described Blinding: none Drop outs: 4 Intention to treat: unclear.
Participants	Recruitment: post-operative Included: men incontinent post radical prostatectomy 6 weeks after six week after surgery N-=43 (39 completed study)
Interventions	Post-operative intervention. Group A (21) intervention: PFMT plus biofeedback plus electrical stimulation directed by physiotherapist Group B (22) control: PFME on their own without medical supervision Length of follow-up: 12 weeks.
Outcomes	Main outcome: urine loss measured by pad test. No statistical difference between groups as to recovery of continence
Notes	Abstract only - unable to contact author for further data.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	No description

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Opsomer 1994 (*Continued*)

Allocation concealment (selection bias)	Unclear risk	"Randomised"
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	4 dropouts

Overgard 2008

Methods	Randomised: yes
Participants	Recruitment: Pre-operative Included; radical prostatectomy, all men. Age: Group A 48 - 68 years, Group B 49-72 years.
Interventions	Intervention: post operative. Group A (38) intervention: Instructions on PFMT and physiotherapy, 45 minutes weekly. Patients were instructed to perform 3 sets of contractions daily at home, in either a supine, sitting or standing position. Digital anal palpation to teach correct contractions, as well as oral and written instructions DVD of instructions given to those living too far from hospital Group B (42) control:Instructions on PFMT alone. Duration of treatment: Up to 1 year. Length of follow-up: 3, 6 and 12 months.
Outcomes	Self reported continence (not using pads): 3 months: A 16/35 (46%), B 17/40 (43%), P=0.73. 6 months: A 27/34 (79%), B 22/38 (58%), P = 0.061. 12 months: A 33/36 (92%), B 28/39 (72%), P = 0.028. 24 hour pad test: g/24hrs, mean (range): 3 months: A 17 (0-282), B 7 (0-46), P = 0.53. 6 months: A 9 (0-203), B 2 (0-12), P = 0.73. 12 months: A 2 (0-55), B 1 (0-14), P = 0.95. PFM strength (anal squeeze pressure, cm H_2O), mean (SD): 3 months: A 50.7 (23.9), B 55.7 (25.6), P = 0.398. 6 months: A 56.1 (21.7), B 65.8 (27.0), P = 0.117. 12 months: A 64.0 (24.0), B 71.5 (26.2), P = 0.237.
Notes	No SDs

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Norwegian University performed the computerised randomisation procedure immediately after pre operative test

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Overgard 2008 (*Continued*)

Allocation concealment (selection bias)	Low risk	Norwegian University performed the computerised randomisation procedure immediately after pre operative test. Urologist no prior knowledge of randomisation procedure
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Blinding to intervention not possible
Incomplete outcome data (attrition bias) All outcomes	High risk	Drop out rate was 6% Four lost to follow up in physiotherapy group, one lost in instructions only group

Parekh 2003

Methods	Randomised: yes Method of allocation: Not described. Blinding: None Dropouts: 1 from each of the control and treatment groups. Reasons not described. Intention to treat: Yes, dropouts categorised as incontinent
Participants	Recruitment: pre-operative Included: all men scheduled for radical prostatectomy N= 38 patients with localized carcinoma of the prostate
Interventions	Pre and post-operative interventions. Group A (19) intervention: 2 treatment sessions preoperatively. Session 1 consisted of PFMT in a hook lying position. Session 2 was on an exercise ball. Teaching methods varied and included verbal cues, visualization with an anatomical model, palpation or biofeedback with rectal probe. Post-operatively, PFMT was reviewed and participants were seen every 3 weeks for 3 months by a physiotherapist. Home exercise for 6 months or more for those requiring further physical therapy guidance Group B (19) control: No formal education on PFMT pre-operatively, telephone or face to face follow-up at least monthly Length of follow-up: 12 months
Outcomes	Main outcome: urine loss measured by number of pads used daily Continence definition: 0 pads or 1 precautionary pad used Data collection: UI questionnaires at 6, 12, 16, 20, 28, and 52 weeks Greater number of the intervention group gained continence earlier than the control group at 3 months (only point of statistical difference). Minimal long term effect as continence rates the same at 1 year
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**

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Parekh 2003 (*Continued*)

Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Unclear risk	"Randomised"
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description
Incomplete outcome data (attrition bias) All outcomes	Low risk	1 dropout from each arm. Categorised as incontinent

Perissinotto 2008

Methods	Randomised: yes. method of allocation: consecutive patients.
Participants	Preoperative randomisation. Included: All men undergoing radical prostatectomy. Pre-operative intervention. Age: Not given.
Interventions	Group A (N not given) intervention: Early pelvic floor rehabilitation program at home twice dally, Kegel exercises Group B (N not given) control: No formal PFMT. Duration of treatment: For six months or until continence was achieved Length of follow-up: At 3 and 6 months.
Outcomes	PFM strength: P = 0.00197 Quality of Life using SF- ICIQ not significant. 24 hour pad test not significant.
Notes	No useable data

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Consecutive patients
Allocation concealment (selection bias)	Unclear risk	Randomised controlled trial
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description

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Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No description

Porru 2001

Methods	Randomised: yes Method of allocation: Not described. Blinding: Report stated that urologist performing digital evaluation of pelvic floor muscle contraction was blinded to the study group. Dropouts: Intervention - 2, control - 1. Reason reported was non-attendance at all clinic appointments. Intention to treat: None.
Participants	Recruitment: pre-operative Included: all men undergoing TURP N=58 men (55 completed study) with benign prostatic hypertrophy randomised to 2 groups
Interventions	Pre and post-operative intervention. Group A (30) intervention: Initial visit before surgery, digital evaluation of pelvic muscle contraction strength. Verbal instruction, feedback and reinforcement on contraction was given to teach selective contraction of anal sphincter and relaxation of abdominal muscles. Verbal and written instruction given for home PFMT. Weekly digital anal reassessment and grading of pelvic muscle contraction by the therapist. Instructed to practice contractions 45 times per day (3 groups of 15 contractions) Group B (28) control: Not specified. Both A & B: Voiding diaries initiated after catheter removal Length of follow up: 4 weeks. Data collection at catheter removal and weekly for 4 weeks
Outcomes	Main outcome: Urine loss (incontinence episodes) measured by 48 hour bladder diaries completed weekly Secondary outcomes: Muscle contraction strength by digital evaluation Scale 0-4 [0=none, 4=strong]. Pressure flow: Urine flowmetry pre-operatively and 1 month post-operatively. Symptoms: AUA (American Urological Association) symptom score preoperatively and 30 days after surgery. Quality of life: ICS male questionnaire. Significant increase in muscle strength in intervention group by week 4. Both groups showed improvement in symptom score and quality of life post-operatively, no significant difference between groups. Significantly better satisfaction with life in intervention group A compared to control B at 4 weeks. Significant difference in voiding intervals between the groups at weeks 2 and 3, but not week 4. No difference in uroflowmetry. Significantly less incontinence in the intervention group A at weeks 1, 2, and 3. No difference at week 4. Concluded that PFMT quickens the return to normal voiding post TURP

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Porru 2001 (*Continued*)

Notes		
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Unclear risk	B - 'randomised'
Blinding (performance bias and detection bias) All outcomes	Low risk	Urologist performing digital evaluation of pelvic floor muscle contraction was blinded to the study group
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Dropouts due to non-attendance at all clinic appointments (A 2, B 1)

Ribeiro 2008

Methods	Randomised: yes	
Participants	Post-operative intervention Included: radical prostatectomy, all men after catheter removal Age: 51-76 years	
Interventions	Group A (36) intervention: PFMT plus BF weekly for 3 months. Group B (37) control: PFMT oral instructions only Duration of treatment: weekly until continent or to a maximum of 3 months Length of follow-up: 3 months after treatment finished.	
Outcomes	UI severity (24 hour pad test weights): 1 month (N, mean, SD): A 96 gm (160) 36, B 355 (423) 37, P=0.007 3 months: A 51 (119), 36, B 197 (269) 37 6 months: A 40 (77), 36, B 80 (176) 37 ICI-SF Score: 3 months:A 3.4 (3.7), 36, B 6.8 (5.6) 37, P=0.022 6 months: A 2.7 (3.5), 36, B 4.3 (5.5) 37, P=0.339 PFM Strength, A vs B: 1 month, P=0.006; 3 months P<0.001; 6 months P=0.799 Quality of Life (IIQ): 3 months: A 1.6 (2.7), 36, B 4.3 (6.2) 37	
Notes	Groups comparable at baseline before operation on age, BMI, voiding symptoms and PFMT strength	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**

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Ribeiro 2008 (*Continued*)

Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Unclear risk	"Randomised controlled trial"
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No numbers given

Robinson 2008

Methods	Randomisation: Yes
Participants	Recruitment: Pre-operatively. Included: All men undergoing radical prostatectomy. Groups comparable at baseline. Age range 39 -74 years. Preoperative UI 9%
Interventions	Group A (62) intervention: Brief verbal instruction in PFMT before operation and offer of one biofeedback session at 2 months after surgery (uptake 33%) plus PFMT for four weeks with biofeedback Group B (64) control: Brief verbal instruction in PFMT before operation and offer of one biofeedback session at 2 months after surgery (uptake 46%)
Outcomes	No urinary outcomes provided. No between group differences in intensity and distress of lower urinary tract symptoms nor in impact on health related quality of life
Notes	No useable data.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer-generated randomisation list
Allocation concealment (selection bias)	Low risk	The co-project director who supervised the intervention was responsible for recruitment, but did not have access to the randomisation list The co-project director who supervised data collection was responsible for concealment of the randomisation list and allocation to the next available assignment on the list to participants sequentially as they enrolled

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Robinson 2008 (*Continued*)

Blinding (performance bias and detection bias) All outcomes	High risk	Participants were advised by the research assistant of their group assignment Questionnaires were filled in by research assistants either in person or by telephone interview
Incomplete outcome data (attrition bias) All outcomes	Low risk	No significant difference between groups in the number of participants who either withdrew prematurely or were dropped from the study. Questionnaires with >20% data missing were excluded from analysis. In remainder mean substitution was inputted for missing data

Robinson 2009

Methods	Randomisation: randomly assigned via sealed envelopes.
Participants	Number of men 54 but no numbers in groups. Recuitment: post operatively. Included: radical prostatectomy, all with UI who were 50 + years, English speaking and were within a 50 mile radius of treatment centre Age: Mean 59.5 (6.3) years
Interventions	Group A intervention: routine brief verbal and written PFMT plus one PFMT session and 3 weekly nurse phone calls Group B intervention: routine brief verbal and written PFMT plus four BF enhanced PFMT sessions and 4 weekly nurse phone calls Group C control: routine brief verbal and written PFMT. Duration of treatment: 3 months. Length of follow up: 9 months.
Outcomes	Urine stream interruption test (PFM strength). Mishell Uncertainty in Illness Scale. Broome Pelvic Muscle self-Efficacy Scale. UI frequency (3day bladder diary). 24 hour pad test (volume of urine lost). Male Urogenital Distress Inventory (UI distress). Male Urinary Symptom Impact Questionnaire (QoL).
Notes	No useable data in abstract.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Via sealed envelopes
Allocation concealment (selection bias)	Unclear risk	No description

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Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No description

Seleme 2008

Methods	Randomisation: Yes, single blind. Method of allocation: Using coloured cards.
Participants	Post operative intervention. Included: men with UI eight weeks after radical prostatectomy Exclusion: previous radiotherapy, anterior transurethral resection, diabetes mellitus and urethral obstruction after surgery Age: median 63.7 years, range 46-83 years.
Interventions	A (44) intervention: verbal instruction and information on PFMT plus information on life style changes. Additional 15 physiotherapy sessions consisting of intensive PFMT with BF and ES B (32) control: verbal instruction and information on PFMT plus information on life style changes Duration of treatment: No description. Length of follow-up: 6 months.
Outcomes	Incontinence Quality of life (I-QoL, higher score better), mean (SD) Directly after treatment: A 44.23 (14.61), B 37.53 (9.94) At 6 months: A 80.32 (7.01), B 51.69 (16.17), P = 0.001 At 6 months for Group A (44) intervention only: 1 hour Pad test: mean urine loss before treatment 54.2g and after treatment 8.8g (P > 0.001) VAS severity of UI: before treatment 9.3, after treatment 1.3 (P > 0.001)
Notes	Unexplained disparity between numbers in randomised groups. No results for Group B control for pad test or VAS.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Coloured cards
Allocation concealment (selection bias)	Unclear risk	Method of selection unknown

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Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description
Incomplete outcome data (attrition bias) All outcomes	High risk	No information for Group B control for both the one hour pad test and the VAS severity of UI

Tibaek 2007

Methods	Randomisation: Yes, mathematical table, grouped in blocks of ten Method of allocation: Sealed envelopes by independent third party Blinding: Slingle blind. Independent physiotherapist undertook initial assessment and 4 week outcome assessment Dropouts: 9 before intervention (4, training to time consuming; 1, didn't have TURP; 4, operated elsewhere) Setting: Hospital, Denmark.
Participants	Pre operative intervention. Included: TURP, all men. Exclusion: Prostate cancer, previous lower urinary tract surgery, neurological disease Age: A 70 (58 to 77) years, B 68 (52 to 79) years.
Interventions	Group A (26) intervention: 1 hour individual session with physiotherapist to teach correct contraction for PFMT , three 1 hour group lessons and home training programme, Group B (23) control: No pre operative physiotherapy. Information about anatomy and physiology and verbal instructions for 2 to 3 days after TURP in the ward Duration of treatment: 4 weeks after surgery. Length of follow-up: 2 and 4 weeks and 3 months after operation
Outcomes	Compliance: A 24/26 attended all 4 training sessions. Use of urinary pads per 24 hours: At 4 weeks: A 4/26, B 4/21. At 3 months: A 3/26, B 5/22 UI (pad test weight g/24hrs): 4 weeks (N, Median, range): A 26, 12 (0-374), B 23, 4 (0-56), P = 0.755 Danish Prostatic Symptom Scale: 3 months (N, median, range): A 26, 3 (0-24), B 23, 4.5 (0-51), P = 0.754 Also data on muscle function, muscle strength, static endurance and dynamic endurance
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Mathematical table, grouped in blocks of 10

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Tibaek 2007 (*Continued*)

Allocation concealment (selection bias)	Low risk	Sealed envelopes by independent third party
Blinding (performance bias and detection bias) All outcomes	Low risk	Single blind, Independent physiotherapist undertook initial assessment and 4 week outcome assessment. Not possible to blind to intervention
Incomplete outcome data (attrition bias) All outcomes	High risk	Nine dropped out before intervention

Tobia 2008

Methods	Randomised: Yes.
Participants	Recruitment: Pre-operative. Included: All men, radical prostatectomy. Age: 45 to 75 years.
Interventions	Group A (19) intervention: PFMT. Group B (19) control: No PFMT. length of follow-up: 2, 4 and 8 weeks.
Outcomes	Dry at 2 weeks: A 9/19, B 9/19. Dry at 4 weeks: A 9/19, B 9/19. Dry at 8 weeks: A 15/19, B 17/19. P = 0.3736. No significant differences for age (P = 0.674), PSA (P = 0.208), Gleason score pre (P = 0,762) and post op (P = 0.824)
Notes	Awaiting translation for more information.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Unclear risk	No description
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description
Incomplete outcome data (attrition bias) All outcomes	Low risk	No dropouts

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van Kampen 1998

Methods	Randomised: yes Method of allocation: stratified randomisation with sealed envelopes. Stratified by grams of urine loss (< 50 , > 50, < 250, > 250 g) Blinding: yes (outcome assessor not involved with the study) Dropouts: 5 Intention to treat: yes
Participants	Recruitment: post-operative Included: men incontinent post radical prostatectomy 15 days after surgery after catheter removal N=102 eligible, 98 completed.
Interventions	Post-operative intervention. Group A (50) intervention: 1 session of PFMT in hospital before discharge and then saw the physiotherapist for 1-2 weeks for as long as UI persisted. 90 daily home exercises sitting, standing and lying. 7 men unable to contract PFM or with weak contraction received electrical stimulation by anal probe Group B (52) control: No formal PFMT instruction but saw the therapist at 1-2 weeks and received placebo stimulation and information about aetiology of UI Both A & B: received bladder training to increase bladder capacity Length of follow-up: 12 months
Outcomes	Main outcome: Urine loss measured by 24 and 1 hour pad tests. 24 hour pad test done daily until continence achieved. 1 hour pad test when loss of < 2 grams of urine to confirm continence Secondary outcomes: Subjective UI by visual analogue scale Fluid Volume Chart Quality of Life - questionnaire designed for study. Continence definition: Numbers cured defined as <2gm urine loss on 24 and 1 hour pad tests Data collection: Subject assessment of continence preoperatively (during screening), and at 1, 6 and 12 months. Daily weighing of pads by participants (24 hour pad test)
Notes	Pragmatic study; policy of management left to clinical judgment as to which protocols to add to PFMT regime. 63 of the eligible subjects were unable to participate because of geographical reasons; demographics and post- operative variables did not differ from the 102 subjects who were in the treatment groups

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Stratified by grams of urine loss (< 50 , > 50, < 250, > 250 g)
Allocation concealment (selection bias)	Low risk	A - stratified randomisation with sealed envelopes

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van Kampen 1998 (*Continued*)

Blinding (performance bias and detection bias) All outcomes	Low risk	Outcome assessor not involved with the study Blinding to intervention not possible
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Dropouts: 5

Wille 2003

Methods	Randomised: yes Method of allocation: Not described Blinding: Not mentioned Dropouts: Numbers participating at 3 and 12 months identified (for pad test, N= 116 at baseline, 79 at 3 months and 124 at 12 months), reason for dropouts not described
Participants	Recruitment: pre-operative Included: all men undergoing radical prostatectomy N = 139 randomised (number in each group at various data collection points varied)
Interventions	Post-operative intervention. Group A (47): PFMT alone Group B (46): PFMT + ES; PFMT as above plus instructed by dedicated in ES via surface anal electrode and bio-impulser (biphasic pulse with 1 second bursts, 5 second pulse width, 2 second pulse trains Group C (46): PFMT + ES + biofeedback. As above plus biofeedback (anal probe) 15 minutes twice daily for 3 months All groups A & B & C: PFMT by physiotherapist, 20-30 minute sessions for 3 days, instructed to perform exercises twice daily for 3 months plus 3 week rehabilitation program after discharge. Regular interaction with health professional for 6 weeks after surgery, encouraged to performed treatment for 3 months post surgery Length of follow up: 12 months
Outcomes	Main outcome: urine loss measure by continence questionnaire and 20 minute provocative pad test Continence definition: Reported use of 0-1 pads on questionnaire (subjective) or loss of less than 1 gram of urine on pad test Data collection: baseline (after catheter removal), 3 months and 12 months post operatively Willingness to undergo surgery again: A 73%, B 83%, C 73% Quality of life EORCT QLQ-C30: scores for physical; role; emotional; social; and global quality of life were not significantly different between the groups at 3 or 12 months (no SDs provided) No significant differences in continence rates between the three groups at baseline, 3 months or 12 months (objective)
Notes	

Risk of bias

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Wille 2003 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Unclear risk	No description
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description
Incomplete outcome data (attrition bias) All outcomes	High risk	Numbers dropped out given (15 at 12 months) but reason not provided

Yamanishi 2006

Methods	Randomised: yes. Blinding: double blind. Drop outs: 1 due to pain in the intervention group.
Participants	Randomisation: Postoperative. Included: radical prostatectomy, all with severe postoperative UI of > 100g after catheter removal Age: Mean 65.7 (7.0) years. Preoperative intervention.
Interventions	All patients instructed pre-operatively PFMT by nurses and continued after catheter removal A (26) intervention: Oral PFMT plus electrical stimulation for 15 minutes twice daily (50 Hz square waves, 300 micro sec pulse duration, maximum output 70mA (5 sec on, 5 sec off duty cycle) B (30) control: Oral PFMT plus sham stimulation (output 3mA, 2 sec on, 13 sec off duty cycle) Duration of treatment: until continent or 12 months Length of follow up: 1, 3, 6 and 12 months after treatment Dropput: A 4/26, B 5/30 (including 2+4 with adverse effects)
Outcomes	Number of incontinent men: 1 month: A 18/26, B 29/30 3 months: A 10/24, B 25/29 6 months: A 5/23, B 15/26 12 months: A 3/22, B 8/25 24 hour pad test weights (mean ml, SD, N): 1 month: A 210 (261) 26, B 423 (357) 30 3 months: A 81 (140) 24, B 232 (339) 29 6 months: A 20 (49) 23, B 132 (293) 26 12 months: A 18 (49) 22, B 98 (277) 25 Time until continent in months (mean, SD, N): A 2.71 (2.6) 22, B 6.82 (3.9) 25, P =

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Yamanishi 2006 (*Continued*)

	0.0006 ICIQ-SF (mean score SD N; 0 to 21, higher = worse): 1 month: A 10.6 (6) 26, B 14.9 (4.9) 30 3 months: A 5.8 (5.7) 24, B 11.2 (5.7) 29 6 months: A 4.3 (6.2) 23, B 8.2 (5.3) 26 12 months: A 4.2 (6.2) 22, B 5.6 (6.5) 25 ICIQ-QoL score (mean score SD N; 0 to 21; 0 to 10, higher = worse) 1 month: A 4.2 (3.5) 26, B 6 (3) 30 3 months: A 2.2 (2.3) 24, B 3.7 (2.9) 29 6 months: A 1.6 (3.1) 23, B 2.5 (2.2) 26 12 months: A 1.5 (3.1) 22, B 1.9 (2.5) 25 Adverse effects: A 2/26, B 4/30 (discomfort or anal pain)
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	By computer
Allocation concealment (selection bias)	Low risk	By computer with allocation concealed from patients and medical staff
Blinding (performance bias and detection bias) All outcomes	Low risk	men were blinded to the intervention (sham, low energy stimulation in control group) Outcomes assessed by men in questionnaires
Incomplete outcome data (attrition bias) All outcomes	Low risk	Equal dropout from the groups

Yokoyama 2004

Methods	Randomised: yes Method of allocation: not stated Blinding: Not mentioned Drop outs: It appears that there are no drop outs but this is not specifically mentioned
Participants	Recruitment: Post-operative Included: 36 men with urinary incontinence, >100g on 24hour pad test, one day after catheter removal Mean Age: Group A 67.2 years, Group B 68.2 years, Group C 66.2 years
Interventions	A (12) intervention: anal electrode for 15 minutes twice a day for 1 month B (12) intervention: extracorporeal magnetic innervation, Neocontrol system, treatment

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Yokoyama 2004 (*Continued*)

	sessions 20 minutes, twice a week for 2 weeks C (12) control: PFMT, digital anal teaching of correct contractions, then verbal and written instructions for home practice Length of follow-up: 2, 3, 4, 5 and 6 months.
Outcomes	24 hour pad test weight (grams): 3 months: A 34g, B 7.3g, C 50g. 6 months: For all groups less than 10g. Quality of Life measured by I-QOL: Improvement in all groups over time, no statistically significant difference between the groups Remaining UI at 6 months: A 2/12, B 1/12, C 2/12.
Notes	Adverse effects: None in any of the groups, no discomfort or irritation from anal probe

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Unclear risk	Randomly assigned
Blinding (performance bias and detection bias) All outcomes	Unclear risk	No description
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Numbers not given

Zhang 2007

Methods	Randomised: yes Method of allocation:not stated Blinding: None Dropouts: Two did not complete the control follow-up assessment because they believed the control group was not helpful
Participants	58 men approached, 33 consented, 3 dropouts. Recruitment: Post-operative Included: All incontinent men 6 months after radical prostatectomy
Interventions	Group A (14) intervention: PFMT plus BF using rectal electrical sensor, initial 45 minute session with physical therapist then written instructions to carry out at home three times a day for 10 minutes. Plus support group, 6 meetings in 3 months with a health psychologist Group B (15) control: PFMT plus BF using rectal electrical sensor, initial 45 minute session with physical therapist then written instructions to carry out at home three times

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Zhang 2007 (*Continued*)

	a day for 10 minutes
Outcomes	Length of follow up: 3 months Frequency of PFMT: 4 to 7 times per week A 12/14, B 6/13, P = 0.077 Use of pad or brief: A 7/14 (50%), B 11/13 (85%), P = 0.057. Not able to control urge to urinate and prevent leakage; A 4/14, B 8/13, P=0.085 Nocturia per week (mean): A 13, B 15.08, P = 0.484. VAS for severity of UI: A 3.21, B 4.65, P = 0.057 (t = - 1.902) QoL measured by Illness Intrusiveness Questionnaires (IIRS): A 10.96, B 17.27, P = 0.037 Mann Whitney U = 48.5
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	No description
Allocation concealment (selection bias)	Unclear risk	"Randomised"
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Group therapy (unable to blind to intervention)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	2 drop outs in the control group

ExMI = extracorporeal magnetic innervation; g = gram(s); PFMT = pelvic floor muscle training; TURP = transurethral resection of the prostate; UI = urinary incontinence;

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Bennett 1997	Insufficient information to assess study for inclusion. Abstract only, no data included. Attempts to contact the author for data unsuccessful
Bocker 2002	Data from study that included male postprostatectomy and female post-polio patients. Translation obtained as reported in German. Data from the two groups were not separated and therefore not in a usable form
Ceresoli 2002	Insufficient information to assess study for inclusion. Attempts to contact the author for data unsuccessful

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(*Continued*)

Chang 1998	Data from study which involved post TURP patients. Two groups, treatment and control. Not randomly assigned to groups, first 25 consecutively assigned to control, next 25 to intervention
Cornel 2005	Descriptive study. No control group.
Cornu 2011	RCT. PFMT + Duloxetine (drug) vs PFMT + placebo
Crevenna 2003	Descriptive pilot study. No control group.
Del Popolo 2006	Pharmacological intervention.
Filocamo 2007	Pharmacological intervention.
Griebling 1999	Insufficient information to assess study for inclusion. Data reported in paper presentation and in later published report did not contain sufficient detail of analysis to include in tables of comparison. Attempts to contact authors not successful in providing further data
Hotston 2006	Pharmacological intervention.
Ip 2004	Education intervention (refrigerator magnet) not an intervention included in review
Kahihara 2006	A comparative study. Early versus delayed PFMT no randomisation
McGlynn 2004	Descriptive study of change in education delivery approach. No control group.
Nehra 2001	Insufficient information to assess study for inclusion. Abstract only. Attempts to contact authors for further data unsuccessful. Possibly ongoing trial but no further data available
Pemberton 2006	Comparative study of different types of urinary sheath.
Pulker 2002	Descriptive study. No control group.
Salinas Casado 1991	Descriptive study. No control group. Article in Spanish with English abstract.
Salinas Casado 1996	Descriptive study. No control group. Article in Spanish with English abstract.
Seki 2005	Descriptive study. No control group.

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(*Continued*)

Zermann 1999	Descriptive study. No control group.

Estim = Electrical stimulation
ExMI = Extracorporeal magnetic innervation;
TURP = Transurethral resection of the prostate.

Characteristics of studies awaiting assessment *[ordered by study ID]*

Delmastro 2010

Methods	Open label RCT
Participants	Men scheduled for radical prostatectomy
Interventions	Preoperative intensive PFMT with or without proprioceptive training
Outcomes	Anal examination to assess pelvic floor muscle function; subjective and objective voiding and incontinence parameters; four tests of pelvic floor muscle function; PGI-I; ICIQ-male score
Notes	Furhter information needed from authors

Marchiori 2010

Methods	RCT
Participants	Men with moderate to severe incontinence 30 days after catheter removal after open or laparoscopic radical prostatectomy
Interventions	All men (N=670) received advice at the time of catheter removal (16 days postop) on PFMT, teaching correct contraction using digital anal biofeedback, advised to perform 3 sets of 30 contractions daily at home (alternate 1-2 second and 6-7 second duration), without gluteal or abdominal muscle involvement. Men who were still incontinent at 30 days (N=512) were eligible to be randomised if they were still incontinent A (166): intensive PFMT + biofeedback teaching of correct contraction; 10 sets of electrical stimulation for 15 minutes each; for 2-3 weeks ? on daily basis? B (166): control, PFMT teaching and oral advice to continue exercising at home and during follow up
Outcomes	ICIQ-male, RAND 36-item Health Survey, use of pads (recovery of continence defined as no pads or mild leakage needing only 2 mini-pads per day)
Notes	Information from authors required regarding randomisation process and outcome data

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Park 2011

Methods	RCT
Participants	Men > age 65 years, after radical prostatectomy
Interventions	A (24): intervention; Kegel exercise, resistance exercise, pelvic flexibility exercise (using ball and elastic band) B (23): control; Kegel exercise only Duration of treatment: 12 weeks (3 to 15 weeks after surgery)
Outcomes	Outocomes: urinary incontinence, voiding symptoms, pad test, ICIQ questionnaire, Beckj-s depression inventory (BDI), SF36
Notes	No useable data

Characteristics of ongoing studies *[ordered by study ID]*

Voorham 2010

Trial name or title	N/A
Methods	RCT
Participants	Men having radical laparoscopic prostatectomy
Interventions	Preoperative pelvic floor physiotherapy versus standard care. If men are still incontinent 6 weeks after operation, all men receive pelvic floor physiotherapy after 6 weeks
Outcomes	KHQ, IPSS, voiding diary, 24 hour pad test, PelFIs, examination of pelvic floor at one year
Starting date	2010
Contact information	Leiden University, the Netherlands
Notes	Sample size 124 in each group (248 in total)

Estim = Electrical Stimulation
ExMI=extracorporeal magnetic innervation

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DATA AND ANALYSES

Comparison 1. Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of incontinent men	9		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
1.1 less than 3 months	7	980	Risk Ratio (M-H, Random, 95% CI)	0.95 [0.84, 1.08]
1.2 within 3-6 months	7	895	Risk Ratio (M-H, Random, 95% CI)	0.96 [0.83, 1.10]
1.3 within 6-12 months	5	792	Risk Ratio (M-H, Random, 95% CI)	0.91 [0.73, 1.14]
1.4 after 12 months	3	665	Risk Ratio (M-H, Random, 95% CI)	0.85 [0.60, 1.22]
2 Number of incontinence episodes per day	2		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 less than 3 months	2		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 within 3-6 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.3 within 6-12 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.4 after first year	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Number of men using pads	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
3.1 less than 3 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.2 within 3-6 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.3 within 6-12 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.4 after 12 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 Pad changes over 24 hours	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
4.1 less than 3 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4.2 within 3-6 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4.3 within 6-12 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4.4 after first year	0		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5 Urinary Incontinence Score (ICI-short form)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
5.1 less than 3 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.2 within 3-6 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.3 within 6-12 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.4 after first year	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6 Quality of life related to urinary incontinence	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
6.1 less than 3 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.2 within 3-6 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.3 within 6-12 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.4 after first year	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
7 Adverse events	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
8 Number of men with erectile dysfunction (no erection) at 12 months	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
9 24 hour pad test (grams of urine lost)	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
9.1 less than 3 months	2	214	Mean Difference (IV, Fixed, 95% CI)	22.29 [-33.12, 77.70]

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9.2 within 3-6 months	2	213	Mean Difference (IV, Fixed, 95% CI)	11.87 [-40.77, 64.52]
9.3 within 6-12 months	2	194	Mean Difference (IV, Fixed, 95% CI)	11.23 [-22.35, 44.82]
9.4 after first year	1	167	Mean Difference (IV, Fixed, 95% CI)	39.0 [-5.72, 83.72]
10 1 hour pad test (grams of urine lost)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
10.1 less than 3 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
10.2 within 3-6 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
10.3 within 6-12 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
10.4 after first year	0		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
11 Number of men not carrying out pelvic floor muscle contractions at 12 months	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected

Comparison 2. Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extra-corporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of incontinent men	3		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 less than 3 months	3	234	Risk Ratio (M-H, Fixed, 95% CI)	0.84 [0.74, 0.94]
1.2 within 3-6 months	1	53	Risk Ratio (M-H, Fixed, 95% CI)	0.48 [0.29, 0.79]
1.3 within 6-12 months	1	49	Risk Ratio (M-H, Fixed, 95% CI)	0.38 [0.16, 0.87]
1.4 after 12 months	1	47	Risk Ratio (M-H, Fixed, 95% CI)	0.43 [0.13, 1.41]
2 Number of incontinence episodes per day	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 less than 3 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 within 3-6 months	0		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.3 within 6-12 months	0		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.4 after first year	0		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Adverse effects	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
4 24 hour pad test (grams of urine lost)	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
4.1 less than 3 months	2	96	Mean Difference (IV, Fixed, 95% CI)	-27.82 [-116.97, 61.33]
4.2 within 3-6 months	2	93	Mean Difference (IV, Fixed, 95% CI)	5.12 [-86.19, 96.43]
4.3 within 6-12 months	2	89	Mean Difference (IV, Fixed, 95% CI)	-1.95 [-64.03, 60.13]
4.4 after first year	1	47	Mean Difference (IV, Fixed, 95% CI)	-80.0 [-190.50, 30.50]
5 Urinary Incontinence Score (ICIQ-short form UI score)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
5.1 less than 3 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.2 within 3-6 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.3 within 6-12 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.4 after first year	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

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6 Urinary Incontinence Quality of Life Score (ICIQ-short form)	1	Mean Difference (IV, Fixed, 95% CI)	Totals not selected
6.1 less than 3 months	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.2 within 3-6 months	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.3 within 6-12 months	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.4 after first year	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
7 Time until continent (months)	1	Mean Difference (IV, Fixed, 95% CI)	Totals not selected

Comparison 4. Treatment of UI after radical prostatectomy: combinations of treatments versus no treatment /sham treatment

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of incontinent men: PFMT + anal Estim + Biofeedback vs no treatment	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
1.1 less than 3 months	0		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.2 within 3-6 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.3 within 6-12 months	0		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.4 after 12 months	0		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

Comparison 5. Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of incontinent men at < 3 months	2		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 PFMT + Anal EStim vs PFMT alone	2	177	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.83, 1.12]
1.2 PFMT + BF vs PFMT alone	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Number of incontinent men at 3 to 6 months	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 PFMT + Anal EStim vs PFMT alone	0		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 PFMT + BF + support group vs PFMT + BF	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Number of incontinent men at 6 to 12 months	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
3.1 FES vs ExMI	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 Number of incontinence episodes at < 3 months	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
4.1 PFMT + anal EStim vs PFMT alone	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

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5 Quality of Life Score (severity of UI) at 3 to 6 months	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
5.1 PFMT + BF + support group vs PFMT + BF	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6 Quality of Life Score (I-QoL) at 6 months	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
6.1 PFMT + BF + EStim vs PFMT	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
7 Quality of Life Score (ICI-Q-SF) at 6 months	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
7.1 PFMT + ExMI vs PFMT	1	24	Mean Difference (IV, Fixed, 95% CI)	-1.60 [-2.73, -0.47]
8 Adverse events	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
8.1 PFMT + Anal EStim vs PFMT alone	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
9 1 hour pad test (grams of urine lost): at < 3 months	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
9.1 PFMT + anal EStim vs PFMT alone	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
9.2 PFMT + perineal EStim vs PFMT alone	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
9.3 PFMT + perineal EStim vs PFMT + anal EStim	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
10 24 hour pad test (grams of urine lost): at < 3 months	2		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
10.1 PFMT + anal EStim vs PFMT alone	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
10.2 PFMT + visual BF vs PFMT + oral BF	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
11 24 hour pad test (grams of urine lost): at 3 to 6 months	2		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
11.1 PFMT + anal EStim vs PFMT alone	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
11.2 PFMT + visual BF vs PFMT + oral BF	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
12 24 hour pad test (grams of urine lost): at 3 to 6 months	3		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
12.1 PFMT + anal EStim vs PFMT alone	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
12.2 PFMT + visual BF vs PFMT + oral BF	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
12.3 ExMI vs PFMT alone	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
13 Pad changes over 24 hours at 3 to 6 months	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
13.1 ExMI vs PFMT alone	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
14 Number of men not carrying out sufficient PFMT at 3 to 6 months	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
14.1 PFMT + BF + support group vs PFMT + BF	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

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Comparison 6. Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of incontinent men	7		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
1.1 less than 3 months	6	631	Risk Ratio (M-H, Random, 95% CI)	0.97 [0.90, 1.05]
1.2 within 3-6 months	6	665	Risk Ratio (M-H, Random, 95% CI)	0.88 [0.80, 0.97]
1.3 within 6-12 months	5	608	Risk Ratio (M-H, Random, 95% CI)	0.55 [0.34, 0.89]
1.4 after 12 months	2	373	Risk Ratio (M-H, Random, 95% CI)	0.32 [0.20, 0.51]
2 Pad changes over 24 hours	2		Mean Difference (IV, Random, 95% CI)	Subtotals only
2.1 less than 3 months	1	51	Mean Difference (IV, Random, 95% CI)	-0.94 [-2.28, 0.40]
2.2 within 3-6 months	2	124	Mean Difference (IV, Random, 95% CI)	-65.49 [-206.50, 75.52]
2.3 within 6 - 12 months	2	124	Mean Difference (IV, Random, 95% CI)	-7.69 [-36.08, 20.69]
3 24 hour pad test (gm/24hrs)	4		Mean Difference (IV, Random, 95% CI)	Subtotals only
3.1 less than 3 months	3	424	Mean Difference (IV, Random, 95% CI)	-78.19 [-211.46, 55.07]
3.2 within 3-6 months	2	373	Mean Difference (IV, Random, 95% CI)	-73.28 [-196.42, 49.86]
3.3 within 6-12 months	2	373	Mean Difference (IV, Random, 95% CI)	-14.50 [-18.36, -10.64]
3.4 after first year	2	378	Mean Difference (IV, Random, 95% CI)	-1.0 [-1.81, -0.19]
4 Urinary Incontinence Score (ICI-short form)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
4.1 less than 3 months	0		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4.2 within 3-6 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4.3 within 6-12 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4.4 after first year	0		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5 Quality of Life Score (IIQ)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
5.1 less than 3 months	0		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.2 within 3-6 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.3 within 6-12 months	0		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.4 after first year	0		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6 Pelvic floor muscle strength (anal squeeze pressure, cm H_2O)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
6.1 less than 3 months	0		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.2 within 3-6 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.3 within 6-12 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.4 after first year	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
7 Number of men not carrying out sufficient PFMT	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
7.1 less than 3 months	0		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7.2 within 3-6 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7.3 within 6-12 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7.4 after 12 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8 Number of men having surgery for incontinence	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected

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Comparison 7. Prevention of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extra-corporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of incontinent men	1		Risk Ratio (M-H, Random, 95% CI)	Totals not selected
1.1 less than 3 months	0		Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
1.2 within 3-6 months	1		Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
1.3 within 6-12 months	1		Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
1.4 after 12 months	0		Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2 24 hour pad test (gm/24hrs)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 less than 3 months	0		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 within 3-6 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.3 within 6-12 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.4 after first year	0		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Time until continent (months)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected

Comparison 10. Prevention of UI after radical prostatectomy: one treatment versus another active treatment

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of incontinent men at < 3months	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
1.1 PFMT pre and post op vs PFMT post op	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Number of incontinent men at 3 to 6 months	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 PFMT pre and post op vs PFMT post op	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 No. with severe incontinence (e.g. pad test weight >150g) at < 3 months	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
3.1 PFMT pre and post op vs PFMT post op	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 No. with severe incontinence (e.g. pad test weight >150g) at 3 to 6 months	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
4.1 PFMT pre and post op vs PFMT post op	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
5 20 minute pad test (grams of urine lost): PFMT + anal Estim vs PFMT at 3 to 6 months	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
5.1 PFMT + anal EStim vs PFMT alone	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

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5.2 PFMT + anal EStim + BF vs PFMT alone	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.3 PFMT + anal EStim vs PFMT + anal EStim + BF	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6 20 minute pad test (grams of urine lost): PFMT + anal Estim vs PFMT at 6 to 12 months	1	Mean Difference (IV, Fixed, 95% CI)	Totals not selected
6.1 PFMT + anal EStim vs PFMT alone	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.2 PFMT + anal EStim + BF vs PFMT alone	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.3 PFMT + anal EStim vs PFMT + anal EStim + BF	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
7 Quality of Life Score (ICS male short form) at < 3 months	1	Mean Difference (IV, Fixed, 95% CI)	Totals not selected
7.1 PFMT pre and post op vs PFMT post op	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
8 Quality of Life Score (ICS male short form) at 3 to 6 months	1	Mean Difference (IV, Fixed, 95% CI)	Totals not selected
8.1 PFMT pre and post op vs PFMT post op	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

Comparison 11. Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of incontinent men	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
1.1 less than 3 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.2 within 3-6 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.3 within 6-12 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.4 after 12 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Number of incontinence episodes per day	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 less than 3 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 within 3-6 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.3 within 6-12 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.4 after first year	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Number of men using pads	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
3.1 less than 3 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.2 within 3-6 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.3 within 6-12 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.4 after 12 months	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 Urinary Incontinence Score (ICI-short form)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
4.1 less than 3 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4.2 within 3-6 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4.3 within 6-12 months	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

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4.4 after first year	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5 Quality of life related to urinary incontinence	1	Mean Difference (IV, Fixed, 95% CI)	Totals not selected
5.1 less than 3 months	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.2 within 3-6 months	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.3 within 6-12 months	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.4 after first year	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6 Number of men with erectile dysfunction (no erection) at 12 months	1	Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
7 Number of men not carrying out pelvic floor muscle contractions at 12 months	1	Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected

Comparison 16. Prevention of UI after TURP: pre or post-operative PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of incontinent men	2		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 less than 3 months	2	105	Risk Ratio (M-H, Fixed, 95% CI)	0.60 [0.21, 1.77]
1.2 within 3-6 months	1	48	Risk Ratio (M-H, Fixed, 95% CI)	0.51 [0.14, 1.89]

Comparison 21. Containment of urinary incontinence from any cause: external penile compression devices (penile clamps) vs no treatment or sham treatment

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of men satisfied with device			Other data	No numeric data
2 Mean urine loss (grams of urine on pad test)			Other data	No numeric data
3 Penile Doppler blood flow (mean systolic velocity)			Other data	No numeric data
4 Penile Doppler blood flow (mean resistence to flow index)			Other data	No numeric data

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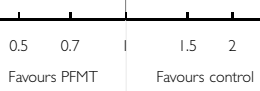
Analysis 1.1. Comparison 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;, Outcome 1 Number of incontinent men.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;

Outcome: 1 Number of incontinent men

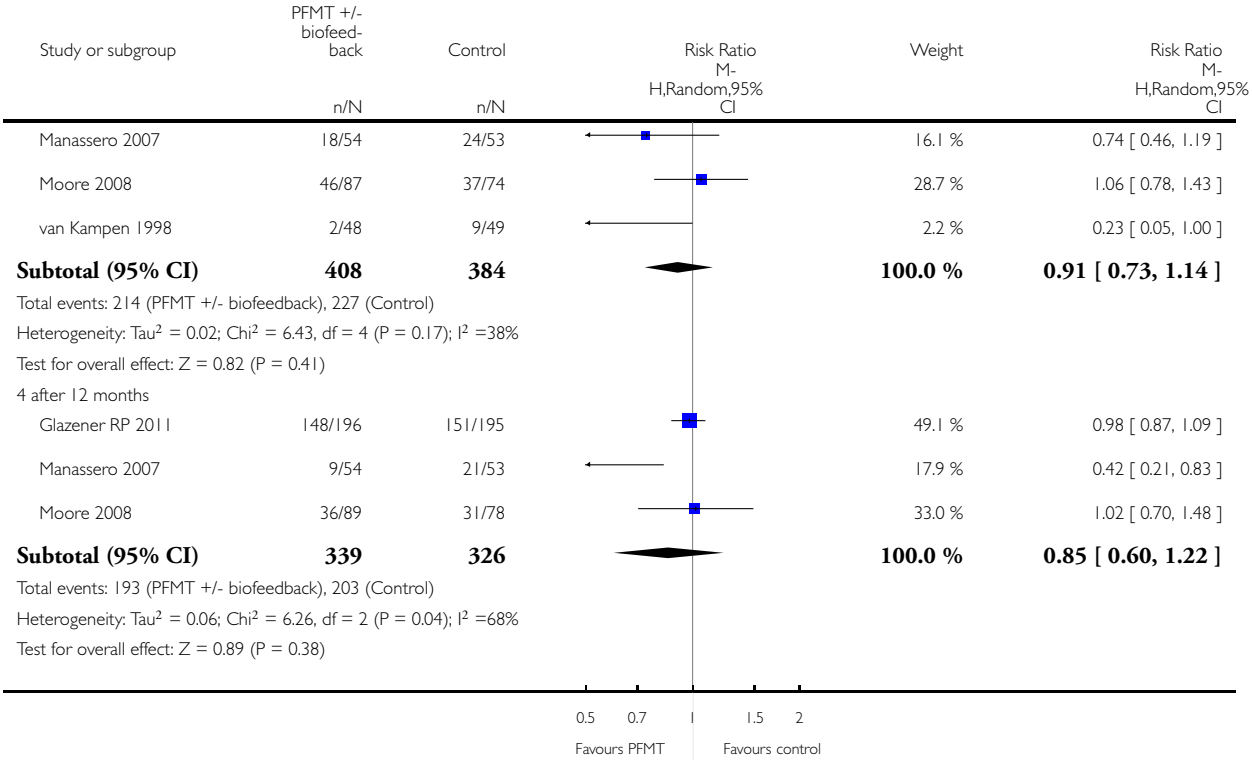
Study or subgroup	PFMT +/- biofeed-back n/N	Control n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
1 less than 3 months					
Franke 1998	6/13	3/10		1.2 %	1.54 [0.50, 4.69]
Glazener RP 2011	172/200	176/198		29.0 %	0.97 [0.90, 1.04]
Goode 2009	59/70	64/68		25.3 %	0.90 [0.80, 1.01]
Manassero 2007	45/54	39/53		17.8 %	1.13 [0.93, 1.38]
Moore 1999	12/18	14/21		6.5 %	1.00 [0.64, 1.56]
Moore 2008	63/93	59/82		18.3 %	0.94 [0.77, 1.14]
van Kampen 1998	5/48	23/52		1.9 %	0.24 [0.10, 0.57]
Subtotal (95% CI)	**496**	**484**		**100.0 %**	**0.95 [0.84, 1.08]**
Total events: 362 (PFMT +/- biofeedback), 378 (Control)					
Heterogeneity: $Tau^2 = 0.01$; $Chi^2 = 15.23$, df = 6 (P = 0.02); $I^2 = 61\%$					
Test for overall effect: Z = 0.76 (P = 0.45)					
2 within 3-6 months					
Dubbelman 2004	17/33	20/33		8.8 %	0.85 [0.55, 1.31]
Franke 1998	1/7	1/8		0.3 %	1.14 [0.09, 15.08]
Glazener RP 2011	158/197	158/197		52.9 %	1.00 [0.91, 1.10]
Manassero 2007	29/54	31/53		13.5 %	0.92 [0.66, 1.28]
Moore 1999	8/18	7/21		2.8 %	1.33 [0.60, 2.95]
Moore 2008	53/94	48/80		20.9 %	0.94 [0.73, 1.21]
van Kampen 1998	2/48	12/52		0.9 %	0.18 [0.04, 0.77]
Subtotal (95% CI)	**451**	**444**		**100.0 %**	**0.96 [0.83, 1.10]**
Total events: 268 (PFMT +/- biofeedback), 277 (Control)					
Heterogeneity: $Tau^2 = 0.01$; $Chi^2 = 7.38$, df = 6 (P = 0.29); $I^2 = 19\%$					
Test for overall effect: Z = 0.65 (P = 0.51)					
3 within 6-12 months					
Floratos 2002	4/28	0/14		0.6 %	4.66 [0.27, 80.84]
Glazener RP 2011	144/191	157/194		52.3 %	0.93 [0.84, 1.04]



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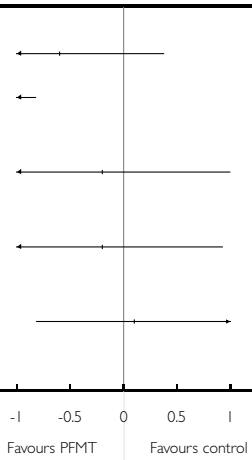
Analysis 1.2. Comparison 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;, Outcome 2 Number of incontinence episodes per day.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;

Outcome: 2 Number of incontinence episodes per day

Study or subgroup	PFMT +/- biofeed-back N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 less than 3 months						
Glazener RP 2011	139	3.3 (3.8)	139	3.9 (4.5)		-0.60 [-1.58, 0.38]
Goode 2009	58	1.86 (0.56)	64	3 (1.17)		-1.14 [-1.46, -0.82]
2 within 3-6 months						
Glazener RP 2011	117	3.3 (5.2)	110	3.5 (4)		-0.20 [-1.40, 1.00]
3 within 6-12 months						
Glazener RP 2011	107	3.1 (4.7)	110	3.3 (3.7)		-0.20 [-1.33, 0.93]
4 after first year						
Glazener RP 2011	105	3 (3.8)	106	2.9 (3)		0.10 [-0.82, 1.02]



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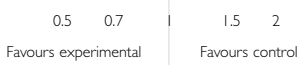
Analysis 1.3. Comparison 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;, Outcome 3 Number of men using pads.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;

Outcome: 3 Number of men using pads

Study or subgroup	PFMT +/- biofeed-back n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 less than 3 months				
Glazener RP 2011	101/177	108/177		0.94 [0.79, 1.11]
2 within 3-6 months				
Glazener RP 2011	74/161	83/164		0.91 [0.72, 1.14]
3 within 6-12 months				
Glazener RP 2011	67/154	71/156		0.96 [0.75, 1.23]
4 after 12 months				
Glazener RP 2011	63/159	68/161		0.94 [0.72, 1.22]



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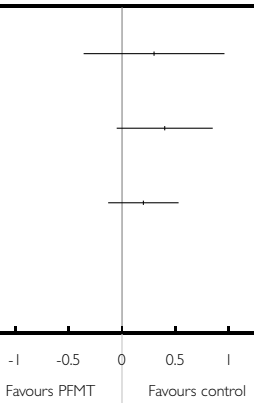
Analysis 1.4. Comparison 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;, Outcome 4 Pad changes over 24 hours.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;

Outcome: 4 Pad changes over 24 hours

Study or subgroup	PFMT +/- biofeed-back N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 less than 3 months						
Floratos 2002	28	1.2 (1.1)	14	0.9 (1)		0.30 [-0.36, 0.96]
2 within 3-6 months						
Floratos 2002	28	0.8 (1)	14	0.4 (0.5)		0.40 [-0.05, 0.85]
3 within 6-12 months						
Floratos 2002	28	0.4 (0.7)	14	0.2 (0.4)		0.20 [-0.13, 0.53]
4 after first year						



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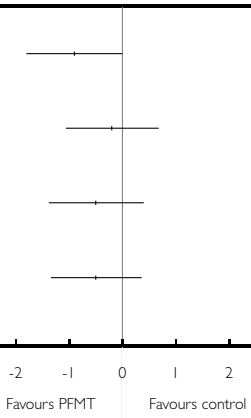
Analysis 1.5. Comparison 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;, Outcome 5 Urinary Incontinence Score (ICI-short form).

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;

Outcome: 5 Urinary Incontinence Score (ICI-short form)

Study or subgroup	PFMT +/- biofeed-back N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 less than 3 months						
Glazener RP 2011	198	6.3 (4.2)	198	7.2 (4.9)		-0.90 [-1.80, 0.00]
2 within 3-6 months						
Glazener RP 2011	197	5.4 (4.2)	197	5.6 (4.6)		-0.20 [-1.07, 0.67]
3 within 6-12 months						
Glazener RP 2011	186	5.1 (4.2)	194	5.6 (4.6)		-0.50 [-1.39, 0.39]
4 after first year						
Glazener RP 2011	196	4.9 (4.1)	195	5.4 (4.5)		-0.50 [-1.35, 0.35]



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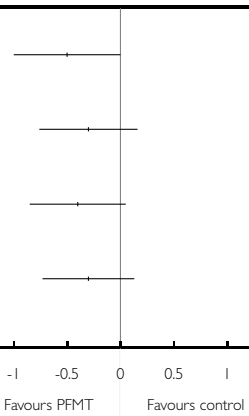
Analysis 1.6. Comparison 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;, Outcome 6 Quality of life related to urinary incontinence.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;

Outcome: 6 Quality of life related to urinary incontinence

Study or subgroup	PFMT +/- biofeed-back N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 less than 3 months						
Glazener RP 2011	198	2 (2.3)	198	2.5 (2.8)		-0.50 [-1.00, 0.00]
2 within 3-6 months						
Glazener RP 2011	194	1.5 (2.1)	196	1.8 (2.5)		-0.30 [-0.76, 0.16]
3 within 6-12 months						
Glazener RP 2011	186	1.4 (1.9)	194	1.8 (2.5)		-0.40 [-0.85, 0.05]
4 after first year						
Glazener RP 2011	193	1.4 (2)	193	1.7 (2.3)		-0.30 [-0.73, 0.13]



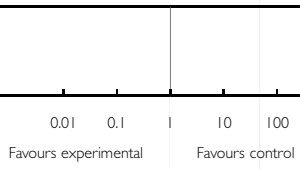
Analysis 1.7. Comparison 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;, Outcome 7 Adverse events.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;

Outcome: 7 Adverse events

Study or subgroup	PFMT +/- biofeed-back n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Goode 2009	0/70	0/68		Not estimable



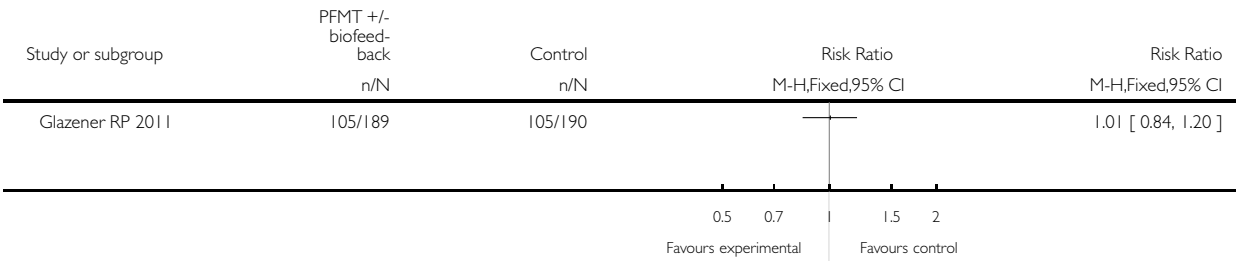
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Analysis 1.8. Comparison 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;, Outcome 8 Number of men with erectile dysfunction (no erection) at 12 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;

Outcome: 8 Number of men with erectile dysfunction (no erection) at 12 months



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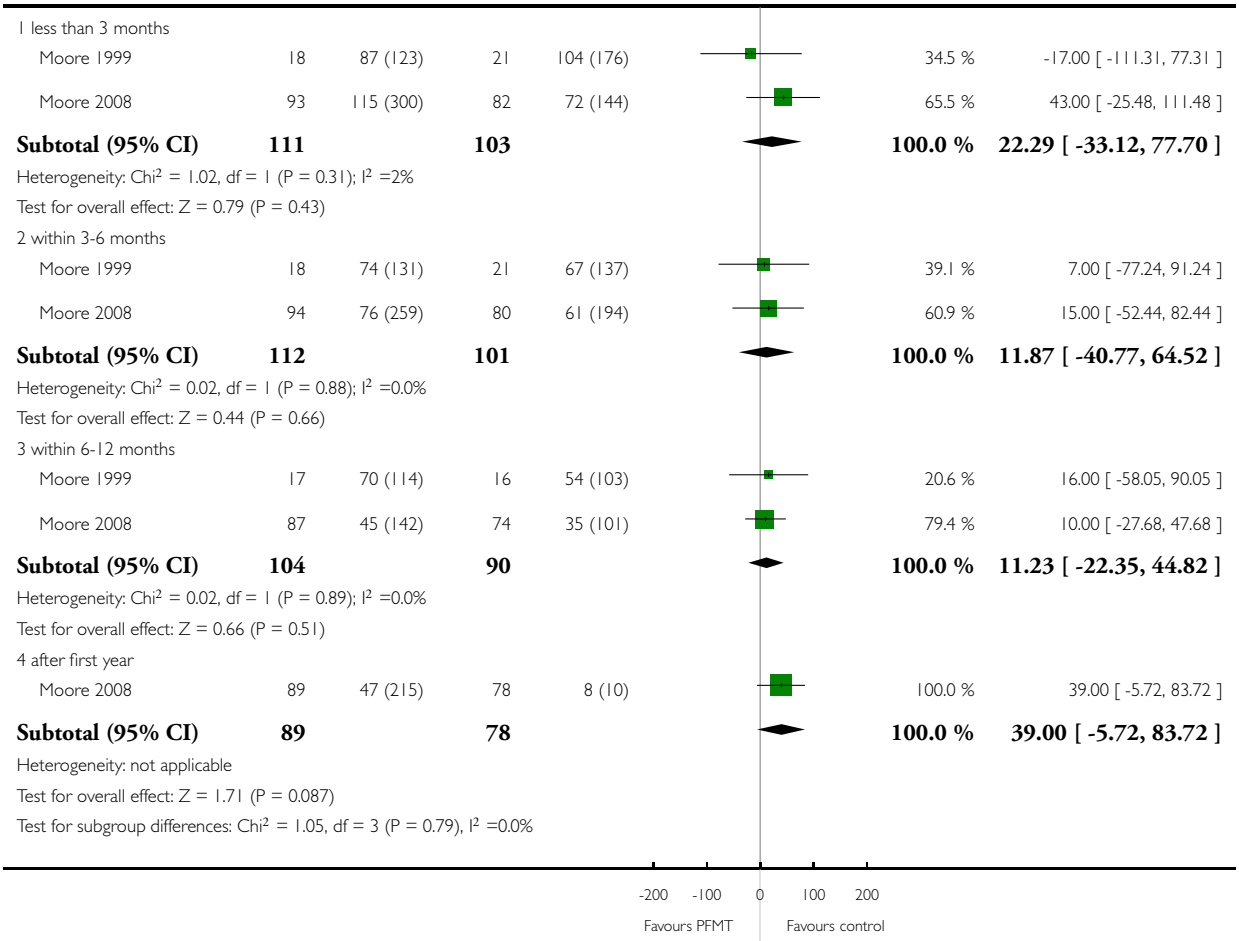
Analysis 1.9. Comparison 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;, Outcome 9 24 hour pad test (grams of urine lost).

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;

Outcome: 9 24 hour pad test (grams of urine lost)

Study or subgroup	PFMT +/- biofeed-back N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 less than 3 months							
Moore 1999	18	87 (123)	21	104 (176)		34.5 %	-17.00 [-111.31, 77.31]
Moore 2008	93	115 (300)	82	72 (144)		65.5 %	43.00 [-25.48, 111.48]
Subtotal (95% CI)	**111**		**103**			**100.0 %**	**22.29 [-33.12, 77.70]**
Heterogeneity: Chi² = 1.02, df = 1 (P = 0.31); I² =2%							
Test for overall effect: Z = 0.79 (P = 0.43)							
2 within 3-6 months							
Moore 1999	18	74 (131)	21	67 (137)		39.1 %	7.00 [-77.24, 91.24]
Moore 2008	94	76 (259)	80	61 (194)		60.9 %	15.00 [-52.44, 82.44]
Subtotal (95% CI)	**112**		**101**			**100.0 %**	**11.87 [-40.77, 64.52]**
Heterogeneity: Chi² = 0.02, df = 1 (P = 0.88); I² =0.0%							
Test for overall effect: Z = 0.44 (P = 0.66)							
3 within 6-12 months							
Moore 1999	17	70 (114)	16	54 (103)		20.6 %	16.00 [-58.05, 90.05]
Moore 2008	87	45 (142)	74	35 (101)		79.4 %	10.00 [-27.68, 47.68]
Subtotal (95% CI)	**104**		**90**			**100.0 %**	**11.23 [-22.35, 44.82]**
Heterogeneity: Chi² = 0.02, df = 1 (P = 0.89); I² =0.0%							
Test for overall effect: Z = 0.66 (P = 0.51)							
4 after first year							
Moore 2008	89	47 (215)	78	8 (10)		100.0 %	39.00 [-5.72, 83.72]
Subtotal (95% CI)	**89**		**78**			**100.0 %**	**39.00 [-5.72, 83.72]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.71 (P = 0.087)							
Test for subgroup differences: Chi² = 1.05, df = 3 (P = 0.79), I² =0.0%							



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Analysis 1.10. Comparison 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;, Outcome 10 1 hour pad test (grams of urine lost).

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;

Outcome: 10 1 hour pad test (grams of urine lost)

Study or subgroup	PFMT +/- biofeedback N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 less than 3 months						
Floratos 2002	28	6.5 (11.4)	14	3 (4.1)		3.50 [-1.24, 8.24]
2 within 3-6 months						
Floratos 2002	28	3.7 (9.9)	14	1.3 (2.4)		2.40 [-1.48, 6.28]
3 within 6-12 months						
Floratos 2002	28	3.1 (8.1)	14	0 (0)		Not estimable
4 after first year						



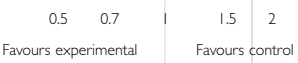
Analysis 1.11. Comparison 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;, Outcome 11 Number of men not carrying out pelvic floor muscle contractions at 12 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 1 Treatment of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction;

Outcome: 11 Number of men not carrying out pelvic floor muscle contractions at 12 months

Study or subgroup	PFMT +/- biofeedback n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Glazener RP 2011	63/191	91/189		0.69 [0.53, 0.88]



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Analysis 2.1. Comparison 2 Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment, Outcome 1 Number of incontinent men.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 2 Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment

Outcome: 1 Number of incontinent men

Study or subgroup	PFMT + extra stimulation n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
1 less than 3 months					
Yamanishi 2006	18/26	29/30		25.6 %	0.72 [0.55, 0.93]
Moore 1999	11/19	14/21		12.6 %	0.87 [0.53, 1.42]
Goode 2009	58/70	64/68		61.7 %	0.88 [0.78, 0.99]
Subtotal (95% CI)	**115**	**119**		**100.0 %**	**0.84 [0.74, 0.94]**
Total events: 87 (PFMT + extra stimulation), 107 (Control)					
Heterogeneity: Chi^2 = 2.01, df = 2 (P = 0.37); I^2 =1%					
Test for overall effect: Z = 2.97 (P = 0.0030)					
2 within 3-6 months					
Yamanishi 2006	10/24	25/29		100.0 %	0.48 [0.29, 0.79]
Subtotal (95% CI)	**24**	**29**		**100.0 %**	**0.48 [0.29, 0.79]**
Total events: 10 (PFMT + extra stimulation), 25 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 2.88 (P = 0.0040)					
3 within 6-12 months					
Yamanishi 2006	5/23	15/26		100.0 %	0.38 [0.16, 0.87]
Subtotal (95% CI)	**23**	**26**		**100.0 %**	**0.38 [0.16, 0.87]**
Total events: 5 (PFMT + extra stimulation), 15 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 2.27 (P = 0.023)					
4 after 12 months					
Yamanishi 2006	3/22	8/25		100.0 %	0.43 [0.13, 1.41]
Subtotal (95% CI)	**22**	**25**		**100.0 %**	**0.43 [0.13, 1.41]**
Total events: 3 (PFMT + extra stimulation), 8 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.40 (P = 0.16)					



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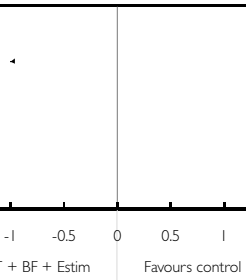
Analysis 2.2. Comparison 2 Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment, Outcome 2 Number of incontinence episodes per day.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 2 Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment

Outcome: 2 Number of incontinence episodes per day

Study or subgroup	PFMT +/- biofeedback + Es N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 less than 3 months						
Goode 2009	54	1.71 (0.54)	64	3 (1.17)		-1.29 [-1.61, -0.97]
2 within 3-6 months						
3 within 6-12 months						
4 after first year						



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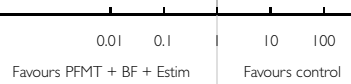
Analysis 2.3. Comparison 2 Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment, Outcome 3 Adverse effects.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 2 Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment

Outcome: 3 Adverse effects

Study or subgroup	Experimental n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Goode 2009	2/70	0/68		4.86 [0.24, 99.39]
Yamanishi 2006	2/26	4/30		0.58 [0.11, 2.90]



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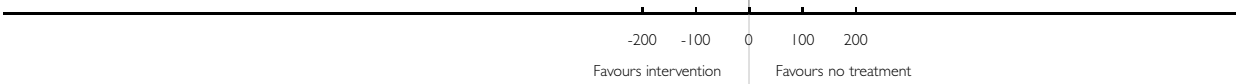
Analysis 2.4. Comparison 2 Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment, Outcome 4 24 hour pad test (grams of urine lost).

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 2 Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment

Outcome: 4 24 hour pad test (grams of urine lost)

Study or subgroup	PFMT + extra stimulation N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 less than 3 months							
Moore 1999	19	156 (168)	21	104 (176)		69.9 %	52.00 [-54.64, 158.64]
Yamanishi 2006	26	210 (261)	30	423 (357)		30.1 %	-213.00 [-375.43, -50.57]
Subtotal (95% CI)	**45**		**51**			**100.0 %**	**-27.82 [-116.97, 61.33]**
Heterogeneity: Chi^2 = 7.14, df = 1 (P = 0.01); I^2 =86%							
Test for overall effect: Z = 0.61 (P = 0.54)							
2 within 3-6 months							
Moore 1999	19	202 (242)	21	67 (137)		54.6 %	135.00 [11.41, 258.59]
Yamanishi 2006	24	81 (140)	29	232 (339)		45.4 %	-151.00 [-286.50, -15.50]
Subtotal (95% CI)	**43**		**50**			**100.0 %**	**5.12 [-86.19, 96.43]**
Heterogeneity: Chi^2 = 9.34, df = 1 (P = 0.002); I^2 =89%							
Test for overall effect: Z = 0.11 (P = 0.91)							
3 within 6-12 months							
Moore 1999	19	98 (132)	21	54 (103)		70.5 %	44.00 [-29.92, 117.92]
Yamanishi 2006	23	20 (49)	26	132 (293)		29.5 %	-112.00 [-226.39, 2.39]
Subtotal (95% CI)	**42**		**47**			**100.0 %**	**-1.95 [-64.03, 60.13]**
Heterogeneity: Chi^2 = 5.04, df = 1 (P = 0.02); I^2 =80%							
Test for overall effect: Z = 0.06 (P = 0.95)							
4 after first year							
Yamanishi 2006	22	18 (49)	25	98 (277)		100.0 %	-80.00 [-190.50, 30.50]
Subtotal (95% CI)	**22**		**25**			**100.0 %**	**-80.00 [-190.50, 30.50]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.42 (P = 0.16)							
Test for subgroup differences: Chi^2 = 1.76, df = 3 (P = 0.62), I^2 =0.0%							



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Analysis 2.5. Comparison 2 Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment, Outcome 5 Urinary Incontinence Score (ICIQ-short form UI score).

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 2 Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment

Outcome: 5 Urinary Incontinence Score (ICIQ-short form UI score)

Study or subgroup	PFMT + extra stimulation N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 less than 3 months						
Yamanishi 2006	26	10.6 (6)	30	14.9 (4.9)		-4.30 [-7.20, -1.40]
2 within 3-6 months						
Yamanishi 2006	24	5.8 (5.7)	29	11.2 (5.7)		-5.40 [-8.48, -2.32]
3 within 6-12 months						
Yamanishi 2006	23	4.3 (6.2)	26	8.2 (5.3)		-3.90 [-7.15, -0.65]
4 after first year						
Yamanishi 2006	22	4.2 (6.2)	25	5.6 (6.5)		-1.40 [-5.03, 2.23]



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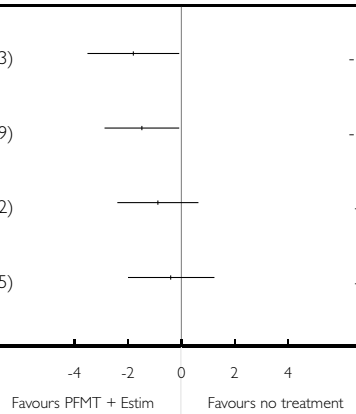
Analysis 2.6. Comparison 2 Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment, Outcome 6 Urinary Incontinence Quality of Life Score (ICIQ-short form).

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 2 Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment

Outcome: 6 Urinary Incontinence Quality of Life Score (ICIQ-short form)

Study or subgroup	PFMT + extra stimulation N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 less than 3 months						
Yamanishi 2006	26	4.2 (3.5)	30	6 (3)		-1.80 [-3.52, -0.08]
2 within 3-6 months						
Yamanishi 2006	24	2.2 (2.3)	29	3.7 (2.9)		-1.50 [-2.90, -0.10]
3 within 6-12 months						
Yamanishi 2006	23	1.6 (3.1)	26	2.5 (2.2)		-0.90 [-2.42, 0.62]
4 after first year						
Yamanishi 2006	22	1.5 (3.1)	25	1.9 (2.5)		-0.40 [-2.02, 1.22]



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Analysis 2.7. Comparison 2 Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment, Outcome 7 Time until continent (months).

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 2 Treatment of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment

Outcome: 7 Time until continent (months)

Study or subgroup	PFMT + extra stimulation N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Yamanishi 2006	22	2.71 (2.6)	25	6.82 (3.9)		-4.11 [-5.99, -2.23]



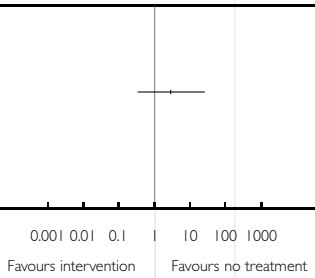
Analysis 4.1. Comparison 4 Treatment of UI after radical prostatectomy: combinations of treatments versus no treatment /sham treatment, Outcome 1 Number of incontinent men: PFMT + anal Estim + Biofeedback vs no treatment.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 4 Treatment of UI after radical prostatectomy: combinations of treatments versus no treatment /sham treatment

Outcome: 1 Number of incontinent men: PFMT + anal Estim + Biofeedback vs no treatment

Study or subgroup	PFMT + anal Estim + BFB n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 less than 3 months				
2 within 3-6 months				
Opsomer 1994	3/20	1/19		2.85 [0.32, 25.07]
3 within 6-12 months				
4 after 12 months				



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Analysis 5.1. Comparison 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 1 Number of incontinent men at < 3 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 1 Number of incontinent men at < 3 months

Study or subgroup	Treatment A n/N	Treatment B n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
1 PFMT + Anal EStim vs PFMT alone					
Goode 2009	58/70	59/70		82.7 %	0.98 [0.85, 1.14]
Moore 1999	11/19	12/18		17.3 %	0.87 [0.52, 1.44]
Subtotal (95% CI)	**89**	**88**		**100.0 %**	**0.96 [0.83, 1.12]**
Total events: 69 (Treatment A), 71 (Treatment B)					
Heterogeneity: Chi^2 = 0.24, df = 1 (P = 0.63); I^2 =0.0%					
Test for overall effect: Z = 0.50 (P = 0.62)					
2 PFMT + BF vs PFMT alone					
Subtotal (95% CI)	**0**	**0**			**Not estimable**
Total events: 0 (Treatment A), 0 (Treatment B)					
Heterogeneity: not applicable					
Test for overall effect: not applicable					



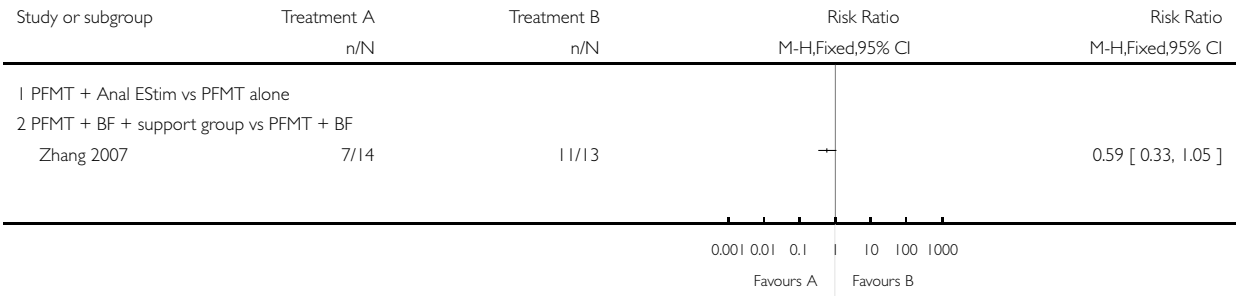
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Analysis 5.2. Comparison 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 2 Number of incontinent men at 3 to 6 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 2 Number of incontinent men at 3 to 6 months

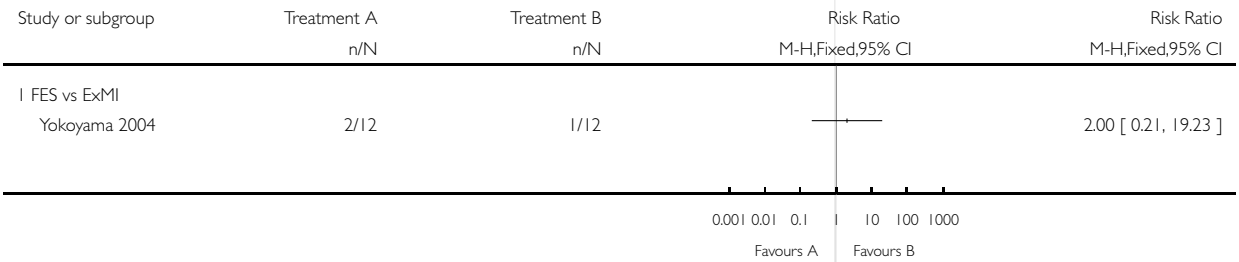


Analysis 5.3. Comparison 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 3 Number of incontinent men at 6 to 12 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 3 Number of incontinent men at 6 to 12 months



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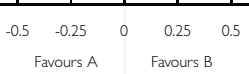
Analysis 5.4. Comparison 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 4 Number of incontinence episodes at < 3 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 4 Number of incontinence episodes at < 3 months

Study or subgroup	Treatment A N	Mean(SD)	Treatment B N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 PFMT + anal EStim vs PFMT alone						
Goode 2009	54	1.71 (0.54)	58	1.86 (0.56)		-0.15 [-0.35, 0.05]



Analysis 5.5. Comparison 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 5 Quality of Life Score (severity of UI) at 3 to 6 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 5 Quality of Life Score (severity of UI) at 3 to 6 months

Study or subgroup	Treatment A N	Mean(SD)	Treatment B N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 PFMT + BF + support group vs PFMT + BF						
Zhang 2007	14	3.21 (2.04)	15	4.65 (2.04)		-1.44 [-2.93, 0.05]



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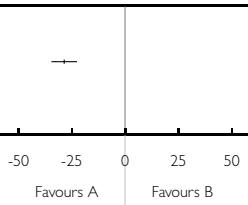
Analysis 5.6. Comparison 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 6 Quality of Life Score (I-QoL) at 6 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 6 Quality of Life Score (I-QoL) at 6 months

Study or subgroup	Treatment A N	Mean(SD)	Treatment B N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 PFMT + BF + EStim vs PFMT						
Seleme 2008	44	-80.32 (7.01)	32	-51.69 (16.17)		-28.63 [-34.60, -22.66]



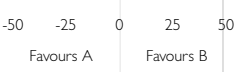
Analysis 5.7. Comparison 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 7 Quality of Life Score (ICI-Q-SF) at 6 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 7 Quality of Life Score (ICI-Q-SF) at 6 months

Study or subgroup	Treatment A N	Mean(SD)	Treatment B N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 PFMT + ExMI vs PFMT							
Liu 2008	12	6.7 (1.2)	12	8.3 (1.6)		100.0 %	-1.60 [-2.73, -0.47]
Subtotal (95% CI)	**12**		**12**			**100.0 %**	**-1.60 [-2.73, -0.47]**
Heterogeneity: not applicable							
Test for overall effect: Z = 2.77 (P = 0.0056)							
Test for subgroup differences: Not applicable							



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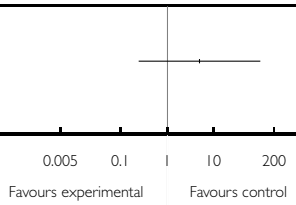
Analysis 5.8. Comparison 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 8 Adverse events.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 8 Adverse events

Study or subgroup	PFMT +/- biofeed-back n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 PFMT + Anal EStim vs PFMT alone				
Goode 2009	2/70	0/70		5.00 [0.24, 102.30]



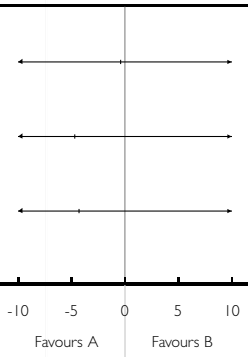
Analysis 5.9. Comparison 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 9 1 hour pad test (grams of urine lost): at < 3 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 9 1 hour pad test (grams of urine lost): at < 3 months

Study or subgroup	Treatment A N	Mean(SD)	Treatment B N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 PFMT + anal EStim vs PFMT alone						
Hoffman 2005	59	89.6 (89.5)	60	90 (111.8)		-0.40 [-36.76, 35.96]
2 PFMT + perineal EStim vs PFMT alone						
Hoffman 2005	59	85.3 (100.6)	60	90 (111.8)		-4.70 [-42.90, 33.50]
3 PFMT + perineal EStim vs PFMT + anal EStim						
Hoffman 2005	59	85.3 (100.6)	59	89.6 (89.5)		-4.30 [-38.66, 30.06]



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Analysis 5.10. Comparison 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 10 24 hour pad test (grams of urine lost): at < 3 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 10 24 hour pad test (grams of urine lost): at < 3 months

Study or subgroup	Treatment A N	Mean(SD)	Treatment B N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 PFMT + anal EStim vs PFMT alone						
Moore 1999	19	156 (168)	18	87 (123)		69.00 [-25.53, 163.53]
2 PFMT + visual BF vs PFMT + oral BF						
Joseph 2000	6	59 (98)	5	31 (40)		28.00 [-57.90, 113.90]



Analysis 5.11. Comparison 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 11 24 hour pad test (grams of urine lost): at 3 to 6 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 11 24 hour pad test (grams of urine lost): at 3 to 6 months

Study or subgroup	Treatment A N	Mean(SD)	Treatment B N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 PFMT + anal EStim vs PFMT alone						
Moore 1999	19	202 (242)	18	74 (131)		128.00 [3.49, 252.51]
2 PFMT + visual BF vs PFMT + oral BF						
Joseph 2000	5	4 (6)	5	0 (0)		Not estimable



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Analysis 5.12. Comparison 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 12 24 hour pad test (grams of urine lost): at 3 to 6 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 12 24 hour pad test (grams of urine lost): at 3 to 6 months

Study or subgroup	Treatment A N	Mean(SD)	Treatment B N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 PFMT + anal EStim vs PFMT alone						
Moore 1999	19	98 (132)	17	70 (114)		28.00 [-52.37, 108.37]
2 PFMT + visual BF vs PFMT + oral BF						
Joseph 2000	4	6 (10)	3	0 (0)		Not estimable
3 ExMI vs PFMT alone						
Koo 2009	16	9 (28)	16	45 (28)		-36.00 [-55.40, -16.60]



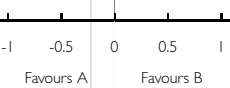
Analysis 5.13. Comparison 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 13 Pad changes over 24 hours at 3 to 6 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 13 Pad changes over 24 hours at 3 to 6 months

Study or subgroup	Treatment A N	Mean(SD)	Treatment B N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 ExMI vs PFMT alone						
Koo 2009	16	0.1 (0.42)	16	0.6 (0.42)		-0.50 [-0.79, -0.21]



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Analysis 5.14. Comparison 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 14 Number of men not carrying out sufficient PFMT at 3 to 6 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 5 Treatment of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 14 Number of men not carrying out sufficient PFMT at 3 to 6 months

Study or subgroup	Treatment A n/N	Treatment B n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 PFMT + BF + support group vs PFMT + BF				
Zhang 2007	2/14	7/13		0.27 [0.07, 1.05]



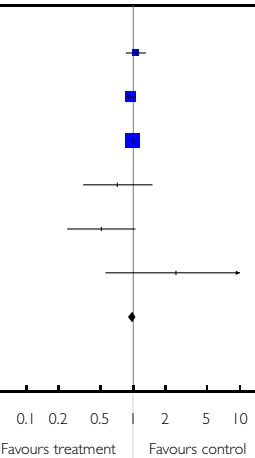
Analysis 6.1. Comparison 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 1 Number of incontinent men.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 1 Number of incontinent men

Study or subgroup	PFMT +/- BF n/N	Control n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
1 less than 3 months					
Bales 2000	38/47	38/50		11.9 %	1.06 [0.86, 1.31]
Burgio 2006	49/54	51/53		31.3 %	0.94 [0.85, 1.04]
Filocamo 2005	145/150	147/150		54.2 %	0.99 [0.95, 1.02]
Mathewson-Chapman 97	8/27	10/24		1.1 %	0.71 [0.34, 1.50]
Parekh 2003	6/19	12/19		1.1 %	0.50 [0.24, 1.05]
Tobia 2008	5/19	2/19		0.3 %	2.50 [0.55, 11.33]
Subtotal (95% CI)	**316**	**315**		**100.0 %**	**0.97 [0.90, 1.05]**
Total events: 251 (PFMT +/- BF), 260 (Control)					

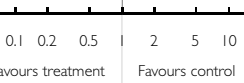


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Study or subgroup	PFMT +/- BF n/N	Control n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
Heterogeneity: Tau² = 0.00; Chi² = 7.31, df = 5 (P = 0.20); I² =32%					
Test for overall effect: Z = 0.67 (P = 0.50)					
2 within 3-6 months					
Bales 2000	20/47	19/50		3.9 %	1.12 [0.69, 1.82]
Burgio 2006	32/53	40/51		13.4 %	0.77 [0.59, 1.00]
Filocamo 2005	115/150	129/150		76.3 %	0.89 [0.80, 0.99]
Mathewson-Chapman 97	1/27	0/24		0.1 %	2.68 [0.11, 62.81]
Overgard 2008	19/35	23/40		5.6 %	0.94 [0.63, 1.41]
Parekh 2003	4/19	7/19		0.8 %	0.57 [0.20, 1.63]
Subtotal (95% CI)	**331**	**334**		**100.0 %**	**0.88 [0.80, 0.97]**
Total events: 191 (PFMT +/- BF), 218 (Control)					
Heterogeneity: Tau² = 0.0; Chi² = 3.26, df = 5 (P = 0.66); I² =0.0%					
Test for overall effect: Z = 2.57 (P = 0.010)					
3 within 6-12 months					
Bales 2000	3/47	2/50		6.4 %	1.60 [0.28, 9.13]
Burgio 2006	22/51	30/50		31.0 %	0.72 [0.49, 1.06]
Filocamo 2005	35/150	102/150		33.4 %	0.34 [0.25, 0.47]
Overgard 2008	7/34	16/38		19.8 %	0.49 [0.23, 1.04]
Parekh 2003	3/19	4/19		9.5 %	0.75 [0.19, 2.91]
Subtotal (95% CI)	**301**	**307**		**100.0 %**	**0.55 [0.34, 0.89]**
Total events: 70 (PFMT +/- BF), 154 (Control)					
Heterogeneity: Tau² = 0.16; Chi² = 11.02, df = 4 (P = 0.03); I² =64%					
Test for overall effect: Z = 2.44 (P = 0.015)					
4 after 12 months					
Filocamo 2005	16/150	49/148		84.2 %	0.32 [0.19, 0.54]
Overgard 2008	3/36	11/39		15.8 %	0.30 [0.09, 0.97]
Subtotal (95% CI)	**186**	**187**		**100.0 %**	**0.32 [0.20, 0.51]**
Total events: 19 (PFMT +/- BF), 60 (Control)					
Heterogeneity: Tau² = 0.0; Chi² = 0.02, df = 1 (P = 0.90); I² =0.0%					
Test for overall effect: Z = 4.74 (P < 0.00001)					



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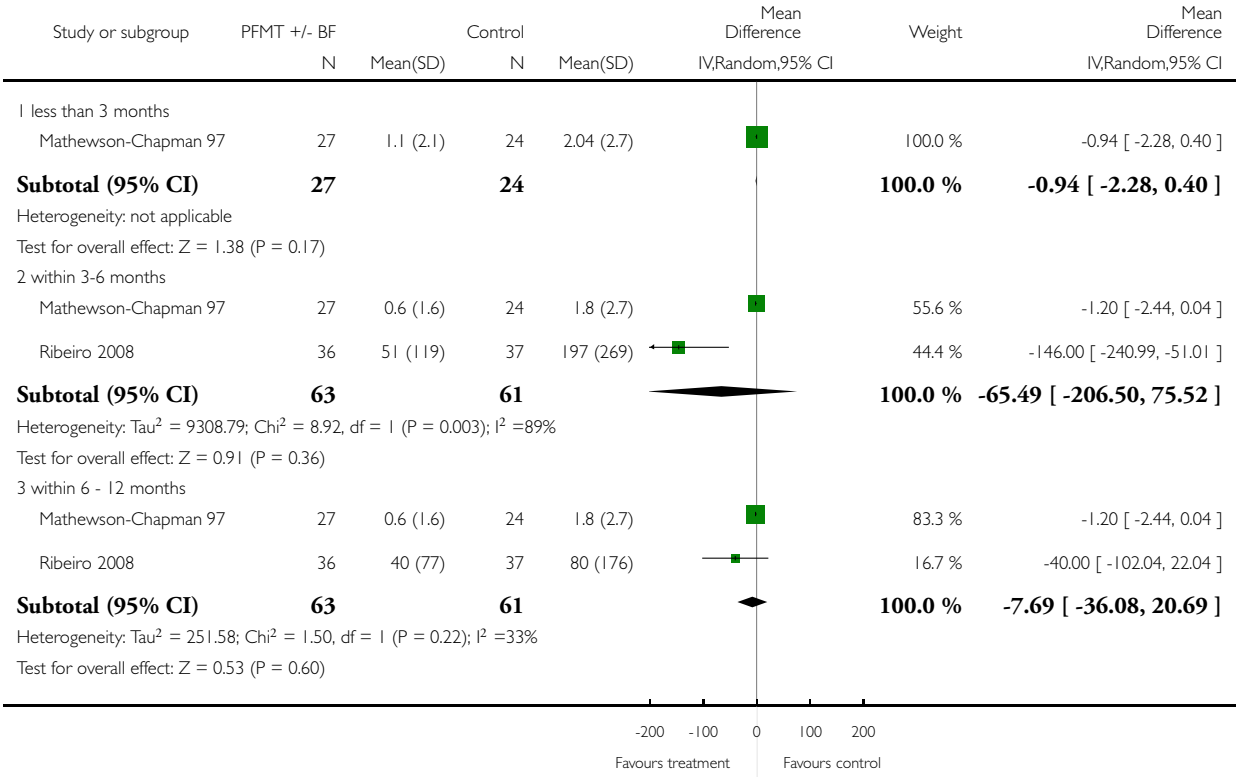
Analysis 6.2. Comparison 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 2 Pad changes over 24 hours.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 2 Pad changes over 24 hours

Study or subgroup	PFMT +/- BF N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
1 less than 3 months							
Mathewson-Chapman 97	27	1.1 (2.1)	24	2.04 (2.7)		100.0 %	-0.94 [-2.28, 0.40]
Subtotal (95% CI)	**27**		**24**			**100.0 %**	**-0.94 [-2.28, 0.40]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.38 (P = 0.17)							
2 within 3-6 months							
Mathewson-Chapman 97	27	0.6 (1.6)	24	1.8 (2.7)		55.6 %	-1.20 [-2.44, 0.04]
Ribeiro 2008	36	51 (119)	37	197 (269)		44.4 %	-146.00 [-240.99, -51.01]
Subtotal (95% CI)	**63**		**61**			**100.0 %**	**-65.49 [-206.50, 75.52]**
Heterogeneity: Tau^2 = 9308.79; Chi^2 = 8.92, df = 1 (P = 0.003); I^2 =89%							
Test for overall effect: Z = 0.91 (P = 0.36)							
3 within 6 - 12 months							
Mathewson-Chapman 97	27	0.6 (1.6)	24	1.8 (2.7)		83.3 %	-1.20 [-2.44, 0.04]
Ribeiro 2008	36	40 (77)	37	80 (176)		16.7 %	-40.00 [-102.04, 22.04]
Subtotal (95% CI)	**63**		**61**			**100.0 %**	**-7.69 [-36.08, 20.69]**
Heterogeneity: Tau^2 = 251.58; Chi^2 = 1.50, df = 1 (P = 0.22); I^2 =33%							
Test for overall effect: Z = 0.53 (P = 0.60)							



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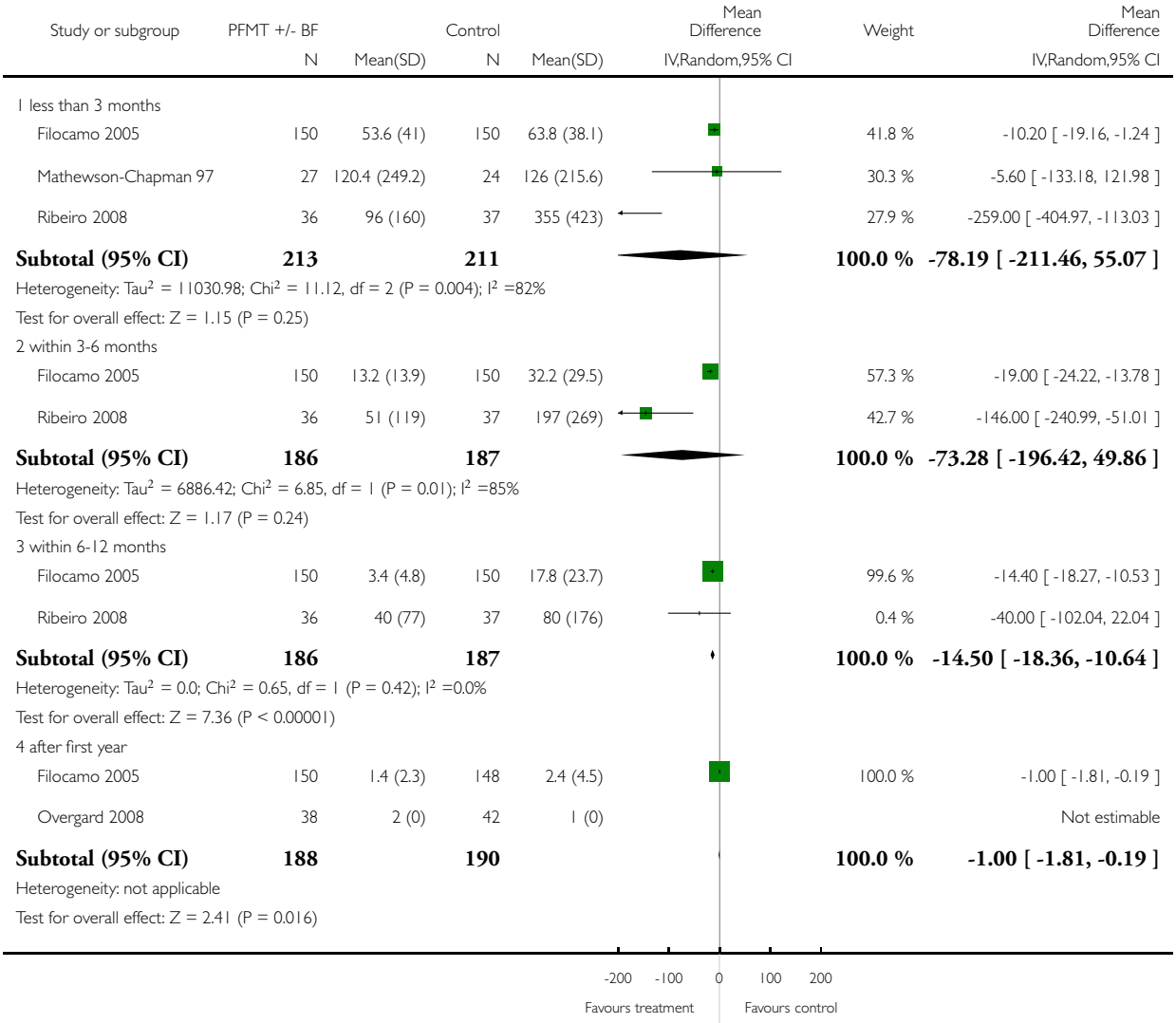
Analysis 6.3. Comparison 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 3 24 hour pad test (gm/24hrs).

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 3 24 hour pad test (gm/24hrs)

Study or subgroup	PFMT +/- BF N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
1 less than 3 months							
Filocamo 2005	150	53.6 (41)	150	63.8 (38.1)		41.8 %	-10.20 [-19.16, -1.24]
Mathewson-Chapman 97	27	120.4 (249.2)	24	126 (215.6)		30.3 %	-5.60 [-133.18, 121.98]
Ribeiro 2008	36	96 (160)	37	355 (423)		27.9 %	-259.00 [-404.97, -113.03]
Subtotal (95% CI)	**213**		**211**			**100.0 %**	**-78.19 [-211.46, 55.07]**
Heterogeneity: Tau^2 = 11030.98; Chi^2 = 11.12, df = 2 (P = 0.004); I^2 =82%							
Test for overall effect: Z = 1.15 (P = 0.25)							
2 within 3-6 months							
Filocamo 2005	150	13.2 (13.9)	150	32.2 (29.5)		57.3 %	-19.00 [-24.22, -13.78]
Ribeiro 2008	36	51 (119)	37	197 (269)		42.7 %	-146.00 [-240.99, -51.01]
Subtotal (95% CI)	**186**		**187**			**100.0 %**	**-73.28 [-196.42, 49.86]**
Heterogeneity: Tau^2 = 6886.42; Chi^2 = 6.85, df = 1 (P = 0.01); I^2 =85%							
Test for overall effect: Z = 1.17 (P = 0.24)							
3 within 6-12 months							
Filocamo 2005	150	3.4 (4.8)	150	17.8 (23.7)		99.6 %	-14.40 [-18.27, -10.53]
Ribeiro 2008	36	40 (77)	37	80 (176)		0.4 %	-40.00 [-102.04, 22.04]
Subtotal (95% CI)	**186**		**187**			**100.0 %**	**-14.50 [-18.36, -10.64]**
Heterogeneity: Tau^2 = 0.0; Chi^2 = 0.65, df = 1 (P = 0.42); I^2 =0.0%							
Test for overall effect: Z = 7.36 (P < 0.00001)							
4 after first year							
Filocamo 2005	150	1.4 (2.3)	148	2.4 (4.5)		100.0 %	-1.00 [-1.81, -0.19]
Overgard 2008	38	2 (0)	42	1 (0)			Not estimable
Subtotal (95% CI)	**188**		**190**			**100.0 %**	**-1.00 [-1.81, -0.19]**
Heterogeneity: not applicable							
Test for overall effect: Z = 2.41 (P = 0.016)							



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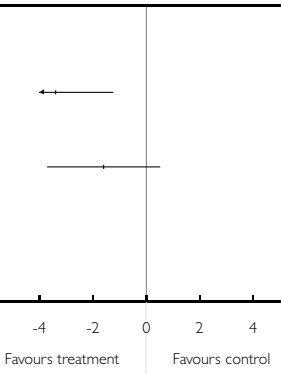
Analysis 6.4. Comparison 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 4 Urinary Incontinence Score (ICI-short form).

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 4 Urinary Incontinence Score (ICI-short form)

Study or subgroup	PFMT +/- BF N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 less than 3 months						
2 within 3-6 months						
Ribeiro 2008	36	3.4 (3.7)	37	6.8 (5.6)		-3.40 [-5.57, -1.23]
3 within 6-12 months						
Ribeiro 2008	36	2.7 (3.5)	37	4.3 (5.5)		-1.60 [-3.71, 0.51]
4 after first year						



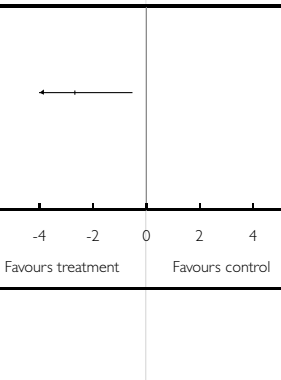
Analysis 6.5. Comparison 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 5 Quality of Life Score (IIQ).

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 5 Quality of Life Score (IIQ)

Study or subgroup	PFMT +/- BF N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 less than 3 months						
2 within 3-6 months						
Ribeiro 2008	36	1.6 (2.7)	37	4.3 (6.2)		-2.70 [-4.88, -0.52]
3 within 6-12 months						
4 after first year						



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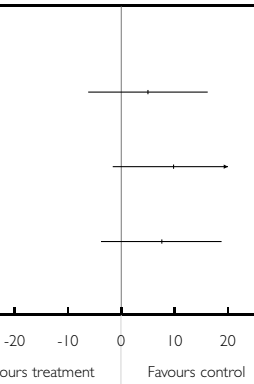
Analysis 6.6. Comparison 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 6 Pelvic floor muscle strength (anal squeeze pressure, cm H2O).

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 6 Pelvic floor muscle strength (anal squeeze pressure, cm H_2O)

Study or subgroup	PFMT +/- BF N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 less than 3 months						
2 within 3-6 months						
Overgard 2008	35	-50.7 (23.9)	40	-55.7 (25.6)		5.00 [-6.21, 16.21]
3 within 6-12 months						
Overgard 2008	34	-56.1 (21.7)	38	-65.8 (27)		9.70 [-1.56, 20.96]
4 after first year						
Overgard 2008	36	-64 (24)	39	-71.5 (26.2)		7.50 [-3.86, 18.86]



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Analysis 6.7. Comparison 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 7 Number of men not carrying out sufficient PFMT.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 7 Number of men not carrying out sufficient PFMT

Study or subgroup	PFMT +/- BF n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 less than 3 months				
2 within 3-6 months				
Overgard 2008	3/35	18/40		0.19 [0.06, 0.59]
3 within 6-12 months				
Overgard 2008	12/34	21/36		0.61 [0.36, 1.03]
4 after 12 months				
Overgard 2008	30/36	26/36		1.15 [0.90, 1.48]



Analysis 6.8. Comparison 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 8 Number of men having surgery for incontinence.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 6 Prevention of UI after radical prostatectomy: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 8 Number of men having surgery for incontinence

Study or subgroup	PFMT +/- BF n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Filocamo 2005	2/150	3/148		0.66 [0.11, 3.88]



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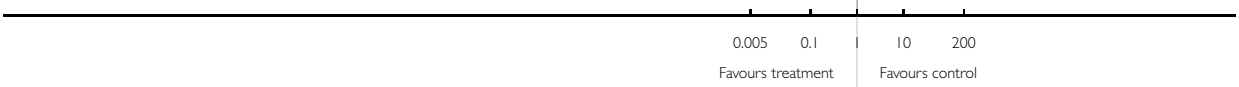
Analysis 7.1. Comparison 7 Prevention of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment, Outcome 1 Number of incontinent men.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 7 Prevention of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment

Outcome: 1 Number of incontinent men

Study or subgroup	PFMT + EStim + BF n/N	Control n/N	Risk Ratio M-H,Random,95% CI	Risk Ratio M-H,Random,95% CI
1 less than 3 months				
2 within 3-6 months				
Mariotti 2009	6/30	20/30		0.30 [0.14, 0.64]
3 within 6-12 months				
Mariotti 2009	1/30	10/30		0.10 [0.01, 0.73]
4 after 12 months				



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Analysis 7.2. Comparison 7 Prevention of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment, Outcome 2 24 hour pad test (gm/24hrs).

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 7 Prevention of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment

Outcome: 2 24 hour pad test (gm/24hrs)

Study or subgroup	PFMT + EStim + BF		Control		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Fixed,95% CI	IV,Fixed,95% CI
1 less than 3 months						
2 within 3-6 months						
Mariotti 2009	30	6.7 (30.6)	30	136.7 (152.6)		-130.00 [-185.69, -74.31]
3 within 6-12 months						
Mariotti 2009	30	3.5 (14.7)	30	27.8 (56)		-24.30 [-45.02, -3.58]
4 after first year						



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Analysis 7.3. Comparison 7 Prevention of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment, Outcome 3 Time until continent (months).

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 7 Prevention of UI after radical prostatectomy: electric or magnetic energy (e.g. anal electrical stimulation (EStim) / perineal electrical stimulation / transcutaneous electrical nerve stimulation (TENS) / extracorporeal magnetic innervation (ExMI)) versus no treatment/ sham treatment

Outcome: 3 Time until continent (months)

Study or subgroup	PFMT + EStim + BF N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Mariotti 2009	30	2 (1.6)	30	3.5 (2.1)		-1.50 [-2.44, -0.56]



Analysis 10.1. Comparison 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 1 Number of incontinent men at < 3months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 1 Number of incontinent men at < 3months

Study or subgroup	PFMT pre and post op n/N	PFMT post op n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 PFMT pre and post op vs PFMT post op				
Centemero 2009	29/50	41/50		0.71 [0.54, 0.93]



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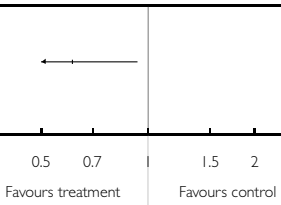
Analysis 10.2. Comparison 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 2 Number of incontinent men at 3 to 6 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 2 Number of incontinent men at 3 to 6 months

Study or subgroup	PFMT pre and post op n/N	PFMT post op n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 PFMT pre and post op vs PFMT post op				
Centemero 2009	19/50	31/50		0.61 [0.40, 0.93]



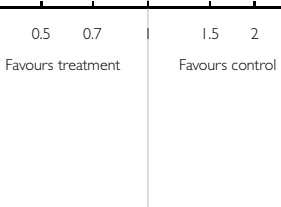
Analysis 10.3. Comparison 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 3 No. with severe incontinence (e.g. pad test weight >150g) at < 3 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 3 No. with severe incontinence (e.g. pad test weight >150g) at < 3 months

Study or subgroup	PFMT pre and post op n/N	PFMT post op n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 PFMT pre and post op vs PFMT post op				
Centemero 2009	15/50	20/50		0.75 [0.44, 1.29]



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Analysis 10.4. Comparison 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 4 No. with severe incontinence (e.g. pad test weight >150g) at 3 to 6 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 4 No. with severe incontinence (e.g. pad test weight >150g) at 3 to 6 months

Study or subgroup	PFMT pre and post op n/N	PFMT post op n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 PFMT pre and post op vs PFMT post op				
Centemero 2009	10/50	16/50		0.63 [0.31, 1.24]



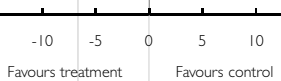
Analysis 10.5. Comparison 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 5 20 minute pad test (grams of urine lost): PFMT + anal Estim vs PFMT at 3 to 6 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 5 20 minute pad test (grams of urine lost): PFMT + anal Estim vs PFMT at 3 to 6 months

Study or subgroup	PFMT + anal E stim N	Mean(SD)	PFMT N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 PFMT + anal EStim vs PFMT alone						
Wille 2003	26	4.7 (10)	27	9.74 (22.1)		-5.04 [-14.22, 4.14]
2 PFMT + anal EStim + BF vs PFMT alone						
Wille 2003	26	4.45 (12.4)	27	9.74 (22.1)		-5.29 [-14.89, 4.31]
3 PFMT + anal EStim vs PFMT + anal EStim + BF						
Wille 2003	26	4.7 (10)	26	4.45 (12.4)		0.25 [-5.87, 6.37]



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Analysis 10.6. Comparison 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 6 20 minute pad test (grams of urine lost): PFMT + anal Estim vs PFMT at 6 to 12 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 6 20 minute pad test (grams of urine lost): PFMT + anal Estim vs PFMT at 6 to 12 months

Study or subgroup	PFMT + anal E stim N	Mean(SD)	PFMT N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 PFMT + anal EStim vs PFMT alone						
Wille 2003	39	0.39 (0.5)	41	3.7 (9)		-3.31 [-6.07, -0.55]
2 PFMT + anal EStim + BF vs PFMT alone						
Wille 2003	44	0.43 (0.66)	41	3.7 (9)		-3.27 [-6.03, -0.51]
3 PFMT + anal EStim vs PFMT + anal EStim + BF						
Wille 2003	39	0.39 (0.5)	44	0.43 (0.66)		-0.04 [-0.29, 0.21]



Analysis 10.7. Comparison 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 7 Quality of Life Score (ICS male short form) at < 3 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 7 Quality of Life Score (ICS male short form) at < 3 months

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 PFMT pre and post op vs PFMT post op						
Centemero 2009	50	16 (7.75)	50	18 (7.75)		-2.00 [-5.04, 1.04]



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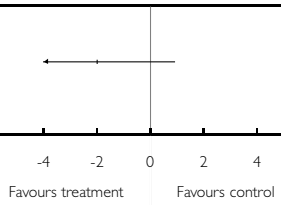
Analysis 10.8. Comparison 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment, Outcome 8 Quality of Life Score (ICS male short form) at 3 to 6 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 10 Prevention of UI after radical prostatectomy: one treatment versus another active treatment

Outcome: 8 Quality of Life Score (ICS male short form) at 3 to 6 months

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 PFMT pre and post op vs PFMT post op						
Centemero 2009	50	15 (7.41)	50	17 (7.41)		-2.00 [-4.90, 0.90]



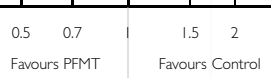
Analysis 11.1. Comparison 11 Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 1 Number of incontinent men.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 11 Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 1 Number of incontinent men

Study or subgroup	PFMT n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 less than 3 months				
Glazener TURP 2011	142/205	132/208		1.09 [0.95, 1.25]
2 within 3-6 months				
Glazener TURP 2011	140/199	129/201		1.10 [0.96, 1.26]
3 within 6-12 months				
Glazener TURP 2011	133/197	131/202		1.04 [0.90, 1.20]
4 after 12 months				
Glazener TURP 2011	126/194	125/203		1.05 [0.91, 1.23]



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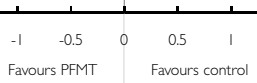
Analysis 11.2. Comparison 11 Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 2 Number of incontinence episodes per day.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 11 Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 2 Number of incontinence episodes per day

Study or subgroup	PFMT +/- biofeed-back N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 less than 3 months						
Glazener TURP 2011	182	1.31 (2.2)	184	1.4 (2.5)		-0.09 [-0.57, 0.39]
2 within 3-6 months						
Glazener TURP 2011	184	1.1 (2)	181	1.4 (2.6)		-0.30 [-0.78, 0.18]
3 within 6-12 months						
Glazener TURP 2011	177	1.2 (2.5)	182	1.31 (2.3)		-0.11 [-0.61, 0.39]
4 after first year						
Glazener TURP 2011	175	1.4 (2.3)	179	1.2 (2.2)		0.20 [-0.27, 0.67]



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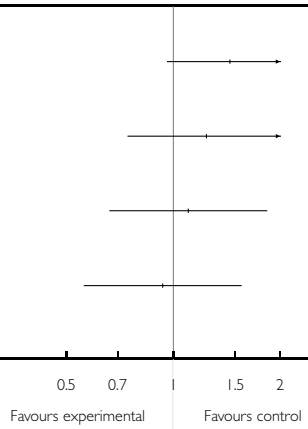
Analysis 11.3. Comparison 11 Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 3 Number of men using pads.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 11 Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 3 Number of men using pads

Study or subgroup	PFMT +/- biofeed-back n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 less than 3 months				
Glazener TURP 2011	45/153	30/147		1.44 [0.96, 2.16]
2 within 3-6 months				
Glazener TURP 2011	27/150	21/145		1.24 [0.74, 2.10]
3 within 6-12 months				
Glazener TURP 2011	25/135	23/137		1.10 [0.66, 1.84]
4 after 12 months				
Glazener TURP 2011	24/146	24/136		0.93 [0.56, 1.56]



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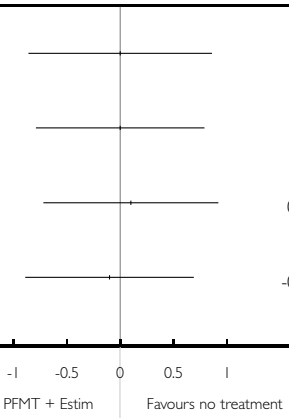
Analysis 11.4. Comparison 11 Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 4 Urinary Incontinence Score (ICI-short form).

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 11 Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 4 Urinary Incontinence Score (ICI-short form)

Study or subgroup	PFMT + extra stimulation N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 less than 3 months						
Glazener TURP 2011	201	4.6 (4)	203	4.6 (4.8)		0.0 [-0.86, 0.86]
2 within 3-6 months						
Glazener TURP 2011	199	4.1 (3.7)	201	4.1 (4.3)		0.0 [-0.79, 0.79]
3 within 6-12 months						
Glazener TURP 2011	193	4.2 (4)	198	4.1 (4.3)		0.10 [-0.72, 0.92]
4 after first year						
Glazener TURP 2011	194	3.9 (3.7)	203	4 (4.3)		-0.10 [-0.89, 0.69]



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Analysis 11.5. Comparison 11 Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 5 Quality of life related to urinary incontinence.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 11 Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 5 Quality of life related to urinary incontinence

Study or subgroup	PFMT +/- biofeed-back N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 less than 3 months						
Glazener TURP 2011	201	1.5 (2.1)	203	1.6 (2.5)		-0.10 [-0.55, 0.35]
2 within 3-6 months						
Glazener TURP 2011	194	1.2 (1.9)	198	1.4 (2.3)		-0.20 [-0.62, 0.22]
3 within 6-12 months						
Glazener TURP 2011	193	1.3 (2.2)	198	1.4 (2.3)		-0.10 [-0.55, 0.35]
4 after first year						
Glazener TURP 2011	190	1.2 (1.9)	199	1.3 (2.2)		-0.10 [-0.51, 0.31]



Analysis 11.6. Comparison 11 Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 6 Number of men with erectile dysfunction (no erection) at 12 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 11 Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 6 Number of men with erectile dysfunction (no erection) at 12 months

Study or subgroup	PFMT +/- biofeed-back n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Glazener TURP 2011	52/177	43/178		1.22 [0.86, 1.72]



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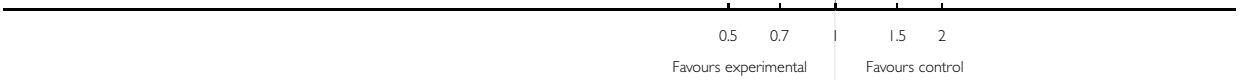
Analysis 11.7. Comparison 11 Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 7 Number of men not carrying out pelvic floor muscle contractions at 12 months.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 11 Treatment of UI after TURP: PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 7 Number of men not carrying out pelvic floor muscle contractions at 12 months

Study or subgroup	PFMT +/- biofeed-back n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Glazener TURP 2011	66/188	154/193	←	0.44 [0.36, 0.54]



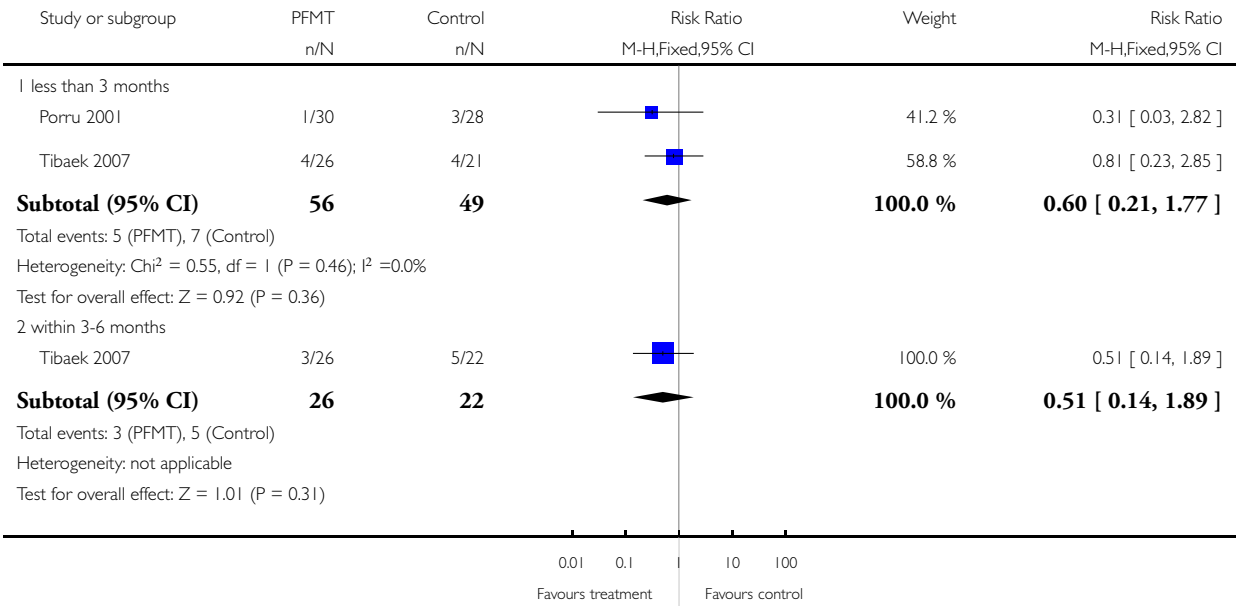
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Analysis 16.1. Comparison 16 Prevention of UI after TURP: pre or post-operative PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction, Outcome 1 Number of incontinent men.

Review: Conservative management for postprostatectomy urinary incontinence

Comparison: 16 Prevention of UI after TURP: pre or post-operative PFMT +/- biofeedback versus no treatment or sham therapy or verbal instruction

Outcome: 1 Number of incontinent men



Analysis 21.1. Comparison 21 Containment of urinary incontinence from any cause: external penile compression devices (penile clamps) vs no treatment or sham treatment, Outcome 1 Number of men satisfied with device.

Number of men satisfied with device

Study	Control (no device)	U-Tex	C3	Cunningham
Moore 2004	0/12	0/12	2/12	10/12

Analysis 21.2. Comparison 21 Containment of urinary incontinence from any cause: external penile compression devices (penile clamps) vs no treatment or sham treatment, Outcome 2 Mean urine loss (grams of urine on pad test).

Mean urine loss (grams of urine on pad test)

Study	Control (no device)	U-Tex	C3	Cunningham

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Mean urine loss (grams of urine on pad test) (*Continued*)

Moore 2004	122.8 gm (SD 130.8)	53.3 gm (SD 65.7) P<0.05 vs Control (no device)	32.3 gm (SD 24.3) P<0.05 vs Control (no device)	17.1 gm (SD 21.3) P<0.05 vs Control (no device)

Analysis 21.3. Comparison 21 Containment of urinary incontinence from any cause: external penile compression devices (penile clamps) vs no treatment or sham treatment, Outcome 3 Penile Doppler blood flow (mean systolic velocity).

Penile Doppler blood flow (mean systolic velocity)

Study	**Control (no device)**	**U-Tex**	**C3**	**Cunningham**
Moore 2004	N=12 men R: 12.4 (SD 2.8) L: 12.3 (SD 3.0)	N=12 men R: 11.9 (SD 4.4) L: 13.8 (SD 7.3)	N=12 men R: 12.4 (SD 5.5) L: 11.7 (SD 4.7)	N=12 men R: 9.5 (SD 2.3) L: 7.3 (SD 3.0) P<0.05 vs Control (no device)

Analysis 21.4. Comparison 21 Containment of urinary incontinence from any cause: external penile compression devices (penile clamps) vs no treatment or sham treatment, Outcome 4 Penile Doppler blood flow (mean resistence to flow index).

Penile Doppler blood flow (mean resistence to flow index)

Study	**Control (no device)**	**U-Tex**	**C3**	**Cunningham**
Moore 2004	N=12 men R: 0.9 (SD 0.1) L: 0.87 (SD 0.1)	N=12 men R: 0.93 (SD 0.08) L: 0.91 (SD 0.11)	N=12 men R: 0.92 (SD 0.1) L: 0.92 (SD 0.11)	N=12 men R: 0.92 (SD 0.13) L: 0.86 (SD 0.29)

ADDITIONAL TABLES

Table 1. Details of interventions

Study ID	Intervention	Control
Bales 2000	PFMT + Biofeedback 45 minute session with nurse trained in biofeedback. Patients were instructed to perform graded PFMT. Contractions of 5-10 seconds, 10-15 repetitions were performed with biofeedback (surface electrodes used to measure muscle strength). Advised to practice the exercises 4 times per day until surgery	No biofeedback training Written and brief verbal instructions from a nurse on how to perform PFMT (isolate muscle that stops urine flow, practice 4 times per day, 10-15 repetitions)

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Table 1. Details of interventions (*Continued*)

Burgio 2006	PFMT + Biofeedback Single session of biofeedback (rectal probe to measure intra-abdominal rectal pressure and external anal sphincter contraction) assisted behavioural training. Feedback and verbal instruction used to teach control of pelvic muscles. Taught to contract sphincter during 2-10 seconds periods separated by 2-10 seconds of relaxation, dependent on ability Written instructions for daily at home practice of 45 PFM exercises daily (3 sessions of 15 exercises each time). Additionally instructed to slow or interrupt voiding once daily. Encouraged to exercise daily preoperatively, then resume when catheter removed post-operatively	Usual care of brief verbal instructions post operatively to interrupt the voiding stream plus any instruction from physician
Centemero 2009	Intervention A: PFMT both pre and post-operatively. A structured PFMT program 30 and 15 days before surgery, previous physiotherapist evaluation to provide the patients with feedback about the quality of pelvic floor muscle function, PC teste (endurance and contraction quality), breathing coordination, typify muscle contraction as tonic and modify incorrect physical attitudes. This was also repeated after the procedure Intervention B: PFMT post-operatively only	
Dubbelman 2004	Nine or less sessions of physiotherapy guided pelvic floor exercises after surgery	Exercise instruction through information folder
Filocamo 2005	Formal instruction (3 treatment sessions plus at home exercises) in PFMT using verbal explanation, palpation and visualization of the base of the penis with a mirror, in different positions and prior to sneezing, coughing or lifting	No formal instruction
Floratos 2002	Initiated after catheter removal, 15 treatment sessions (3 times per week for 30 minutes) of PFMT with EMG (surface) biofeedback in clinic	Instruction with verbal feedback and an information pamphlet with instructions to perform PFMT 50-100 times daily at home
Franke 1998	Biofeedback (perineal patch EMG) enhanced PFMT; exercise treatment sessions at 6, 7, 9, 11, and 16 weeks postoperatively	No treatment.
Goode 2009	Intervention A: Behavioural therapy with PFMT for 8 weeks Intervention B: Behavioural therapy with biofeedback and electrical stimulation for 8 weeks Behavioural therapy consisted of pelvic floor mus-	No treatment

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Table 1. Details of interventions (*Continued*)

	cle exercises and bladder control strategies in both groups	
Hoffman 2005	Intervention A: perineal E Stim plus physiotherapy (PFMT) Intervention B: anal E Stim plus physiotherapy (PFMT)	PFMT alone
Joseph 2000	Intervention A: Instruction in PFMT including biofeedback with visual feedback as well as verbal to assist in identifying and discriminating muscles Intervention B: Instruction in PFMT, squeezing of finger during digital rectal exam	
Koo 2009	ExMI, treatment sessions were for 20 minutes twice weekly for 8 weeks	PFMT alone
Liu 2008	Extracorporeal magnetic innervation (ExMI), the frequency of the pulse field was 10Hz for 10 minutes, followed by a 3 minute rest and a second treatment of 50Hz for 20 minutes. This was done twice a week	PFMT alone, instructions given to carry out 20mins x 3 a day
Manassero 2007	PFMT re-education program, verbal feedback. The training program involved active PFE. verbal feedback of the contraction was used to instruct the patients to correctly and selectively contract their pelvic muscles while relaxing the abdominal muscles. the strength of the pelvic floor muscles was measured by digital anal control using a score of 0 to 5 (0 = no contraction, 5 = good contraction against strong resistance) Initially home practice comprised 45 contractions (3 sessions of 15) per day at home, progressively increasing the number until 90 per day. This was taught by two experienced urologists	No treatment.
Mariotti 2009	PFMT plus electrical stimulation and biofeedback twice a week for 6 weeks ES - a surface electrodes was inserted into the anus and pulsed, the intensity was adequate to induce visual lifting of the levator ani and pubococcygeus muscle, considering the level of comfort to the patient Biofeedback - via surface electrodes both perineal and abdominally	Instructions to conduct PFMT - verbal and written instructions at catheter removal and follow up visits

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Table 1. Details of interventions (*Continued*)

Mathewson-Chapman 97	Pre-operatively received further instruction and practice with PME protocol Home exercises and biofeedback (anal probe) (Incare 8900); practiced at home 3 times a week, starting with daily 15 PFMT and increasing by 10 every 4 weeks to a maximum of 35 PFMT	Post-operatively no further interventions until week 5 when pelvic muscle strength was assessed
Moore 1999	Intervention A:PFMT alone Intervention B: PFMT plus rectal electrical stimulation treated by one physiotherapist 30 minutes twice a week for 12 weeks Both included home exercises 3x/day gradually working up to 30 minutes per session lying, standing, sitting; strength, endurance, speed and control with maximum contractions of 5-10 seconds, 10-20 second relaxation and 12-20 repetitions; submaximum contractions at 65-75% of maximum strength with hold 20-30 seconds and equal rest time, 8-10 repetitions; speed was sets of quick repetitive contractions in a 10 second time span; control involved gradual recruitment to maximum contraction in 3 stages with 5 second hold at each stage and a slow release with rest 15-30 seconds	oral and written information about PFMT pre and post- operatively (standard treatment)
Moore 2004	Each participant had 4 periods (each lasted 1 day) Group A: No device Group B: C3 device Group C: U-Tex device Group D: Cunningham clamp	
Moore 2008	Maximum 24 weekly, 30-minute treatment protocol (30 min biofeedback-assisted PFMT) and home exercise protocol of 2-3 times a day	Verbal and written information on PFME and weekly telephone contact by a urology nurse
Nowak 2007	Extra corporeal magnetic innervation (EXMI) based pelvic floor device	PFMT alone
Opsomer 1994;	PFMT plus biofeedback plus electrical stimulation directed by physiotherapist	PFMT on their own without medical supervision.
Overgard 2008;	Instructions on PFMT and physiotherapy, 45 minutes weekly. Patients were instructed to perform 3 sets of contractions daily at home, in either a supine, sitting or standing position. Digital anal palpation to teach correct contractions, as well as oral and written instructions DVD of instructions given to those living too far from hospital	Instructions on PFMT alone.

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Table 1. Details of interventions (*Continued*)

Parekh 2003	Two treatment sessions preoperatively. Session 1 consisted of PFMT in a hook lying position. Session 2 was on an exercise ball. Teaching methods varied and included verbal cues, visualization with an anatomical model, palpation or biofeedback with rectal probe. Post-operatively, PFMT was reviewed and participants were seen every 3 weeks for 3 months by a physiotherapist. Home exercise for 6 months or more for those requiring further physical therapy guidance	No formal education on PFMT pre-operatively, telephone or face to face follow-up at least monthly
Perissinotto 2008	Early pelvic floor rehabilitation program at home twice dally, Kegel exercises	No formal PFMT
Porru 2001	Initial visit before surgery, digital evaluation of pelvic muscle contraction strength. Verbal instruction, feedback and reinforcement on contraction was given to teach selective contraction of anal sphincter and relaxation of abdominal muscles. Verbal and written instruction given for home PFMT. Weekly digital anal reassessment and grading of pelvic muscle contraction by the therapist. Instructed to practice contractions 45 times per day (3 groups of 15 contractions)	Not specified
Ribeiro 2008	PFMT plus BF weekly for 3 months.	PFMT oral instructions only
Robinson 2008	Intervention A: Brief verbal instruction in PFMT before operation and offer of one biofeedback session at 2 months after surgery (uptake 33%) plus PFMT for four weeks with biofeedback Intervention B: Brief verbal instruction in PFMT before operation and offer of one biofeedback session at 2 months after surgery (uptake 46%)	
Robinson 2009	Intervention A: routine brief verbal and written PFMT plus one PFMT session and 3 weekly nurse phone calls Intervention B : routine brief verbal and written PFMT plus four BF enhanced PFMT sessions and 4 weekly nurse phone calls	Routine brief verbal and written PFMT.
Seleme 2008	Verbal instruction and information on PFMT plus information on life style changes. Additional 15 physiotherapy sessions consisting of intensive PFMT with BF and ES	Verbal instruction and information on PFMT plus information on life style changes

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Table 1. Details of interventions *(Continued)*

Tibaek 2007	One hour individual session with physiotherapist to teach correct contraction for PFMT, three 1 hour group lessons and home training programme	No pre operative physiotherapy. Information about anatomy and physiology and verbal instructions for 2 to 3 days after TURP in the ward
Tobia 2008	PFMT	No PFMT
van Kampen 1998	1 session of PFMT in hospital before discharge and then saw the physiotherapist for 1-2 weeks for as long as UI persisted. 90 daily home exercises sitting, standing and lying. 7 men unable to contract PFM or with weak contraction received electrical stimulation by anal probe	No formal PFMT instruction but saw the therapist at 1-2 weeks and received placebo stimulation and information about aetiology of UI
Wille 2003	Intervention A: PFMT alone Intervention B: PFMT + ES; PFMT as above plus instructed by dedicated in ES via surface anal electrode and bio-impulser (biphasic pulse with 1 second bursts, 5 second pulse width, 2 second pulse trains Intervention C: PFMT + ES + biofeedback. As above plus biofeedback (anal probe) 15 minutes twice daily for 3 months All groups: PFMT by physiotherapist, 20-30 minute sessions for 3 days, instructed to perform exercises twice daily for 3 months plus 3 week rehabilitation program after discharge. Regular interaction with health professional for 6 weeks after surgery, encouraged to performed treatment for 3 months post surgery	
Yamanishi 2006	Oral PFMT plus electrical stimulation for 15 minutes twice daily Instructed pre-operatively PFMT by nurses and continued after catheter removal	Oral PFMT plus sham device. Instructed pre-operatively PFMT by nurses and continued after catheter removal
Yokoyama 2004	Intervention A: anal electrode for 15 minutes twice a day for 1 month Intervention B: Extraxcorporeal magnetic innervation, Neocontrol system, treatment sessions 20 minutes, twice a week for 2 weeks	PFMT, digital anal teaching of correct contractions, then verbal and written instructions for home practice
Zhang 2007	PFMT plus BF using rectal electrical sensor, initial 45 minute session with physical therapist then written instructions to carry out at home three times a day for 10 minutes. Plus support group, 6 meetings in 3 months with a health psychologist	PFMT plus BF using rectal electrical sensor, initial 45 minute session with physical therapist then written instructions to carry out at home three times a day for 10 minutes

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APPENDICES

Appendix 1. Searches performed for the previous versions of this review

Details of the searches performed for previous versions of this review, up to and including 2007 (Hunter 2007) are given below.

Systematic searches of electronic bibliographic databases

MEDLINE (January 1966 to January 2006), EMBASE (January 1988 to January 2006), CINAHL (January 1982 to January 2006), PsycLIT (January 1984 to January 2006), ERIC (January 1984 to January 2006)
The following electronic bibliographic databases were searched (date search was performed: 10 January 2006):
MEDLINE - dates searched: January 1966 to January 2006;
EMBASE - dates searched: January 1988 to January 2006;
PsycLIT - dates searched: January 1984 to January 2006;
CINAHL - dates searched: January 1982 to January 2006;
ERIC - dates searched: January 1984 to January 2006.
The following search terms were used in each database (no limits were applied to the searches):
incontinence, urinary, male, postprostatectomy, stimulation, electrical stimulation, biofeedback, pelvic muscle exercises, Kegel exercises, behavioural, behaviour, behavior, therapy, behaviour modification, therapy, physiotherapy, lifestyle, weight loss, caffeine, smoking, extracorporeal magnetic innervation, external penile compression devices, continence, bladder control, quality of life, randomised (randomized) controlled trial, evaluation, effectiveness, efficacy, outcomes.

Handsearching of conference proceedings

The following conference proceedings were handsearched:

- American Urological Association (years searched: 1989-2005) Supplement to the Journal of Urology, published as a supplement.
- Society of Urologic Nurses and Associates (SUNA) (formerly American Urologic Association Allied) these abstracts are not published but are available in the SUNA office. Annual meeting (years searched: 1991 to 2003);1991-Las Vegas, NV; 1992-Washington, DC; 1993-San Antonio, TX; 1994-San Francisco, CA; 1995-Las Vegas,NV; 1996-Orlando, FL, 1997-New Orleans, LA. Biannual incontinence meeting: 1992-Tampa, Fla (1st meeting), 1994-Phoenix, 1996-Dallas, 1998-Orlando, 2000-Nashville, 2004-Chicago, 2006-NYC; Understanding urodynamics seminar:1993-Denver, CO; 1994-San Antonio, TX; 1995-Cleveland, OH; 1996-St Louis, MO.
- Wound Ostomy and Continence Nurses (years searched: 1996, 1997,1999 to 2006). Annual meeting: 1996- Seattle, WA; 1997-Nashville, TN; Incontinence meeting (biannual); 1997-Beverly Hills (1st meeting); 1999-Austin, TX. (No further Incontinence meetings.)
- International Continence Society (years searched: 1980 to 2006). Published proceedings in Neurourology and Urodynamics.

Appendix 2. Searches performed for this update of the review

Extra specific searches were also performed for this update of the review. These are detailed below:

- CINAHL on EBSCO (January 1982 to 20 November 2009) was searched on 7 December 2009;
- EMBASE on OVID (January 1980 to Week 48 2009) was searched on 3 December 2009.

The search strategies used to search these databases can be found below:
CINAHL on EBSCO (January 1982 to 20 November 2009) was searched on 7 December 2009:

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S38	S31 and S35 and S37
S37	S1 or S2 or S3 or S4 or S5 or S6 or S7 or S8 or S9 or S10 or S11 or S12 or S13 or S14 or S15 or S16 or S17 or S18 or S19 or S20 or S21 or S36
S36	TI (singl* N25 blind* OR singl* N25 mask* OR doubl* N25 blind* or doubl* N25 mask* OR trebl* N25 blind* OR trebl* N25 mask*OR tripl* N25 blind* OR tripl* N25 mask*) or AB (singl* N25 blind* OR singl* N25 mask* OR doubl* N25 blind* or doubl* N25 mask* OR trebl* N25 blind* OR trebl* N25 mask*OR tripl* N25 blind* OR tripl* N25 mask*)
S35	(S32 or S33 or S34)
S34	TI postprostat* OR AB postprostat*
S33	TI post-prostat* OR AB post-prostat*
S32	(MH "Prostatectomy")
S31	(S22 or S23 or S24 or S25 or S26 or S27 or S28 or S29 or S30)
S30	AB overactive N3 bladder*
S29	TI overactive N3 bladder*
S28	AB urin* N3 leak*
S27	TI urin* N3 leak*
S26	AB incontinen* OR continen*
S25	TI incontinen* OR continen*
S24	(MH "Incontinence")
S23	(MH "Overactive Bladder")
S22	(MH "Urinary Incontinence+")
S21	(MH "Comparative Studies")
S20	(MH "Clinical Research+")
S19	(MH "Static Group Comparison")
S18	(MH "Quantitative Studies")
S17	(MH "Crossover Design") or (MH "Solomon Four-Group Design")
S16	(MH "Factorial Design")

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(*Continued*)

S15	(MH "Community Trials")
S14	(MH "Random Sample")
S13	TI balance* N2 block* or AB balance* N2 block*
S12	TI "latin square" or AB "latin square"
S11	TI factorial or AB factorial
S10	TI clin* N25 trial* or AB clin* N25 trial*
S9	(MH "Study Design")
S8	(AB random*) OR (TI random*)
S7	(AB placebo*) OR (TI placebo*)
S6	(MH "Placebos")
S5	PT Clinical Trial
S4	(MH "Clinical Trials+")
S3	MH (random assignment) OR (crossover design)
S2	cross-over
S1	crossover

EMBASE on OVID (January 1980 to Week 48 2009) was searched on 3 December 2009:

1	Randomized Controlled Trial/
2	controlled study/
3	clinical study/
4	major clinical study/
5	prospective study/
6	meta analysis/
7	exp clinical trial/

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(*Continued*)

8	randomization/
9	crossover procedure/ or double blind procedure/ or parallel design/ or single blind procedure/
10	Placebo/
11	latin square design/
12	exp comparative study/
13	follow up/
14	pilot study/
15	family study/ or feasibility study/ or pilot study/ or study/
16	placebo$.tw.
17	random$.tw.
18	(clin$ adj25 trial$).tw.
19	((singl$ or doubl$ or trebl$ or tripl$) adj25 (blind$ or mask$)).tw
20	factorial.tw.
21	crossover.tw.
22	latin square.tw.
23	(balance$ adj2 block$).tw.
24	factorial design/
25	parallel design/
26	triple blind procedure/
27	community trial/
28	intervention study/
29	experimental study/
30	prevention study/
31	quasi experimental study/

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(*Continued*)

32	or/1-31
33	(nonhuman not human).sh.
34	32 not 33
35	exp urine incontinence/
36	incontinence/
37	overactive bladder/
38	(incontinen$ or continen$).tw.
39	(urin$ adj2 leak$).tw.
40	(overactive adj2 bladder$).tw.
41	35 or 36 or 37 or 38 or 39 or 40
42	prostatectomy/
43	post-prostat$.tw.
44	postprostat$.tw.
45	42 or 43 or 44
46	electrostimulation/ or electrostimulation therapy/
47	stimulation.mp.
48	(electric$ adj2 stimulat$).tw.
49	electrostimulat$.tw.
50	magnetotherapy/
51	exmi.tw.
52	(magnet$ adj2 (stimulat$ or innervat$)).tw.
53	feedback system/
54	biofeedback.tw.
55	pelvis floor/ or muscle training/ or pelvic floor muscle training/ or muscle exercise/ or muscle strength/

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(*Continued*)

56	(pelvi$ adj5 (exercis$ or train$)).tw.
57	pfmt.tw.
58	pfe.tw.
59	(kegel adj2 exercis$).tw.
60	behavior therapy/
61	(behavio?r$ adj3 (therap$ or train$ or treat$)).tw.
62	physiotherapy/
63	home physiotherapy/ or physiotherapy practice/
64	physiotherapist/ or physiotherapist assistant/
65	physiotherap$.tw.
66	(physi$ adj3 (therap$ or treat$)).tw.
67	lifestyle/ or lifestyle modification/
68	(lifestyle$ adj3 (chang$ or modif$)).tw.
69	(life adj2 style$ adj3 (chang$ or modif$)).tw.
70	weight reduction/
71	(weight adj3 (los$ or reduc$)).tw.
72	caffeine/
73	caffeine.tw.
74	smoking cessation/
75	smoking cessation.tw.
76	(peni$ adj3 (device$ or clamp$)).tw.
77	"quality of life"/
78	quality of life.tw.
79	or/46-78

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(*Continued*)

80	34 and 41 and 45 and 79

WHAT'S NEW

Last assessed as up-to-date: 24 August 2011.

Date	Event	Description
24 August 2011	New citation required and conclusions have changed	In this update, 18 new trials have been added (of which 1 was a previously excluded trial). The total number of trials included is now 37
24 August 2011	New search has been performed	18 new trials added

HISTORY

Protocol first published: Issue 3, 1998

Review first published: Issue 4, 1999

Date	Event	Description
16 September 2008	Amended	Converted to new review format.
21 February 2007	New citation required and conclusions have changed	Substantive amendment. In this update (Issue 2 2007) , 7 trials were added to the review. The total number of studies included was 17. In this update, comparisons were separated on the basis of type of surgery and as well whether the intervention occurred pre- or post-operatively
25 February 2004	New citation required and conclusions have changed	Substantive update Issue 2 2004. In this update, five trials were added to the review. One trial previously listed as included was excluded after attempts to contact the author to access data were unsuccessful. The total number of studies included was 10. 7 extra studies were excluded
23 January 2001	New citation required and conclusions have changed	Substantive update Issue 2 2001

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CONTRIBUTIONS OF AUTHORS

For the updates in 2004 and 2006, the original lead review author (KNM) and an additional review author (KFH) independently undertook the quality assessment, data extraction and collation. KFH took the lead in updating the text and completed the data entry, which were then checked and commented upon by the other review authors.

For the earlier versions, two of the original review authors undertook the quality assessment of the trials and the data extraction independently. This information was then collated and checked by the original lead review author (KNM) for agreement and in the few instances where this did not occur, consensus was reached after checking with the other review authors. For the 2004 and 2006 updates, KFH updated the text and entered the data. These were checked by the other review authors, whose additional comments and edits were then incorporated.

For the update in 2012, CG and SC undertook quality assessment and data abstraction for the 18 new included trials, revised the previous data as appropriate, analysed the data and wrote the review text assisted by JC. All review authors contributed to writing or editing the text of the review.

DECLARATIONS OF INTEREST

One of the reviewers (KNM) was the Chief Investigator in three of the 37 included trials. Another (CMAG) is the Chief Investigator of two newly included trials (Glazener RP 2011; Glazener TURP 2011) and KNM was a member of the research group for both trials.

SOURCES OF SUPPORT

Internal sources

- University of Alberta , Edmonton, Alberta, Canada.

External sources

- National Health Service Research and Development Programme, UK.
- Chief Scientist Office, Scottish Executive Health Department, UK.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

Trials were reclassified as treatment or prevention trials, and trials amongst men having radical prostatectomy or TURP were analysed separately. The trial of containment (penile clamps) was analysed separately from those of PFMT and its variations.

INDEX TERMS

Medical Subject Headings (MeSH)

Biofeedback, Psychology; Electric Stimulation Therapy [methods]; Erectile Dysfunction [rehabilitation]; Exercise Therapy [methods]; Magnetic Field Therapy [methods]; Pelvic Floor; Prostatectomy [*adverse effects]; Randomized Controlled Trials as Topic; Urinary Incontinence [etiology; *therapy]

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MeSH check words

Humans; Male

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